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Tools & Shops

ANNUAL ISSUE

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with the right bench**

Setting up a first shop

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**Complete guide
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- Spindle sanders
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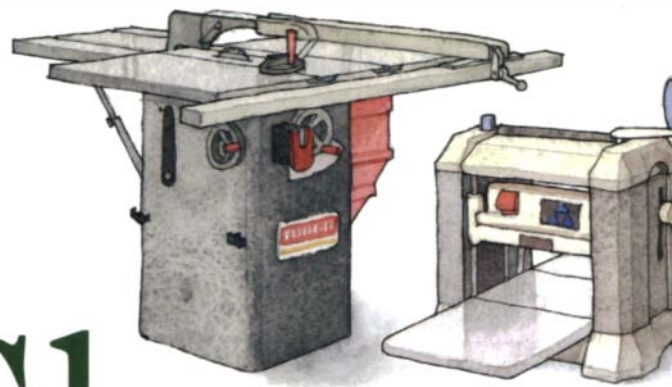
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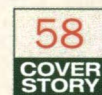
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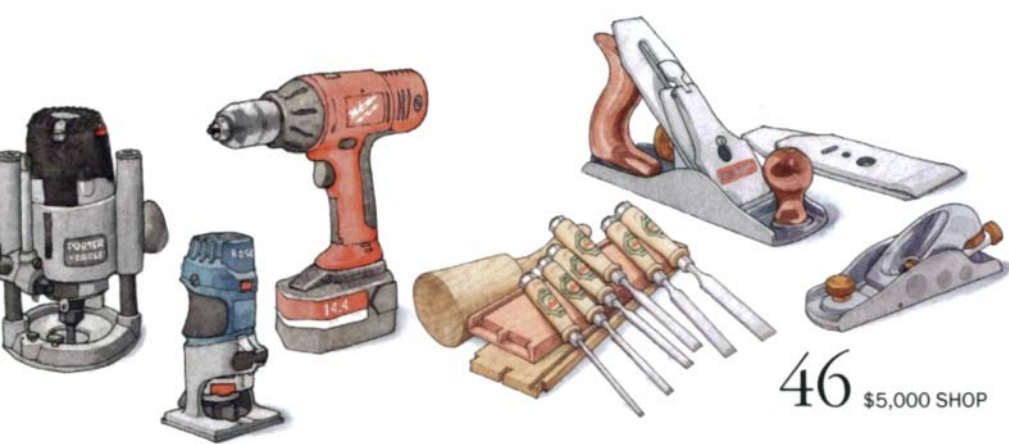


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Spindle-Sander Basics

Fine Woodworking editors discuss the anatomy and uses of an oscillating spindle sander.

New Tools for 2007

Get a peek at new power tools and machinery due out in time for the holiday shopping season.

AUDIO INTERVIEW

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VIDEOS

Box-Joint Jig

NOVEMBER 20: Gary Rogowski shares plans for his tablesaw jig and demonstrates how to use it to cut tight-fitting joinery.



Bracket Feet

DECEMBER 4: In this three-part video series, Lonnie Bird shows how to make a traditional bracket foot using hand and power tools.



TOOL SURVEY

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HOW TO CONTACT US:

Fine Woodworking

The Taunton Press, 63 S. Main St., PO Box 5506,
Newtown, CT 06470-5506 203-426-8171

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Editorial:

To contribute an article, give a tip, or ask a question, contact *Fine Woodworking* at the address above or:

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Jan Zoltowski ("Quick-to-Make Tool Cabinet") was born and raised in Poland, studying antique and art restoration at the Academy of Fine Arts in Warsaw. Disillusioned with life under communism, he defected to Italy and studied antique restoration there for two years. After emigrating to the United States several decades ago, he and an equally penniless friend took a road trip from New York to Los Angeles, heating their food on the car's engine block as they drove. He now lives in Kirkland, Wash., where he builds and restores period furniture, while his wife works at fine art restoration and repair.



After a few years of cutting off the ends of 2x4s as a carpenter, **Charles Durfee** ("Japanese-Style Dovetail Saws") began working as a boatbuilder on the coast of Maine. Not liking the cold boat shops, he moved to even colder barns to make furniture and do finish carpentry. Several years later, he managed to upgrade to a nicely heated shop in Woolwich, still near the coast, where he has built furniture and cabinets for the last 20 years.

Bob Smalser ("Get a Handle on Your Chisels") began helping in the family trades of farming, carpentry, and boatbuilding when very young. Woodworking has been at least an income supplement ever since. Smalser is experienced in conserving, restoring, and reproducing antique furniture, firearms, and traditional wooden boats. He and his wife are building a retirement home on a tree farm near Hood Canal, Wash., from woods harvested and milled on their land.



Eric Foertsch (*Shop Design*) describes himself as a self-taught weekend woodworker. He picked up the pastime 14 years ago, and he uses it as an outlet to unwind from his full-time technology-consulting business. When not in his timber-frame workshop or hunting for a new tool, he enjoys being a dad to his children, Clare and Daren.

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



Clifford A. Popejoy ("Wiring a Workshop") is a licensed electrical contractor in Sacramento, Calif. A hobbyist woodworker, he especially admires the Arts and Crafts movement and the Craftsman style in particular. He has rewired many a bungalow, and has had the privilege of working on some Greene and Greene houses. When he's not wearing his tool belt, you'll probably find him hiking the northern Sierra Nevada or the Canadian Rockies.

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From the Editor



THAT MAGIC MOMENT

I remember clearly the day I looked around my shop and realized I had everything I needed to make furniture. Before that day—before I had the equipment to mill my own stock, cut smooth curves, drill straight holes, smooth big surfaces—woodworking was a series of work-arounds. Filling my shop with tools wasn't easy. It took a few years and a significant outlay of cash.

You could bypass that whole process by going to FineWoodworking.com/ToolShop to tell us “Why I Deserve a New Shop.” We'll choose one passionate but under-equipped woodworker to receive a shop full of tools—enough for a lifetime of furniture making.

This contest is different from most. For one, we picked all the tools to give away, most of which have won high marks in our rigorous product tests. Second, the grand-prize winner also receives a contributing editor—just for a day—to help set up shop and get the tools in running order.

Even if you're not a winner, my article “Set Up Shop for \$5,000” on p. 46 explains how you can equip a modern shop on a modest budget.

We look forward to reading your stories. We'll publish the best in the magazine and online, along with a profile of the grand-prize winner.

—Asa Christiana

Kitchen-cabinet fallout continues

I am a novice woodworker—there, I said it. After finishing my first project, a computer desk with cabinets, I thought I might be ready to take on *Fine Woodworking* magazine. Until now I always felt unworthy.

I subscribe to *Fine Homebuilding*, and while I do not intend ever to build a fine home, building is my profession and I find the magazine unpretentious and full of valuable information at any skill level.

Would the sister publication be as accessible? Would all those ultraslick cover shots with unimaginably beautiful work prove too much? What secret knowledge of the highest levels of craftsmanship awaited me?

Well, the October issue looked OK—“Ten Essential Router Bits”—yeah, sure, I have been planning to buy a few soon.

“10-in Sliding Compound-Miter Saws”—OK, good, I'm thinking about an upgrade.

After first thumbing through and lusting over ads for tool companies I never knew existed, my next stop was the letters column, and what was the first letter I read? Someone wrote in to express his

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“great concern” that *FWW* would lower itself to include an article on kitchen cabinets. Not only that, he felt the drawer design was the worst in your history. Shameful! And then a letter chastising you for having a cover shot wherein a block plane was shown lying on its bed. Horrors! What scrupulous attention to detail. Was I in over my head?

I set the magazine down for a minute to consider if I should continue, and then I did, checking the miter-saw story. Beautiful layout—concise and informative. And, hey, what's this? Alongside a very fine \$500 saw is one by my favorite purveyor of bottom-end offshore floor sweepings. Oh, the letters will be pouring in. You guys are all right—I think I'm gonna subscribe.

—RANDY EISENBERG, Chico, Calif.

I just received my renewal notice, but I guess I can't continue my subscription. I just learned from Michael Dennis (“Feedback on ‘A Woodworker's Kitchen,’” Letters, *FWW* #186) that your readers are purist snobs, and that woodworking to save money is beneath them. I have been creating sawdust for over 40 years, and saving money by doing it myself has always been a motivating factor.

I am a disgrace to the fraternity. Not only have I saved \$6,000 by building my own oak kitchen cabinets, but I also have built several bathroom vanities.

I have a large bin of wood shavings next to my thickness planer; I suppose it would be best if I just lower myself into this bin and set myself on fire.

—LARRY E. MORAN, Dell Rapids, S.D.

3M abrasive film suited to sharpening

I have been using waterstones for honing for several years, and I'm tired of the mess and the constant lapping required to keep the stones flat. After trying the technique described in “Sharpen With Sandpaper” (*FWW* #184), I'm putting my stones away. I recognized the 3M films used in



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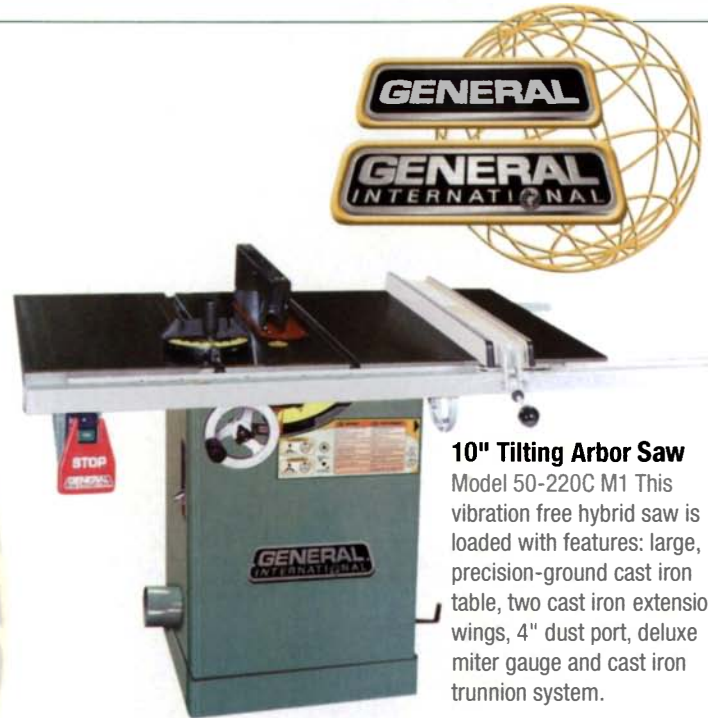
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the article; I had used them before for polishing optical fibers. I think this is the application for which they were originally designed. So alternate sources for the polishing film (often listed as “lapping film”) include vendors of fiber optics and related equipment.

—ERIC KALTENBACHER, St. Petersburg, Fla.

Why leave the scribe line on dovetails?

Why do some craftsmen (“Half-Blind Dovetails,” *FWW* #185) go through all the trouble to fashion a beautiful piece of

“ Why do some craftsmen go through all the trouble to fashion a beautiful piece of furniture only to leave the dovetail scribe line visible? ” —KEVIN JAYNES

furniture only to leave the dovetail scribe line visible? Are we to pretend we don't see it? You'd have to be half-blind. Does it add something to the effort? I have never seen this issue addressed. I find it quite puzzling that any craftsman would want to leave such evidence of the process, and actually incorporate it into the piece as though it were somehow part of the form.

—KEVIN JAYNES, Bonham, Texas

Editor replies: Some people see the line as a hallmark of handcrafted work. Others agree with you: See Q&A, p. 108.

About your safety

Working wood is inherently dangerous. Using hand or power tools improperly or ignoring standard safety practices can lead to permanent injury or even death. Don't try to perform operations you learn about here (or elsewhere) until you're certain they are safe for you. If something about an operation doesn't feel right, don't do it. Look for another way. We want you to enjoy the craft, so please keep safety foremost in your mind whenever you're in the shop.

—Asa Christiana, editor

Ball-and-claw tips

I loved the Master Class article by Eugene Landon (“Carve a Ball and Claw Foot,” *FWW* #186). I've always wanted to learn how to carve a ball-and-claw foot, and that article gave me the confidence to try a couple of test pieces in basswood. I was left with a couple of questions, though.

One, as a beginner, is it best to work on all of the feet bit by bit (e.g., work on the first quadrant of each piece before moving to the next) or should you complete the first foot before starting the

second? And two, given that basswood is very easy to carve, are there any woods that should be avoided because they are too difficult to carve or have grain patterns that do not look appealing?

—MARK STECKEL, London, Ont., Canada

Managing editor Mark Schofield

replies: I spoke to Gene Landon and he said that he does his multiple feet on an assembly-line principle, laying them all out, doing the saw cuts on all of them, etc. In this way you are much more likely to get very similar-looking feet. Regarding the species of wood to use, the easiest is mahogany, followed by cherry and then walnut, which is slightly more fibrous and sinewy. The only other wood used on historical pieces is tiger maple, the hardest wood to carve. Stay away from oak, which is both hard to carve and historically inaccurate. Good luck and I hope the feet turn out well.

Unplug router before changing bits

I have a shopmade router table with an enclosure below the table. I put a panel-raising bit into the router and was about to fit the motor back into its base under the table when I realized that I had not

removed the knock-out ring to allow for the large-diameter bit. I should have unplugged the router to change the bit. Instead I just laid the router on its side in the lower compartment. The switch hit a scrap of wood and turned on, and the router began flailing around inside the table. At least I had the presence of mind not to try to grab it. I pulled the cord.

Did I forget to say that I store the router wrenches down there? The bit had all its corners knocked off from hitting the steel wrenches. Lesson learned: Unplug the tool before changing bits or blades.

—CHARLES E. WALKER JR., Atlanta, Ga.

Krenov-style planes are customizable

I appreciated Lyn Mangiameli's insight into “Handplane Blade Angles” (A Closer Look, *FWW* #186). But the article only dealt with metal-bodied planes. Krenov-style handplanes, being shopmade, offer a unique flexibility of design. I just build planes of different bed angles, widths, and



lengths, so I can pick and choose for the exact task at hand. Also, I can sharpen all of my blades at the same angle.

—WILLIAM LOHR, Frederick, Md.

Corrections

In “Philadelphia Side Chair” (*FWW* #186), the chart for the back legs (p. 82) should read 1 sq. = 2 in.


In “Exhibition in Ebony” (back cover, *FWW* #187), the photographer's name was misspelled. It should have been Iain Gibbs.

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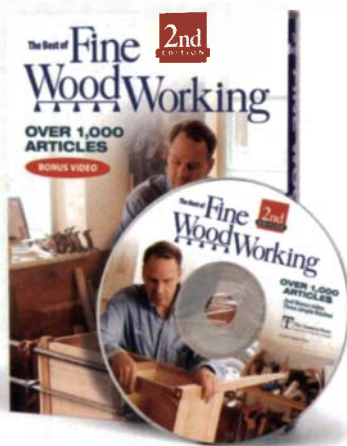




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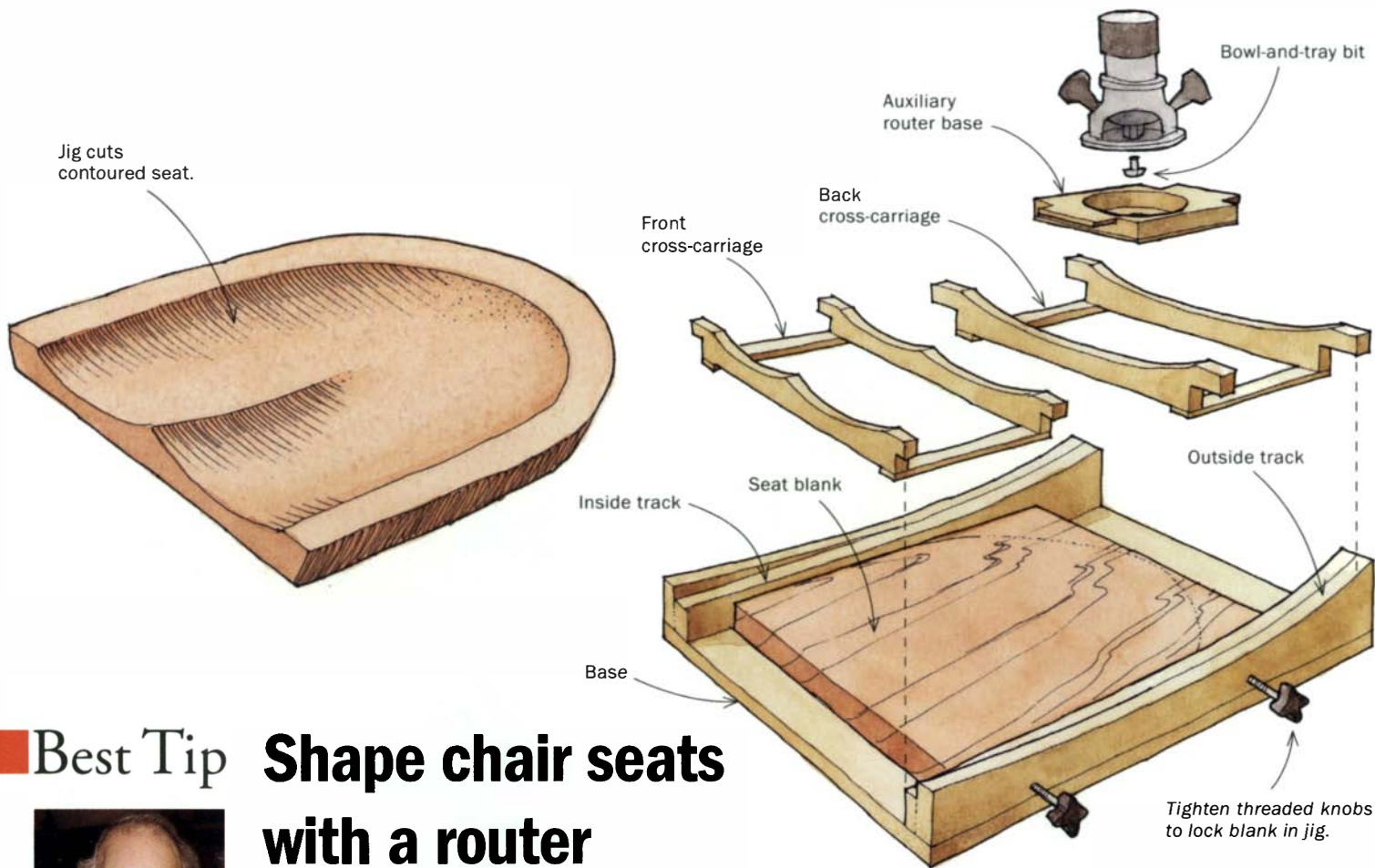
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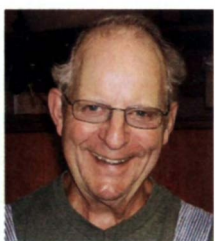
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Best Tip Shape chair seats with a router



After careers in education and real estate, Bill Garner returned full-time to woodworking, where he has concentrated on building and restoring period furniture. In a class on Windsor chair-making, he learned that making the seats by hand was labor-intensive. He built this jig to speed up the process.

The purpose of this fixture is to shape wooden chair seats so that they fit the body. The outside tracks of the base are higher at the ends and lower in the middle to match the desired profile of the chair seat. The outside tracks are used with the back cross-carriage to shape the seat's back. The inside tracks are used with the front cross-carriage to shape the pommel (front).

The back cross-carriage has a smooth concave shape and extended ears to ride on the outside tracks. The front cross-carriage has a double concave shape and shorter ears so that it rides on the inside tracks. The auxiliary router base rides on the cross-carriages.

To use the fixture, position the seat blank in the base and tighten with threaded knobs. Install a bowl-and-tray router bit (available from Amana; part No. 45986; www.amanatool.com) in your router and bolt the router to the auxiliary router base. Place the router in the back cross-carriage and adjust the depth so that the bit takes a light cut. Standing at the back of the chair seat, push the router forward to take a light cut. Step the router a small increment to one side and repeat the cut. Continue until you

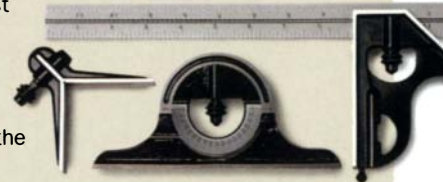
have scooped the entire seat at that depth. Now lower the bit about $\frac{1}{16}$ in. and repeat the process. Keep repeating until the depth of the scooped area is $\frac{3}{8}$ in. or more. Leave a flat area for spindle holes.

Now remove the back cross-carriage and replace it with the front cross-carriage. Repeat the process to shape the pommel at the front. While routing, it is a good idea to install a small C-clamp at the back end of a track to prevent pushing the cross-carriage off the end of the track and gouging the seat.

—BILL GARNER, Auburn, Wash.

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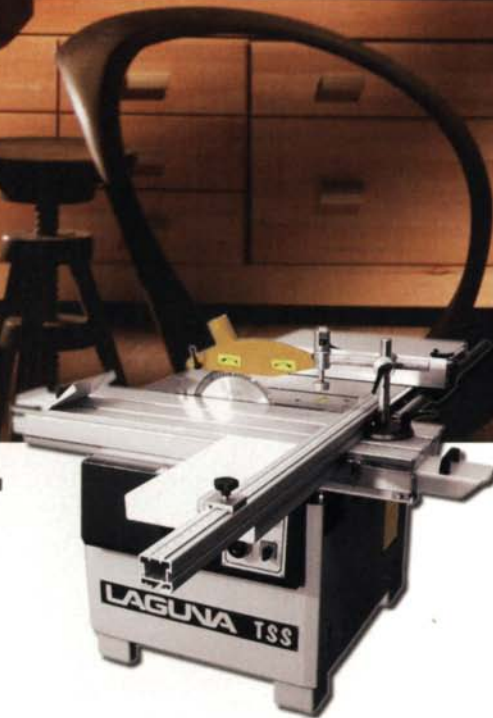
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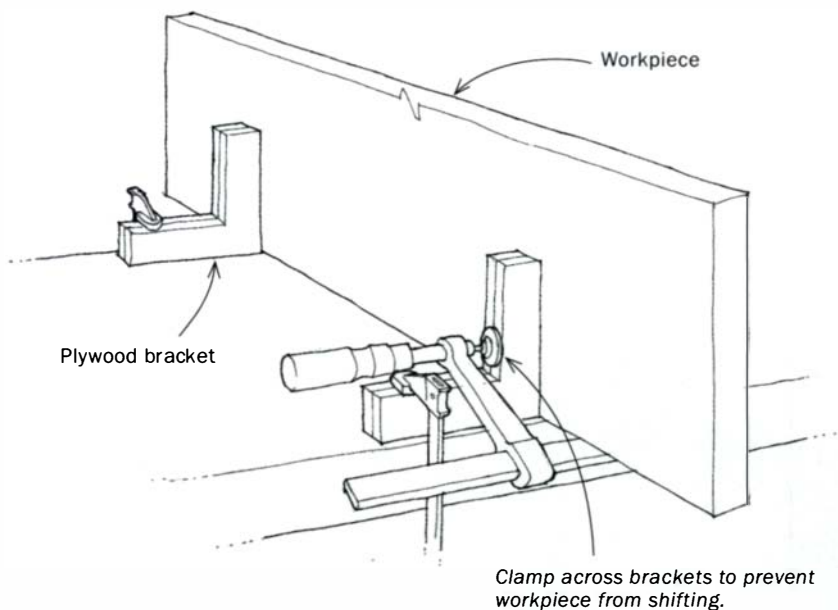
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Shopmade brackets support wide stock on edge



If you've ever tried to work on the edge of a wide door or tabletop, you know how difficult it is to secure a large, flat workpiece in the vertical position. I've found a solution in the form of some L-shaped brackets made from plywood.

To make the brackets, you need two pieces of plywood, each one measuring 8 in. wide by 16 in. long. Face-glue the two pieces, taking care to ensure that all four edges are perfectly flush. From this 1½-in.-thick lamination, lay out and cut four L shapes, making each one 2 in. wide by 8 in. long by 6 in. tall. It is imperative that all the corners be 90°.

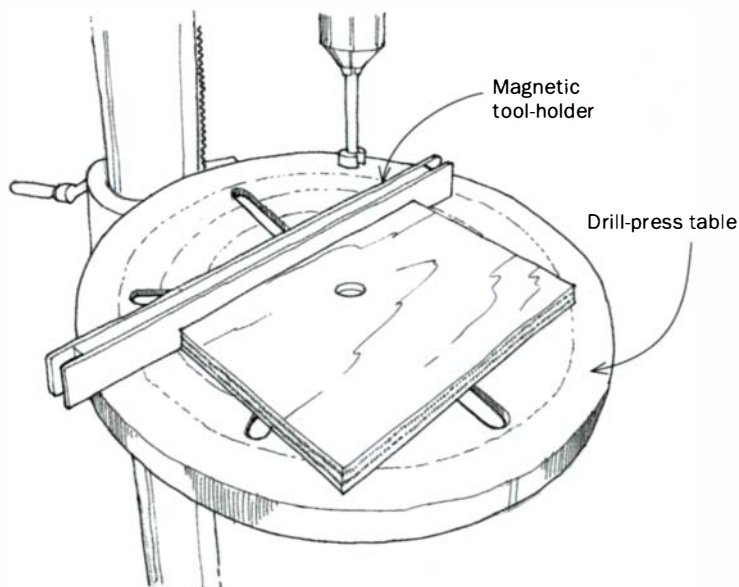
The fixtures work in pairs. Clamp one leg of each fixture to your workbench as shown, then slip the workpiece between the pairs. For a snugger fit, loosen clamps as needed and push the fixtures closer together. To prevent the workpiece from shifting, add a clamp across the fixtures.

—MICHAEL SHEVELEV, Princeton, N.J.

Magnetic drill-press fence

Rather than build a complicated auxiliary drill-press table with an adjustable fence, a simpler solution is to use a 12-in.-long magnetic tool-holder as a fence. The magnets in the tool holder are powerful and will hold the device where you put it on your drill-press table. If the tool holder by itself is not tall enough, you easily can embed it into a block of wood.

—MICHAEL WILSON, Tuscaloosa, Ala.



Quick Tip

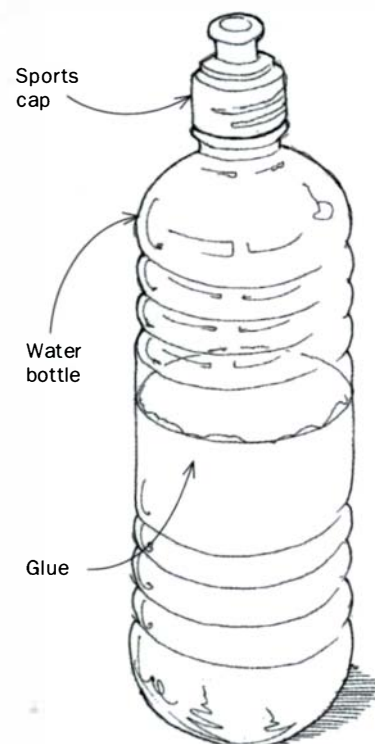
I use a block of ski wax that I bought about 10 years ago to wax the sole of a bench plane. Ski-wax blocks are nicely rectangular, very hard, and last for ages. One swipe does it.

—NIALL DUXBURY, Harrogate, U.K.

A better glue dispenser

I like to buy bulk glue to save money. In the past I transferred the glue to a small dispenser for use, the kind with a chisel tip. Over time, however, the tips on these applicators clog up and don't seal very well. When I got tired of this, I came up with the idea of using a water bottle with a sports cap. These seal well, are just the right size, and produce a thin glueline. So next time you buy a case of water, get one with sports caps, and you'll have enough ready-made glue dispensers to last several years.

—PAUL CANARIS, Waco, Texas



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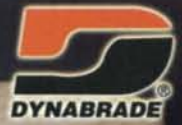
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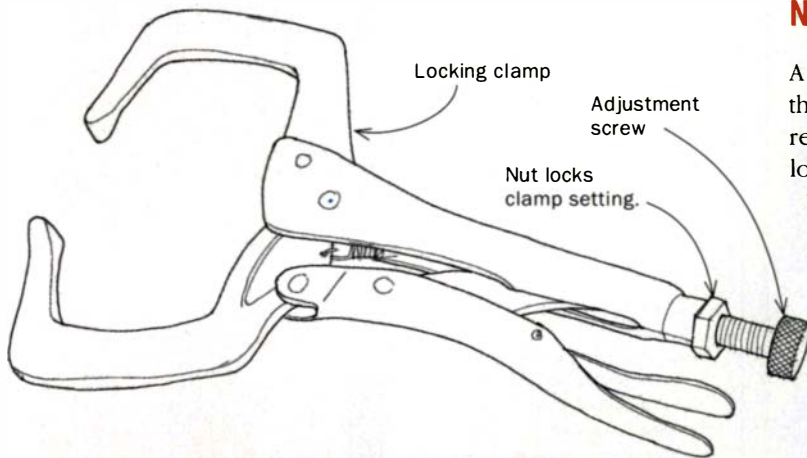
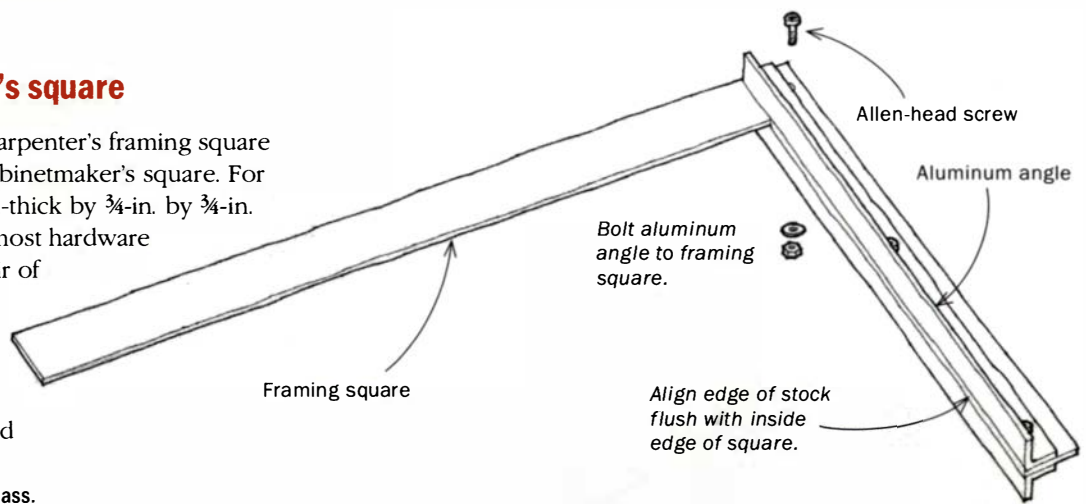
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Make a giant cabinetmaker's square

In not much more than an hour, a carpenter's framing square can be converted to a jumbo-size cabinetmaker's square. For the fence of the square, I used $\frac{1}{8}$ -in.-thick by $\frac{3}{4}$ -in. by $\frac{3}{4}$ -in. aluminum angle stock, available at most hardware stores. Cut the angle stock into a pair of 16-in. lengths. Align the angle stock so that it's flush with the inside edge of the square, and clamp the three parts together. Drill holes for three Allen-head screws, then add the screws, lock-washers, and nuts.

—BOB WEY, Westford, Mass.



Nut holds setting on locking clamp

A locking clamp is one of my most useful tools. Unfortunately, the clamp setting tends to change when the tool is used repeatedly for the same task, because the adjustment screw loosens. So, I have to constantly readjust the screw.

To solve this problem, I threaded a 7/16-14 nut onto the adjustment screw to create a locknut. Now, once I establish the needed setting for the clamp, I tighten the locknut against the tool handle and everything stays put.

By the way, I cut the nut in half, making it $\frac{3}{16}$ in. thick instead of $\frac{3}{8}$ in. thick. The thinner nut allows for a greater range of clamp adjustment.

—ROBERT C. WALKER, Harbor Springs, Mich.

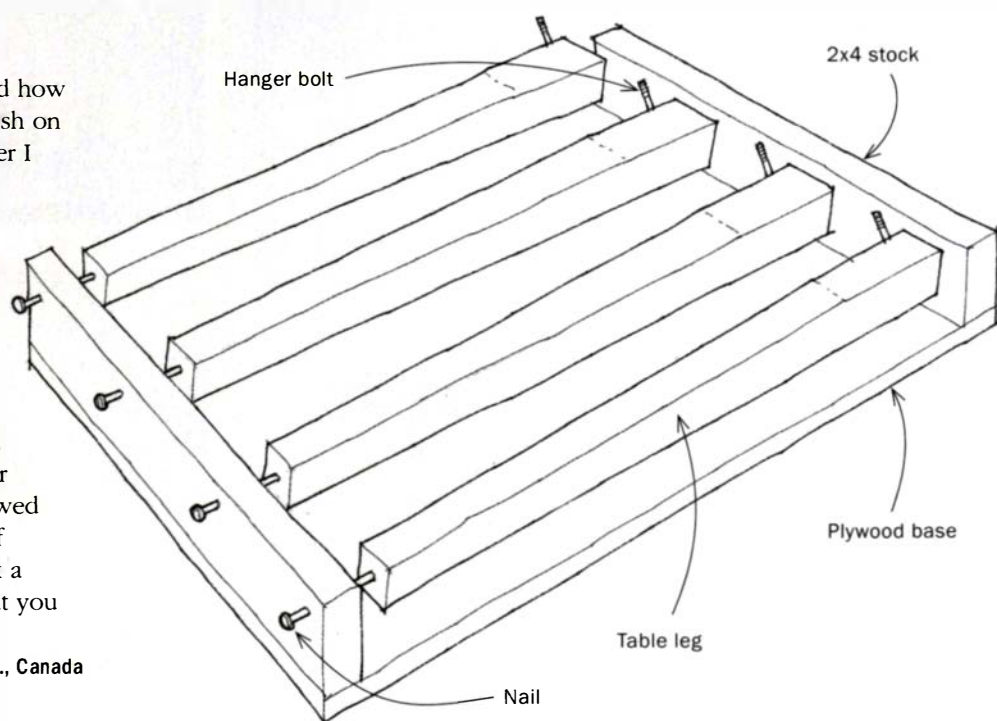
Table-leg finishing jig

Finishing some table legs recently, I discovered how difficult it can be to get a spotless, dripless finish on such parts. The project became a lot easier after I built this rack from scrap.

The rack is just two lengths of 2x4 stock screwed to a plywood base. Common nails serve as spindles. Allow about $\frac{1}{2}$ in. of clearance on either side of each leg. Drill holes the same diameter as the nails in the 2x4s at appropriate intervals. Make some indentations in the top and bottom of each leg to act as bearing points for the nails.

In my leg design, I installed hanger bolts for attaching the legs. The hanger bolts also allowed me to freely spin the legs to reach all sides. If hanger bolts are not part of your design, affix a screw in some hidden area of each leg so that you can grip the leg without touching the finish.

—BARRY BORTNICK, Calgary, Alta., Canada



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We reviewed five midi-lathes (also called mini-lathes) in 2002 (*FWW* #158, pp. 68-73), and now Rikon (model 70-100) and Steel City Tool Works (model 60100) have entered the market. Both lathes operated smoothly and accurately, so the choice came down to features and capacity. Both include faceplates and have standard #2 Morse tapers and 1-in. by 8-tpi threads. Neither offers outboard turning.

The Rikon has a 12-in. swing—2 in. more than most of the competition—a 16-in. capacity between centers, and the ability to add multiple bed extensions, for a capacity comparable to a floor-standing machine. Plus, its stock 8-in. tool rest is superior to the standard 6-in. rest on most midi-lathes.

The Rikon also features a headstock with a 12-position indexing head to assist when marking, routing, or carving on the lathe. This feature also locks the spindle for easy removal of the faceplate.

The Steel City has the advantage when it comes to speed control. It has a variable-speed drive, which I love because I can go from roughing a blank to sanding a finished piece with the turn of a dial. Rikon requires you to change speeds by moving a belt on stepped pulleys, but it takes only a moment.

Forced to pick between the two, I'd go with the Rikon because of its lower cost, big capacity, and handy features, including a helpful handle that makes the heavy lathe easier to carry than its lighter competitors.

—Matt Berger is the online managing editor.



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Motor: ½ hp, 6.6 amps
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Indexing head does double duty. The 12-position head locks a workpiece for marking, routing, or carving, and it makes removing the faceplate easy.



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www.steelcitytoolworks.com

Street price: \$380 (\$280 with manual five speed, model 60170)
Weight: 72 lb.
Motor: ½ hp, 3 amps
Swing: 10 in.
Distance between centers: 15 in.
(37¾ in. with bed extension)
Variable speed (rpm): 500 to 1,350;
1,400 to 3,800



Change speeds with a twist of a dial. The Steel City 60100 has a variable-speed drive, which allows you to crank up the speed for sanding, for example, without turning off the machine.

■ SHARPENING

JET SLOW-SPEED SHARPENER IS A GOOD VALUE

JET'S NEW WET SHARPENER HAS A LOT IN COMMON with the Tormek SuperGrind 2000, which I reviewed in *FWW* #182 (pp. 38-43), but the Jet has a lower price. Like the Tormek, the Jet Sharpener uses an ultraslow 10-in.-dia. by 2-in.-wide grinding wheel—running through a water trough—and a leather-faced honing wheel. Both machines share a similar micro-adjustable support arm to hold jigs for grinding and honing.

Unlike the Tormek, the Jet has a variable-speed motor (90 to 150 rpm) that allows you to maintain grinding speed as the wheel shrinks in diameter. And the Jet does a great job at managing water by adding splash guards and a large trough.

The Jet system offers a variety of accessory jigs (interchangeable with the jigs on the Tormek system) for sharpening carving tools and turning gouges, as well as an accessory support arm for grinding on the side of the wheel, which can be helpful when sharpening tools where a hollow grind is not ideal, such as a skew chisel.

The machine I looked at had a few small problems. The straightedge jig that came with the machine required me to file a slight hump to allow the tool to register at 90°. Additionally, the support arm exhibited a slight amount of slop and required extra attention to lock it down parallel to the wheel, and the honing wheel wobbled. Yet despite these small problems, I was able to achieve excellent results when sharpening and honing.

The Jet's performance and price (\$100 less than the Tormek) make this machine a good value. The basic kit (\$300; www.woodcraft.com) includes the machine, a stone grader, straight-edge jig, angle measuring devices, support arm, honing compound, and a training DVD.

—Tim Albers is a hobbyist furniture maker and tool refurbisher.



■ TRADE SHOW

HIGHLIGHTS FROM IWF 2006

The International Woodworking Machinery and Furniture Supply Fair in Atlanta is always a hot event—and not just because it's held in August. At the fair, held every other year, manufacturers unveil new and exciting tools for the woodworking market. As usual, editors returned home this year with worn-out shoes, sore feet, and a suitcase-load of information about the new offerings. Here are a few items that turned our heads.



GRIZZLY UPS THE ANTE ON CABINET SAWS

Grizzly's showcase product was the "Extreme Series 12-in. Table Saw with Riving Knife" (model G0606X). While adding a true riving knife and keeping the price competitive at \$2,000, Grizzly has outdone the competition in a number of ways: The blade is 12 in.; the power is 5 hp, single phase; and the trunnions move up and down in a straight line (instead of pivoting), keeping the riving knife just below the top of the blade. Other notable features are the quick-release action on the riving knife, and a digital gauge for blade angle. A three-phase, 7½-hp model is available for the same price. Grizzly products are sold direct (www.grizzly.com).

BOSCH VACUUM CLEANS ITS OWN FILTERS

The Bosch Airsweep 3931A is a tool-actuated vacuum designed to work with a variable electrical load to avoid tripped circuit breakers. A dial on the Airsweep lets you adjust its amperage to accommodate a high-draw tool. The 13-gal. wet/dry vacuum automatically senses when its two drop-in filters are dirty and shakes them clean. It's also very quiet: 69 db., or about the same as normal conversation. The street price is \$430.

SELF-CLOSING HINGES AND SLIDES

Available in popular woodworking catalogs, two new products join the growing number of self-closing hinges and slides, which bring drawers and doors softly and steadily home whether they are nudged or slammed. Accuride's (www accuride.com) new Eclipse Easy-Close undermount drawer slides bail out cabinetmakers with ¼ in. of adjustment in every direction—after installation—which ensures perfect action. Blum (www.blum.com)



■ HAND TOOLS

Bevel-up jointer plane makes silky-smooth cuts

WITH THEIR LONG SOLES, jointer planes are unmatched at preparing dead-flat surfaces and edges by hand. The typical jointer plane

has its blade with the bevel down, but a new Veritas jointer features a bevel-up blade configuration that has some distinct advantages. First, the blade is supported nearly all the way to its cutting edge, dampening vibration and chatter. Second, the chipbreaker is eliminated, which simplifies sharpening, setup, and tuning. Finally, the bevel-up format allows the plane's cutting angle to be fine-tuned easily to suit the task at hand by sharpening the blade at different angles.

The 22-in. plane has a 2¼-in.-wide A2 blade with a 25° bevel, a Norris-type adjuster, and rosewood handles. Veritas sells accessory blades (sharpened to 38° and 50°) to handle trickier grain, and a fence to make jointing boards easier. Jointing board edges for glue-up was quick and predictable, and panels flattened with the plane were ready for finish—flat and smooth, with no torn grain. I highly recommend this tool (\$245; www.leevalley.com).

—Chris Gochnour is a furniture maker and hand-tool user in Salt Lake City.



A big mouth. The adjustable sole plate on this Veritas plane makes it easy to adjust the blade for coarse or fine shavings.

■ DRILLING

DURABLE COUNTERSINK SET

AMANA'S NEW COUNTERSINK and plug set (model PS-500) comes with everything you need to keep screw holes discrete: four countersink bits with built-in stop collars and four removable drill bits— $\frac{1}{8}$ in., $\frac{9}{64}$ in., $\frac{5}{32}$ in., and $\frac{11}{64}$ in.—plus a matched 10mm plug cutter. With unique and durable carbide-tipped countersinks, this \$100 set worked beautifully (www.amanatool.com).

—Matthew Teague is a woodworker and writer in Nashville, Tenn.



■ TRADE SHOW (CONTINUED)

blum.us) is adding to its self-closing lineup with Blumotion for Doors. The tiny regulator snaps onto standard Blum cup hinges, with options for inset and overlay doors in a variety of opening angles.

PORTER-CABLE REINVENTS THE OMNIJIG

Taking a run at the Leigh for the title of most versatile dovetail jig, Porter-Cable is reengineering its Omnijig for a January 2007 release. Like the Leigh, the new Omnijig uses a single set of sliding fingers for both through- and half-blind dovetails, all variably spaced. But what sets the Omnijig apart is a series of stops for template position and bit depth designed to remove trial-and-error from the process. The sliding-finger template is standard on the 24-in. version (\$550). A 16-in. version (\$400) comes with a template for half-blind and sliding dovetails, though all templates will be available for both jigs. A versatile mortise-and-tenon system will be offered for \$300.

RIKON 14-IN. BANDSAW HAS BIG RESAW CAPACITY

With 13 in. of resaw capacity, two speeds, and 1½ hp, Rikon's new 14-in. bandsaw (model 10-325) offers big-saw capacity in a small package. The saw has a number of other useful features: cast-iron wheels; quick-release blade tension; micro-adjust roller-blade guides; large, 26-in. by 20½-in. table; one-piece table support trunnions; blade tracking and tensioning windows; forward-facing blade slot; 4-in.-dia. dust port; base-cabinet storage; and a work light, all for around \$750.

WORKBENCH CHANGES HEIGHTS, STAYS SOLID

The Noden Adjust-A-Bench is a heavy-duty, ratcheting leg system that adjusts a benchtop height smoothly between 28 in. and 45 in., yet is engineered to withstand the pounding and racking pressures of serious workbench use. A basic bench package with legs, rails, and maple top is \$800, but you can buy just the legs for \$430. Nice options include casters, a



Photo, bottom right: Courtesy of Rikon

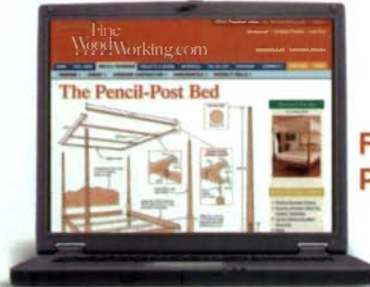
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■ CLAMPING

VACUUM CLAMPS HOLD ON WITHOUT GETTING IN THE WAY

ROUTING THE EDGES OF A SMALL PART often requires clamping the piece to a workbench, routing a section of the perimeter, and then moving the clamps to allow access to the rest of the edge. The process is a hassle, and it can lower the quality of the work with burns or lumps where the routing stops and starts. Vacuum Pressing Systems is now selling a clamping kit based on pads that use vacuum pressure to hold parts in place, effectively eliminating the need for clumsy clamps.

The machined aluminum pads, with a built-in vacuum valve on each side, attach to a vacuum pump. A soft rubber gasket on the edges of each face of the pads helps maintain a vacuum seal when the pump is turned on. The vacuum pressure (up to 1,800 lb. per sq. ft.) adheres the pads to the benchtop and secures the workpiece to the pads. The workpiece can be released from the pads by depressing a foot switch. Pads can be used individually or linked together with plastic tubing, and they can be mounted vertically or secured to support surfaces for production applications.

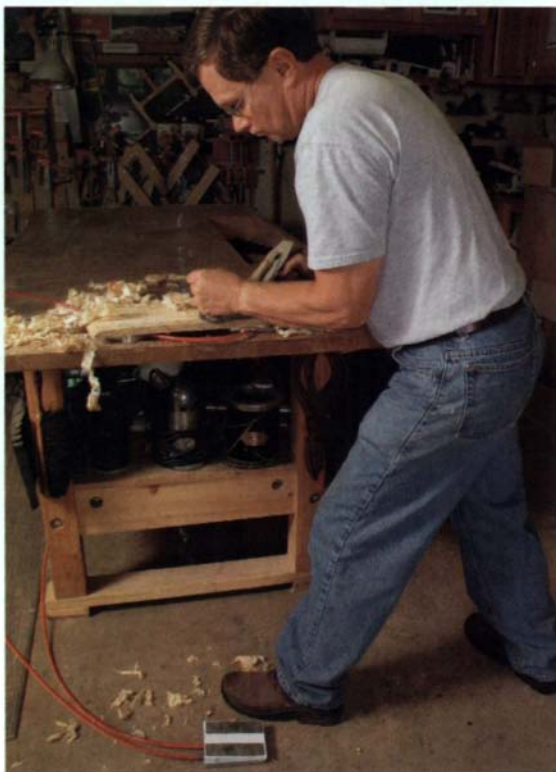
The system works well. It was strong enough to hold a part while I carved it with chisels and mallet, and it also held a piece solidly for routing. The only downside is that the pads need a relatively clean, smooth surface to ensure adequate holding power. Also, the workpiece must be wider than the 4-in.-square pads.

VacuClamp pads can be purchased directly from Vacuum Pressing Systems (800-382-4109). The basic kit costs \$162 and includes two pads, a foot switch, and 20 ft. of tubing with a quick-disconnect fitting matched to the company's pumps.

—Roland Johnson is a contributing editor.



Clamping without clamps. The VacuClamp system holds a workpiece in place using vacuum pressure. To release the workpiece, simply press the foot switch.



■ TRADE SHOW (CONTINUED)

storage cabinet, and various tops and vises. Call 609-882-3300, or go to www.adjustabench.com.

DELTA DRILL PRESS HAS BIG TABLE, LONG STROKE

A new floor-standing drill press from Delta (model 20-950) offers some great features for woodworkers, one of which is a mechanical variable-speed adjustment. It also has a 24-in. by 14-in. table, a wide, stable base, a cast-iron head, a 20-in. swing, and a 6-in. quill stroke. The drill press retails for \$750.



FREUD FUSION SAWBLADE

Freud's new Fusion general-purpose sawblade combines Hi-ATB tooth geometry with double-side-grind sharpening. The result is chip-free cuts top and bottom when crosscutting or ripping solid or composite materials, and a glass-smooth edge. A nonstick coating protects against pitch buildup, and new anti-vibration reed design eliminates blade vibration. The street price is \$100.

CMT BIT MAKES LONG TENONS

With the new tenon-cutting router bit from CMT, you can cut tenons quickly and precisely. The bit comes with a 1/2-in. shank, four cutters, and a number of shims to allow you to dial in tenons from 3/16 in. thick to 3/8 in. thick, and up to 1 1/4 in. long. The bit costs around \$100. For more information, go to www.cmtusa.com.

PLANER WITH TRUE HELIX CUTTERHEAD

Powermatic has combined forces with Byrd Tool Corp. to provide true helical planing ability through the installation of Byrd's Shelix planer head. The new 209HH planer also has a cast-iron base with integrated casters and offers four feed speeds and a 5-hp motor. The machine retails for \$3,057.

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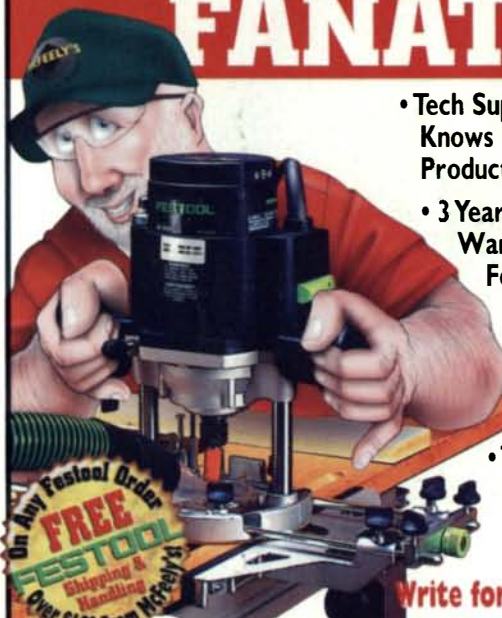
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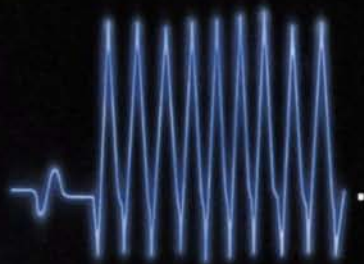
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shop design

A timber-frame dream

BY ERIC FOERTSCH

MAKE IT AFFORDABLE BY FINDING A COMPANY THAT RECYCLES OLD BARNES



For 15 years I dreamed of building the perfect shop. After making do with space in cramped, dark garages and basements, I wanted a workspace that was bright and inspiring. When we moved from New York to Connecticut, I had my chance.

Designing my ideal shop building consumed the first few months of 2004. I made lists, read books and magazines, drew on 15 years of experience, and made dozens of layouts on graph paper.

I kept asking myself if the shop building would create a positive, a neutral, or a negative value for the property. In the end, I decided that a building made with conventional framing would be a neutral addition at best, but a properly executed timber-frame structure would be a positive—especially from inside, where it would be obvious that this was no ordinary structure. A timber-frame shop also would fit in with the neighborhood and would be adaptable for other uses.

Hardwood floors, wainscoting, and finished walls between the exposed post-and-beam structure give the shop the bright and inspiring appearance I've

It just looks old. This 24-ft. by 36-ft. shop dates from mid-2005. It was made to resemble a 19th-century barn, using post-and-beam construction. Inside, the massive timbers dominate. Arranging the tablesaw island and other machines for maximum efficiency took weeks of planning.



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craved. If the next owner doesn't need a shop, the building will work as office space or as a studio.

In my experience, building a timber-frame structure involves about as much time and expense as a conventional stick-frame building. The biggest drawback to timber framing is the extra time needed to get building permits and find a reputable, affordable timber framer. Timber framers don't use graded lumber, so a building inspector may require a structural engineer to provide a set of plans that include all the necessary load and span calculations.

Setback requirements for local zoning restricted me to a 24-ft. by 36-ft. structure. With its second-floor loft, the building has 1,500 sq. ft. of floor space. That's large enough to satisfy my main requirement: being able to work with plywood sheets anywhere in the shop. Still, I couldn't make space for a finishing room or a dedicated place to dry wood.

Before I could proceed, I had to gain the building inspector's approval. I used Tedd Benson's book *Building the Timber Frame House* (Fireside, 1981) to provide tables, charts, and stress calculations for every joint and beam. It helped to

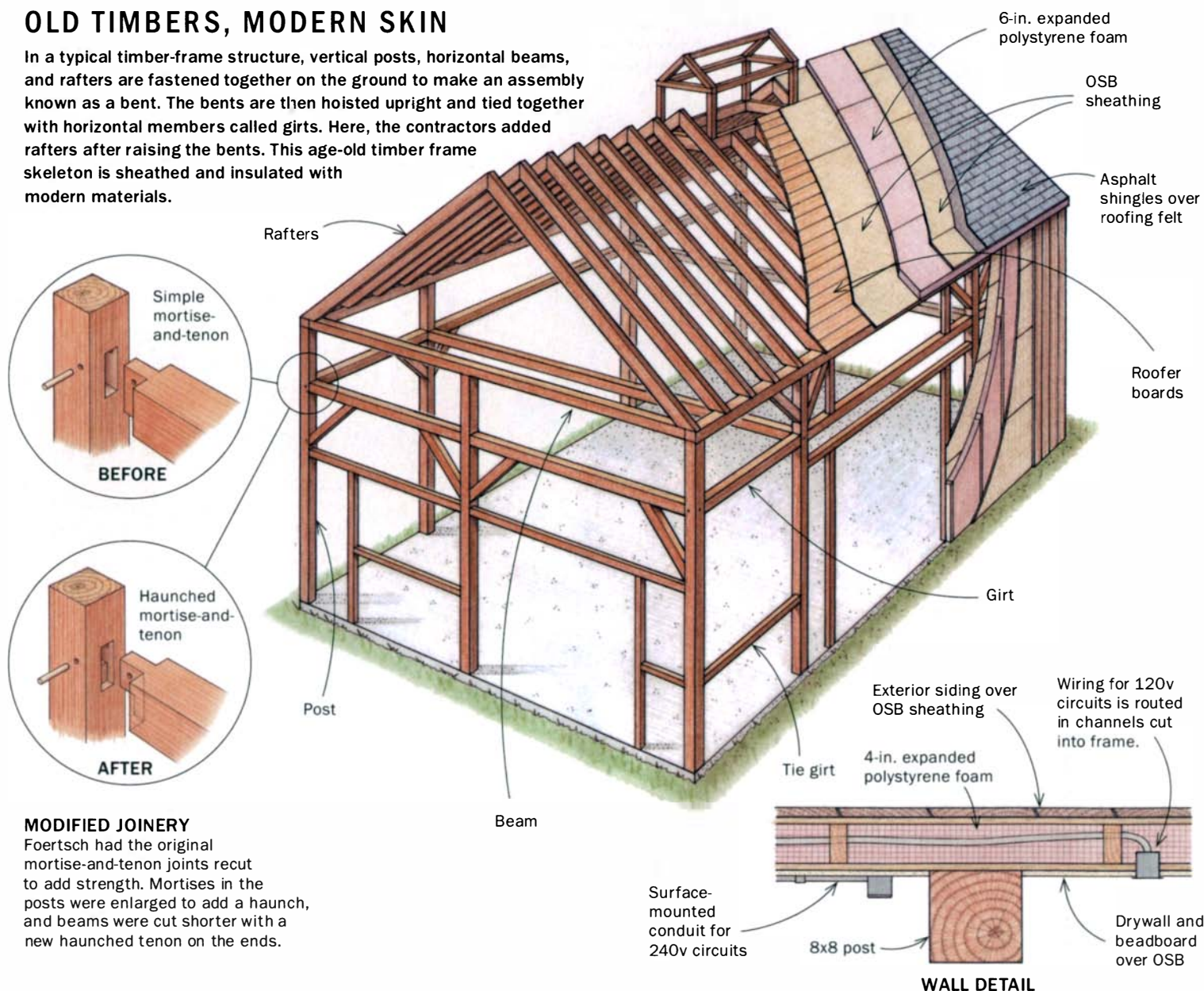
over-engineer the design. If you're not up to dealing with the local building department, be sure that the timber-framing contractor you hire can obtain needed permits and variances.

Getting real

Internet research turned up companies that would build a brand-new timber frame, but they were way too expensive—about \$45,000 just for materials. That's three times the cost of conventional stick framing. My best option seemed to be a company that could dismantle, repair, and reassemble

OLD TIMBERS, MODERN SKIN

In a typical timber-frame structure, vertical posts, horizontal beams, and rafters are fastened together on the ground to make an assembly known as a bent. The bents are then hoisted upright and tied together with horizontal members called girts. Here, the contractors added rafters after raising the bents. This age-old timber frame skeleton is sheathed and insulated with modern materials.



MODIFIED JOINERY

Foertsch had the original mortise-and-tenon joints recut to add strength. Mortises in the posts were enlarged to add a haunch, and beams were cut shorter with a new haunched tenon on the ends.



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FESTOOL



a timber frame on my property. Their prices came closest to fitting my budget.

That led me to Jesse Benedict of Benedict Antique Lumber and Stone, in New Milford, Pa. Benedict had a hundred-year-old barn that could be modified to meet my needs by cutting a foot off each main beam. And, to stay on the good side of the building inspector, I had Benedict recut the post-and-beam joints to make them haunched mortises, thereby strengthening each joint.

Barn raising

In early May, Benedict and his four-man crew arrived with a flatbed truck hauling the components for the basic frame. Rafters, roofing lumber, and sheathing filled another two trucks.

The men raised each of the 1,000-lb. post-and-beam assemblies (known as bents) by hand, pulling it upright with ropes. Then, balancing themselves on the 8-in.-wide beams like trapeze artists, they attached the rafters. That part of the barn raising took them only three days; they needed another month to sheathe the walls and roof with plywood,

oriented strand board, and rigid foam. Over the rough sheathing on the interior, I attached beadboard wainscot panels 4 ft. high. A large beam called a tie girt hides the seam between the beadboard and the wallboard that runs to the ceiling.

The shop cost me about \$35,000 in all, about what a comparable conventional building would cost in my area.

Finishing touches

I didn't limit my recycling to the post-and-beam structure. The 11 double-hung windows came from a contractor tearing down a nearby house. Windows in the roof cupola are salvaged French doors turned sideways. The beech hardwood floor came from a company auctioning offcuts and seconds online. I also turned to the Internet for the porcelain barn lamps that supply most of the lighting.

I still have to finish the second-story loft and add window trim and a few other details. But from the outside, the building looks just like a 19th-century barn. And my wife says the space inside is already nicer than our house. □

Lots of storage. The shop has more than 20 ft. of drawers and cabinets along one wall (above), with more built into the workbench and tablesaw island. Upstairs, a loft provides ample storage for wood and assorted odds and ends (right).



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BY TOOL GUYS. FOR TOOL GUYS.



Quick-to-Make Tool Cabinet

Attractive design stores all your tools in a small space

BY JAN ZOLTOWSKI

After a career of 35 years I had collected a substantial number of woodworking tools and I finally decided that they deserved a proper home. I set out to create a cabinet capable of holding my tools in a relatively small but accessible area. The result is home to well over 300 tools, yet covers only about 12 sq. ft. of wall.

I deliberately dedicated this cabinet to hand tools to keep them apart from dusty power tools, but the design can be modified easily to accommodate small power

tools as well. Think twice before making the cabinet smaller; even if your tool collection would look lost in a cabinet of this size, it's nice to have space to grow into.

No wasted space

The inside surfaces of the main doors hold thin tools such as chisels and screwdrivers. Inside the cabinet, working down from the top, the upper shelf seats larger handplanes; the middle section has a pair of internal doors that support tools on both sides (increasing the hanging area by 40%)

and that open to reveal additional space for saws and marking tools. The lower area is divided into cubbyholes for smoothing planes and other specialty planes, while six small drawers in the bottom hold smaller tools such as block planes, drill bits, and router bits.

The cabinet hangs on upper and lower pairs of French cleats. Behind the cabinet, in the space between the cleats, is a place to hold a carpenter's square on one side, and three panel saws, held securely by means of the friction of their teeth, on

A brief tour



Drawers for small objects. The six drawers at the bottom of the cabinet hold small objects such as block planes.



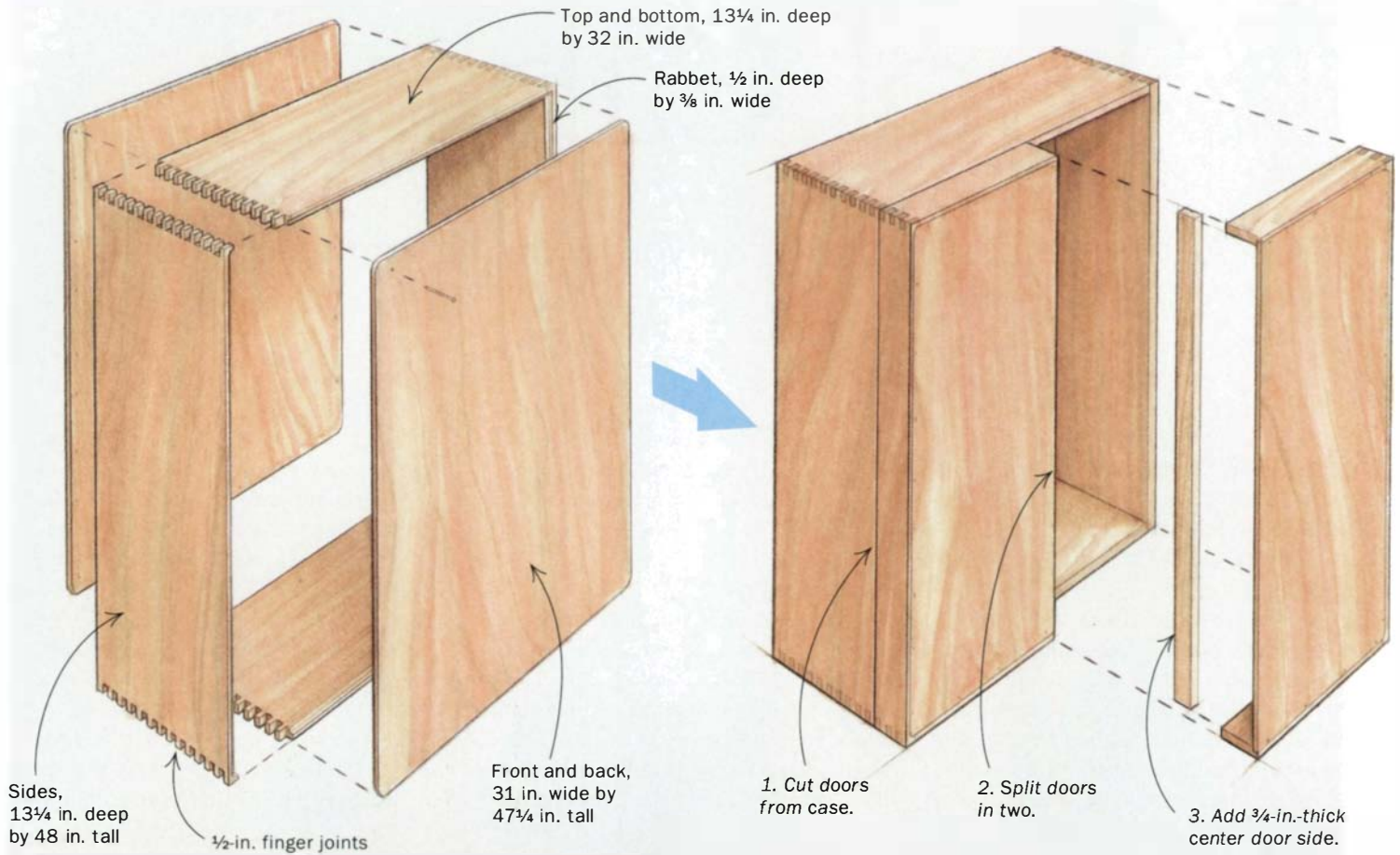
Hinged panels add storage. Tools hang on both sides, adding 40% to the cabinet's hanging area.



Storage behind the cabinet. A carpenter's square on one side and three panel saws on the other fit into slots in the back of the cabinet.

A COMPACT CABINET WITH AMPLE CAPACITY

The cabinet is made almost entirely from birch plywood, which gives dimensional stability at a budget price. The main carcass is $\frac{3}{4}$ -in.-thick plywood connected with finger joints.



Construct the carcass



Build a big box. The main body of the cabinet is connected at each corner with $\frac{1}{2}$ -in. finger joints cut on the tablesaw (left). Rabbet the front and rear for the panels. Glue and nail the front panel (above), but attach the rear with screws for interior access.

the other. The cabinet holds all these tools within easy reach, and every blade and tooth stays sharp and protected.

Construction starts with a single box

I built my cabinet out of Baltic-birch plywood. Not only is it more economical than solid lumber, but it eliminates problems such as stuck drawers from dimensional changes caused by the high humidity in the Northwest. The body of the cabinet starts out as one large box with the sides made from $\frac{3}{4}$ -in.-thick plywood. Join the corners with $\frac{1}{2}$ -in. finger or box joints (for more on this method, see "A Lesson in Box Joints," *FWW* #181, p. 84, or "Box Joints on the Tablesaw," *FWW* #148, pp. 60-63).

Rout a $\frac{1}{2}$ -in.-deep by $\frac{3}{8}$ -in.-wide rabbet around the inside front and back edges to accept panels of $\frac{1}{2}$ -in.-thick plywood. The front of the cabinet is attached with glue and nails, but the back is attached with screws only to allow access during later construction.

Next, cut off approximately the front third of the box to form what will become the main doors. On the tablesaw, using the rip fence as a guide, cut through both ends of the box. Attach a thin piece of scrap plywood to each end by nailing it on both sides of the cut. This is to keep the two parts of the box attached while cutting through the long sides on the tablesaw.

While at the saw, cut the newly removed front section of the cabinet in half to form the two main doors. When this is done, attach pieces of $\frac{3}{4}$ -in.-thick plywood to form the center side of each door. Don't worry about the exposed edges of the plywood sides; these will be covered by banding.

Create the gallery and drawers

The central gallery, with its cubbyholes used to store planes, gives the cabinet rigidity. Cut the upper and lower crosspieces, then cut the dados for the $\frac{1}{4}$ -in.-thick shelf partitions either on the tablesaw or with a router. Use the same method to create the dado on the underside of the gallery to receive the center drawer divider.

Before installing the gallery you need to make the drawers, because their height and spacing will determine the location of the gallery. The six drawers are made of $\frac{1}{2}$ -in.-thick plywood with $\frac{1}{4}$ -in. finger joints. The

bottoms, made of $\frac{1}{4}$ -in.-thick plywood, sit in a rabbet rather than a groove because the latter would reduce the depth of these already-shallow drawers.

After unscrewing the back panel of the cabinet, rout a dado on each side for the upper shelf, and then glue in the shelf. Stack the drawers using laminate or thin cardboard as spacers, and mark the top of the stack for the location of the bottom dado of the gallery. Lay the gallery across the cabinet and mark the location of the top dado. Cut the pair of dados on each side, and then install the gallery and the central drawer divider. The latter is screwed to the bottom of the cabinet from the outside and is not dadoed, so as not to weaken the bottom of the cabinet.

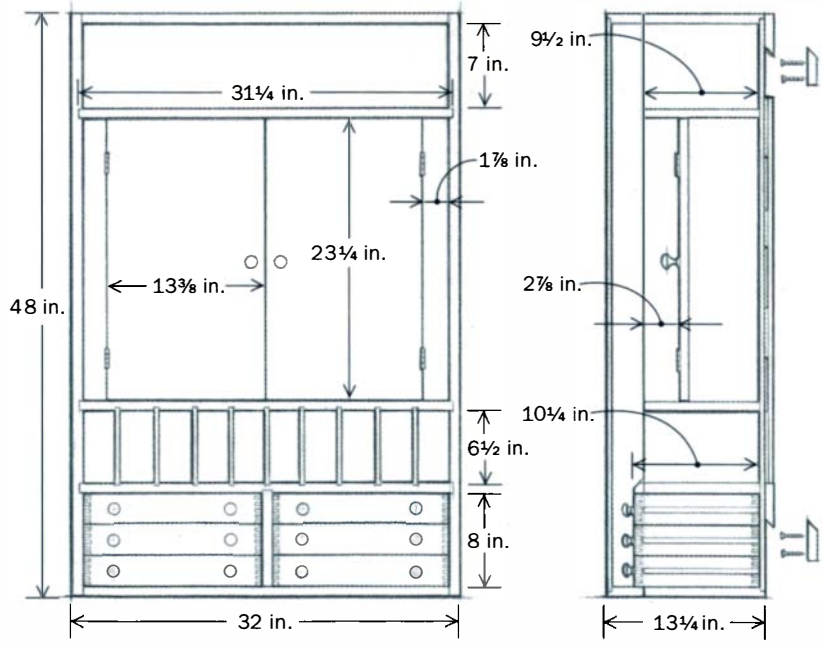
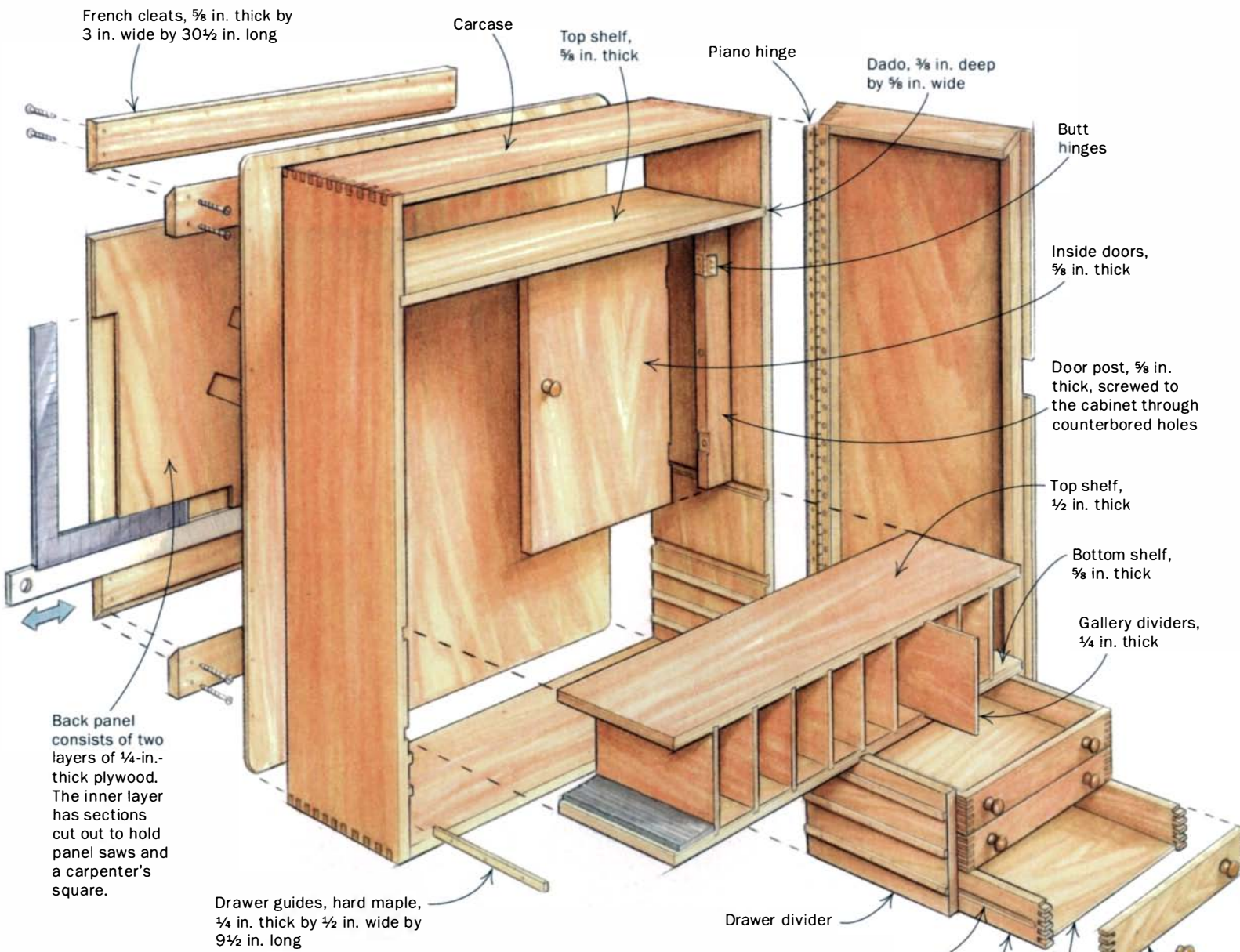
I hung the drawers by attaching $\frac{1}{4}$ -in.-thick by $\frac{1}{2}$ -in.-wide strips of hard maple to the sides of the cabinet and the central divider. To get the drawers to hang perfectly



Cut away the door section. With the front and rear panels installed, cut away the front quarter of the box to form the main doors. Cut the short sides first, and then tack a batten across the cut to hold the section in place while cutting the long sides.



Next cut makes the two main doors. Tack two strips of wood across the cut line as shown. Then set the sawblade to just score the underside of the strips. In this way the panel is cut in half but won't bind on the sawblade.



SHELVES AND CUBBYHOLES PROVIDE TOOL STORAGE

The internal doors are $\frac{5}{8}$ in. thick; the shelves are either $\frac{5}{8}$ in. or $\frac{1}{2}$ in. thick, and the front and back are $\frac{1}{2}$ -in.-thick panels. The drawers are made from $\frac{1}{2}$ -in.-thick material with $\frac{1}{4}$ -in.-thick plywood used for the drawer bottoms and the gallery dividers.

parallel, I used the same spacers when cutting rabbets in the drawer sides and when attaching the strips to the cabinet.

On a router table, create a guide channel the same width as the drawer sides comprising two outer guide strips, two center strips of wood the width of the straight-cut router bit, and two equal spacers to go above and below the bit that center the drawer side over the router bit. Clamp the outer strips to the table, remove the spacers and the center strips, raise the bit to $\frac{1}{4}$ in., and cut a groove until just before the finger joints at the front of the drawer.

When all the grooves have been cut, use the spacer strips from the router table and the laminate spacers used earlier when stacking the drawers to establish the location for each maple drawer runner. Screw the runners to the sides, and the central divider and the drawers are hung.

The two inner doors and their posts are made from $\frac{5}{8}$ -in.-thick plywood. Cut matching recesses on each door and post for a pair of hinges, and then screw each post to the sides of the cabinet between the top of the torsion box and the upper shelf. Hang the doors on these posts.

The separate unit at the back of the cabinet is built of two layers of $\frac{1}{4}$ -in.-thick plywood and should be designed to accommodate carpenter's squares and panel saws. Screw this unit to the back of the cabinet between the French cleats.

The outer doors are hung using piano hinges and magnetic catches; ball catches give a positive latch to the doors. After hanging the front doors, conceal the exposed rabbet joint around the front panel with a $\frac{3}{16}$ -in.-thick by $\frac{3}{4}$ -in.-wide strip of solid maple, rounded slightly (as all exposed corners should be).

With the main cabinet construction complete, make and attach custom hangers for each tool using scraps of plywood.

I finished my cabinet with two coats of oil-based sealer that were sanded with P320-grit sandpaper. Then I wiped on a couple of coats of tung oil.

The cubbyholes and the bottoms of the drawers were covered with industrial rubber-backed floor covering, available from home centers. It comes in many colors and gives excellent protection to edge tools. The final step was to attach pulls to the drawers and doors, and stout handles to the outside of the cabinet. These are a great help when you and a friend lift the cabinet onto the wall-mounted part of the cleats. Install all of the tools and then start putting them to use. □

Jan Zoltowski is a professional antique and art restorer who lives near Seattle, Wash.



Install the upper shelf and gallery. Cut a dado on both sides of the cabinet and install the upper shelf. This gives the carcass extra rigidity. After routing the dados for the upper and lower shelves, test-fit the gallery and then glue it in.

Assemble the interior



Attach the inner doors. Stretching from the top of the gallery to the bottom of the upper shelf, each inner door is hung from a post screwed to the cabinet.



Storage behind the cabinet. An inner layer of $\frac{1}{4}$ -in.-thick plywood is cut to receive panel saws and a carpenter's square, then covered by a solid outer piece of plywood.

Set Up

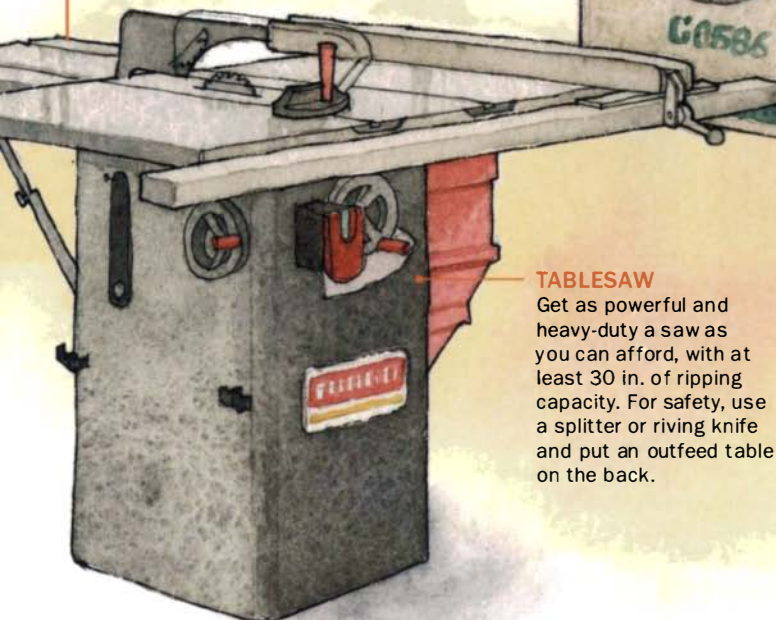


Choose wisely and your first set of tools could be your last

BY ASA CHRISTIANA

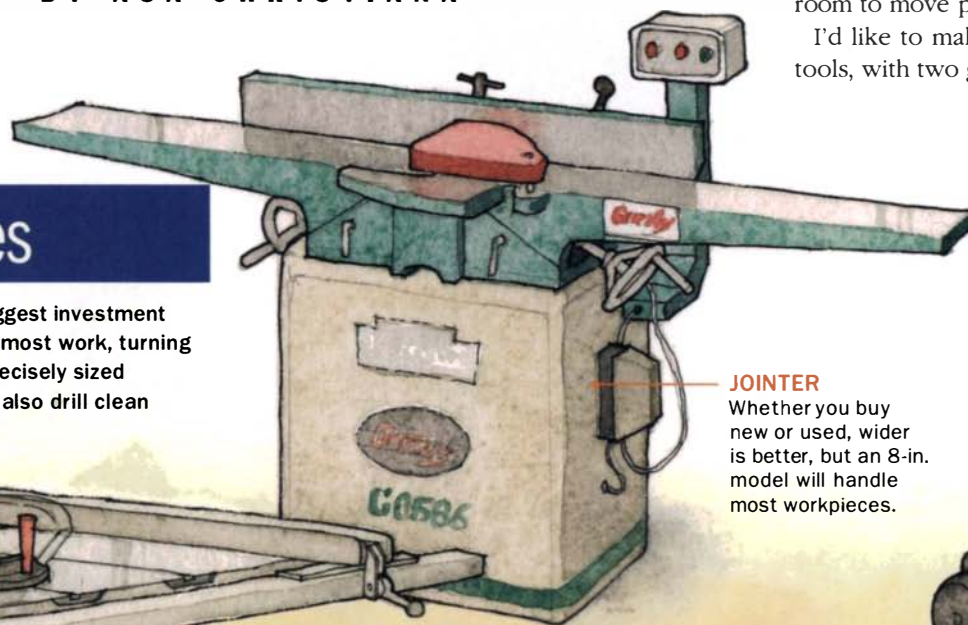
Machines

These require the biggest investment because they do the most work, turning rough lumber into precisely sized furniture parts. They also drill clean holes and cut joints.



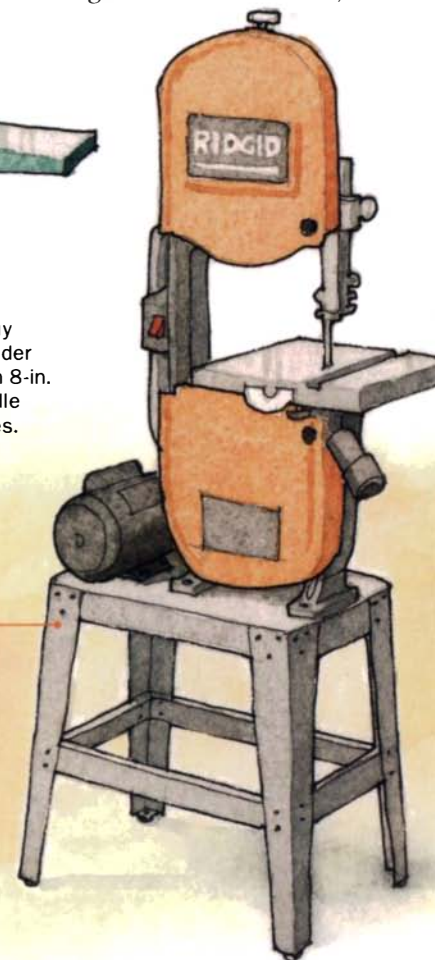
TABLESAW

Get as powerful and heavy-duty a saw as you can afford, with at least 30 in. of ripping capacity. For safety, use a splitter or riving knife and put an outfeed table on the back.



JOINTER

Whether you buy new or used, wider is better, but an 8-in. model will handle most workpieces.



BANDSAW

A 14-in. or 15-in. bandsaw is enough, and a riser-block accessory is a good way to double the resaw capacity to 12 in. This tool is indispensable for ripping, resawing, and cutting curves.

Most furniture makers would welcome a few more chisels, planes, and clamps, and probably a wider jointer, but there is a critical mass of tools that allows you to get fine woodworking done in an efficient way—a point when the balance tips from struggle to satisfaction.

It's easy to charge past that point, becoming obsessed with building or buying every jig and having the best of everything. In the meantime, you're probably not producing much furniture.

Space is one important factor in deciding when to stop buying and start building. There is no point in adding another machine to save time if you no longer have the room to move projects around efficiently.

I'd like to make a case for my essential tools, with two goals in mind. For one, I'll

Shop for \$5,000

provide beginners with a shopping list for this lifelong hobby. Also, I hope to reassure more experienced woodworkers that they may already have what they need to make beautiful projects.

To arrive at a bottom line, I've assembled a list of specific brands and models, most of which have been winners in recent tool reviews in *Fine Woodworking*. I won't cover a few categories of tools that are truly necessary but vary too much to pin down: marking and measuring tools, sharpening gear, and clamps (they say even God needs more clamps).

The street price for all-new equipment is about \$5,000. Buy used equipment, and you can cut that in half. I consider this a reasonable investment for a lifelong hobby. Consider the cost of a bass boat (not to mention the truck and trailer). And you

can't fill your house with bass—unless they are stuffed or singing. I'll take furniture.

Of course, my own way of working has informed my list of essential tools. I am not a professional woodworker. Almost every piece I make is different. And I do a fair bit of woodworking to beautify my home, such as built-ins and trim. Join our Knots discussion at www.FineWoodworking.com/toollist to share your opinions about my tool choices.

Machines do the heavy lifting

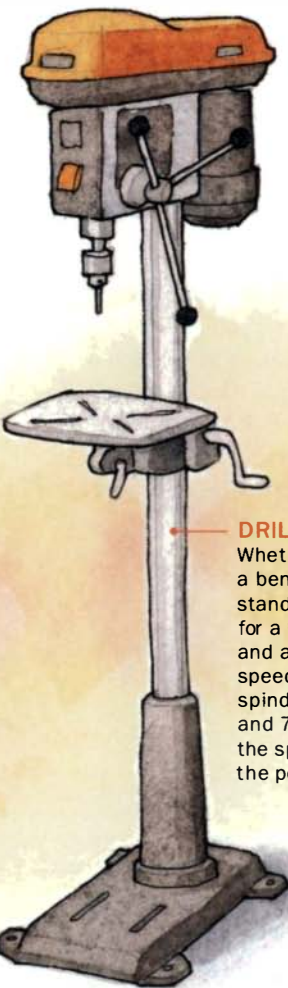
Hand-tool purists might argue, but machines are the backbone of an efficient shop. With a set of plans in hand and the rough lumber chosen, most woodworkers turn first to machines to straighten, flatten, square up, and cut off precise workpieces. Well-tuned machines and power tools also

will get curves, joints, and final surfaces very close to perfect before hand tools and sandpaper take over.

However, if your machines lack capacity, power, or accuracy, you'll find these preliminary stages frustrating. If the first surface of a board isn't flat and straight, the opposite one won't be either. If edges and ends aren't square, you'll chase those inaccuracies all the way through the project.

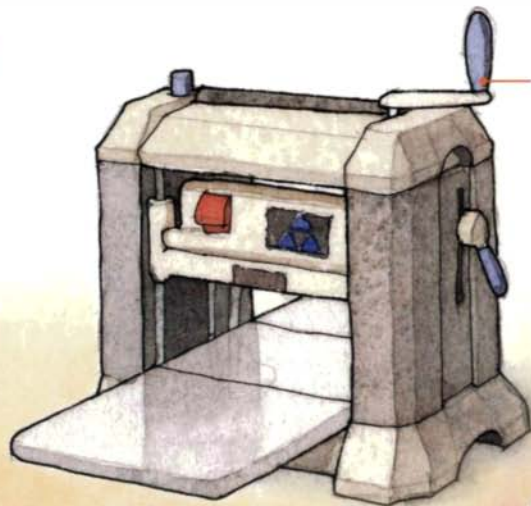
When it comes to setting up shop, a planer and jointer often mark

the moment when a woodworker gets serious about the hobby. These machines allow you to mill stock



DRILL PRESS

Whether you get a benchtop or floor-standing model, go for a $\frac{5}{8}$ -in. chuck and at least eight speeds, 3 in. of spindle travel, and 7 in. between the spindle and the post.



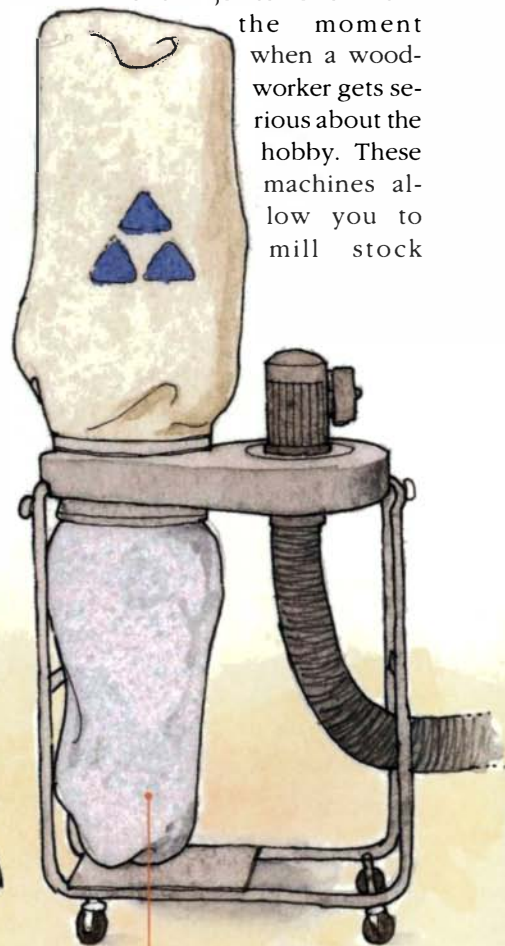
PLANER

Today's small planers leave a great finish with minimal snipe on boards up to 13 in. wide. Get one with indexed knives for easy blade changes.



MITER SAW

Aside from roughing stock quickly to length, this machine can make quick miter cuts that are clean enough for many uses, like built-in cabinets and trim. Non-sliding, 12-in. "chop saws" offer the best value.

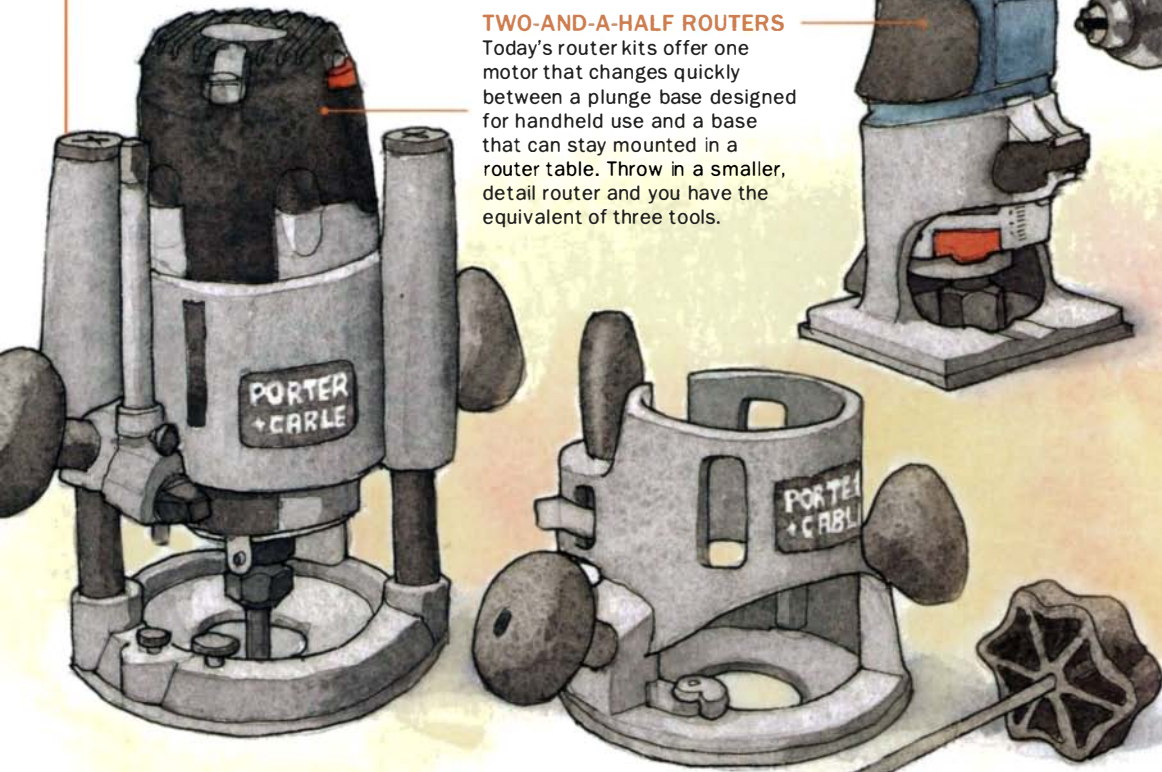


DUST COLLECTOR

Get a 1½-hp, single-stage collector at a minimum. To collect the finest dust, opt for a cartridge filter or a felt bag. A 2-hp collector is better because it can be located farther from a table saw or planer and still can do its job.

Power tools

Like machines, these speed up the more tedious woodworking tasks: drilling, sanding, sawing, molding, mortising, and some other joinery.



TWO-AND-A-HALF ROUTERS

Today's router kits offer one motor that changes quickly between a plunge base designed for handheld use and a base that can stay mounted in a router table. Throw in a smaller, detail router and you have the equivalent of three tools.

CORDLESS DRILL/DRIVER

A 14.4v model has enough power for big bits and enough control for small screws.

quickly to any thickness, which means you can buy rough lumber. Bottom line: You'll need a jointer and planer wide enough to handle most workpieces.

You'll also need a heavy-duty table saw that can make smooth cuts in thick hardwoods; a medium-size bandsaw that keeps its blade on track; a miter saw to rough-cut lumber to length and to cut moldings; and a drill press to cut clean and accurate holes with large and small bits.

Machines need dust collection—If only to keep machines running right, with less maintenance, you'll need dust collection. Tablesaws and planers work better when dust is being sucked away. Then there's the latest government data about fine wood dust causing nose and throat cancer. It takes very fine filtration to capture the smallest, most insidious stuff. Finally, it's just more pleasant to work in a clean shop.

I keep a tight cluster of the worst offenders (table saw, planer, bandsaw) permanently connected to my dust collector with a simple blast-gate system and flexible hoses. I don't bother with the jointer;

its **big** chips just fall down a ramp into a bucket.

Mortisers and lathes are optional—I made a tough call on these tools. Whether hollow-chisel or horizontal, a mortiser makes the joinery process quicker and easier, but is essential for pros only. A router, in tandem with shopmade jigs, will make great mortises.

Choosing a lathe is complicated. If most of your woodworking is turning, my list of tools is not for you. But even if you dabble, and ever want to try big bowls and vessels, you'll need a large-capacity lathe with enough mass to control vibration, and speed that is variable on the fly. So you'll be out \$1,000 or more for a tool you'll use only once in a while. However, if all you turn is knobs and spindles for furniture, you can get by with a benchtop (mini or midi) lathe. Newer models are solid and offer bed extensions.

Power tools give speed and precision

The next row in your arsenal is the power tools: two-and-a-half routers (you'll see), a

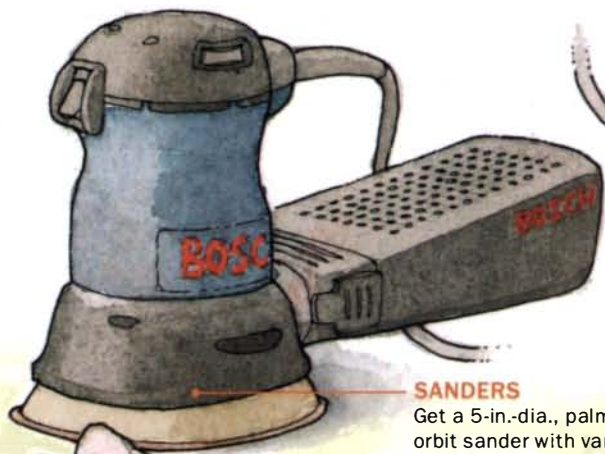
random-orbit sander, a cordless drill/driver, a circular saw, and a biscuit joiner.

I can't imagine woodworking without a handheld router and a router mounted in a table. The good news on routers is that there are multi-base models that will allow you to keep a fixed base mounted in your router table and a plunge base free for handheld routing, such as mortising. You'll have to switch the 2-hp motor from one to the other, but that takes only seconds.

As for a router table, it can be as simple as a piece of plywood clamped to the end of a workbench, with a shopmade fence that has a dust port tacked on.

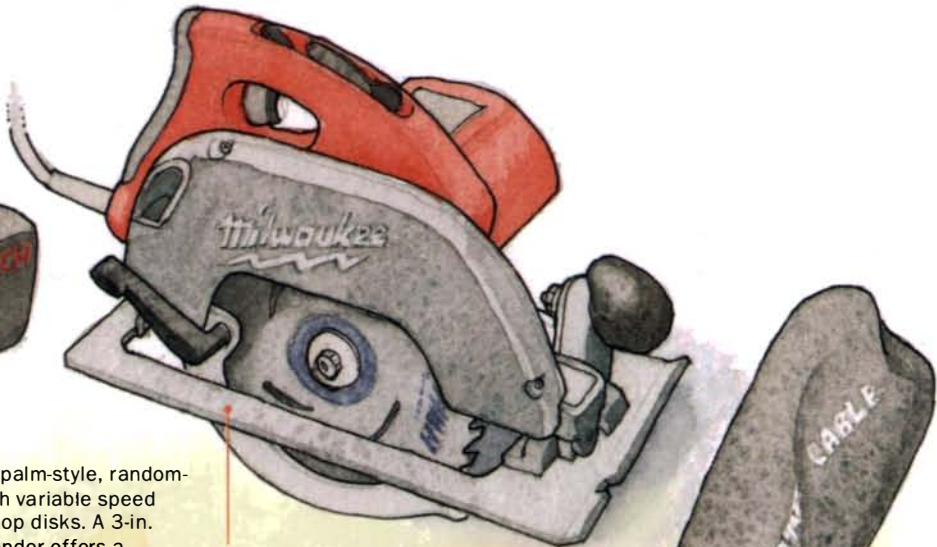
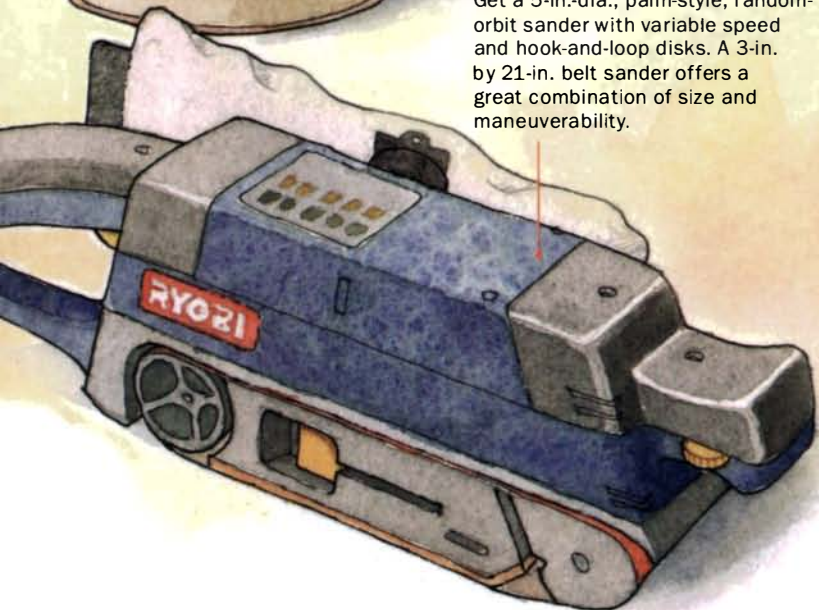
I also recommend a small fixed-base router (the "laminat trimmer" type) for detail work. They are easier to handle for inlay and light edge work, and there are times when it is nice to have a second router loaded and ready to go.

Though I'll make a case later for a smoothing plane, there are woods and situations for which a sander is simply the easiest way to go. A random-orbit palm sander is aggressive enough to remove



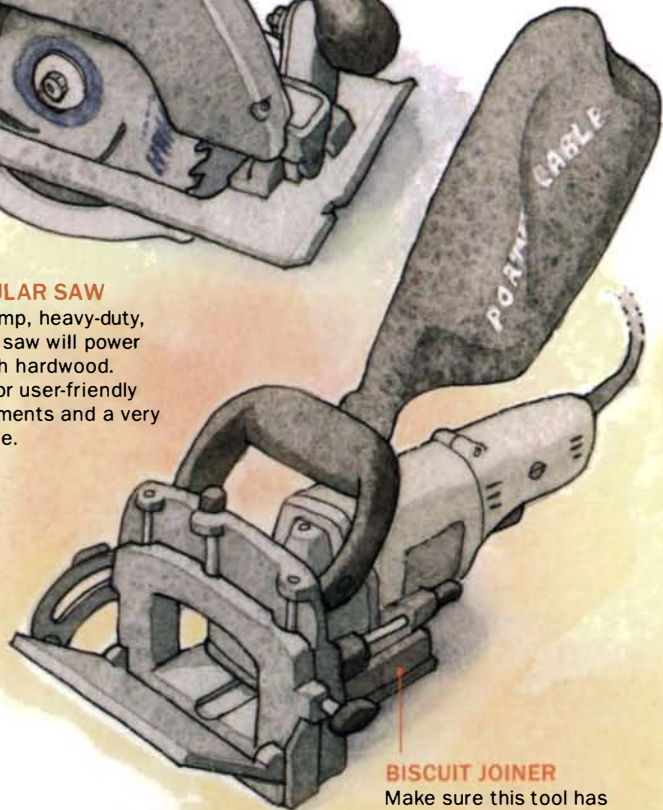
SANDERS

Get a 5-in.-dia., palm-style, random-orbit sander with variable speed and hook-and-loop disks. A 3-in.-by-21-in. belt sander offers a great combination of size and maneuverability.



CIRCULAR SAW

A 15-amp, heavy-duty, 7¼-in. saw will power through hardwood. Look for user-friendly adjustments and a very flat sole.



BISCUIT JOINER

Make sure this tool has good reference surfaces—base, face, and fence—you'll use them all.

machine marks and tearout, yet it is pretty easy to control. If used properly, it won't leave dips in the surface and it won't sand through veneers or the first coat of finish.

A cordless drill/driver is a fixture in every shop. Woodworkers don't need as much power and endurance as homebuilding contractors, yet we inevitably do jobs around the house. A 14.4v drill offers the right combination of power and fine control.

The last three power tools on my list are sometimes sneered at. A belt sander seems like a long shot but has a host of uses in a woodshop. It can surface slabs that are too wide for the planer or jointer. It is also great when scribing and fitting the frames and moldings of built-ins to walls and ceilings.

A circular saw is essential anytime it is easier to bring the saw to the work rather than the work to the tablesaw, such as when roughing out plywood parts. Guided by a straightedge and armed with a good blade, a heavy-duty saw also will make clean, accurate cuts on the end of a wide panel.

Though a biscuit joint is not as strong as traditional joinery, it is lightning-fast

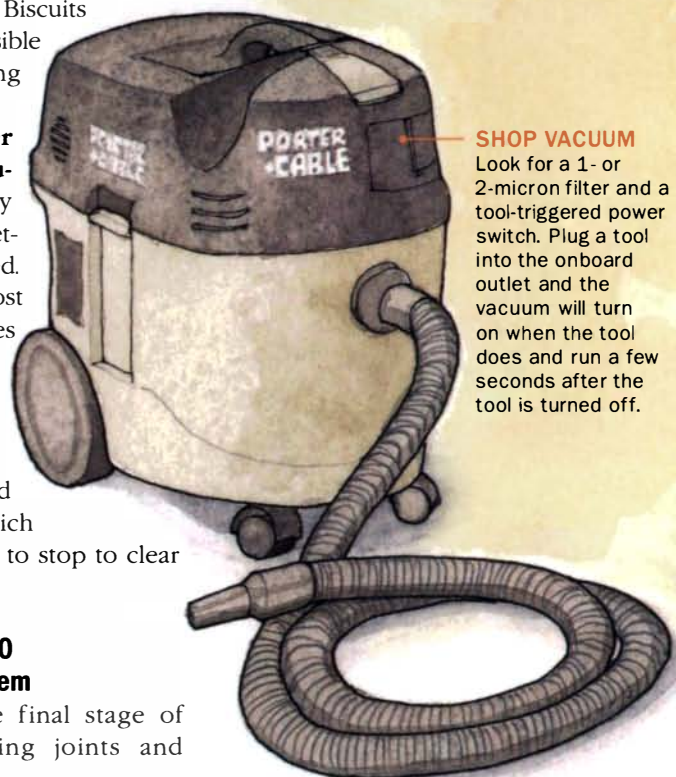
and plenty strong for many applications. A biscuit joiner is the ideal tool to build plywood cabinetry. Biscuits also make quick and invisible splines for aligning mating parts.

Team up your power tools with a shop vacuum

—Like machines, many power tools run much better with a vacuum attached. Palm sanders can be almost dust-free, which increases their efficiency. Router-table procedures are easier without a lot of chips in the way. Some routers are well-designed for dust collection, which means you'll never have to stop to clear chips when mortising.

Hand tools: Get these 10 and learn to sharpen them

Hand tools handle the final stage of construction: fine-tuning joints and



SHOP VACUUM

Look for a 1- or 2-micron filter and a tool-triggered power switch. Plug a tool into the onboard outlet and the vacuum will turn on when the tool does and run a few seconds after the tool is turned off.

Hand tools

For final fitting and final surfaces, when precision is critical, turn to high-quality hand tools. The following are essential.

THREE HANDPLANES

You'll need a block plane (right) for detail work, a No. 4 smoothing plane (above) for removing machine marks and prepping final faces and edges, and a shoulder plane (below) for trimming joinery. All should have thick blades to reduce chatter.

surfaces. Every woodworker should learn to use a smoothing plane. It is simply the fastest way to prep a board for finishing after it leaves the planer. Handplanes are also the best tool for leveling one surface to another without creating dips or hollows. Put in a thick aftermarket blade to dampen vibration, and sharpen it to 8,000-grit. For most woods, this is all you will need to create an almost-final surface, followed by a quick pass with fine sandpaper on a sanding block.

For figured woods and other tough planing situations, I use a cabinet scraper to create a smooth surface with no tearout. (When all else fails, I turn to my power sanders.)

Two other essential planes are a shoulder plane and a block plane. The block plane is the handplane I use most often—for chamfers, roundovers, trimming cuts, narrow edges, or just for breaking sharp corners. I prefer the versatility of a low-angle version, though a standard-angle plane would be fine, too. The former does better on straight grain and end grain; the latter on grain that wants to tear out.

The shoulder plane is ignored by some woodworkers, but is unequaled at trimming tenons and rabbets to fit. It is great

SCRAPER

For difficult woods, a sharp cabinet scraper will prep final surfaces with no tearout. A wide base is helpful. Add a card scraper for a few dollars.

DOVETAIL SAW

Christiana prefers a Japanese-style handsaw (called a dozuki), which has very fine teeth and a thin blade, and cuts on the pull stroke. However, many woodworkers prefer a Western-style dovetail saw.

And the actual retail price is...



In order to arrive at a bottom-line street price for new equipment, I had to choose actual products. To be fair to manufacturers, I checked our recent tool reviews and used authors' picks for Best Value. When reviews were somewhat outdated, I chose tools that got favorable reviews in our Tools & Materials column. When that didn't work, I went with features I deem essential. Anyway, the point is the class and type of each tool, not the exact brand and model.

any time you need to plane right up to a square shoulder.

Even if you make dovetails with a router jig, tablesaw, or bandsaw, you'll still need a good dovetail saw for those small, precise cuts. Western or Japanese, push or pull, take your pick. Just get a good one. I prefer a pullsaw; its thin blade and fine teeth make it easier to start and control.

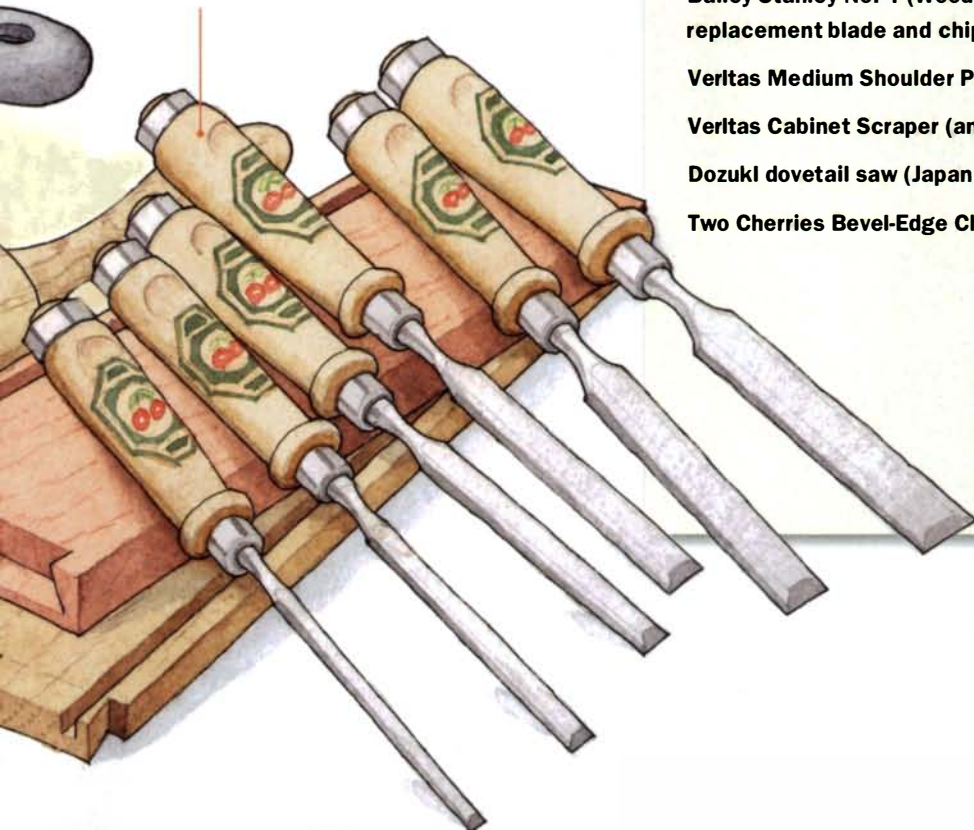
The last hand tools you'll need are chisels and a mallet. I cut deep mortises with a router, so I don't need mortising chisels to chop them by hand. You'll be quite happy with a basic set of five or six bench chisels, ranging from 1/4 in. through 1 in. Look for those designed for both paring and light pounding. Down the road, look for a few flea-market chisels—an extrawide one and a couple of narrow ones to grind to a right- and left-hand skew angle for cleaning out the bottoms of dovetails.

That's the basic equipment. You'll need clamps, a few marking and measuring tools, sharpening gear, and a heavy bench with a woodworking vise. Then you'll be able to build almost anything. □

Asa Christiana is the editor and a hobbyist furniture maker.

CHISELS

Many bevel-edge chisels are good for both paring and light pounding. These five sizes are essential, though others can be helpful: 1/4, 3/8, 1/2, 3/4, 1 in.



Craftsman Professional 10-In. Tablesaw (OR35504)	\$1,000
Delta 22-580 13-In. Two-Speed Finishing Planer	\$ 380
Grizzly G0586 8-In. Jointer	\$ 655
Ridgid BS-1400 14-In. bandsaw (riser block available)	\$ 350
Bosch 3912B 12-In. Compound Miter Saw	\$ 310
Ridgid DP1550 15-In. Drill Press	\$ 270
Delta 50-760 1½-hp dust collector with 1-micron bag	\$ 300
Porter-Cable 7812 10-Gal. Tool-Triggered Vacuum	\$ 260
Porter-Cable 895PK Router (with two bases)	\$ 270
Bosch PR10E Colt Palm-Grip Router	\$ 90
Bosch 1295DVS 5-In. Random-Orbit Sander	\$ 80
Milwaukee 0612-22 14.4v ½-in. driver/drill	\$ 160
Ryobi Variable-Speed Belt Sander, BE321VS	\$ 100
Milwaukee 6390-21 7¼-In. Circular Saw	\$ 140
Porter-Cable 557K Deluxe Plate (biscuit) Joiner	\$ 180
Veritas Low-Angle Block Plane	\$ 120
Bailey-Stanley No. 4 (Woodcraft) Smooth Plane (\$62) plus replacement blade and chipbreaker (Lie-Nielsen: \$55)	\$ 117
Veritas Medium Shoulder Plane	\$ 160
Veritas Cabinet Scraper (and card scraper)	\$ 50
Dozuki dovetail saw (Japan Woodworker), 8¼ in.	\$ 35
Two Cherries Bevel-Edge Chisels, set of 6	\$ 140

\$5,167

WIN THIS SET OF TOOLS

Go to FineWoodworking.com/ToolShop to tell us "Why I Deserve a New Shop." Send in the best essay and you'll win every tool on the list, delivered to your shop space, along with a visit by our tool expert to help you set everything up! Runners-up will receive the Porter-Cable 895PK Router Kit.



Dust Collection

Tips for choosing and configuring a



Woodworkers have been battling sawdust ever since the ancients invented the handsaw about 5,000 years ago. The Egyptians cleverly disposed of at least some woodworking debris by using it to stuff mummies, but this is not an option for today's woodworker.

In more recent times, the dust and chips created by woodworking machines has grown vastly more plentiful, finer, and more hazardous. Prolonged exposure can cause respiratory problems and has been linked to the development of some types of cancer. So keeping all of this material out of the air and off your tools and floor, and gathering it for disposal, have become more urgent and more challenging tasks.

Enter the dust collector.

A woodshop dust collector is a simple exhaust system. Its blower moves contaminated air through hose or ductwork to filters, which clean that air for recirculation back into the shop. The more effective the blower, the more ductwork you can add and still have enough suction at the other end to do the job.

For many woodworkers, a shop vacuum is the first dust collector. A shop vac can handle small amounts of fine debris like that produced by a 5-in. orbital sander or a router. But a shop vac moves small volumes of air, making it a poor choice for larger stationary machines.

Dust collectors generally belong to one of two families. Single-stage collectors carry the sawdust and other debris directly through the fan and into filter bags or cartridges. Two-stage cyclone collectors allow heavier debris to drop out of the airstream before it reaches the blower, meaning less work and abuse for the fan and filters.

The more air a dust collector moves, the more debris it can carry. Dust from a small hand sander might be captured effectively with as little as 100 cubic feet per minute (cfm), but a tablesaw might require 800 cfm. Also, the faster a collector moves the

Demystified

BY STEVE SCOTT

system to fit your needs

air, the heavier the debris it can carry. The lightweight dust from a small sander might need an airspeed of as little as 3,000 linear feet per minute. The coarser material produced by a planer often demands as much as 4,000 fpm. Finally, the more effective a dust collector's filters, the less fine dust will be returned to the air.

Dust-collection systems are like many other things in life: The safest approach is to plan for the worst. Some modestly powered dust collectors can deliver 800 cfm only if connected to a machine by less than 4 ft. of flexible hose. The bigger challenge lies in collecting dust from machines on the far side of the room. A key question

A shop vac isn't enough

Choices in dust collection range from light-duty shop vacs to powerful cyclone-style dust collectors. A shop vac might be your first dust collector, but it shouldn't be your last. Shop vacs can

handle the dust from small tools, but are undermatched for the amount of waste that a stationary machine can throw. In choosing the collector, consider

how frequently you use machines that produce large volumes of dust and chips. You also should weigh whether you need a collector that can support long segments of ductwork.



SINGLE-STAGE DUST COLLECTOR

The strongest of these, 2-hp and 3-hp units, can collect dust effectively from a tablesaw or other large woodworking machine through several feet of duct or hose. Units rated at 1½ hp can deliver top performance only through a short length of hose. The 1-hp units shouldn't be relied on to clear all the debris from large machines. Prices range from \$150 for a 1-hp collector to \$500 for a 3-hp unit.

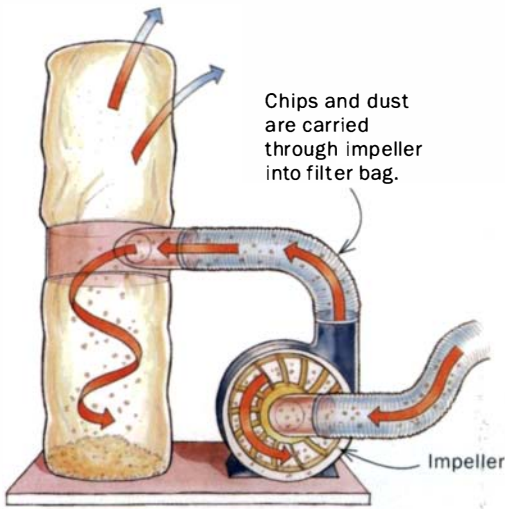


TWO-STAGE CYCLONE

These units move more air with the same horsepower as their single-stage counterparts, offering as much capacity as most home shops are likely to need. If you want complete freedom on shop layout and ductwork, this is your best bet. Prices start around \$750.

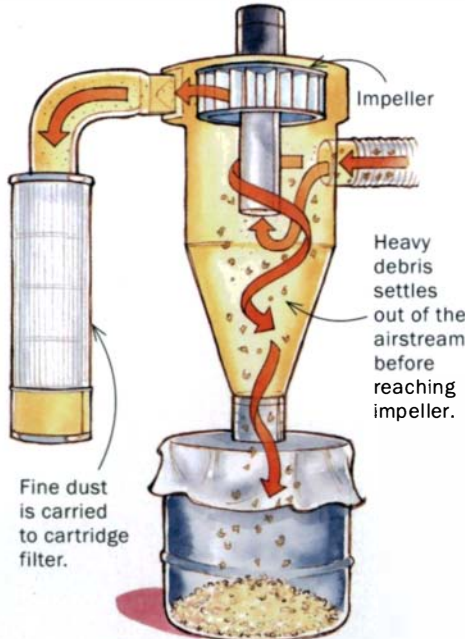
Single- or two-stage dust collector?

Both will do the job, if connected to the right hose/duct setup. The difference is a matter of cost and convenience.



SINGLE STAGE

A single-stage dust collector carries all of the debris past its impeller and then separates it into heavy chips and lightweight dust. It is the more affordable option.



TWO-STAGE CYCLONE

A two-stage cyclone allows larger debris to fall out of the airstream before it reaches the blower. This lets the fan spin more freely while being more efficiently shrouded, increasing airflow. The filter sees far less dust, and so doesn't need much maintenance.

to consider about any dust collector is how much ductwork it can support.

We tested a sampling of different-size collectors ranging from a 1-hp single-stage unit to 3½-hp cyclone. The testing protocol was similar to that used for our review of 1½-hp collectors (*FWW* #183, pp. 38-43). We used the results to estimate how much ductwork each machine might support while delivering the baseline performance of 800 cfm and 4,000 fpm.

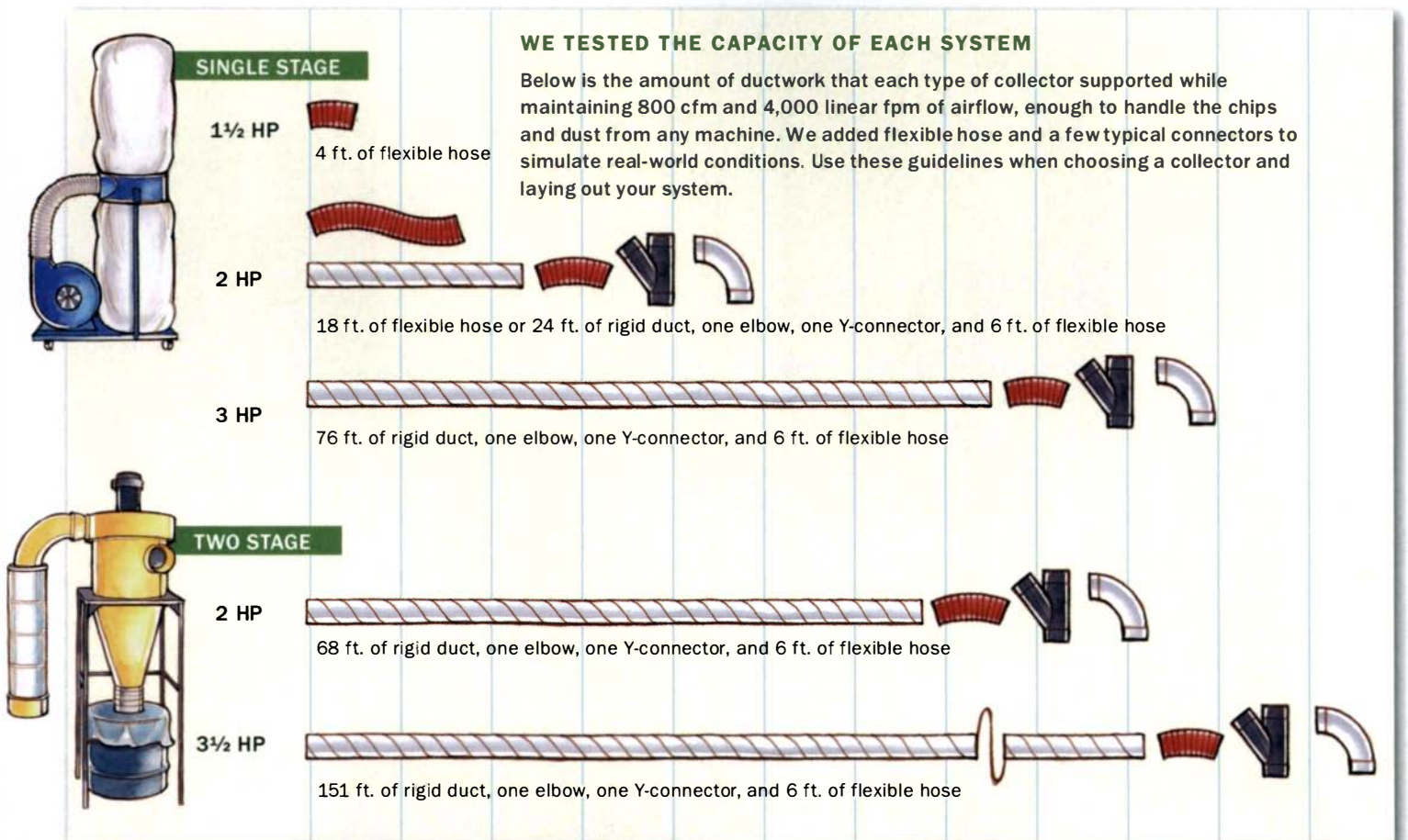
Which equipment is right for you? This survey should help clarify your choices.

A single-stage portable works for smaller shops and budgets

For a woodworker with a garage shop that includes a tablesaw, jointer, planer, and bandsaw, and with \$600 or less to spend on dust collection, the most practical choice is a single-stage dust collector.

A 1-hp collector is the least expensive, but you're likely to be disappointed with its performance—about 450 cfm at best. Unless your larger machines have perfectly efficient dust-collection hoods or ports (extremely rare), that's not enough.

The 1½-hp collectors are the most powerful units that run on standard 110v current.



They work well, given a minimum of flex hose and frequent cleaning of filters.

If you've got 220v power, though, consider stepping up one rung in class (and price). The 2-hp single-stage collector that we tested handled the equivalent of 18 ft. of flex hose before dropping below 800 cfm and 4,000 linear fpm.

Because the collector is mobile, you can wheel it from machine to machine, connecting it to each via a short length of hose. This ensures optimum performance at each machine, but sacrifices convenience.

An alternative is to park the collector in a central location and use Y-connectors, blast gates, and a couple of hose runs to connect it to your most frequent offenders. This approach lets you operate a variety of woodworking machines without undoing and redoing dust-collector connections. Put machines that generate less dust at the farthest end of the hose. Use a shop vac to handle the lightest-duty machines.

It's worth pausing at this point to say a few words about filters. Dust smaller than 10 microns—about half the thickness of this page—can be inhaled far more easily than expelled; once lodged in the lungs, it can cause a host of health problems.

Many single-stage collectors come with woven fabric bags that, when new, capture particles as small as 30 microns. Their performance improves with use, as a layer of fine dust builds up on the filter surfaces. This works, but erratically: Plenty of hazardous dust escapes while the coating accumulates, and the coating will often release sudden puffs of ultrafine dust through the fabric and into the shop.

You will breathe easier with 1-micron filters, but they still require fairly frequent cleaning. In contrast, the accordion pleats of cartridge filters allow much more filter area in the same space, increasing intervals between cleanings by three to 10 times. A warning: Cartridge filters can be more delicate than cloth bags. A protective screen at the filter's intake is a good idea.

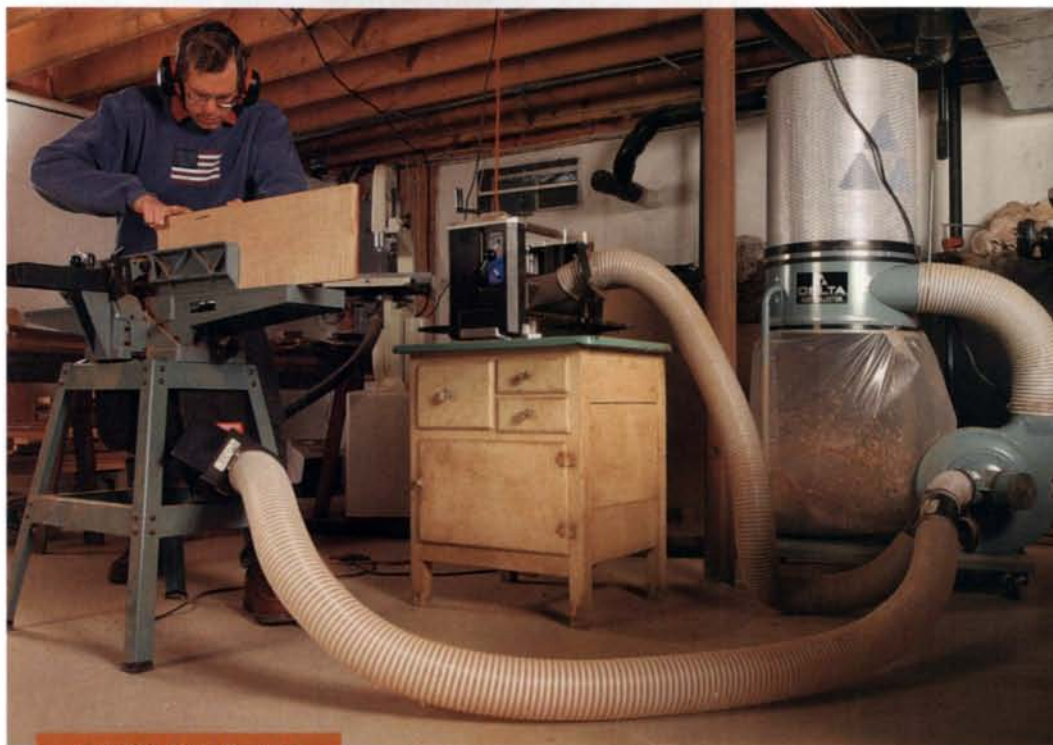
As a last word on single-stage collectors, there are more powerful units available. A 3-hp single-stage collector can be left in a corner and connected to a significant amount of pipe. The one we tested will provide sufficient airflow and velocity at the end of 76 ft. of ductwork, plus an elbow, a Y-connector, and 6 ft. of hose. On the downside, the collector will take up about 10 sq. ft. of shop space, and you'll

Two ways to use a single-stage collector



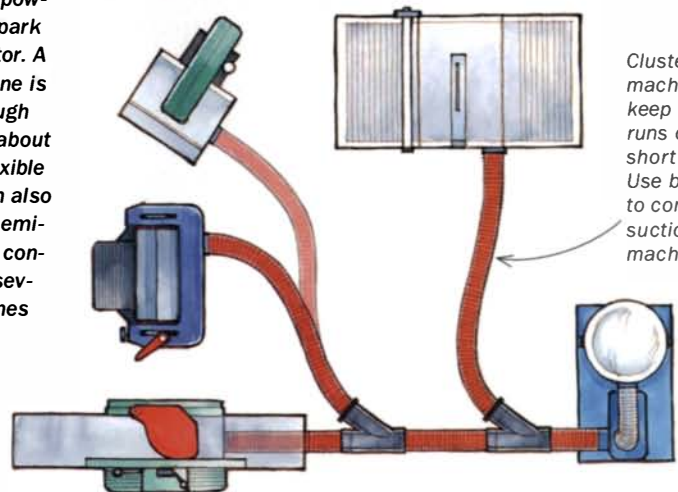
ONE MACHINE AT A TIME

Fitted with a short length of hose, a 1½-hp or 2-hp collector can be wheeled around the shop and connected to each machine as needed.



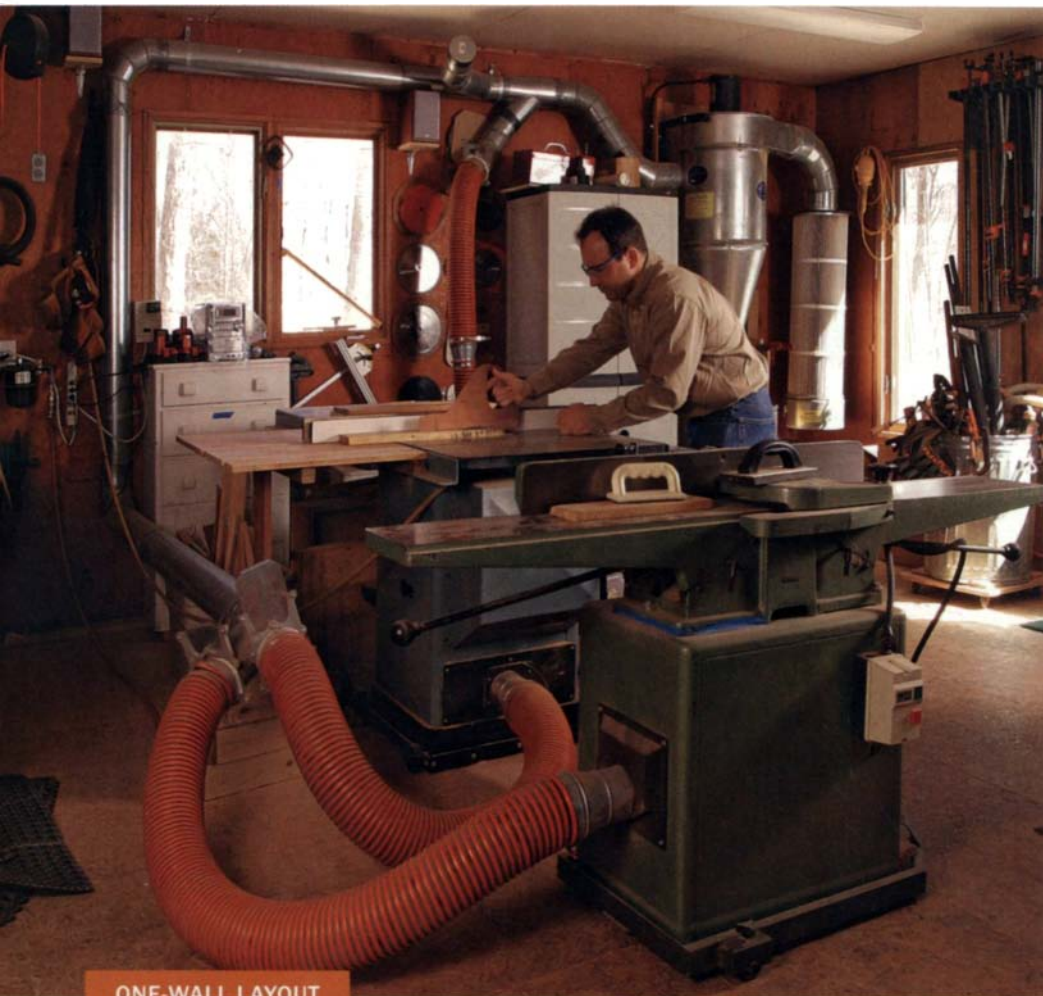
MULTIPLE MACHINES

More horsepower lets you park your collector. A 2-hp machine is strong enough to support about 18 ft. of flexible hose, which also allows for semi-permanent connection to several machines at once.



Cluster your machines to keep maximum runs of hose as short as possible. Use blast gates to concentrate suction on one machine at a time.

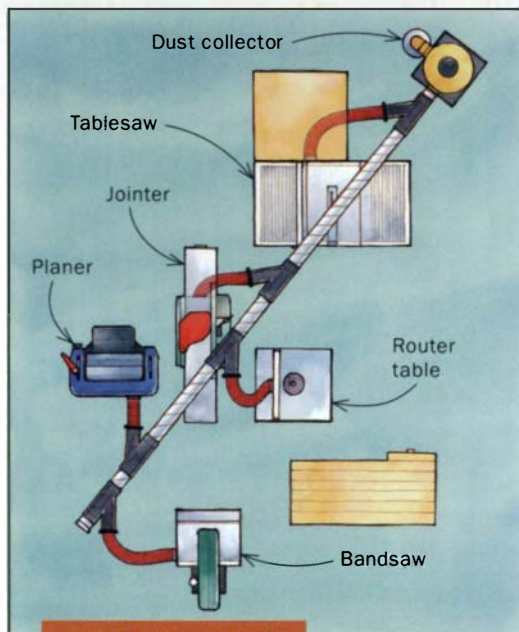
Bigger dust collectors offer more shop layout options



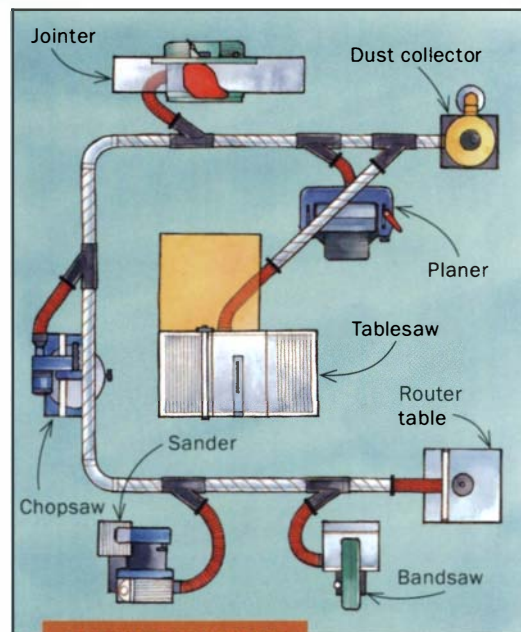
ONE-WALL LAYOUT

THREE POSSIBLE DUCTWORK CONFIGURATIONS

Cyclone collectors are powerful enough to support permanent installations of fixed ductwork. Run ductwork along one wall (above) and use branches of duct or flexible hose to reach machines. A diagonal duct run (near right), mounted overhead, works well for tools in the middle of the room. A duct run around the shop's perimeter (far right) can be mounted overhead or on the walls and works best for tools positioned along the walls.



DIAGONAL LAYOUT



PERIMETER LAYOUT

have four filter bags to clean, not just two. In addition, a collector in this 3-hp class costs about \$500. Upgrading the filter bags, which often is necessary, might cost another \$400. That's before ductwork.

Once you've reached that level of expense, it's worth considering a cyclone.

A cyclone is best for fixed ductwork

The cyclones we tested range in price from \$750 to \$1,200 and come with good cartridge filtration. Any of them can quickly move high volumes of air through enough ductwork to span the length and width of a two-car garage. Assuming you plan to spend \$2,000 or so, the purchase price leaves plenty of cash for adding that ductwork. Your choice should be guided by your own shop layout. How spread out are your machines?

The 2-hp unit we tested, for instance, can support roughly 68 ft. of ductwork, one 90° elbow, one Y-connector, and 6 ft. of flex hose. As you might expect, the 3½-hp machine will handle larger loads. Tests show that it will deliver similar performance with up to 151 ft. of straight ductwork and the same elbow, Y-connector, and length of flex hose. There are larger cyclones on the market, but they provide more capacity than a home shop is ever likely to need. □

Michael Standish provided research and testing for this article.

Get the most from your system

Buying an appropriately sized collector for your woodworking machines is only the first step toward a cleaner shop. Here are several important ways to maximize the performance of your collector.

FILTERS

Replace 30-micron filter bags. A 1-micron bag is necessary to keep the finest dust from escaping back into the shop. Cartridge filters are just as effective but easier to keep clean.

DUST PORT

It's sometimes possible to fit a machine with an aftermarket dust outlet to improve dust pickup.

REDUCERS

For the best airflow, use hose and ductwork the same diameter as the collector's inlet. Use a reducing adapter to connect with woodworking machines that have smaller outlets. Install this fitting at or near the machine.

CONNECTORS

Because sharp turns reduce airflow, it's best to use 45° "Y" connectors to merge two branches of ductwork, rather than 90° "T" fittings.

TURNS

Keep elbows and Y-connectors to a minimum. For the best airflow, use the widest-radius elbows that you can.

BLAST GATES

Close off unused branches. Install at Y-connectors or at individual machines.

DUCTWORK

Smooth-walled metal duct carries air more efficiently than hose, but it's also more expensive and less flexible. In any case, use ductwork that matches the inlet diameter on your collector; airflow friction increases exponentially as duct size decreases.



Editors get a feel for each bench

Fine Woodworking's editors evaluated a bench's appearance and how well the vises worked. They also brought in their tools and gave each bench a good workout. As they planed, sawed, and chopped, they noted the sturdiness and rigidity of each bench, and how comfortable they found the working height.



Ready-Made Workbenches

The best are rock solid, dead flat, and a joy to use

BY MARK SCHOFIELD

At the heart of any woodworking shop is a solid workbench, but there has long been a debate over whether it's better to build your bench or buy it. Then there is the conundrum that you need a bench in order to build a bench. And if you think you can make a bench for a fraction of the cost of buying one, you may want to rerun the numbers: Remember that you can't buy 12/4 maple in bulk like a manufacturer can, and even if you hand-pick your boards, you'll have to cut away some knots, swirly grain, or checking. Add in the cost of some high-quality hardware and you'll find the savings melting away fast.

However, buying a workbench is rather like shopping for shoes: A single brand can have numerous models; the pros and cons of different features are not obvious without trying them out; and one size definitely doesn't fit all.

To help simplify the process of buying a bench, *Fine Woodworking* decided to test some models head-to-head. Because personal preference plays such a large role when selecting a workbench, rather than use a single author, we decided to let all the editors have their say. Sure enough, opinions varied widely on some benches, but overall there was a consensus on the winners. If you are in the market for a workbench, this survey should help you pick one that suits you.

How the benches were selected and tested

We chose benches approximately 6 ft. long by 2 ft. wide, with both a front and a tail vise, that were robust enough to stand up to the rigors of planing, chopping, and sawing by hand.

Eight manufacturers or retailers supplied benches that met these criteria. Nearly all of them make or sell benches of different sizes and with other features than the ones we tested, so if you like the brand but not the bench, check their Web sites for alternatives.

For the more subjective part of the test, the editors recorded how stable the bench felt, how well the vises worked, and how easy the dogs were to use. They also noted the general appearance of each bench; the quality of the finish; and the utility of any storage shelves, cabinets, or tool trays.

When we were done, John White, our shop manager, moved in with his straightedge, feeler gauges, combination square, and scales to objectively measure each bench.

Workbenches vary enormously. You really do have a wide choice when it comes to price, quality, and configuration. More than any other tool in your shop, a good workbench should last you a lifetime, so choose wisely. □

Mark Schofield is the managing editor.





Lie-Nielsen CUSTOM MADE

www.lie-nielsen.com

Price: \$1,800
Length: 84 in.
Width: 24 in.
Height: 38 in.
Weight: 281 lb.
Wood: Maple

Editors' score: 8.5

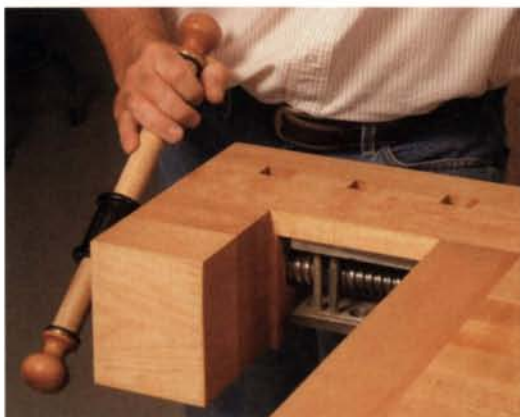
O rder one of these benches and you're unlikely to see its identical twin: Like a bespoke suit from Savile Row, each product is custom built to fit the owner's needs and desires. The owner can specify a top up to 8 ft. 4 in. long and 24 in. wide, with or without a tool tray, and any height. The tall vise can be positioned at either end, or you can

specify a twin-screw tall vise at one or both ends with a double row of dog holes.

We ordered a traditional style of bench that was higher than most. Not surprisingly, 6-ft. 3-in. Rodney Diaz, an associate art director, loved the height, but a surprising number of sub-6-ft. editors also found this height more relaxing to work at. Both vises earned high marks for their German hardware and their beautiful handles, which come complete with rubber O-rings to stop the turned cherry knobs from banging against the metal. The 50/50 boiled linseed oil and turpentine satin finish achieved the right balance of protecting the wood and being renewable.

This bench felt like it had been designed and built by a woodworker, and I think we'd all love to be able to boast that we'd made it ourselves. I suspect that this reason as well as the quality and the features made it our choice as best overall.

One nice vise. The tail vise's stiffness can be adjusted using a pair of bolts. The vise handles, with their black rubber O-rings to protect the turned cherry knobs from hitting the metal, earned unanimous praise.



Hoffman & Hammer 114102

www.highlandwoodworking.com

Price: \$800
Length: 71 in.
Width: 22 in.
Height: 34 in.
Weight: 162 lb.
Wood: European beech

Editors' score: 5.6

T he smallest, lightest, and cheapest of the benches we looked at, Hoffman & Hammer's medium bench could have been overshadowed by the heavyweight competition, but it stood its ground and earned the best-value award. The front vise in particular had very little racking. The main criticism was the lightness of the bench, particularly the base,

which made the bench unstable when pushed from front to back (end-to-end planing pressure was no problem). A solution would be to install a tool cabinet in the base, although the elevated stretchers



Solid vise. The front vise displayed almost no racking when the workpiece was clamped at one end.

Dog vs. drawer. When a dog is deployed in the central holes of the bench, it prevents the drawer from opening.



ers don't leave much room. The dogs and vises were small but worked smoothly, although the tall vise gradually increased in height as it was extended. This would be an ideal choice for someone looking for an economical, well-made workbench but without the physical mass.



Diefenbach

GB 16-43 V/3S/4R

www.workbenches.com

Price: \$1,600

Length: 63 in.

Width: 24³/₈ in.

Height: 35¹/₂ in.

Weight: 271.5 lb.

Wood: European beech

Editors' score: 7.6

Like Mercedes-Benz cars, Diefenbach benches have long been symbols of German engineering prowess. A few years ago, however, Mercedes cars began being recalled for design faults and the marque slipped down the rankings in customer satisfaction. Based on the bench we looked at, Diefenbach's halo may also have slipped. There were several

examples of poor quality control: Only two of the four screw holes for attaching the top to the base were aligned properly, and the threaded rod on the front vise had to be bent slightly to fit into its hole in the bench. The spring clips on all four metal dogs were so poorly riveted that they wouldn't fit into the holes, although after being pounded on an anvil and then filed, they worked fine.

Examples of poor design include the protrusion of the finger-jointed end into the front vise area. Because the dog holes were spaced wider than the end vise's travel, there was a ³/₄-in. dead zone when clamping certain length workpieces (the Laguna bench also had this problem; see p. 62).

In other respects, this was a great workbench with stout legs

and a thick top, giving a very solid feel. The vises were, as associate art director Kelly Dunton put it, "nicely massive," and the anti-racking wheels on both vises were a standout feature.

Vise stays parallel. By spinning the metal wheel until the distance between it and the vise jaw is slightly smaller than the thickness of the workpiece, the piece can be clamped securely without racking or twisting.



Garrett Wade

88A02.01

www.garrettwade.com

Price: \$1,100

Length: 74¹/₂ in.

Width: 24 in.

Height: 33³/₄ in.

Weight: 242 lb.

Wood: European beech

Editors' score: 6.1

Editor Matt Berger's comment, "When I think of a workbench this is it," was typical of the initial favorable views of this workbench. The shelves and lockable cupboard under the bench were welcome, as was the nonmarring felt on the jaws of the tail vise. When planing and sawing, the bench was rigid and stable, but extended use exposed

some problems. Most editors found the low 33³/₄ in. height back-breaking, and the dog holes were too close to the front of the bench to grip wide boards securely. When combined with the loose dogs and the poorly aligned top of the front vise, this bench left editors disappointed, a reaction reflected in its sixth-place ranking.



Dog gone. Because the dogs were too loose, they slipped down when positioned about ¹/₂ in. or less above the surface.



Front vise too low. The top of the front vise is about ¹/₈ in. below the benchtop.



Grizzly

H7725

www.grizzly.com

Price: \$850

Length: 84 in.

Width: 24¾ in.

Height: 34¼ in.

Weight: 299.5 lb.

Wood: Birch

Editors' score: 4.4

This bench certainly looked different from all the rest. Instead of being made from large chunks of beech or maple, Grizzly's bench is made from thousands of strips of birch, most no larger than ¾ in. sq., laminated together. The top was relatively flat, and this method of construction should, in theory, make it the most stable of all the benches.

That's where the good news ends: Despite being the heaviest bench, when given a jolt it wobbled several times from end to end, probably due to the small stretchers and the undersize nuts and bolts that attach them to the legs. The front vise racked alarmingly, while the tail vise climbed ⅛ in. when tightened. When combined with the fact that the dogs leaned backward under pressure in their oversize holes, the effect was to raise the workpiece into the air.

The other trouble spot is the massive drawer in the base. Heavy even when empty, it is difficult to open when storing anything but bulky, light objects.



Unsteady workpieces. A combination of slop in the tail vise and dogs that angle backward under pressure causes the workpiece to rise off the bench when clamped.



Laguna

7-FT. WORKBENCH

www.lagunatools.com

Price: \$1,365

Length: 89½ in.

Width: 26½ in.

Height: 33 in.

Weight: 242.5 lb.

Wood: European beech

Editors' score: 6.5

The largest of the benches we tested, the Laguna also was the shortest. The overall appearance was pleasing and the bench had good stability, but on closer inspection the construction and the vises left something to be desired. The top was visibly wavy and dished 0.030 in. in several places including the critical right-front corner near the

tail vise, suggesting the top had been poorly wide-belt sanded. Also, the top of the trestle base protrudes beyond the front of the top, interfering when edge-planing a long board.

The dogs and dog holes got mixed reviews. Some editors described the fit as just right, while others found the dogs' flat spot too small to locate without a second glance. With some modest redesign and better quality control, this could become a much better bench.



Good and bad dogs. The Laguna dogs slid in and out of the holes with the right amount of resistance, but editors disliked the small flat spot.



Sjoberg ELITE 2000

www.woodcraft.com

Price: \$1,500
Length: 76½ in.
Width: 23⅝ in.
Height: 35½ in.
Weight: 279 lb.
Wood: European beech
Editors' score: 8.3

The Sjoberg only just missed the best-overall award. Initial comments were “handsome,” “beautiful,” “massive,” and “well made,” and closer inspection revealed a number of unique and useful features: The front vise can be switched to the opposite side of the bench and the bench rotated 180° for left-handed use; square vise runners almost

eliminated racking despite the nearly 2-ft. width of each vise; the legs are flush with the top and fitted with dog holes to allow wide boards to be supported when edge-planing. A heavy bench, the top is 3 in. thick with a 4-in.-thick apron, giving it a very sturdy feel. Uniquely, the front vise was also fitted with a pair of dog holes, which, combined with the holes running the length of the front and back sides, gives great clamping flexibility.

The dogs were round with a large, flat clamping spot, but a

little stiff and hard to remove when low in the hole. The only other complaint was the slightly rough and low-luster oil-finished surface, a minor blemish on an otherwise excellent bench.



Edge-plane wide pieces. The legs are flush with the sides of the benchtop and contain dog holes so they can support long boards.



Veritas 05A01.01

www.leevalley.com

Price: \$995
Length: 72¾ in.
Width: 26 in.
Height: 35 in.
Weight: 187 lb.
Wood: Maple
Editors' score: 6.8

Opinions differed sharply on this bench, with nearly half the editors picking it as best value while others considered it overpriced. The most debated feature was the twin-screw tail vise—a Veritas exclusive. Proponents cited its lack of racking and ability to clamp a 15½-in.-wide board between the guides, and proclaimed it the best end vise on any

bench. Skeptics called it weird, stiff, and jerky. The vise arrived unable to turn using one handle. Shop manager John White spent a few hours trying to tune it up and eventually reached a compromise between operating and not being too slack. The troubleshooting details in the manual suggest that our experience is not unique.

The center tool tray impressed some editors, but the design may be responsible for the bench being dished by 0.016 in. around the center. The dogs come with slip-on plastic tool protectors, but these prevented the dogs from being lowered less than an inch above the bench and must be removed when planing thinner

stock. Finally, the shiny wipe-clean finish attracted some editors, but others wondered how it would look after a few years of use with no easy way to renew it. More than any other bench, this is probably one to try before you buy; you'll love it or leave it.



Wide clamping ability. The large distance between the guides in the tail vise allow wide boards to be clamped securely.

Get a Handle on Your Chisels

Invest new life into old tools with shopmade handles

BY BOB SMALSER



Have some old socket chisels around that need handles? If not, perhaps you should. Even with today's high collector interest, flea markets, estate sales, and auctions still provide excellent values in tools if you can make your own handles. I prefer my own handles anyway, as I custom-fit them to the size of my hands and to my working style.

What's the big deal about old socket chisels in the first place? They generally are premium tools, made when chisels were drop-forged instead of investment-cast. Except for price (a handle-less old chisel often can be had for less than \$5), the differences between an old Thomas Witherby or James Swan and a modern chisel are subtle, but many of my generation still consider them to be the best compromise between edge retention and ease of sharpening in a factory-made chisel. They also are relatively plentiful—there were a couple dozen premium chisel manufacturers in the decades before World War II, not just the two or three best known. I like to see those heritage tools in the hands of users instead of collecting dust.

To make a good handle, any dense hardwood will do. Use what you have locally so you can make matching handles later. The original factories used common woods like hickory, ash, and oak pretty interchangeably. I suppose the hardest, toughest, and heaviest woods with interlocked grain are best—woods like dogwood and hop hornbeam—but I haven't found one species to outlast another in normal use. A teenager with a framing hammer can destroy any one of them as easily as another.

Here in the hardwood-scarce Northwest, I use Pacific madrone, simply because it's the densest of the three hardwood species growing in my woods.

I use a lathe, but you can make handles without one. Anything done on a lathe can be done as well, just not as fast, using a drawknife, a spokeshave, rasps, and files.

Bob Smalser is a woodworker and boatbuilder in Seabeck, Wash.

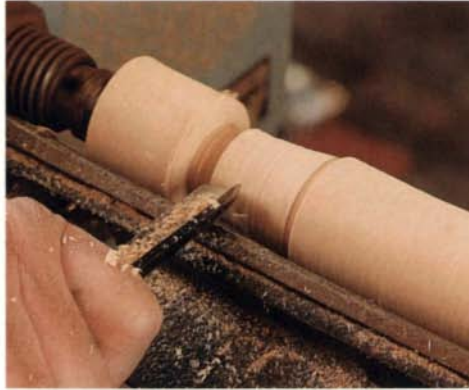
FineWoodworking.com

No lathe? Learn how to shape a chisel handle with hand tools.

1. Shape the handle



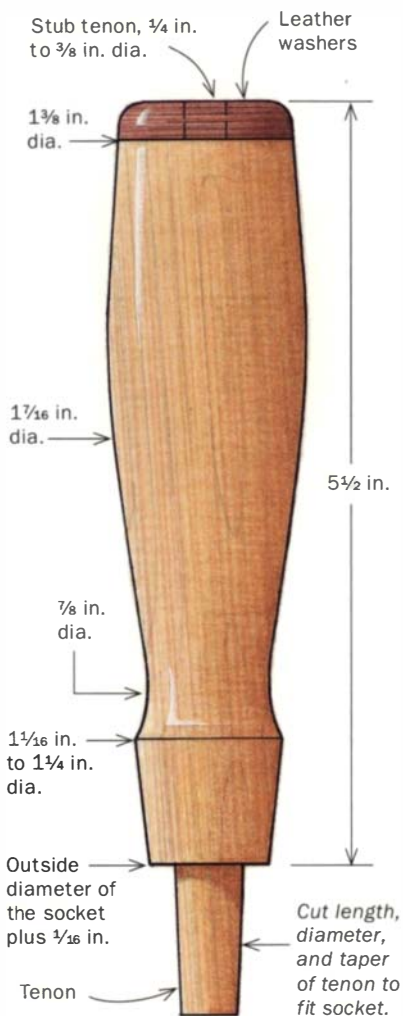
Start by turning a stub tenon. Smalser uses a parting tool to form the tenon, and then glues leather washers over it to create a durable striking surface.



Establish the tenon shoulder. Use the parting tool to mark the start of the tenon that fits in the chisel socket, then shape the adjacent tapered section with a small gouge.



Cut the handle to final shape. Use the small gouge followed by a skew chisel for cleanup. This design relies on subtle curves for comfort.



2. Shape the tenon



Use an inside-outside caliper. Transfer the inside diameter of the socket mouth to the tenon shoulder, checking progress as you cut the top of the tenon to size with a parting tool.



Finish the taper. Gauge the socket's depth and its diameter at the deep end. Use these measurements, and the parting tool, to cut the small end of the tenon to size. Finish the taper by pulling a small skew from the tenon shoulder to the pointed end. Leave the tenon slightly oversize for hand-fitting later.



HANDLE DIMENSIONS

After turning more than a hundred handles for himself and tradesmen friends, Smalser finds these dimensions most comfortable for a man with large hands.

3. Sand and finish the handle



Begin sanding with 120-grit. Work through the grits up to 320-grit.



Raise the grain. Wipe the handle with a damp towel between each grit. The water swells and loosens the wood fibers in the scratches, so less work is required to sand them off.



Apply the finish. Smalser prefers a thin wiping varnish formulated for gunstocks (Tru-Oil or Lin-Speed), rubbed out with paste wax and #0000 steel wool after curing.

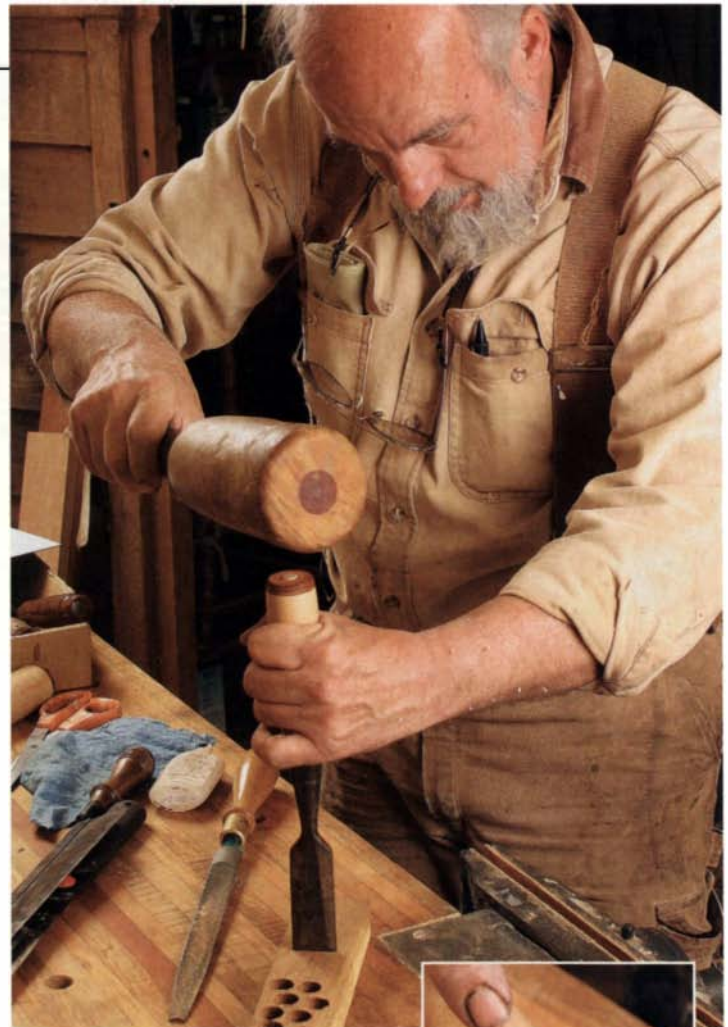
4. Fit it and set it



An age-old fitting trick. After securing the blade in a vise, insert the tenon firmly and twist it a full revolution. A dirty socket will leave dark patches on the high spots; file these away using a fine rasp. Repeat until you have full wood-to-metal contact for a perfect fit.

Fixing a tenon that's too small

A tenon that's too skinny won't fit securely. Simply cut a piece of cloth to fit the tenon's length and circumference, wrap it around the tenon, and glue it in place as a shim. Once the glue dries, drive the handle into the socket.



Drive the socket tenon home with a mallet. Leave a gap between the socket and the tenon shoulder. This helps prevent splitting. You also can seat the tenon and shoulder in epoxy to prevent the handle from coming loose when the handle shrinks in the dry season.



Spindle Sanders

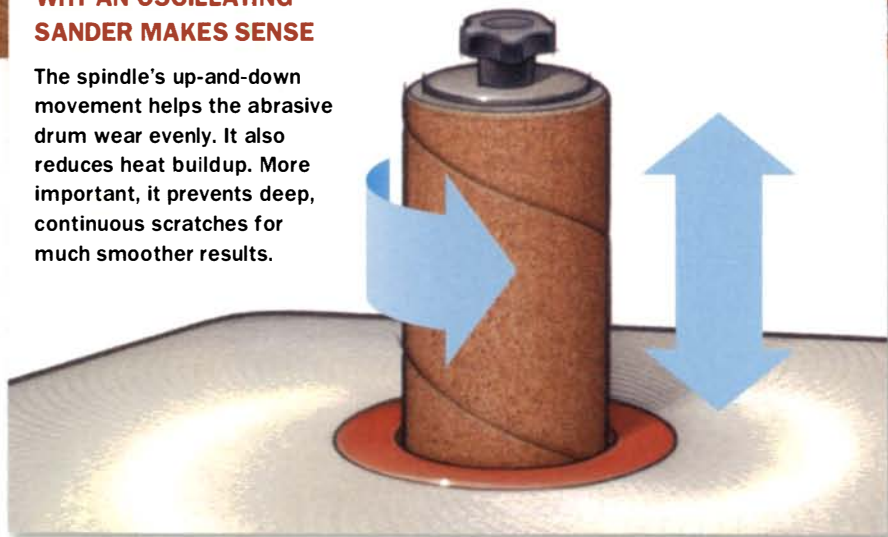
Oscillating drums
smooth curves
quickly and easily

BY ROLAND JOHNSON



WHY AN OSCILLATING SANDER MAKES SENSE

The spindle's up-and-down movement helps the abrasive drum wear evenly. It also reduces heat buildup. More important, it prevents deep, continuous scratches for much smoother results.



Nothing beats an oscillating spindle sander for sanding curves. The up-and-down movement helps keep the sanding sleeve from clogging. Sanding goes faster, the abrasive lasts longer, and there's less risk of heat buildup.

The seven sanders I tested sell for \$140 to \$640. They're compact enough to sit on a workbench, although a couple have a floor stand. One, the Ridgid 4424, has the unique ability to convert quickly from a spindle sander to an oscillating 4x24 belt sander. These machines won't grind away large amounts of hardwood

Test results

Every machine handled its main job—sanding curves—very well. Factors such as table height or onboard storage for tools and accessories mattered more. What set the Ridgid apart from the rest is the added versatility of its belt-sanding attachment.



RIDGID EB4424



Two in one. The Ridgid 4422 is the only machine that converts from spindle to belt sander. The changeover takes about half a minute and doesn't require tools.



BRIDGEWOOD OVS-5

in no time. However, all have enough power to sand 8/4 red oak without slowing or stalling. I was able to stall the two with the least horsepower, the Delta and the Grizzly G0538, but only when they were bolted down and fitted with a 3-in. drum and I pushed hard on the stock. But that kind of aggressive sanding isn't right for these machines.

Motor speed, oscillations per minute, and spindle stroke vary, but those differences don't matter. I had no trouble sanding to a line or following a curve with any machine. What does matter are seemingly small things—a place to store sanding sleeves and tools, or a dust port that fits a shop vac without an adapter.

A drum for every curve

Except for the Grizzly G9922, which comes only with a 2-in. sanding drum, these sanders come with at least four spindles, generally ranging in diameter from 1/4 in. to 2 in. That range of sizes highlights a real benefit of spin-

dle sanders—the ability to change the drum and the sleeve that fits over it to suit any curve.

Drums smaller than 1/2 in. slide onto metal spindles and are secured by a washer on the top or a clamp on the bottom. Those larger than 1/2 in. slide onto rubber drums that either fit the 1/2-in. spindle or have a spindle of their own. To hold the sanding sleeves in place, you tighten a nut at the end of the spindle, compressing the rubber drum against the sleeve. That's easiest on the Ridgid, which doesn't require tools. It's outfitted with knobs for drum changes, table tilting, and conversion from belt- to spindle-sanding mode.

Few things aggravate me more than hunting for the wrenches or parts I need to change spindles or sanding drums. The Delta, the Grizzly G0538, and the Ridgid are the handiest; they store spindles, spare drums, and tools on their bases. The Jet is nearly as good; it holds spare spindles, sanding drums, and table inserts, but not tools. The Clayton has a separate

MODEL/SOURCE	STREET PRICE	WEIGHT
Bridgewood OVS-5 www.wilkemachinery.com 717-764-5000	\$270	85 lb.
Clayton 140 www.woodworker.com 800-971-5050	\$640	70 lb.
Delta SA350K www.deltamachinery.com 800-223-7278	\$200	45 lb.
Grizzly G0538 www.grizzly.com 800-523-4777	\$140	27 lb.
Grizzly G9922 www.grizzly.com 800-523-4777	\$200	86 lb.
Jet JBOS-5 www.jettools.com 800-274-6848	\$380	77 lb.
Ridgid EB4424 www.ridgid.com 800-474-3443	\$200	48 lb.





CLAYTON 140



GRIZZLY G9922



GRIZZLY G0538



DELTA SA350K



JET JBOS-5

MOTOR	OSCILLATIONS PER MINUTE	SPINDLE STROKE	SPINDLES INCLUDED	TABLE SIZE	HEIGHT	COMMENTS
½ hp, 5.7 amp	30	1 in.	¼, ½, ⅝, 1½, 2 in.	14½ in. sq.	18 in. (39 in. with base)	Cast-iron table tilts. Includes steel base. Very similar to Grizzly G9922 and Jet.
½ hp, 7.5 amp	60	¾ in.	½, ¾, 2, 3 in.	14 in. by 2 in.	13½ in.	Heavy-duty oscillation mechanism, sturdy construction, high-quality motor. Steel table does not tilt. Highest spindle runout (0.012 in.) Mfr. said it would replace machine under warranty.
¼ hp, 3.5 amp	60	⅞ in.	¾, 1, 1½, 2, 3 in.	18 in. dia.	12 in.	Cast-iron table does not tilt. Lowest spindle runout (0.001 in.). Smallest dust port (1¼ in.). Base holds spare drums, spindles, tools.
⅓ hp, 2.4 amp	72	⅝ in.	½, ¾, 1, 1½, 2, 3 in.	14 in. by 20 in.	11¼ in.	Laminate-covered MDF table does not tilt. Oscillation mechanism may need periodic lubrication. Base holds spare drums, spindles, tools.
½ hp, 4.6 amp	64	1 in.	2 in.	14½ in. sq.	18 in. (39 in. with base)	Cast-iron table tilts. Includes steel base. Noisiest sander tested. 3,450 rpm (twice as fast as others). Very similar to Bridgewood and Jet. ⅝-in. miter slot in base.
½ hp, 5.7 amp	30	1 in.	¼, ½, ⅝, 1½, 2 in.	14¾ in. sq.	18 in.	Cast-iron table tilts. Very similar to Bridgewood and Grizzly G9922.
⅜ hp, 5 amp	60	¾ in.	½, ¾, 1, 1½, 2 in.	16½ in. by 18⅞ in.	13½ in.	Unique design converts easily from 4x24 oscillating belt sander to spindle sander. Aluminum table tilts. ¾-in. miter slot in base. Base holds spare drums, spindles, tools.

Spindle-sanding tips

Here are six good ways to make an oscillating spindle sander a workshop asset.

1. BEGIN WITH ACCURATE CUTS

It's hard to turn an irregular line into a fair curve; lumps and bumps tend to get magnified. When roughing out a curve on the bandsaw, try to leave a small, constant margin that can be sanded away quickly and consistently.



2. SAND WITH A LIGHT, STEADY HAND

You'll get the most uniform, fair curves with a steady feed rate and long, fairly fast, sweeping feeds. A slow feed rate or sanding to the line in short segments usually yields lumpy curves. Feed the stock into the drum gently for better control and less heat buildup. Sanding sleeves will last longer, too.



3. MATCH THE DRUM TO THE CURVE

For smooth, fair lines, use as big a drum as you can fit into the curve. All these sanders hold a 2-in. drum; a few go up to 3 in.

rack for spindles, but no tools. The Bridge-wood and the Grizzly G9922 don't provide storage.

Testing spindles and tables

To find out if the spindles were square to the tables, I jointed the edge of a piece of mahogany, drew pencil lines along that edge, and then sanded away. Any remaining pencil marks would show whether the spindle was out of alignment. All the spindles were square in all directions.

I then measured each spindle's runout, or tendency to wobble. My view is

that runout of less than 0.005 in. doesn't matter. On that basis, five of these sanders did fine. But I measured runout of 0.009 in. on the Grizzly G9922 and a whopping 0.012 in. on the pricey Clayton. When told about the runout, Clayton said it would fix the problem. But as this article went to press, I hadn't received the repaired sander.

FineWoodworking.com

Watch a video detailing the basic anatomy and uses of a spindle sander.

Four sanders have tilting tables. I seldom need to sand angled curves, but it's nice to have the option. The tilting tables move on protractor-style mounts held with clamping knobs. All can be returned to zero without fuss, and all have adjustments for setting the zero stops accurately.

The Ridgid and Grizzly G9922 have miter slots in their tables. The Ridgid's fits a common $\frac{3}{4}$ -in.-wide miter gauge, while the Grizzly's is only $\frac{5}{8}$ in. wide. With a miter gauge (or shopmade fence, above), you can easily sand straight stock or end grain.

Sanding accurately to a line requires

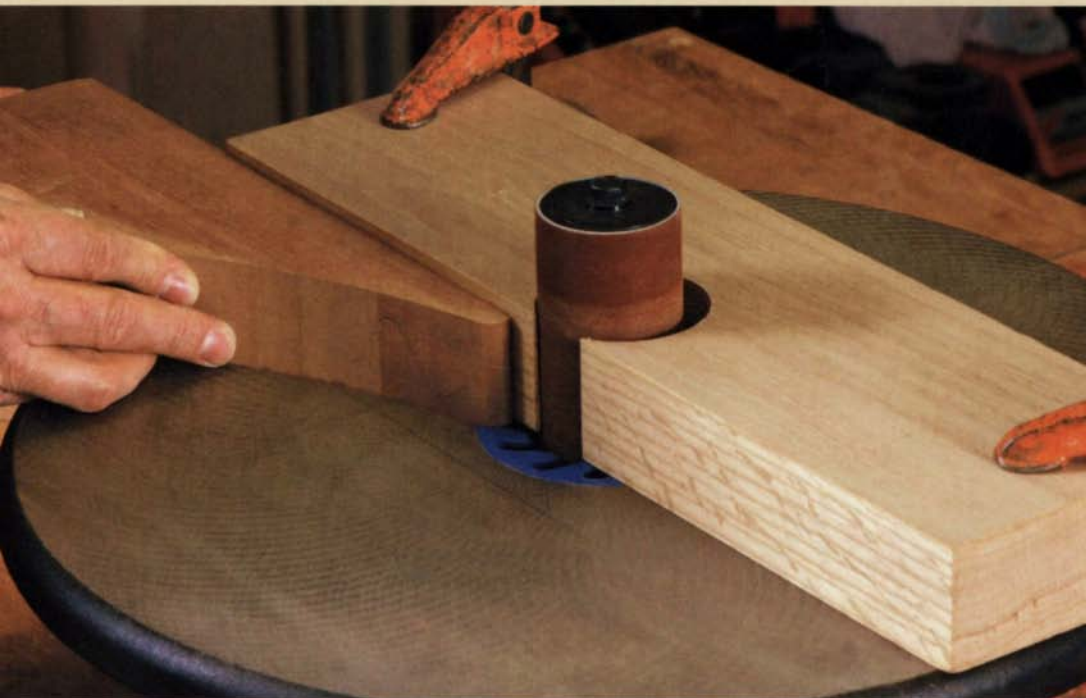
4. KEEP SANDING SLEEVES FRESH

Spend \$5 to \$10 for a sanding-belt cleaning stick and use it often. It will greatly extend the life of sanding sleeves, increase the efficiency of the abrasive, and reduce the chance of scorching the wood.



5. TILT FOR BEVELS

A tilting table, found on four of the seven sanders tested, becomes a handy feature for bevels and roundovers along a curve.



6. DON'T SAND STRAIGHT EDGES FREEHAND

If you want your spindle sander to follow a straight line, turn it into an edge sander with this simple jig: Take a board at least 1½ in. thick and bore a hole slightly larger than the sanding drum near the board's edge. Rip the edge off the board, removing a bit of the hole to leave a gap in the side of the board. Clamp the fence to the sander table so that the drum peeks through the gap.

looking directly down at the line. So the work needs to be about elbow-high. For me, at 5 ft. 9 in., the sander table should be no more than 45 in. off the floor.

The Bridgewood, Grizzly G9922, and Jet are about 18 in. tall, much taller than the others. The Bridgewood and Grizzly come with steel bases that put them at a handy (for me) height of 39 in. But the Jet is a benchtop-only machine and too tall for me to use comfortably at my 34½-in.-tall bench. If I were 6 ft. 3, I'd have no complaint. Overall, the Grizzly G0538 at 11¼ in. tall is most suited to benchtop

use, followed by the Delta at 12 in. and the Clayton and Ridgid at 13½ in.

Dealing with dust

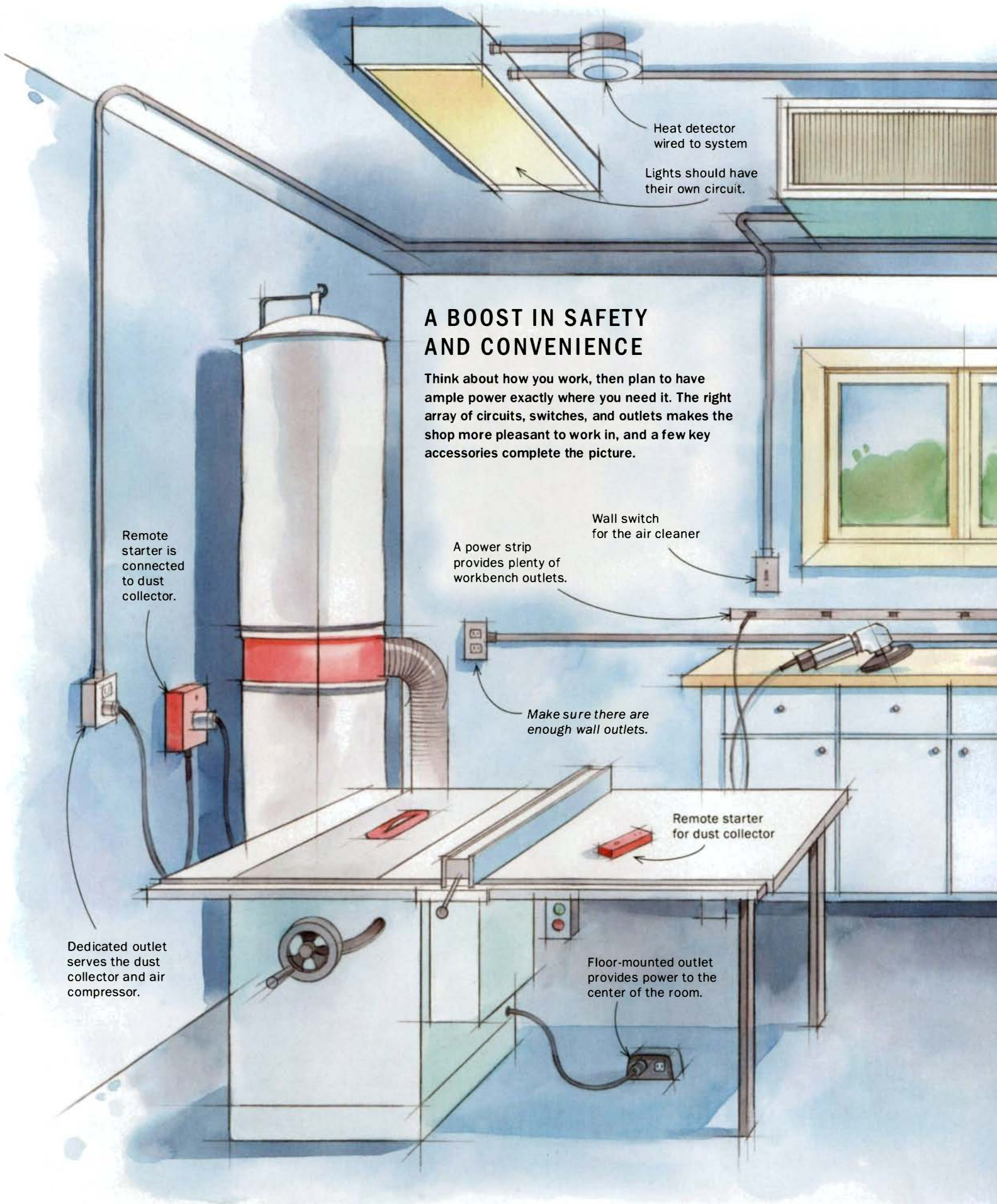
The Delta was best at the critical task of dust collection. Its spindle has a small fan that moves air down and out the dust port. The sander comes with a dust bag that does a fair job of containing fine particles. But I found that the Delta, like all the other sanders, does a better job of dust collection when it's connected to a shop vacuum. Next best are the Grizzly G0538 and the Clayton, with dust ports under the edge of

the table. The Ridgid's dust-collection system was reasonably good only when the machine was in spindle-sander mode.

One clear winner

I chose the Ridgid EB4424 as the best overall and the best value. Because it can work as both a spindle sander and a belt sander, it has versatility that the others don't. Its tilting table and no-tools-needed design add to its convenience. And its \$200 price makes it an excellent buy. □

Roland Johnson is a contributing editor.



Heat detector wired to system

Lights should have their own circuit.

A BOOST IN SAFETY AND CONVENIENCE

Think about how you work, then plan to have ample power exactly where you need it. The right array of circuits, switches, and outlets makes the shop more pleasant to work in, and a few key accessories complete the picture.

Remote starter is connected to dust collector.

Wall switch for the air cleaner

A power strip provides plenty of workbench outlets.

Make sure there are enough wall outlets.

Remote starter for dust collector

Dedicated outlet serves the dust collector and air compressor.

Floor-mounted outlet provides power to the center of the room.

Wiring a Workshop

Plan smart, and you'll know what to tell the electrician

BY CLIFFORD A. POPEJOY

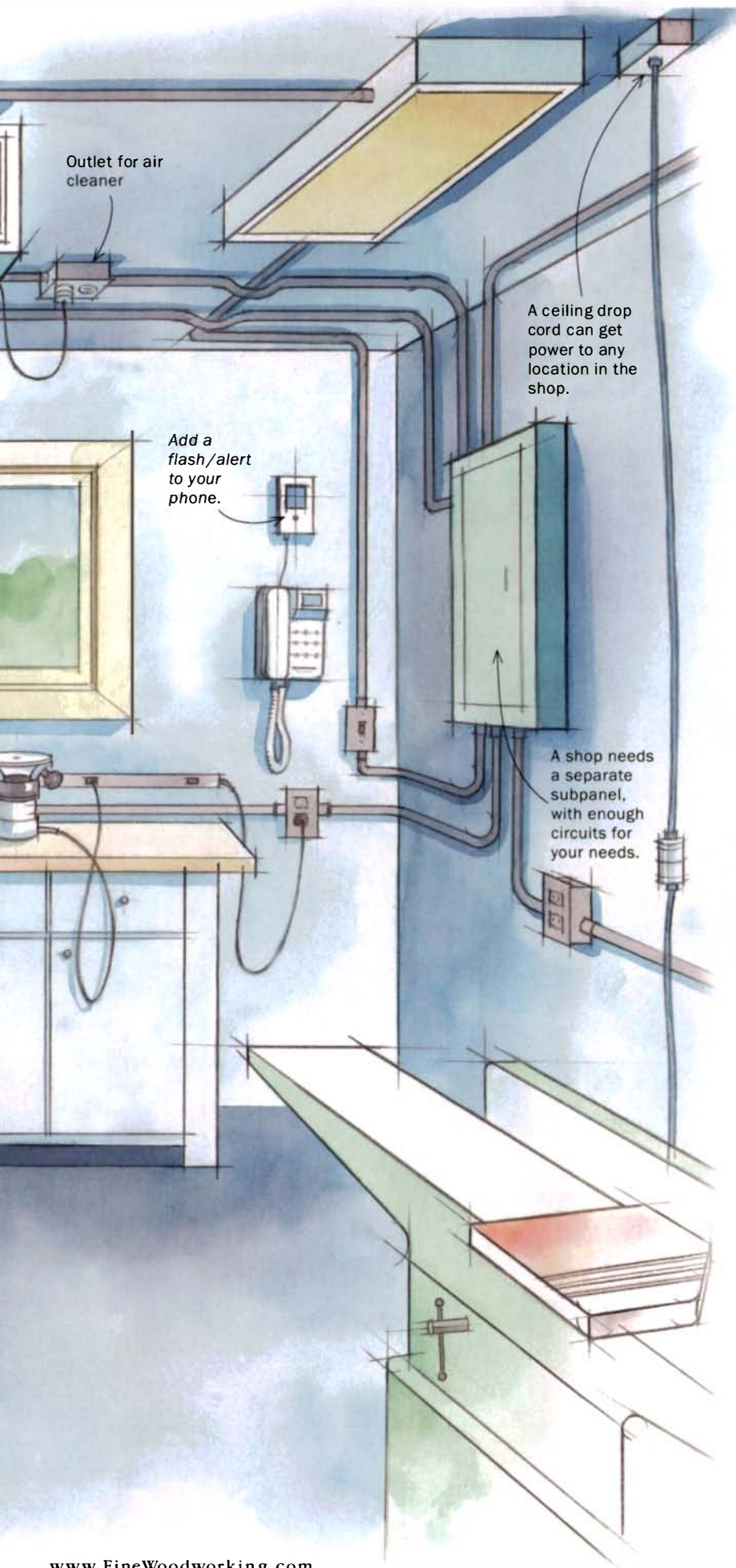
The electrical wiring, outlets, and lighting in your shop should be as specialized as your tools. It's hard to turn out high-quality work—or to work safely—in a poorly illuminated shop. It is equally frustrating and potentially dangerous if your tools keep tripping breakers on underpowered circuits or if your floor is a tangle of extension cords. To upgrade your workspace to meet the special needs of woodworking, you should know how to identify your needs and then communicate them to an electrician with the skills to turn your plan into reality. If you put these ideas to use, your woodworking will be safer and more satisfying.

Shop features dictate the wiring layout

Installing the wiring for a woodshop is done most easily during construction or remodeling with the walls open, but it can be done anytime. If the walls are closed in, either have the wiring run in surface-mounted conduit or hire an “old work” electrician who can run wires in existing walls and make a minimum of holes to be patched later.

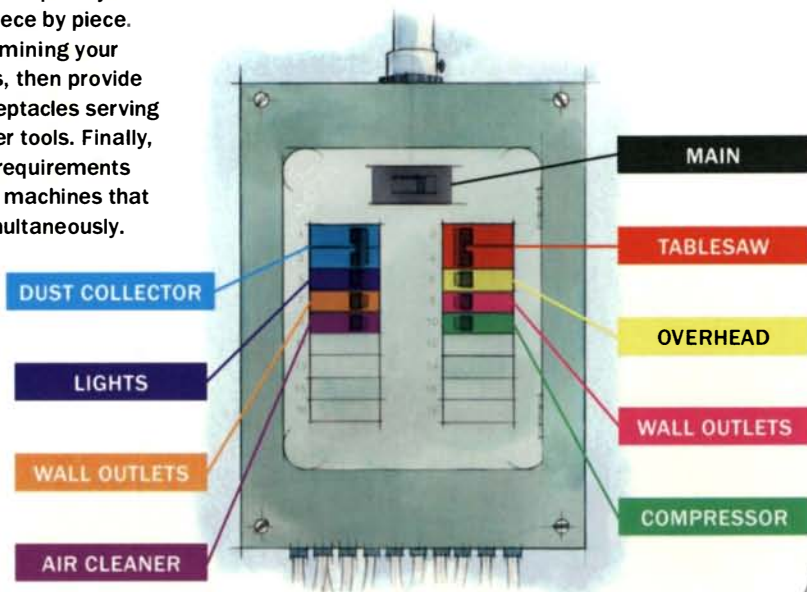
To feed the shop circuits, the best approach is to install an electrical subpanel (breaker box) specifically for the shop. In a well-designed system a breaker will rarely trip, but if it does, it helps to have the panel nearby. There's a wide range of subpanels available, and your choice will depend on how much power and how many circuits you need.

At any given time, most one-person shops will be running one major stationary tool, a dust

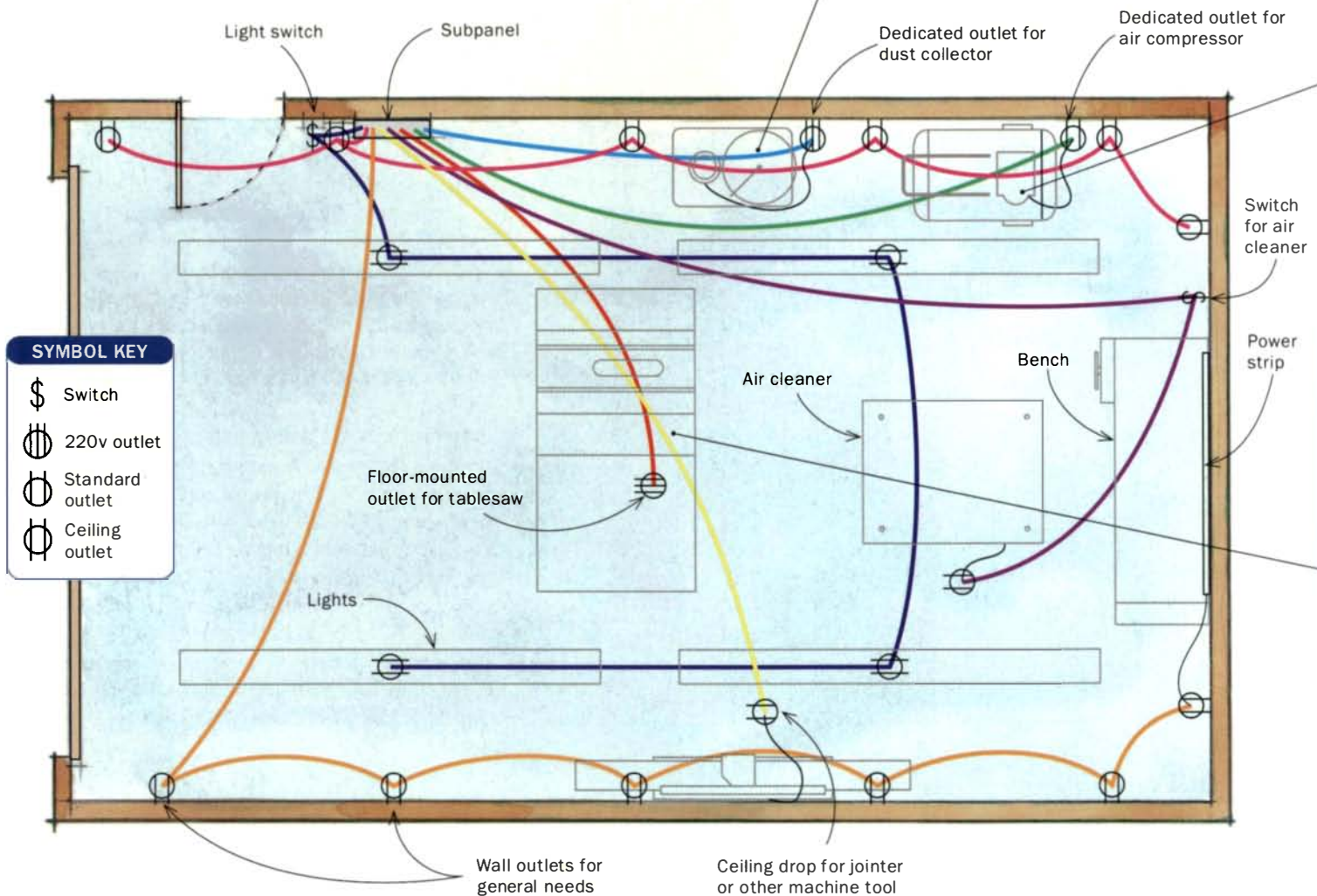


Plan circuit by circuit

Designing the wiring for your shop is pretty simple if you approach it piece by piece. Start by determining your lighting needs, then provide power for receptacles serving portable power tools. Finally, work out the requirements for stationary machines that might run simultaneously.



Dust collector needs dedicated power. Check the voltage that the dust collector motor runs on, and wire a separate circuit for it.



collector, an air filtration system, and lights. In this case, 60 amps at 240/120v likely will provide enough power. If there's heating or air conditioning running as well, a 100-amp subpanel probably will be adequate. I suggest a panel with room for 16 or 20 circuit breakers. These are starting points. Because each shop is different, you should calculate the number of circuits and power needs of your own.

There are two interdependent aspects to wiring a shop. One is circuit design—how the various things that use power (called “loads”) are arranged and grouped, and how they are connected to their electricity source through wiring and circuit breakers. The other is the choice and location of light fixtures, receptacles, and switches.

Let there be light (on its own circuit)

Depending on the size of the shop, you should have one or more 120v, 15-amp circuits dedicated to lighting. That way if you are ripping a board and your table saw trips a breaker, you won't be plunged into darkness and into a dangerous situation.

To compute how many lighting circuits you will need, add up the total wattage of the lights and provide one 15-amp lighting circuit for every 1,500 watts. This is based on loading each circuit to about 80% of its capacity. This cushion, though not required in noncommercial applications, is still a good idea.

For example, to provide lighting for a single-car garage-size shop (240 sq. ft.) with 96-in., high-output (HO) fluorescent lights, you would need four separate 2-lamp fixtures. Each 8-ft. lamp requires 110 watts, so you would need a total of 880 watts to light this shop. Consider installing some task lighting (say a track fixture with three, 65-watt floodlamps or equivalent fluorescent floods) as well. I'd put this lighting on one 15-amp circuit.

Consider setting up the lighting so that the general lighting fixtures are wired to two or more separate switches, with the task lights switched separately from the general lighting. This way, if your machine and bench areas are separate, you can save energy by illuminating only the area in which you're working. (For more information on how to select and install shop lights, see “Lighting for the Workshop,” *FWW* #154, pp. 56-61.)

Outlets: the more the better

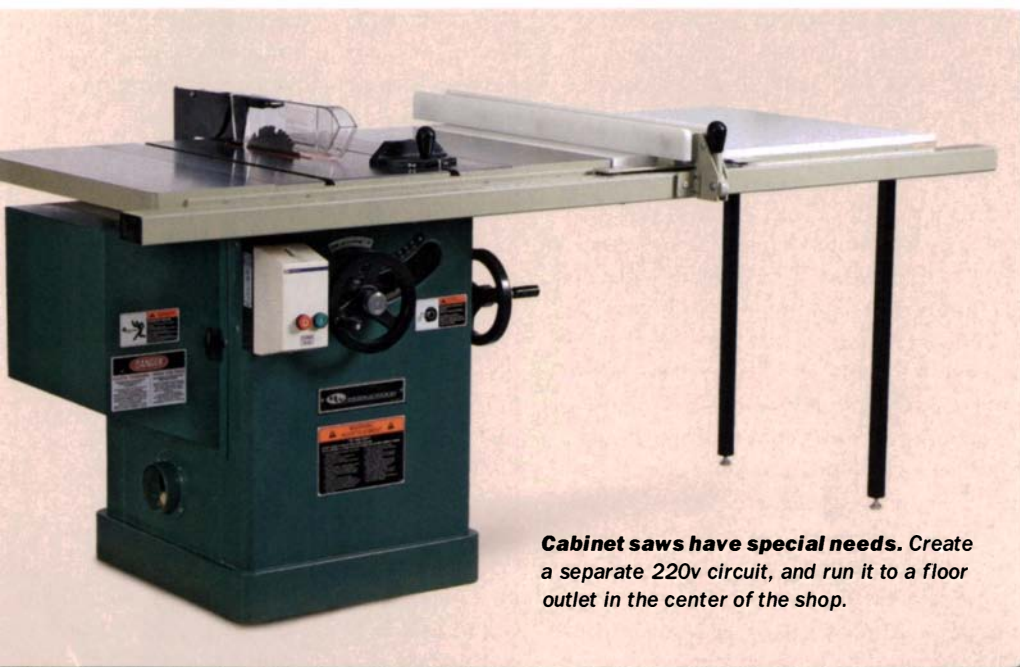
It's a fact that a shop can never have too many clamps, and it's equally true that it can't have too many receptacles. Receptacles should go on 20-amp circuits. There's no limit set by the National Electrical Code (NEC) for the number of outlets that can go on a circuit in a residential application. For a shop, it makes sense to identify the loads you expect to operate at the same time and group the receptacles onto circuits so that each circuit can comfortably support the expected demand. A 120v, 20-amp circuit can provide 2,400 watts, although it's a good idea to keep the load to 80% or less, or about 1,900 watts. To figure out how many circuits are needed, look at the power needed as shown on the tool nameplate (some nameplates will specify watts, and some amps). If the tool specs give amps only, convert from amps to watts for a 120v tool by multiplying amps times 120. For instance, if you have a small air compressor that draws 13 amps (1,560 watts), put in a receptacle supplied by its own 20-amp circuit, called a “dedicated” circuit. For outlets that won't be supplying a specific tool, as in an area like an assembly bench where you will be using various small power tools, I suggest three or four outlets on a 20-amp circuit.

The NEC requires ground fault circuit interrupter (GFCI) protection for any 15-amp or 20-amp branch circuits supplying a garage or other work area at grade level. You can meet this requirement by using a GFCI circuit breaker or by having a GFCI receptacle first in line and wired to protect the downstream receptacles.

For general-use outlets, like the ones used for routers, hand sanders, and corded drills, it is a good idea to set up circuits based on the area served. For example, you might set up a separate circuit for each wall. Or you may want a couple of 20-amp circuits to serve your workbench, where

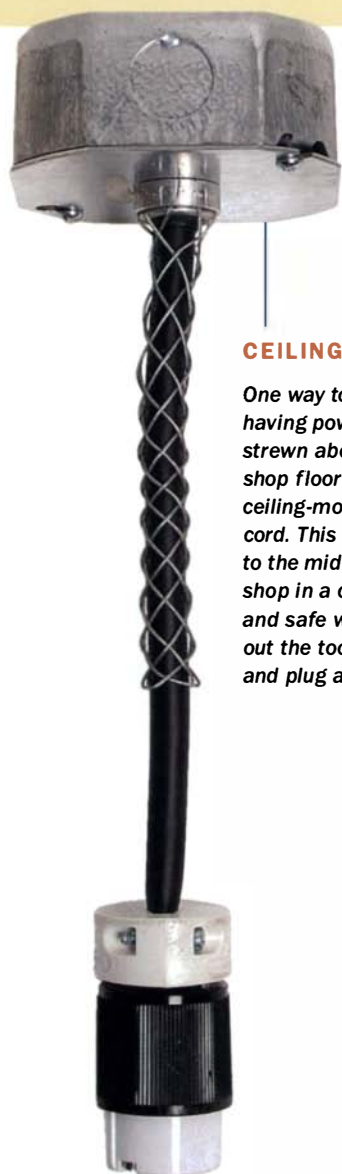


Consider a separate circuit for the compressor. By running your air compressor on its own circuit, you avoid the possibility that it will trip a circuit breaker when another tool is used.



Cabinet saws have special needs. Create a separate 220v circuit, and run it to a floor outlet in the center of the shop.

Get the power where you need it



CEILING

One way to avoid having power cords strewn about your shop floor is to use a ceiling-mounted drop cord. This brings power to the middle of your shop in a convenient and safe way. Just roll out the tool of choice and plug away.

FLOOR



Another way to bring power to the middle of your shop is to use a monument-style receptacle. This type avoids the problems of a flush-mounted receptacle, which include dust clogging and possible shorts from metal objects.



Workbench power. A Plugmold power strip gives you a convenient place to plug in power tools that are used often at your workbench.

you might have three or four outlets on each circuit. A neat trick is to run two circuits along the wall and feed alternating receptacles from the two different circuits. Don't use a shared neutral circuit for this; you have to GFCI-protect the outlets, and keeping the two circuits completely separate makes this easier.

A product called Plugmold (www.wiremold.com) is useful for providing workbench power. It is a steel channel with outlets spaced at intervals. Plugmold stands about 1¼ in. wide and above the surface and is available in various receptacle spacings (12 in. is best for shop use). Plugmold is much sturdier than a typical cord-connected "power strip" and is the right way to pack a lot of outlets along a wall.

It's a good idea to place wall outlets 50 in. above the floor (to the bottom of the box). That way if you lean sheet goods against the wall, they won't cover the outlets. And the outlets will be well above any benchtop or other worksurface. Another nice setup is to set aside a shelf area for cordless-tool chargers, and put a 3-plus-ft. strip of Plugmold with 6-in. receptacle spacing on the wall behind the shelf. Put this on a separate 20-amp circuit, so you can leave it powered up while turning the other receptacle circuits

off at the breakers for safety when you're not in the shop.

Get plenty of juice to stationary tools

The big guns—stationary tablesaw, jointer, planer, dust collector—draw so much power that they each require their own circuit. (Without it, running two simultaneously will trip a breaker.) If the motor can be set up to run on 240v, have an electrician do it. It will probably require taking the motor out of the machine. There's no power efficiency advantage to running a machine at 240v vs. 120v in a single-phase system, but the higher voltage means lower amperage, and as a result, you can use smaller-gauge power-supply wiring. That translates into less expense to run the wire and to hook it up.

To figure out what size circuits you will need, check the amp rating on each tool's data plate or in its product manual. Keep in mind that the circuit breaker at the sub-panel is designed to protect the building's wiring from an overcurrent condition—it does not, however, ensure that the machine's motor won't overload. If the motor does not have an internal circuit breaker for overload protection (the tool manual will indicate this), a fused disconnect may be required. Ask the electrician to install it.

The fuses in the disconnect box will protect the motor windings from overheating.

Some tools are an island—Getting power to a machine in the middle of the floor can be a challenge. You don't want a cord running along the floor that you might trip over. If there's a basement or crawlspace below, I would run cable or conduit below the floor and use a monument-style housing to hold the receptacle at the base of the machine (see bottom left photo, facing page). A flush-mounted floor outlet is a poor choice for a shop. It will fill with debris and could be shorted out by a stray nail or staple.

If you plan to move shop machines around and you want to keep the floor clear, use a hanging (pendant) outlet about 6 ft. to 7 ft. above the floor. To prevent accidental unplugging, a locking cord cap on the receptacle end of the pendant outlet is a good idea (see top left photo, facing page). This will require you to put a compatible locking plug on the machine cord, or make an adapter.

Custom touches add safety, convenience

Even though they are full of flammable materials, most woodshops have no smoke alarms. That is because airborne sawdust can set off the photo-ionization or photo-electric sensors typically used in smoke alarms to detect smoke. The solution is to install a heat-detecting fire alarm that can activate the smoke alarms in the house. Firex (www.icca.invensys.com/firex) has a complete line of smoke alarms that includes compatible heat-detector units.

It's nice to have a phone in the shop, but how do you hear it ring while planing boards and wearing hearing protectors? You can add a flashing visual alert.

Another convenience is to have your dust collector start automatically when you switch on a machine it serves. It's possible to build a current sensor/relay setup (for more information, see *FWW* #143, pp. 66-69), but there are commercially available ones. Ecogate (www.ecogate.com) sells a system that not only turns on the dust collector when it senses that a tool has started, but also opens and closes the adjacent blast gate. Alternatively, you could install a relay and receiver on the dust collector's cord that switches on and off with a remote-control transmitter that can sit in a convenient spot or hang on your key ring (like a car-door remote).

Consider these useful accessories

HEAT DETECTOR



Airborne wood dust can cause false alarms with a standard smoke detector. A heat detector can warn you of a shop fire and can be wired into your home fire-detection system if the shop is in a detached building.

Work with your electrician

Unless you're a qualified electrician or are willing to take the time to become familiar with the techniques of the trade, the many requirements of the NEC, and any local codes pertinent to shop wiring, you should find a licensed electrician or electrical contractor to wire your shop. Look for one who does both residential and commercial work; a strictly residential electrician might not be familiar with some of the products and design elements suggested here.

When working with an electrician, it's more productive to explain the objective or goal than to try to dictate a precise method or approach. Sit down with the electrician before work begins, and lay out your requirements clearly. If your plan and goals are not clear at the outset, be prepared to pay for changes.

Finally, don't expect to find an electrician who will "just do the hookups" after you've pulled the wires, etc. Few licensed electricians will take the risk of putting the finishing touches on work they didn't do themselves. □

Clifford A. Popejoy is a licensed electrical contractor and occasional woodworker in Sacramento, Calif.

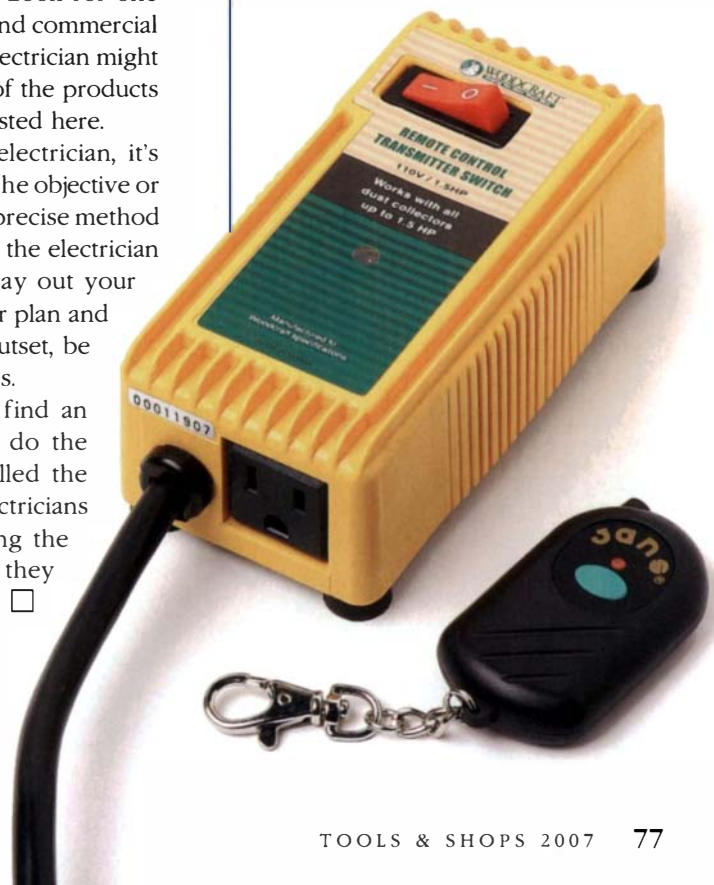
TELEPHONE FLASHER

If your shop has a telephone, it will be impossible to hear when you are wearing earplugs and operating loud machinery. This device uses a flashing light to let you know that you have a call.



REMOTE-CONTROL TRANSMITTER SWITCH

A remote-control receiver is connected between the dust collector's power cord and the receptacle. A small transmitter lets you turn the collector on and off from anywhere in the shop. This will save you a few steps and let you devote more attention to your work.



All About Impact Drivers

Is there a place for them in furniture-making shops?

BY ROLAND JOHNSON



Impact action offers advantages

On average, an impact driver generates four times the torque produced by the same-size cordless drill. What's better, the force comes in microbursts, so the bit won't come out of the screw head as easily. An impact driver also can provide added control, as the action rotates the bit relatively slowly. Be aware, though, that this tool is noisy when in impact mode.

At a quick glance, you might mistake a cordless impact driver for a common cordless drill. Both can drive screws and drill holes. A closer look shows critical differences, however. Curious to find out if those differences have any significance when making furniture, I gave several impact drivers—ranging in size from 9.6v to 18v—a workout in my shop.

Impact drivers crank out more torque

Torque is a measure of twisting force. Compared to a cordless drill with the same-size battery, an impact driver produces about four times the torque.

Under normal screw-driving torque, an impact driver operates exactly like a typical cordless drill. But when the driving gets tough, a spring-loaded cam and gear mechanism kicks in. Often, the driver works like a drill as you begin to drive a screw. As the screw goes farther into the wood, the driver switches to impact mode.

A few good things happen when the impact function is in action. You don't need to apply as much downward pressure on the screw head to keep the bit in place. You don't need a hold-on-for-dear-life grip. And because the screw rotates slowly when in impact mode, you have great control over the depth of the screw. No need to fret about the screw spinning out of control to a point well below the surface—you spin the screw head slowly until it's perfectly flush.

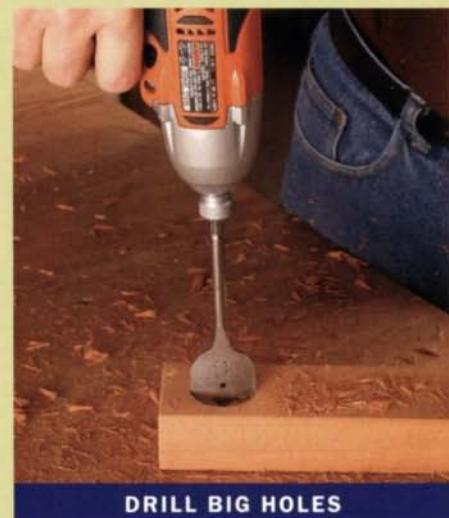
Be aware, though, that impact drivers don't have adjustable clutches like cordless drills have. When driving a screw that's too tight, the applied torque can twist the upper portion of the screw and snap it off. Granted, cordless drills have been known to snap screws, but it's more likely with impact drivers.

Also, because impact drivers are clutchless, you can drive a screw too far. That's most likely to occur with



DRIVE LARGE SCREWS

Long screws can be a challenge for cordless drills, but impact drivers send them home with little fuss.



DRILL BIG HOLES

Cordless drills sometimes stall when drilling big holes; impact drivers keep on turning.

a small screw. Because it takes little torque to drive a small screw all the way, the impact mode doesn't kick in and the driver behaves like a regular drill.

One more point: Impact drivers have a quick-change chuck, so it takes seconds to add or remove a drill-driver or bit. But the chucks accept only hex-shank bits, which don't slip but are harder to find and are more expensive than bits with round shanks.

Power to suit every need

Cordless impact drivers come in a range of battery sizes; typically 9.6v, 12v, 14.4v, and 18v. Surprisingly, the size and weight of the tool don't change much as the battery size increases.

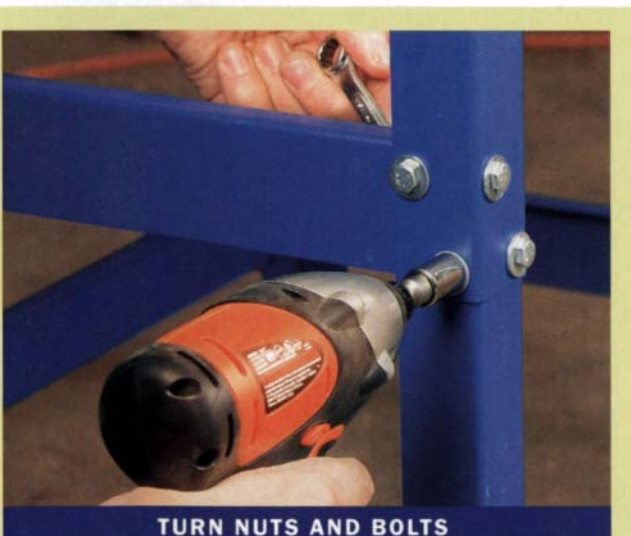
After using each tool in my shop for several weeks, I concluded that they all have more power than most furniture makers need. That said, if I had to pick a size, I'd want an 18v driver. It's relatively light, yet drives 3-in.-long screws with little fuss.

Do you need one?

At the end of the day, there's a lot to like about cordless impact drivers. Their compact size, light weight, added torque, quick chuck, and driving control give them plenty of appeal. Indeed, for almost all screw-driving or hole-drilling tasks, I reach for an impact driver. If I were buying my first cordless drill, I'd spend the extra 10% to 20% for an impact driver.

Is an impact driver a must-have tool for someone on a tight budget or who already has a cordless drill? When you consider that a cordless drill probably can do 90% of the work an impact driver can do, I'd say that for most furniture makers the answer is no. □

Roland Johnson is a contributing editor.

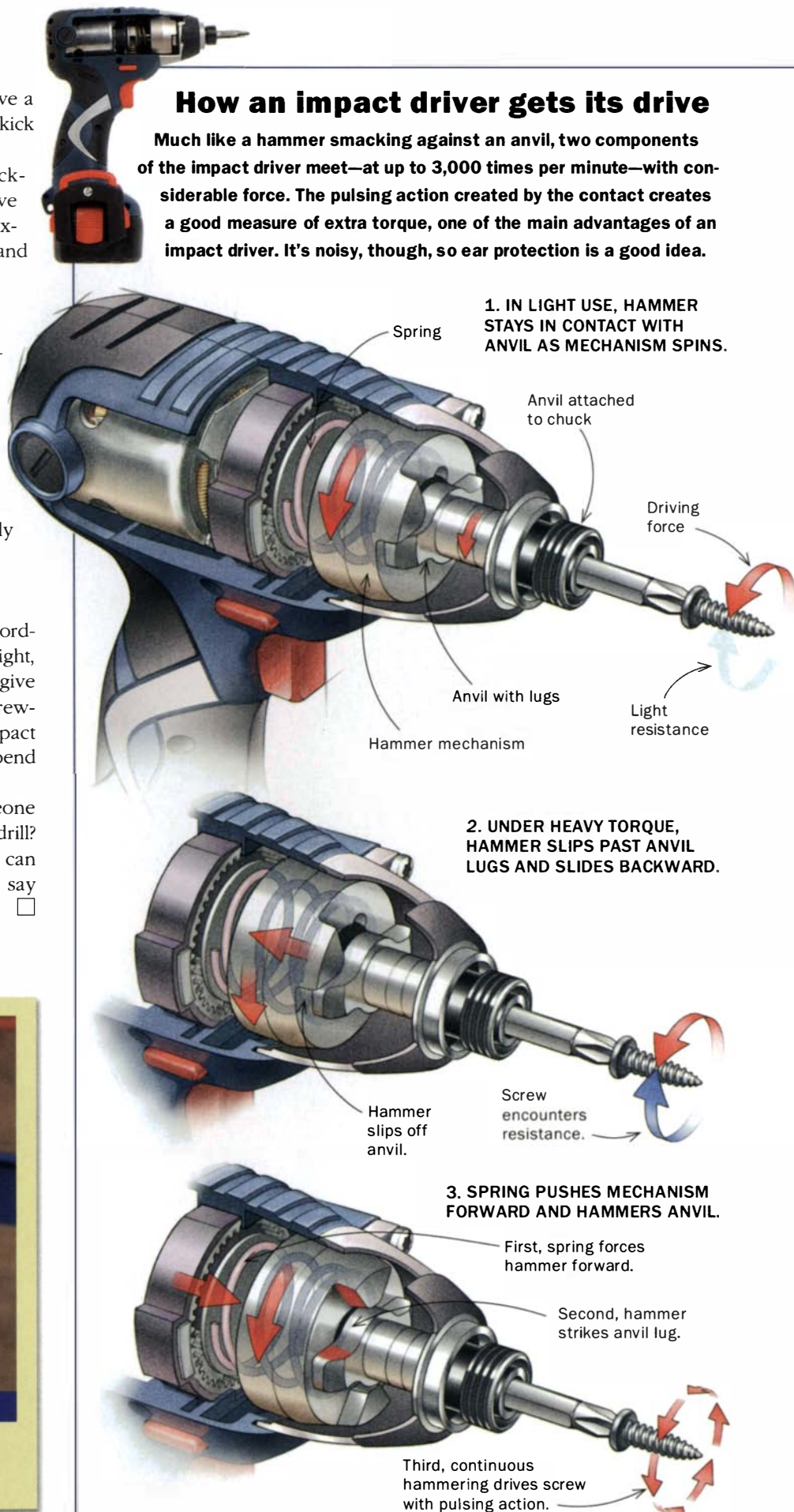


TURN NUTS AND BOLTS

With a nut-drive in the chuck, an impact driver can tighten a bolt in no time.

How an impact driver gets its drive

Much like a hammer smacking against an anvil, two components of the impact driver meet—at up to 3,000 times per minute—with considerable force. The pulsing action created by the contact creates a good measure of extra torque, one of the main advantages of an impact driver. It's noisy, though, so ear protection is a good idea.

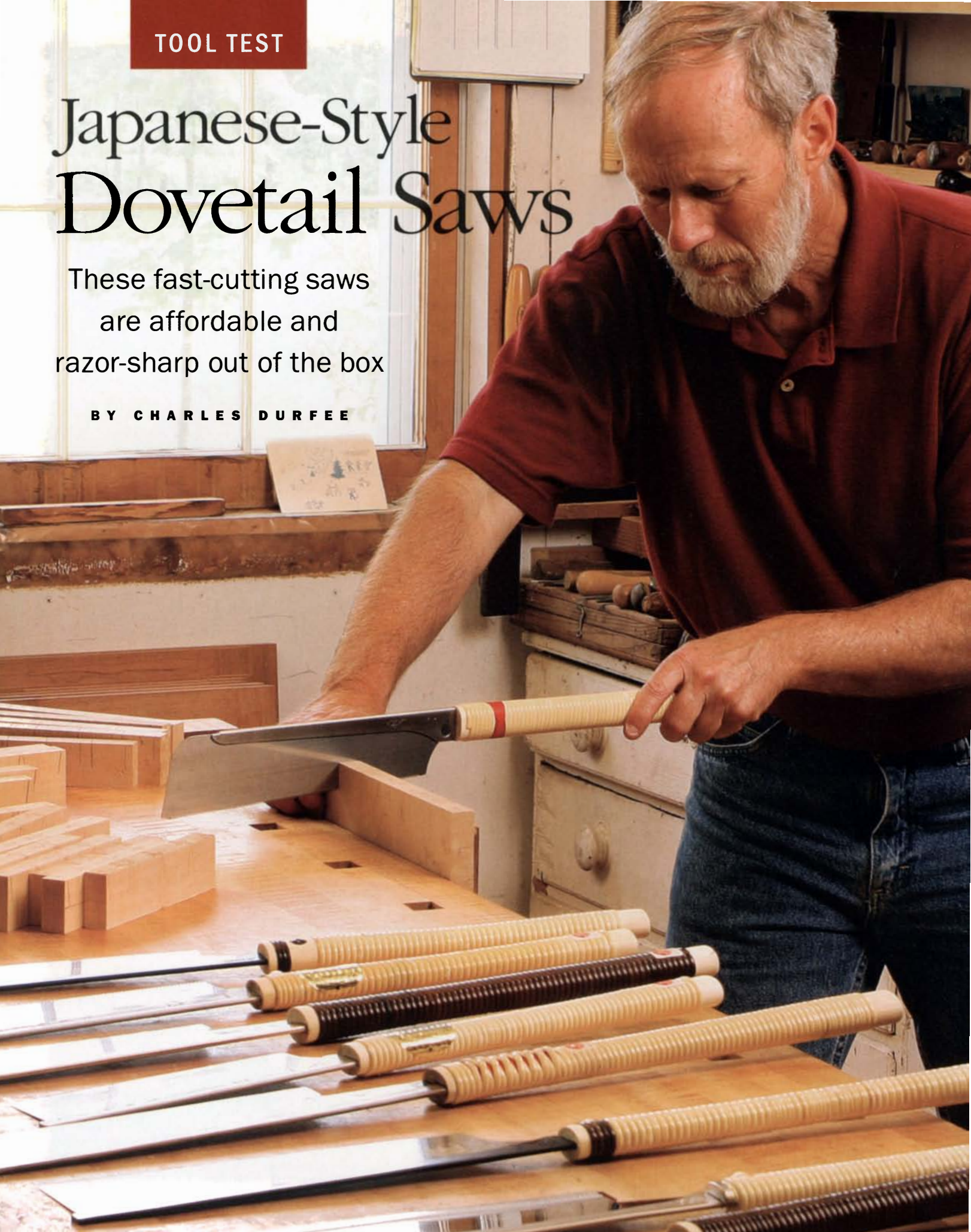


TOOL TEST

Japanese-Style Dovetail Saws

These fast-cutting saws
are affordable and
razor-sharp out of the box

BY CHARLES DURFEE



My first woodworking years were spent building traditional wooden boats with a small group of similarly wide-eyed enthusiasts. We would gather around the woodstove to warm our fingers, and invariably would talk about tools. Our handsaws were the typical carpenter's variety: crosscut and rip, with an occasional backsaw. Sharpened as best we could, they cut pine and cedar adequately, struggled in oak and mahogany, and in general made sawing by hand an unwelcome chore.

Then one day a shop-mate came in holding a carefully wrapped, slender package. He pulled out a strange-looking saw with a thin blade and a long, straight handle. He explained that the blade was so thin because this type of saw cuts on the pull stroke, an action that keeps the thin blade from buckling. The narrow blade naturally creates a thin kerf or cut, which means it requires less effort to remove less wood, and it cuts faster.

We tried the saw. It was like touching the pedal of a Jaguar after driving a Ford all your life. The saw raced through the cut, straight down the line. It was my first exposure to Japanese handsaws, and I've been a fan ever since.

Although I've now used Japanese saws for 30 years, I've never really studied them other than to read catalog descriptions or the occasional article. When I needed a new one, I looked through tool catalogs and tried to figure out the differences among the many offered. Other than price, they seemed very similar in appearance and description, so the chance to test and evaluate a range of these saws was a fine opportunity to learn more.

Quick tour of a Japanese saw

Like their Western counterparts, Japanese saws come in a range of styles depending on the type of cut to be made and whether speed or smoothness is more important. The type of saw I tested is known as a dozuki, which means "tenon shoulder" in Japanese. The standard dozuki is a crosscut saw, but rip dozukis are finding their way into the market and examples are included in this review.

A dozuki has a very thin blade—generally 11 to 12 thousandths of an inch, or half the thickness of a Western sawblade—supported by a back of folded-over steel or

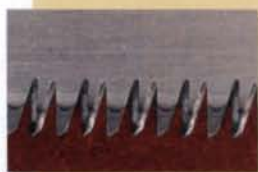


Pullsaws have different tooth styles

A closer look. The teeth on Japanese saws are small, yet they have a number of differences in design and performance.

CHOOSE WISELY

There are four types of tooth pattern on the saws that I looked at, two crosscut and two rip variations. While dovetail cuts are ripping cuts, you might want a saw that also crosscuts cleanly.



CROSSCUT This pattern is typical on dozukis. The teeth are long and narrow, sharpened at an angle to the blade. These make very good crosscuts and rip cuts, though they rip more slowly than saws with a true rip pattern.



IKEDA CROSSCUT In the Ikeda tooth pattern, a set of normal crosscut teeth is followed by two raker teeth, which have less set and are slightly lower in height. The goal is to clean out the chips more efficiently, but the ones I tested had a rougher action than the conventional crosscut pattern.



RIP Ripsaws have teeth shaped very similar to Western-style saws, although with thin blades and the pull-stroke action, of course. These saws make the fastest dovetail cuts, but I wouldn't ask them to do any crosscutting.



MODIFIED RIP Modified rip teeth look similar to crosscut teeth in profile, with the secondary bevel. However, they are sharpened as rip teeth, that is to say, straight across the blade. They rip very decently and can crosscut in a pinch, although with a rather rough action.

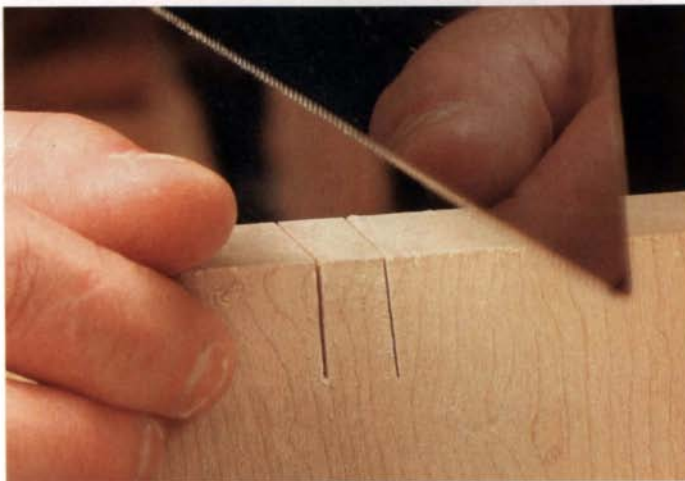


Ripping speed. To test how fast each saw could rip, Durfee cut dovetails in 3/4-in.-thick cherry, and in soft and hard maple (left). The number of strokes it took to make each cut was recorded and then averaged to give each saw's score (above).



THINNER BLADES CUT FASTER WITH LESS EFFORT

The number of strokes to make each cut was recorded, and the kerf width cut by each saw was measured with feeler gauges (above). The thickness of the sawkerfs ranged from 20 to 10 thousandths of an inch (right).



brass. The straight oval handle is wrapped with rattan.

The number of teeth per inch (tpi) on the finer dozukis is usually in the 24 to 28 tpi range, compared to 15 to 20 tpi on the average Western dovetail saw. The dozuki crosscut teeth are long and thin, with a distinctive secondary bevel at the tip. The blade length is usually 9 in. to 10 in., but a couple of the saws I looked at have 7-in. blades.

The final difference relates to sharpening and resharpening. Basically, a Western-style saw dulls a bit more quickly, but can be resharpened with specialized tools and some experience. On the other hand, most Japanese saws arrive with razor-sharp, hardened teeth that stay sharp longer, and the blade simply is replaced when it dulls, usually at a cost of \$20 to \$30. My saws usually last as long as 10 years under frequent use in a professional shop. Higher-end saws

have blades that can be resharpened, but that costs about \$30 and the saw must be returned to Japan, so you'd be without it for three to four months.

The saws were tested for ease of use, speed, and smoothness

For this test, I chose 15 saws. I selected crosscut dozukis with 18 to 30 tpi, intended for very fine cuts. I also chose some rip dozukis, which, like Western saws, have fewer teeth per inch. Two of the rip saws had tooth patterns similar to those of Western saws, while a couple of others had a modified rip sharpened at 90° to the blade, but with secondary bevels (see "Choose wisely," p. 81).

Unlike many Western-style saws, every dozuki arrived very sharp and ready to cut. I used each saw to cut a series of dovetails in ¾-in.-thick cherry, soft maple, and hard, bird's-eye maple to a depth of ¾ in. To measure the speed of each saw, I counted the number of strokes needed to get to the final depth. I also noted how well the saw set in when starting the cut, especially when making the angled, tail cuts. The smoothness of the stroke, the ability to correct the cut, and the smoothness of the side walls were also observed.

As a group, the saws set in well, and their sharpness was very helpful when getting



REPLACEABLE BLADES ELIMINATE SHARPENING

Most of the saws tested come with hardened teeth that cannot be sharpened. When they eventually become blunt, or if the blade is damaged, the blade is removed from the back and handle and replaced.

Helpful hints for using a pullsaw

IT TAKES TIME TO BECOME COMFORTABLE with the pull-stroke action, but any new tool takes some getting used to. Because of the thinness of the saw, use a light touch in general, but especially on the forward stroke, to avoid buckling the blade.

When gripping the saw, I prefer to hold the handle near the end with all four fingers wrapped around it. Alternatively, you can grip the front of the handle, with or without the index finger pointing along the top.

Start a cut on the rear corner of the workpiece using the heel of the blade. Angle the blade very slightly and pull back gently, applying very light pressure; the sharp teeth are designed to

do all the work. Once the cut is on track in the back, come across the top to establish the kerf before working down the front line. In this way you won't have to deal with following two lines at once.

Because the teeth have so little set (a sideways bend to the tooth, to avoid the blade binding in the cut), it is difficult to correct a cut that's not straight from the start. It's best to back out and restart the cut instead of trying to twist the blade in the kerf. If you've been used to a Western-style saw, you will notice the fine dust, the thin kerf, the speed, and (with a few exceptions) the very smooth action of the dozuki.

THREE WAYS TO HOLD THE SAW

End of the handle. Durfee prefers to hold the saw near the end of the handle for a light touch.

Finger pointing. An alternative is to extend the index finger along the length of the handle to help direct the saw.

Tuck the handle in. Some users prefer to hold the handle close to the blade and keep the end of the handle close to their side to help guide the saw.



STARTING A CUT

Guide the cut with your thumb. Angle the saw very slightly and start cutting at the back corner. Use only very light cuts and let the teeth do the work.



CORRECTING A CUT



If you find that the cut has drifted off course, don't try to correct it by tilting the saw; the thin blade will bend (top). Instead, back the blade out and start again at a steep angle until you are back on the right line.



CHOOSING A DOVETAIL SAW

If you only want to cut dovetails, then buy a rip saw such as the Gyokucho 9½ in. or the Deluxe rip dozuki. For both ripping and crosscutting, the Dozuki “Z” crosscut saw is the best buy.



SAW NAME	RETAILER (TOOL NUMBER)	STREET PRICE
CROSSCUT (ALL-PURPOSE) SAWS		
8½-in. dovetail saw	Japan Woodworker (18.210.0)	\$42
Craftsman dozuki	Garrett Wade (49117.01) Lee Valley (60 T 03.15)	\$50 \$50
Deluxe dozuki	Tools for Working Wood (MS-JS320)	\$90
Deluxe dozuki with replaceable blade	Tools for Working Wood (MS-JS445) Japan Woodworker (19.210.0)	\$40 \$51
BEST OVERALL BEST VALUE Dozuki “Z” saw	Rockler (65607) Woodcraft Supply (12F27)	\$43 \$42
Hardwood dozuki	Garrett Wade (49115.01)	\$50
Ikedame dozuki	Highland Woodworking (056406)	\$50
Juntaro Mitsukawa	Tools for Working Wood (MS-JS420)	\$270
Odate crosscut dovetail	Highland Woodworking (056423)	\$50
Standard dozuki	Lee Valley (60 T 03.01)	\$45
Takumi dozuki	Woodcraft Supply (142421)	\$55
RIPSAWS		
BEST OVERALL Deluxe rip dozuki	Tools for Working Wood (MS-JS340)	\$90
Dozuki rip saw Izaemon	Japan Woodworker (05.114.24)	\$147
BEST VALUE Gyokucho 9½ in.	Japan Woodworker (19.311.0)	\$39
Odate rip dovetail	Tools for Working Wood (MS-JS340.01)	\$48

a cut started. All cut straight down a line with minimal guidance, which indicates a good job of sharpening and setting.

A key component of performance is speed: You may be willing to take the time for hand dovetailing, but you don't want to spend all weekend at it. It was in this category that the rip saws separated themselves from the pack. I was startled, to say the least, by how fast the two true rip saws flew through the cuts. Thirteen strokes to get through ¾-in. by ¾-in. cherry is pretty remarkable, especially when compared to the 30 to 40 strokes it took some of the crosscut saws.

All the saws tested had a lovely, smooth action, with only subtle differences between them. The expensive, handmade

Juntaro Mitsukawa is an exceptionally smooth cutter, although probably to a degree that would interest only the true connoisseur. For most users, a saw that costs one-fifth as much will do nicely. On the other hand, I found the Ikeda tooth-pattern saws to have a generally rougher action than the standard crosscut saws.

I also examined the quality of the cut. All the saws left smooth side walls that would be fine as is for joinery. The stand-out was the fine-toothed 8½-in. dovetail saw, which left a remarkable, glass-smooth surface.

As a group, these saws reward accurate starts and don't appreciate being used to try and correct a misaligned cut (see “Helpful hints for using a pullsaw,” p. 83).

TOOTH TYPE	TEETH PER INCH	BLADE THICKNESS (INCHES)	KERF WIDTH (INCHES)	REPLACE OR SHARPEN	RIP SPEED TEST RESULTS (AVERAGE STROKES PER CUT)			CROSSCUT RATING	COMMENTS
					Cherry	Soft maple	Hard maple		
Crosscut	30	0.008	0.010	Replace	21	35	64	A	Short blade
Ikeda crosscut	24	0.012	0.016	Replace	26	42	48	C	Brass back
Crosscut	26	0.011	0.014	Sharpen	26	46	60	A+	Very little set, so not a beginner's saw.
Crosscut	26	0.011	0.017	Replace	26	55	70	B	Decent basic dozuki
Crosscut	25	0.012	0.015	Replace	18	31	55	A	The best of the basic dozukis
Crosscut	25	0.011	0.015	Replace	32	44	75	B	Unusually wide 3-in. blade; nicely finished
Ikeda crosscut	18	0.012	0.020	Replace	29	40	68	B	Same maker as Dozuki "Z" saw but with fewer tpi
Crosscut	26	0.012	0.015	Sharpen	18	34	70	A	Longest blade and handle of saws tested
Crosscut	23	0.011	0.016	Replace	40	46	60	B	Rough stroke; slow due to short blade; cloth blade cover
Crosscut	18	0.011	0.017	Replace	30	43	74	B	Fewer tpi than most crosscut saws
Crosscut	26	0.009	0.013	Replace	20	33	60	A	Enameled back and long blade
					Cherry	Soft maple	Hard maple		Comments
Rip	13	0.011	0.013	Sharpen	13	16	13	n/a	Same maker as Deluxe dozuki crosscut saw
Rip	9-14	0.012	0.013	Sharpen	13	16	13	n/a	More tpi toward the heel for starting cuts
Modified rip	20	0.011	0.016	Replace	19	23	22	n/a	Did extremely well at an affordable price
Modified rip	20	0.011	0.016	Replace	16	23	22	n/a	Short 7-in. blade; cloth cover

When using saws with a minimal set of about 2 to 3 thousandths of an inch (generally the higher-end saws), the only way to correct a cut is to bring the blade back to the top of the kerf and rework it. Those saws with a set of at least 5 thousandths of an inch afford some ability to correct a cut in progress, but less than most Western-style saws.

Choose your saw based on the cuts you'll make

Your choice of dozuki should depend on what you want to use it for, your skill level, and your willingness to invest. Sawing dovetails consists of a rip cut. Even cutting the tails (while on a slight bias) primarily is ripping with the grain. A saw dedicated

to dovetails calls for a rip-tooth pattern, but while ripsaws cut dovetails well, they are quite rough when used for crosscuts. A crosscut saw, on the other hand, crosscuts beautifully and also rips smoothly, although more slowly. Thus a good-quality saw with a crosscut or a modified rip-tooth pattern may be your best choice if you are buying just one pullsaw.

Within the dovetail-only group, the rip dozukis clearly have the performance edge. Tools for Working Wood's Deluxe rip dozuki saw and Japan Woodworker's dozuki ripsaw Izaemon both performed superbly. However, because it is substantially less expensive, the Tools for Working Wood saw is my choice as the best overall.

For best value, I chose the Japan Woodworker Gyokucho 9½-in. dovetail saw. It does quite well making the dovetail cuts with its modified rip-tooth grind, it has a replaceable blade, and it's very modestly priced.

If you are looking for an all-purpose dozuki, I recommend as best overall the "Z" saw, offered by both Rockler and Woodcraft Supply. Being a crosscut saw, it does that very nicely, but it also can rip adequately. Despite the superior performance, the price is about the same as many others tested, so the "Z" dozuki is my choice for best value as well.

Charles Durfee is a furniture maker in Woolwich, Maine.

Lie-Nielsen Toolworks at 25

Woodworking entrepreneur rekindled an interest in serious hand tools

BY TOM BEGNAL

In 1981, Tom Lie-Nielsen had a fledgling business making a single model of a bronze edge-plane, doing the assembly work on his kitchen table. This year, the company's 25th, Lie-Nielsen Toolworks makes more than 100 models of high-end hand tools. I recently toured the factory and talked to Lie-Nielsen about the evolution of his company and of hand-tool use over the last few decades.

"My father had a wooden-boat-building shop in Maine

where we had a small machine shop and made all the hardware for the boats—custom hardware, mostly out of brass and bronze," he said. It was in that shop, while still in grade school, that Lie-Nielsen developed an appreciation for hand tools.

In 1977, not long out of college, he got his first job. At GarrettWade, a newly created woodworking retailer in New York City, he handled purchasing, importing, customer service, and showroom/telephone sales. It was there that he recognized a need for top-quality, American-made handplanes. Power tools were doing much of the work once done by hand. The major plane manufacturers were shrinking their product lines in response to a smaller market.

"Every year it was obvious where (big manufacturers) were headed, and it wasn't toward the hand-tool

market," Lie-Nielsen said, adding that customers who wanted a discontinued plane had one option: "Find an antique and fix it."

A few cottage-industry manufacturers were still making specialty planes for GarrettWade, many of wonderful quality, but these small makers couldn't deliver on time. Customers wanted the tools, Lie-Nielsen said, but GarrettWade had back-orders all the time. "I couldn't understand why you couldn't make tools in a serious way and have them available for people to buy."

1981: The first plane

One supplier made a handsome and functional bronze edge-plane (based on the earlier Stanley No. 95), most commonly used to square the edge of a board to its face. When the supplier lost interest in making the plane, the young Lie-Nielsen felt the time just might be right for a new plane-maker, albeit one with a single product. He arranged to buy the bronze edge-plane business, including all the necessary tooling patterns and some tutoring sessions. He'd have GarrettWade as a likely customer. And the connections he had made while there would be another plus.

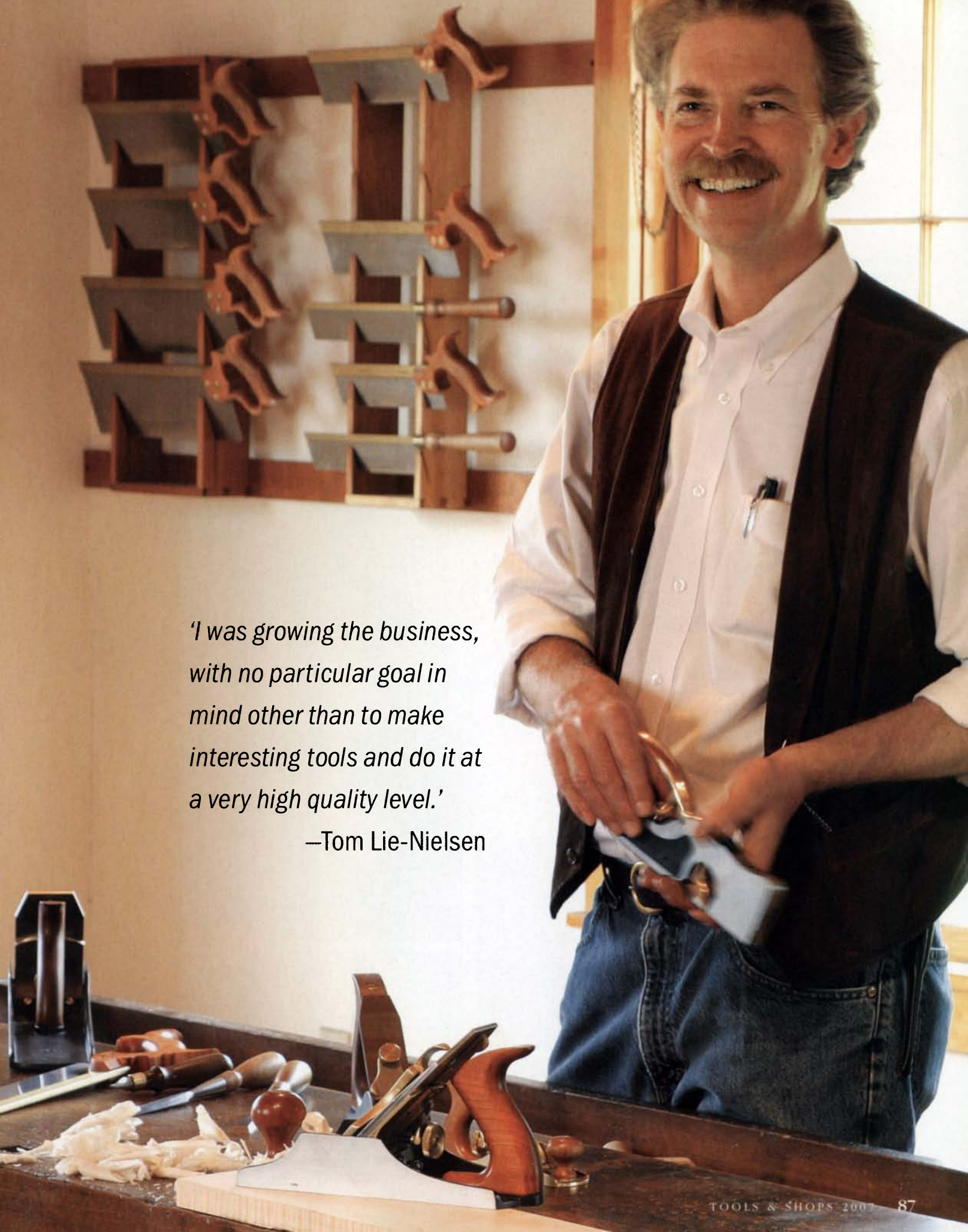
He soon moved to West Rockport, Maine, buying property that included a "very decrepit old farmhouse," 50 acres of blueberry bushes, and an old woodshed that became the shop. A nearby artisan with a small bronze foundry produced the body castings. The blades were purchased, the parts farmed out to a few local machinists.

"I was mostly doing the polishing and assembly—on the kitchen table," Lie-Nielsen said. Despite the low-tech production facilities, the first order of 200 planes was delivered successfully to GarrettWade in the fall of 1981.

That first order proved to Lie-Nielsen that he could make a plane, but it remained to be seen if he could make one profitably. Outsourcing the machining was expensive, so one of his first big investments was a milling machine. With the help of an experienced

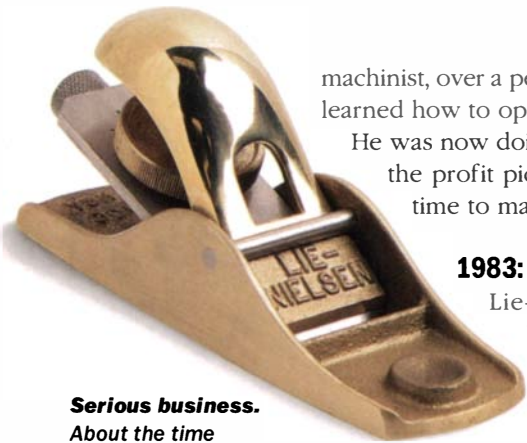


Two planes that made a plane-maker. The bronze edge-plane (left) and the bronze skew-plane (right) enabled Lie-Nielsen to gain a toehold in the industry.

A man with a mustache, wearing a white shirt and a dark vest, is smiling while working on a tool in a workshop. He is holding a pair of pliers and a piece of metal. In the background, there is a rack of various tools hanging on the wall. In the foreground, there is a workbench with various tools and wood shavings.

*'I was growing the business,
with no particular goal in
mind other than to make
interesting tools and do it at
a very high quality level.'*

—Tom Lie-Nielsen



machinist, over a period of several months, Lie-Nielsen learned how to operate it.

He was now doing everything but the casting, and the profit picture began to look better. It was time to make a second plane.

1983: Plane No. 2

Lie-Nielsen's second plane was a bronze skew block plane, modeled after the old Stanley No. 140. Like the bronze edge-plane, it had long been out of production by Stanley. The tool not only functioned well as a block plane, it converted easily to a rabbit plane by removing a side plate.

Lie-Nielsen now had a line of two planes, but he still was a long way from being a full-time plane-maker. Money remained tight. He and his wife grew most of their own food. Ducks, geese, sheep, and a milk cow were part of the farm. Their summers were devoted mainly to farming chores and to raising blueberries.

"We spent quite a bit of time doing the back-to-the-land thing," Lie-Nielsen said. Plane-making was set aside for the long Maine winters. But with the farm providing the family's basic needs, he was able to develop the plane business at a comfortable pace. He didn't have to bring a plane to market until everything was just right.

1985: Low-angle block plane

A low-angle bronze block plane came next. At about the same time, in 1985, Lie-Nielsen began running a small classified ad in *Fine Woodworking*. His

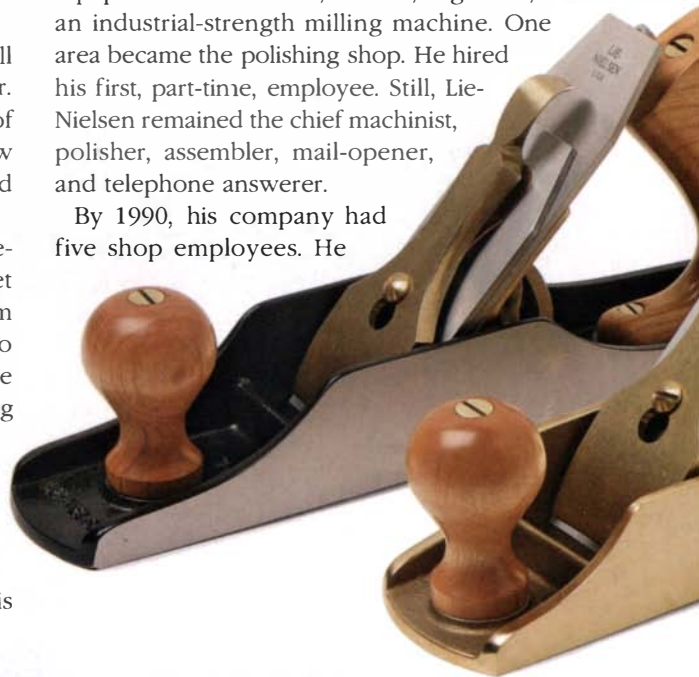
little plane-making business started to grow. As it did, he increased his advertising.

"I (ran) the smallest black-and-white (ad) I could, and I've gradually done more and more. I was fortunate to have *Fine Woodworking* pave the way, educating and exciting woodworkers about tools and techniques that had been forgotten by the power-tool hungry '50s and '60s."

1986: To Warren, and growth

In 1986, Lie-Nielsen sold the farm and moved operations to an abandoned icehouse in Warren, Maine. The added space soon filled with more metalworking equipment—a bandsaw, a lathe, a grinder, and an industrial-strength milling machine. One area became the polishing shop. He hired his first, part-time, employee. Still, Lie-Nielsen remained the chief machinist, polisher, assembler, mail-opener, and telephone answerer.

By 1990, his company had five shop employees. He



Serious business. About the time Lie-Nielsen began advertising, he added a low-angle bronze block plane to his line and the business began to grow. Soon he had left the farm behind and hired an employee.

Building a plane

It takes more than 100 steps to build a typical Lie-Nielsen bench plane. Machines have an important role, but a good deal of the work is done by hand.



Side grinding. A pair of bench planes, clamped end to end, have their sides ground flat and square to the soles.



Fire and ice. To improve hardness, the steel plane blades are heated in an oven until red hot (top). Later, to improve wear-resistance, the blades are subjected to a Pluto-like temperature of minus 320°F (bottom).



was starting a line of cast-iron bench planes based on the old Stanley Bedrock model, a decision that brought a new set of challenges. The early bronze planes that were the foundation of his company weren't being made by anyone else, so competition wasn't an issue. But most of these cast-iron bench planes were available from several other established plane-makers. Lie-Nielsen planned to elevate the quality to a new level, but with higher quality came a considerably higher price. Would woodworkers be willing to pay? Then, too, he had to learn the nuances of machining cast-iron—a material he had not used before—and all the other details of making this type of plane. “We had to learn how to make handles (and knobs), all the mechanisms. The whole bit.”

A glance through the current catalog shows that the bench planes were a huge success. They helped the business more than triple in size during the 1990s.

2006 and beyond

Lie-Nielsen now makes an assortment of other high-end planes; among them chisel, rabbet, scraper, scrub, and shoulder planes. (I counted about 50 in the catalog.) He also has several dovetail saws and tenon saws. Bevel-edge socket chisels were introduced a few years ago. Recently, he began making workbenches. And he plans to introduce a shave horse soon.

Today, Lie-Nielsen has some 70 employees. A recent 10,000-sq.-ft. addition effectively doubled the size of the manufacturing and warehousing facilities.

The addition houses a long line of milling machines, including several Computer Numerical Control (CNC) models. Plane and spoke-shave blades are heat-treated in a nearby building.

Lie-Nielsen's approach to quality seems to have remained steadfast. Every plane and chisel still gets a hands-on cutting test before it goes to the shipping room.

Today, all plane blades are made from A-2 steel, which holds an edge longer than other steels. He uses ductile iron in his plane bodies, rather than the more common gray cast-iron; the former is stronger and less brittle.

What's in store for Lie-Nielsen Toolworks over the next 5 to 10 years? “That's the \$64,000 question,” he said with a comfortable smile. “We've always steadily progressed toward new products as we could, trying to balance new products with our capacity and our ability to do things.”

“The woodworking population does seem to be aging,” he added. “But, there does seem to be a number of younger folks getting interested.”

At a time when American companies are moving to faraway lands as fast as you can say bigger profits, Lie-Nielsen has figured how to enjoy success without straying from its roots on the New England coastline. □

Tom Begnal is an associate editor.



Plane-maker to toolmaker. In addition to more than 50 planes, Lie-Nielsen now makes chisels, saws, workbenches, and shave horses.



FineWoodworking.com
Listen to the complete interview with Tom Lie-Nielsen.



Bring out the shine. The operator of a polishing machine makes the body of a bronze edge-plane look like jewelry.



Putting things together. All the parts converge in the assembly department, where the planes are put together by hand.



A plane is born. But before it's wrapped and boxed, every plane, handsaw, and chisel must pass a hands-on cutting test.

readers gallery

CHRIS VESPER

Victoria, Australia

Vesper purchased this bandsaw in 1998 and took a year to transform it from “an inoperable wreck” to the centerpiece of his workshop. The bandsaw, which he believes was made around 1900, is huge (he calls it The Bandosawrus on his Web site), with wheels that are 2 ft. dia. The frame is a hollow box casting and the whole machine weighs more than 1,600 lb. For safety, Vesper made guards for the wheels, which were removed for the photo. He says the machine works extremely well and has a resaw capacity of up to 13 in.



ROBERT M. SOULE

West Haven, Conn.

This low-angle block plane is Soule's second, improved version of the tool. He made this plane (1¾ in. wide by 5¼ in. long by 2½ in. tall) a bit narrower than the first version so that it would fit easily into one hand, and he improved the shape of the rear handle. The plane allows for fine blade adjustments and features brass sides dovetailed to a steel sole, with cocobolo in-fill. The finish is shellac.



BARRY WEAVER

Barrington, R.I.

Weaver, a retired furniture maker, is an admitted tool junkie, having spent years collecting tools and attending tool auctions. Now Weaver has found great joy in making his own tools, crafting elegant wooden levels and selling them at the same tool auctions he used to browse. This model (1 in. wide by 8 in. long by 1½ in. tall), based on a design made by Stratton Brothers of Greenfield, Mass., is made of ebony and brass, with ivory plugs. The finish is high-gloss polyurethane.





MERV KRIVOSHEIN

Rocky Mountain House, Alta., Canada

Krivoshein's wooden jointer plane (3¼ in. wide by 24 in. long by 6¾ in. tall) has a hickory body with accents made from moose antlers. An item in no short supply in the Canadian Rockies, the material takes a polish well and adds a local flavor to the plane. The finish is a mix of turpentine and boiled linseed oil.

JAMES MURSELL

West Sussex, England

Having owned and broken two store-bought travishers—a tool with long thin handles used to shape Windsor chair seats—Mursell decided to make his own version that's beefier and fits his hands better. The purchased blade is microadjustable from the front of the tool via two grub screws, and the deep nose in front of the blade provides superb control. The travisher is 2¼ in. wide by 8½ in. long by 3¾ in. tall and is finished with an oil-varnish mixture.



PERRY CRABER

Yuba City, Calif.

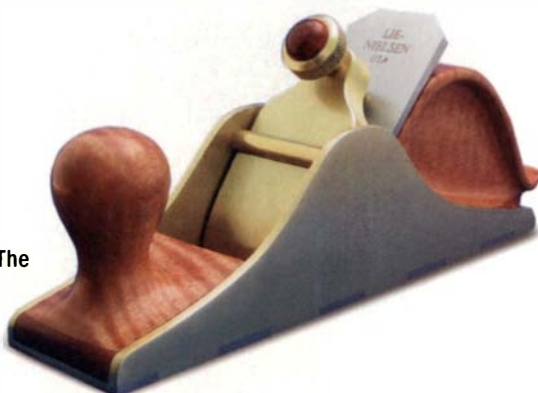
One of Craber's passions is making and using wooden handplanes. For this plane, he used highly figured bubinga left over from another piece he had made, combining it with ebony in what he hoped would be a functional yet beautiful tool. Craber's exotic plane, with a shape and stripes reminiscent of an old race car, is 1½ in. wide by 13 in. long by 2½ in. tall and has a 1½-in.-wide Hockplane iron. The finish is polyurethane.



KENNETH W. GEORGE

Alvin, Texas

While making the parts for his handplane, George noticed that it was beginning to resemble a snail. So he went with the flow and shaped the handle and knob to look like a snail's body and head, respectively. The plane is 1½ in. wide by 7½ in. long by 3 in. tall. The wood is curly jarrah and redheart, the sole is steel, and the body is brass. The finish is lacquer.



Submissions

Readers Gallery provides design inspiration by showcasing the work of our readers. For consideration, send entry forms (available at www.FineWoodworking.com) and photos (unaltered digital images, prints with negatives, or slides) to Readers Gallery, *Fine Woodworking*, 63 S. Main St., Newtown, CT 06470, or email fwgallery@taunton.com. If you want materials returned, you must include a self-addressed envelope with appropriate postage.

T.R. FISHER

East Yorkshire, England

Since his retirement from cabinetmaking, Fisher has developed a keen interest in both wood carving and antique hand tools. While reading *The Art of Fine Tools* by Sandor Nagyszalanczy (The Taunton Press, 2000), Fisher spied an antique swanhead bowsaw and saw an opportunity to combine both of his passions. His version of the saw, which has a 10-in.-long blade, is made of rosewood and is finished with wax polish.



JOE WINGERT

Lakewood, Colo.

When Wingert, a collector of antique Stanley tools, got his hands on this old transitional plane (3 in. wide by 15 in. long by 6¼ in. tall), all of the wood parts were shot. Fortunately, the metal parts were salvageable, so he made a new wood base and painted and polished the metal body. The finish is Danish oil.



MATT MORIAN

Jasper, Texas

Morian says the shape of the handle and the heavy weight of these scrapers make for great-performing tools. The body of each scraper is walnut crotch and incorporates three brass threaded inserts. The blades are made from an old planer blade, the locknuts are pink ivory, and the handles are made from a dense, blackjack oak sapling. Each scraper has a 14-in.-long handle with a head that measures 4 in. wide by 5½ in. tall. The finish is lacquer.



MICHAEL WOLLOWSKI

Terre Haute, Ind.

Wollowski used an early version of this panel gauge, which is basically an oversize marking gauge, while building a blanket chest. But he had difficulty controlling the scoring knife on that version, so he modified the design to include a handle that allows him to put pressure directly over the blade, providing more control with less wobble. Wollowski's panel gauge (10 in. wide by 30 in. long by 5 in. tall) is made of beech and is finished with linseed oil and wax.



MICHAEL FLAHERTY

Bellingham, Wash.

This whimsical chamfer plane was made for a tool collector's wife, who's into sports cars and fine jewelry. So Flaherty incorporated jade (wheel rims), moonstone (headlights and steering wheel center), brass (exhaust pipe), and sterling silver (radio antenna and hood ornament) into the design. The car body is about 8 in. long, is made of cocobolo, and features an ebony steering wheel and tires (there is a spare in the trunk). The driver acts as the plane's wedge and is carved from applewood.



DAN BARRETT

Barrie, Ont., Canada

Barrett made this cocobolo coffin smoother to be awarded as first prize in the Ontario Provincial Carpentry Apprenticeship Contest, which recognizes the top carpenter's apprentice in the province. The 1½-in.-thick handle—modeled after the handle on his great-grandfather's Mathieson jack plane—is mortised into the body. The plane is 2½ in. wide by 10¾ in. long by 2¾ in. tall. The finish is boiled linseed oil and wax.

DANIEL LACROIX

Westford, Mass.

Lacroix built this reproduction "Yankee" plow plane after seeing an 18th-century version made by Thomas Nixon of Framingham, Mass. (The original is owned by the Framingham Historical and Natural History Society.) Lacroix's plane (7¾ in. wide by 10¼ in. long by 5¾ in. tall) is made of yellow birch with riveted skate and fence, along with wooden thumbscrews. The finish is boiled linseed oil.



DARYL SULLIVAN

Cedar Falls, Iowa

When designing his workbench, Sullivan found inspiration in *The Workbench* by Lon Schleining (The Taunton Press, 2004). Sullivan culled various details from benches in that book and built a beefy bench (27 in. deep by 72 in. long by 36 in. tall) with storage and utility galore. The base is made of cherry, and the 2¾-in.-thick top is hard maple with 4-in.-thick aprons. The tail vise is walnut with teak slides. Sullivan finished the bench with Danish oil and wax. PHOTO: BILL WITT





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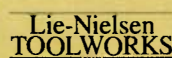
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NO PURCHASE NECESSARY TO ENTER. Contest begins at 12:01 a.m. ET on November 14, 2006, and ends 11:59 p.m. ET on January 31, 2007. Contest is open to legal residents of the United States, who are at least 18 years old, and to legal residents of Canada (except Quebec), who are over the age of majority in their province of residence. Contest void in Quebec, Puerto Rico, and anywhere else where prohibited. TO ENTER: There is one way to enter the sweepstakes. Visit FineWoodworking.com/ToolShop. Complete the online entry form, including your name, complete address, daytime phone number, email address (if available), and date of birth. Answer five questions and tell us in 150 words or less why you deserve a new tool shop. Your essay should convey your commitment to woodworking and need for equipment. WINNING: On or about March 31, 2007, judges will choose one Grand Prize winner and four runner-up prize winners from among all eligible entries received. Entries will be reviewed and judged on the basis of commitment to woodworking and need for equipment. Winner will be notified by phone initially, then by mail within 10 days of the selection. Judges' decisions are final. Odds of winning will depend upon the total number of eligible entries received. One prize per person, household, or family. WINNERS' LIST: Send self-addressed, stamped envelope by May 15, 2007, to: Fine Woodworking "Why I Deserve a New Shop" Contest Winners' List Request, PO Box 5506, Newtown, CT 06470.

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Code FW

Build a simple crosscut sled for the tablesaw

ESSENTIAL JIG ENSURES SQUARE CUTS

BY GARY ROGOWSKI

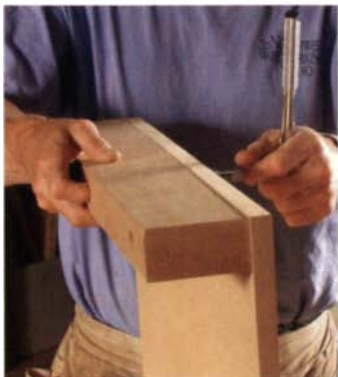
It's a euclidean world, darn the luck. Woodworking goes better when angles are precise, true, and above all, consistent. "Consistently off" may be how your work has been going until now, but making a tablesaw crosscut sled can fix many crosscutting woes.

My sled is a focal point of my shop. With it, I can produce square ends on stock. I can clamp on a stop block or make a pencil mark for repeat cuts. I can use the sled as a platform for other jigs to cut precise angles and to cut a variety of joints. And I can do all of this work safely and with greater accuracy.

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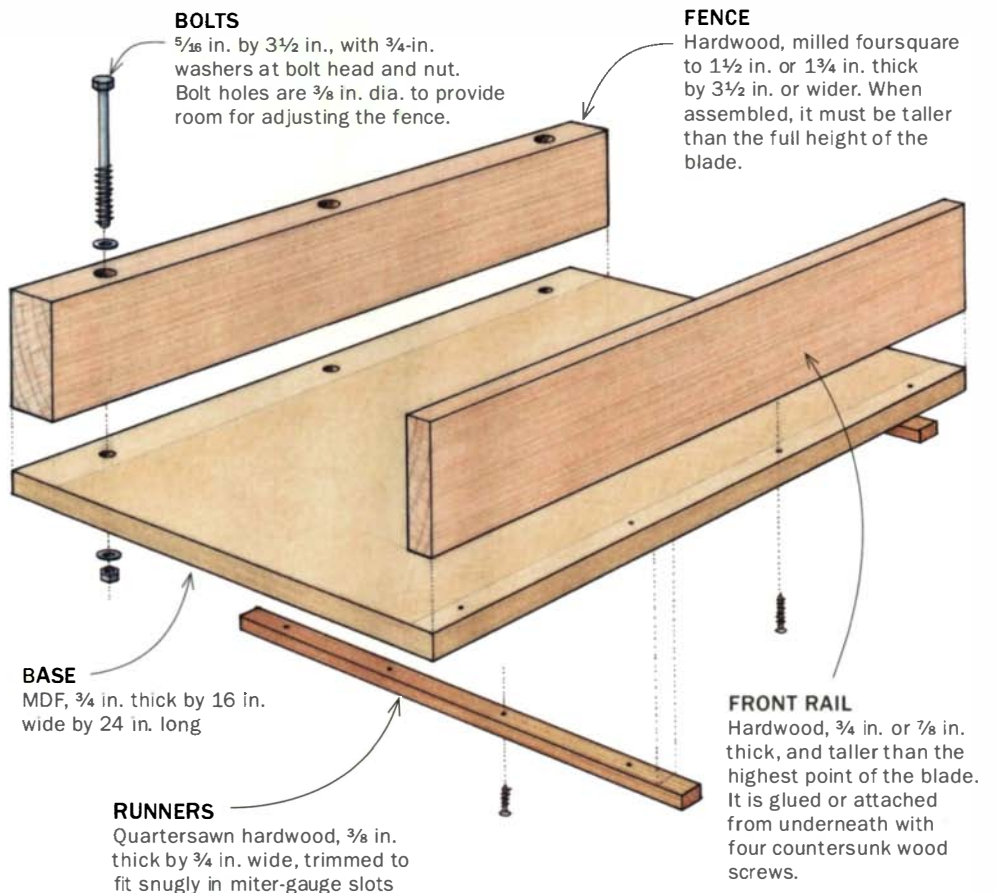
Attach the fence with bolts. This makes it easier to adjust the fence so that it is square to the blade.



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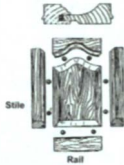
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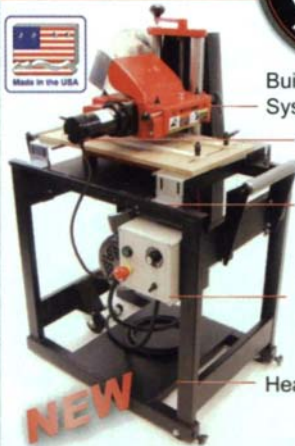
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and so holds a workpiece more securely than most stock miter gauges. This is especially helpful when crosscutting wider pieces, where a sled is a much safer option than running a workpiece against the rip fence, which is a recipe for kickback.

The sled is accurate in part because its twin runners ensure that the stock moves in a straight line past the blade. The stock is registered against a back fence that is carefully set at 90° to the blade. The fence is adjustable, so it can be reset if it gets knocked out of whack.

Start with a square piece of MDF

You can build any size sled, but I strongly recommend starting small. I've learned that it pays to make your first sled for 99% of cuts, that is, boards less than 13 in. wide. The sled will be easier to make, easier to move, and easier to adjust. For any cut wider than 13 in., I have another sled at 37 in. wide.

There are several keys to an accurate sled: a flat baseplate, straight runners that fit snugly in the miter slots, and a flat and square fence. Make the base out of ¾-in. medium-density fiberboard (MDF) about 16 in. wide by 24 in. long. Attach a front rail that is taller than the fullest height of the sawblade. Its job is to hold the front of the jig together.

Make fence and runners of hardwood

I make the fence out of hardwood, milled foursquare about 1½ in. thick and taller than my tallest cut. I make it this thick so I can fasten it onto the baseplate with bolts and washers. I built my first sled with screws, and they just don't hold up to the banging around this jig gets. If your MDF is relatively square, bolt on the fence so that its rear face is aligned with the back of the base. You'll adjust it later to square it with the blade.

For this sled, I used 5/16-in. bolts and drilled 3/8-in.-dia. holes. This gives me room to adjust the position of the fence.

The runners are critical to the success of the jig. If they don't run without play in the miter-gauge slots, then your jig will ride sloppily, your cuts will be inconsistent, and your salty vocabulary

2. Install the runners

Make the runners of quartersawn hardwood. With the grain oriented in this way, seasonal wood movement will cause the runners to shrink or swell in thickness, as opposed to width. This means the runners won't bind.



1 Bandsaw to rough dimensions. Set the fence using measurements taken from the tablesaw's miter-gauge slot.



2 Joint two faces. These will serve as reference surfaces for final trimming of the runners to fit in the miter-gauge slots.



3 Trim to final width. Take light cuts and check the fit in the slot as you go. You also can use a planer or a handplane.



4 Attach the runners. Assembling the sled with the runners in their slots helps ensure they'll be parallel and properly spaced when you're done. Attach the runners with wood screws driven into countersunk holes.

5 Trim the high spots. Push the completed sled back and forth in the slots a few times. Any places where the runners rub against the side of the slots will darken. Trim these areas with a scraper, then wax the runners and the bottom of the sled to reduce friction.



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3. Square the fence to the blade

The sled won't make accurate crosscuts unless the fence is precisely perpendicular to the blade. The oversize bolt holes in this fence make it possible to adjust the angle until test cuts yield square results.



1 Make the kerf. Set the blade to its full height and cut through the sled.



2 Make a test cut. Crosscut a piece of wide stock to gauge the fence's accuracy.



3 Check the cut with a square. Any gaps will help you determine the direction and amount of adjustment the fence requires.

will grow at an alarming rate. Make the runners of hard-wearing quartersawn stock such as oak or maple, about $\frac{3}{8}$ in. thick, or slightly thinner than the depth of the gauge slots. You don't want the runners bottoming out in the slots and lifting the baseplate off the saw table.

Make the runners to fit snugly in width, trimming them with a handplane to fit into the gauge slots. Next, drill four countersunk holes in each runner for flat-head screws to hold it in place.

Mount the runners and adjust the fence

Place the runners in the slots, lay the assembled base and fences on them, and push the package all the way to the

are visible. Mount these screws and then flip the sled over and drill and mount the four remaining screws.

Place the sled in the slots and try to push it. The runners will probably be too tight. Wax them and the bottom and see if will slide. If not, check for black spots on the runners that show where they're rubbing. Use a scraper or shoulder plane to trim those areas, re wax, and try again. The sled should move effortlessly in the slots with no side-to-side play.

Now you're ready to start working. Make the first cut in the sled by raising the blade just enough to slice through the baseplate. Then raise it for a higher cut. Place a piece of scrap on the sled and crosscut it, checking the results with a square. Adjust the fence accordingly. You can make a through crosscut and flip the pieces to see if they line up perfectly, but I prefer to use a square. Lock down the fence with the bolts when you're cutting square.

Remember to always set the jig down so that it's not resting on its fence. You don't want it knocked about. Also, be very careful of the exit point on the sled. Mark this zone to remind yourself never to place your fingers close to it. □



4 Mark your starting place. Before adjusting the fence, mark its original location as a reference point.



5 Tighten the fence. When you're done adjusting, crank the bolts home and you're ready to make crosscuts.

FineWoodworking.com

In a video, Gary Rogowski offers tips and tricks to upgrade a tablesaw crosscut sled. His suggestions will keep this useful jig working smoothly.

rear of the saw table so that one set of countersunk holes is visible. Make sure the jig's fence is relatively parallel to the back edge of the saw. Mount two screws into the sled, one in each runner. Then slide the assembly back to the front edge of the saw table so that two more holes

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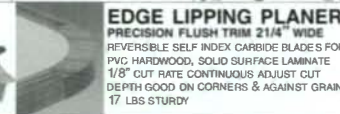


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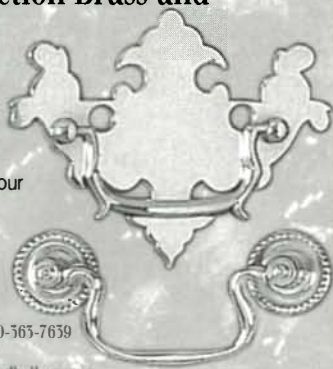
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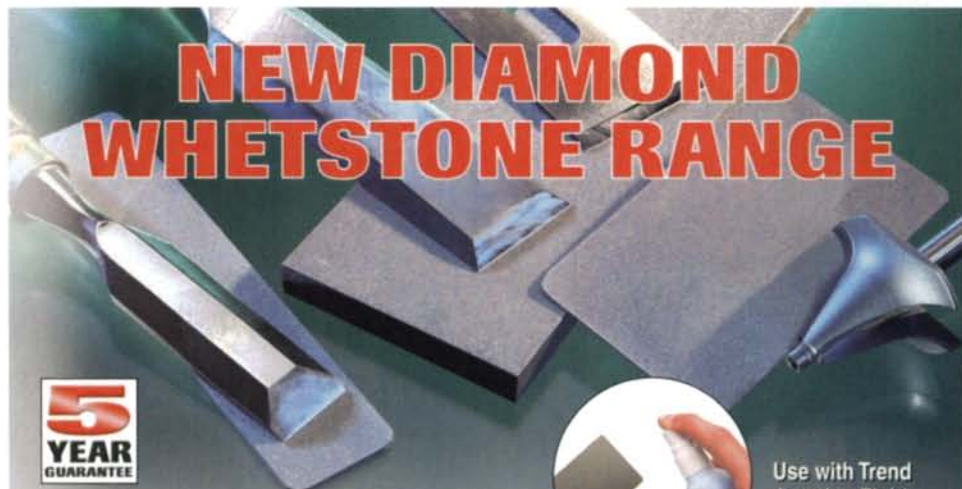
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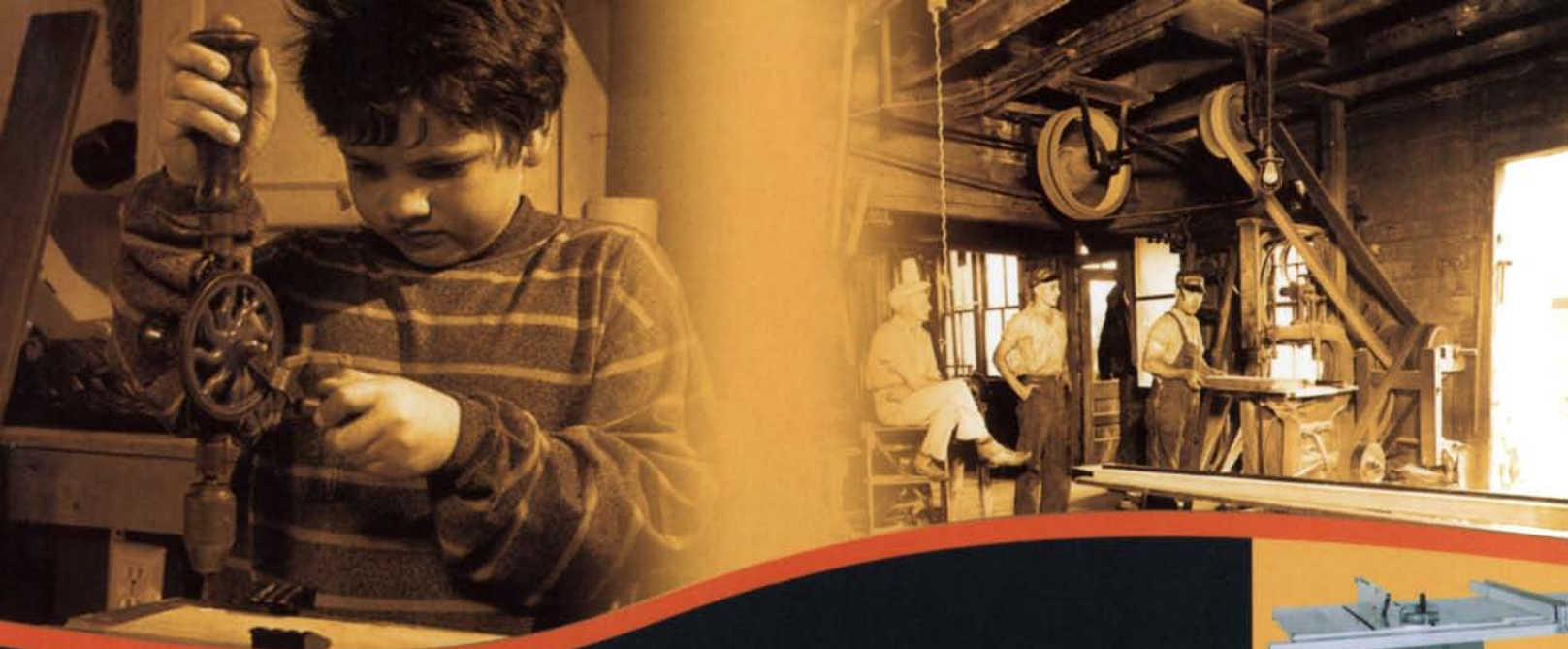
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Working with live-edge boards

Q: I want to use some live-edge boards in my work. What's the best way to strip the bark to reveal the surface below?

—AMIR FAHZAD, Negril, Jamaica

A: THERE'S AN INTRIGUING VISUAL AND TACTILE APPEAL to live-edge boards, those sawn so that one or both edges are the edge of the log, with the bark removed to reveal a wonderfully undulating surface.

It's easiest to remove the bark from a tree cut in the spring, when the sap is rising. The bark will come off easily with a drawknife. The moist cambium layer beneath the bark can be scraped away quickly with the dull edge of a putty knife.

Removing bark from dry wood requires a little more effort. Clamp the board bark-side up. Use a sharp drawknife to remove most of the bark (see photo, right). I use a small teardrop-shaped scraper to remove most of the stringy cambium layer.

Give the wood a good rubbing with a stiff wire brush, then sand up to P220-grit and apply a couple of coats of your favorite finish.

—Andy Rae is author of "Taunton's Complete Illustrated Guide to Working With Wood" (The Taunton Press, 2005).



Exposing an edge. Use a drawknife (left) to remove bark quickly. Slice beneath the surface, then twist the blade as you pull. Clean up the undulating wood edge with a scraper (above).



Poof. The acrid vapor that sometimes rises from cyanoacrylate glue is just steam.

A crazy glue problem

Q: I recently bought a spalted maple pen blank. One end was fairly soft and punky, so I tried to stabilize it with cyanoacrylate glue. But that generated a wisp of white vapor that smelled like pure chlorine. What caused the glue to behave that way?

—BOB MYERS, Cupertino, Calif.

A: THE VAPOR AND SMELL ARE WELL-KNOWN TO WOOD TURNERS. The quick-setting cyanoacrylate adhesive is ideal for filling small cracks and stabilizing wood on the lathe.

The vapor was probably nothing more problematic than a small puff of steam. Cyanoacrylate glue cures through a chemical reaction, and it can give off steam when it reacts with moisture in the wood. (Moisture helps trigger the curing reaction. If a cyanoacrylate bond doesn't hold, you can often kick-start it by separating the joint and breathing on it.)

Cyanoacrylate contains no chlorine, but it does have a pungent odor that's mainly unpleasant. The odor from small amounts of glue used in a well-ventilated shop isn't likely to pose a health problem.

—Peter A. Heinlein is a retired chemist in Lake Hiawatha, N.J.

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.



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Quieting an air compressor

Q: I work in a basement shop, where I use a small, noisy, “pancake” air compressor. Can I enclose it in a cabinet to soften the noise?

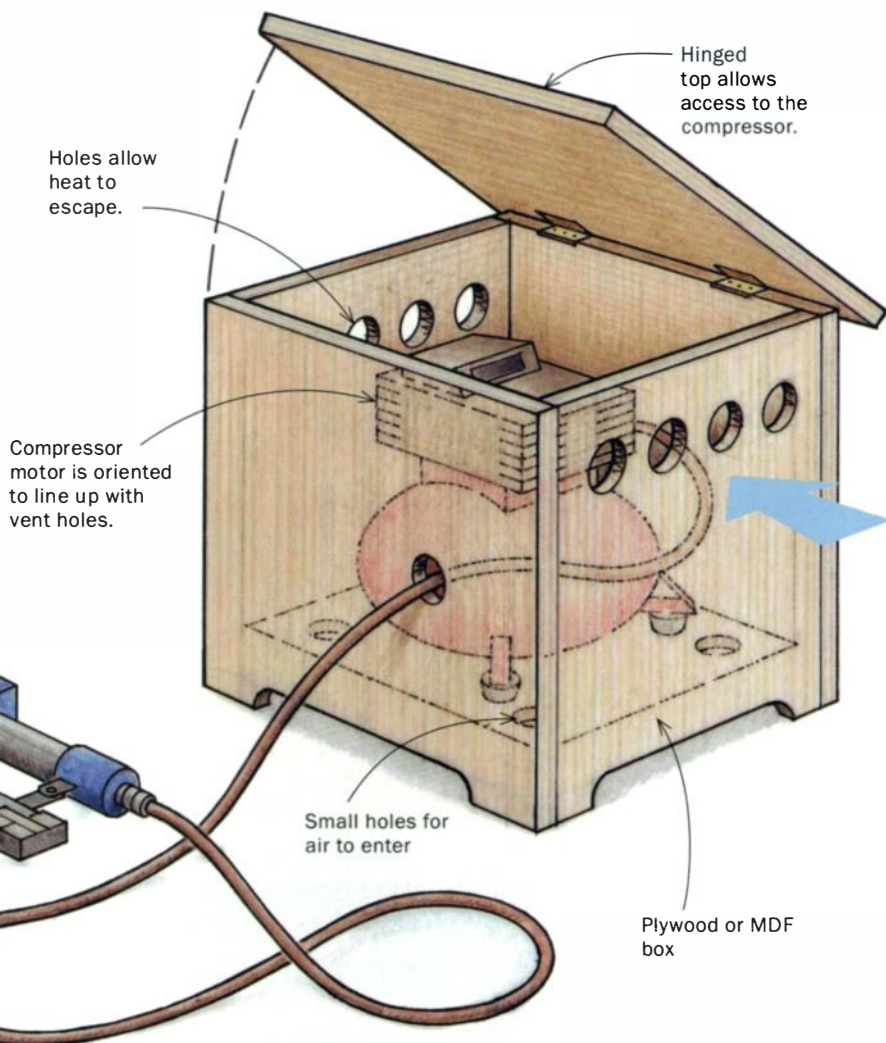
—JEFF DINARDO,
Concord, Mass.

A: YOU SHOULD BE ABLE TO ENCLOSE a small compressor in a plywood or medium-density fiberboard (MDF) box, provided that you make the cabinet large enough to allow good air circulation around the compressor and drill enough vent holes.

The number of vent holes and their locations will vary from one compressor to another, and it takes trial and error to get the ventilation right.

You can use a thermostat to monitor the temperature inside the cabinet. If it gets too hot—and especially if the compressor overheats—drill more vent holes.

—Chris Ermides, an assistant editor at *Fine Homebuilding* magazine, writes about portable air compressors in the 2007 Tool Guide, on newsstands now.



Off the floor. This kind of alkyd varnish makes a long-lasting finish for wood countertops as well as floors.

A gym-floor finish in the kitchen

Q: About 15 years ago, I made an oak countertop that I coated with gym-floor finish. Now it's time to refinish the wood. Should I use some form of polyurethane or two-part epoxy?

—WILLIAM LAMB,
Heath, Texas

A: GYM-FLOOR FINISH was a great choice then and remains a great choice today. It's known as a long-oil alkyd finish, which means that it contains a high percentage of drying oils that impart toughness, flexibility, and water-resistance. The oil also allows the finish to penetrate deep into the wood, reducing the chance of peeling.

Epoxy or catalyzed urethane finishes might seem to be better choices because they

generate a lot of high-tech buzz. But they are much less scratch-resistant. Polyurethane wood finishes fall between catalyzed and oil finishes in scratch-resistance.

I'd stay with a good-quality oil-based floor finish. You've already proved that it lasts a long time. I've used McCloskey Gymseal and like the results. It's available at hardware and paint stores.

—Chris A. Minick is a consulting editor.



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Why leave marks on dovetails?

Q: I don't understand why people leave a layout line marking the tails on a dovetail joint. Other layout lines and marks never show on a finished piece, so why are dovetails an exception?

—DICK SNEDEKER,
West Windsor, N.J.

A: WE NOTICE THE LAYOUT LINES on dovetails because those joints always attract scrutiny. A dovetail is one of the few joints where you can see how precisely the pieces are cut and fitted. My guess is that some woodworkers leave the scribe line in the finished joint to emulate traditional pieces. Personally, I find the layout line not very attractive. I mark my lines with a light touch, so I can easily plane them away when I clean up the joint.

—Garrett Hack is a contributing editor.



Making a mark. The line marking dovetail tails is often left to call attention to a traditional handcrafted joint, not one made by machine.

Fine-tuning a jointer

Q: I recently changed the knives on my 6-in. jointer and set them level with the outfeed table. Now the jointer leaves boards slightly concave in the middle. Do I have to adjust the outfeed table again?

—BILL SMITH,
North Attleboro, Mass.

A: YES. NO MATTER HOW CAREFULLY you install new knives, you can nearly always improve a jointer's accuracy by fine-tuning the outfeed-table height after the knives are in place.

This fine-tuning is easiest if the outfeed table has a handwheel for height adjustments. It's almost impossible if the table has a lever for height adjustments.

Begin with the outfeed table a bit low, and edge-joint two boards that are one-half to two-thirds the length of the jointer. You'll almost surely see a gap when you put the jointed edges together. Raise the outfeed table in small increments and joint the boards after each adjustment. When the edges match perfectly, you're done.

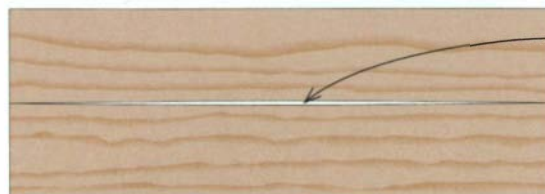
—John White is FWW shop manager.



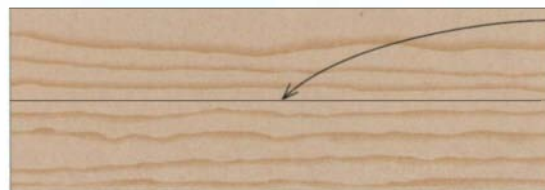
Outfeed adjustment. Many jointers have a handwheel for fine-tuning the height of the outfeed table. You'll need to do that after changing knives.

CLOSE THE GAP TO DIAL IN THE JOINTER

Edge-joint boards, check for a gap between them, then raise the outfeed table and joint again. Repeat until the gap is gone.



Gap means the jointer table still needs adjustment.



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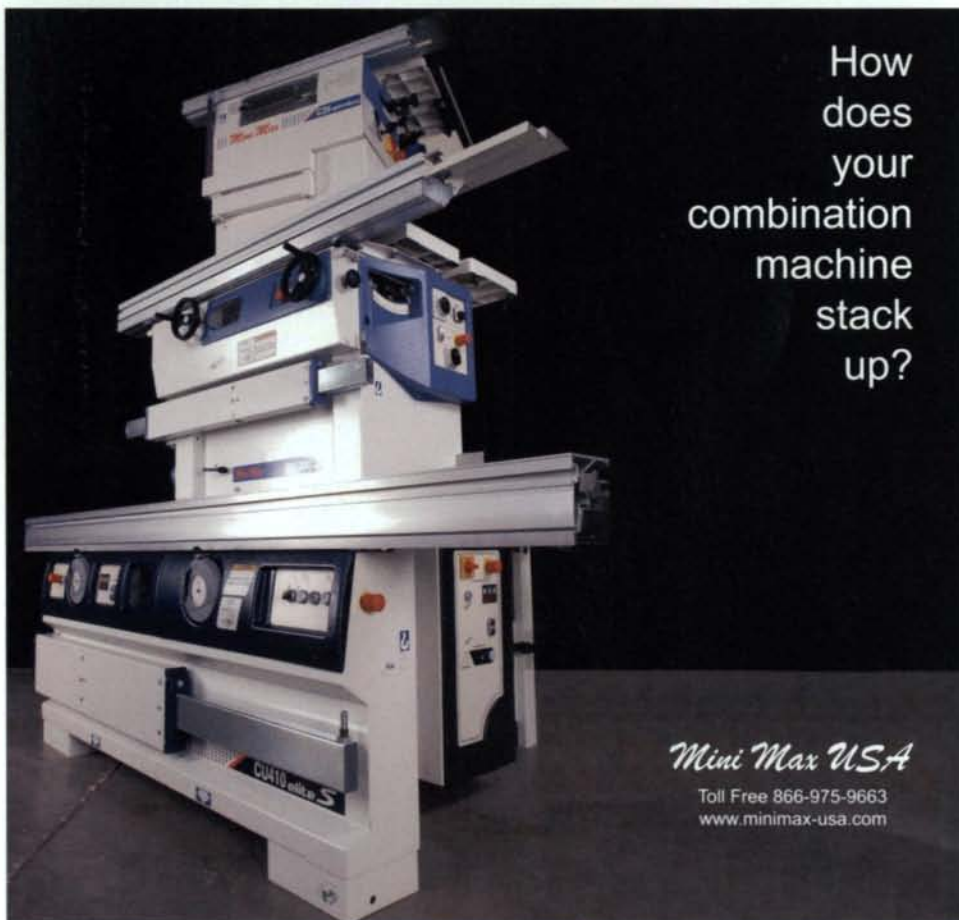
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BY BRIAN BOGGS

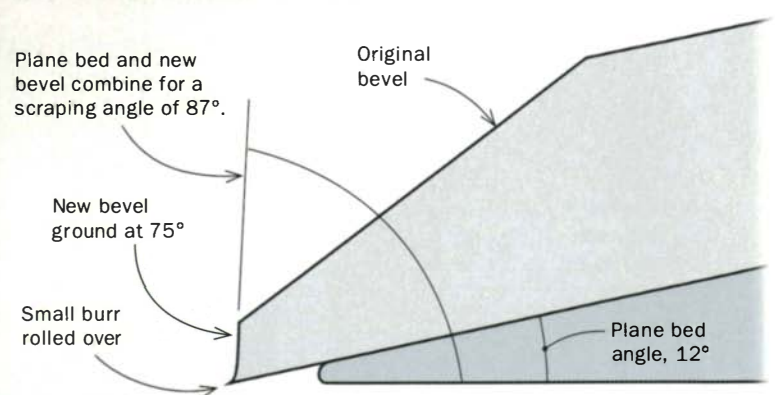


A sharp and well-tuned bench plane can handle the vast majority of surfaces, but every now and then you run into an area of wood so ornery that only a scraper can deliver a good finish. However, I've found it difficult to prevent chatter on some commercial scraper planes, so I came up with a way of converting low-angle planes to work as scraper planes. No modifications are made to the body of the plane; the only investment is the price of a replacement blade. The conversion from one mode to the other is quick and requires no tools.

Regrind a replacement blade

Any type of low-angle plane can be converted to a scraper plane. Jack planes allow you to apply more power and work on a large area quickly, but block planes work fine. Because you will be turning a very small and delicate burr, I urge you to buy an A2 cryogenically treated blade rather than a regular steel blade. A2 blades are available from Hock Tools (www.hocktools.com;

MODIFYING A PLANE BLADE FOR SCRAPING



SHARPEN THE BLADE



Establish the bevel angle. Use a sliding bevel to set the blade at the correct height in the vise for grinding a 75° bevel.



Grind the bevel. Guided by the edge of the bench, use a coarse diamond stone to establish the new bevel on the blade (above left). Clear tape protects the bench from wear. Polish the back of the blade with a fine diamond stone (below left). Finally, use a very fine stone such as a translucent Arkansas stone to polish both the bevel and the back of the blade.



888-282-5233) and Lie-Nielsen (www.lie-nielsen.com; 800-327-2520).

Determine the grinding angle—I find that scraper planes leave the cleanest surface when the blade is angled slightly back from the vertical, say around 87°. With the angle of the plane's bed at 12°, the blade's bevel must be ground at 75°.

Using a sliding bevel to establish the correct angle, grip the blade in a bench vise. Wrap tape around the bench to protect the edge from the sharpening stone, and, starting with a coarse diamond or oilstone, carefully hone an even bevel. You need to remove only a small amount of metal to leave a bevel just shy of $\frac{1}{64}$ in. wide. I follow up with a fine stone and then a hard, translucent Arkansas stone, polishing both the bevel and the back of the blade. If you use waterstones, be careful not to gouge them, and try using the sides of the stones.

Turn the burr on glass—Because the burr is so small and the steel so hard, I have found that the easiest way to turn it is by rubbing the blade on a sheet of flat $\frac{1}{4}$ -in.-thick float glass. I place a $\frac{1}{8}$ -in. drill bit under the blade about a third of the way back from the tip, put a few drops of oil on the glass, and then roll the blade backward and forward

about an inch. Keep the pressure firmly on the bevel at all times. After a dozen or so strokes, see if you can feel a burr. Your finger should feel just a small amount of resistance, but the burr won't be visible.

The pros and cons of using a scraper plane

Converting a low-angle plane to a scraper plane is a quick process, and a well-tuned scraper pretty much guarantees no tearout. But there is a

price to pay. The plane takes greater effort to push through wood and requires more maintenance than a smoothing plane. The burr will not last as long as the edge on a conventional blade, and because you'll need to remove all of the distorted metal the next time you sharpen it, the blade on a scraper plane will be consumed more quickly than that on a bench plane. However, compared to buying a scraper plane, a second blade for your custom-made one is a small investment. □



Roll a burr. Place a few drops of oil on a piece of float glass and roll the blade to and fro on a $\frac{1}{8}$ -in. drill bit with the tip of the blade pressed firmly on the glass. After a few strokes, you should start to feel a burr.



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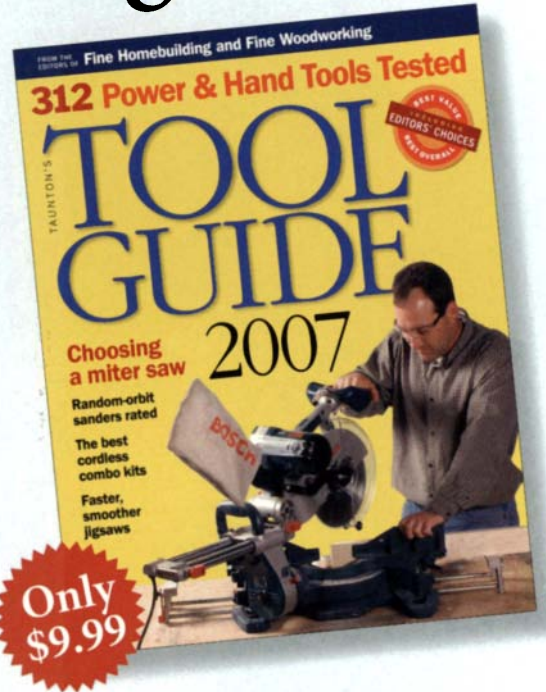
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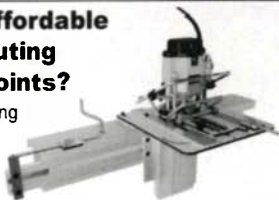
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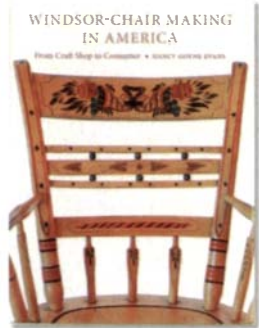
16. This statement of ownership will be printed in the *Tools and Shops* 2006-2007 issue of this publication. 17. I certify that all information furnished on this form is true and complete.

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book reviews



Windsor-Chair Making in America: From Craft Shop to Consumer

by Nancy Goyne Evans. University Press of New England, 2006. \$65; 528 pp.

WHEN I STARTED MAKING WINDSOR CHAIRS in 1971, I quickly learned about Nancy Goyne Evans, the registrar at Winterthur who was even then working on a definitive study of America's classic seating form. After

three decades she finally began publishing her work, and it has taken three enormous volumes. The first was a survey of chairmaking by region and decade. The second was a study of specialized forms.

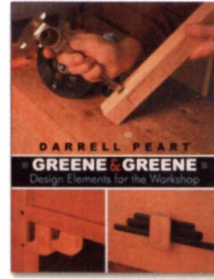
This third volume is the one Windsor chairmakers have been waiting for all these years, and it was well worth the wait. In it, Evans examines the craft of Windsor chairmaking. Her exhaustive research has taken her to every conceivable source of information about chairmakers' working habits, business practices, and personal lives. Today's chairmakers and other furniture makers will be fascinated to discover that in

many ways, our business has not changed a lot in 250 years.

This is a landmark work that may never be surpassed. Scholarly studies like this often go out of print after several years.

Then, they soar in value. Buy a copy now, or someday you will pay through the nose for one.

—Mike Dunbar teaches Windsor chairmaking at The Windsor Institute.



Greene & Greene: Design Elements for the Workshop by Darrell Peart. Linden Publishing, 2006. \$24.95 paperback; 128 pp.

I WASN'T HOPEFUL WHEN I SAW THE COVER of Darrell Peart's new book. Why put a photo of a dial indicator on the cover of a book about design details from two preeminent architects and furniture

designers of the 20th century?

I suppose it's there to show that this is a thoughtful and thorough investigation of the Greenes' work. It turns out that this book is just that. The antiseptic cover belies the real love of the subject matter shown by the author, the beauty of the work itself, and the depth of joy to be had when building with these details.

The first section is devoted to the history of the Greenes and their design work, and to their chief builders: John and Peter Hall.

The second part offers suggestions and plans for producing 10 design details. But these are sometimes only "in the spirit of the original Greene and Greene work." The last section offers several contemporary takes on the design elements, and regrettably these don't compare well to the originals. But as the author notes, "they are here to point the way."

All in all, it's a very thoughtful and wonderful book of history. It isn't the last word on design details, but for aspiring students of Greene and Greene, it's a good place to start.

—Gary Rogowski, contributing editor



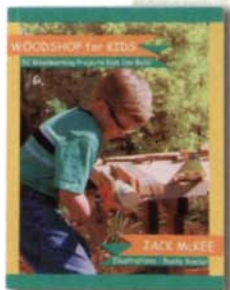
Woodshop for Kids: 52 Woodworking Projects Kids Can Build

by Jack McKee. [www.home.earthlink.net/~mckee/] Hands On Books, 2005. \$21.95 paperback; 201 pp.

WITH THE DEMISE OF THE SHOP CLASS and the rise of the Xbox and iPod, fewer kids than ever are working with their hands. That leaves parents and grandparents wondering how to introduce young people to the pleasure of building things. The trick is choosing projects that children actually will do, and safely. Enter Jack McKee, who teaches woodworking for children and teachers, and designs equipment for children's museums. His 52 projects include toys, games, gadgets, musical instruments, signs, stools, stilts,

and boxes, all designed to excite kids, not overwhelm them. Introductory chapters give excellent advice on safety and tools. All I had to do was leave this book lying around; my 8-year-old daughter found it and picked her projects.

—Asa Christiana, editor



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DVD Reviews



Sharpening Woodworking Tools Using Norton Oilstones, and Sharpening Woodworking Tools Using Norton Waterstones, by Joel Moskowitz and Maurice Fraser. www.toolsforworkingwood.com, 2006. \$10.

Making Your Tools as Sharp as Your Mother-in-Law's Tongue by Ernie Conover. www.conoverworkshops.com, 2005. \$14.95.

TWO OF THESE DVDS are a collaborative effort by Joel Moskowitz, the proprietor of Tools for Working Wood, and the Norton Abrasives Company. The “how-to” in both is very similar and extremely focused. In the oilstones DVD, Moskowitz calls upon Maurice Fraser (a former *FWW* author from the old black-and-white days), who taught him how to sharpen more than 20 years ago. Fraser (and Moskowitz in the waterstone DVD) advocates a freehand technique—no jigs or honing guides are required to put a fine, polished edge on a cutting tool. Fraser uses a medium aluminum-oxide India stone, a finer hard Arkansas stone, and a bare leather strop. He explains himself clearly as he

chases the burr and puts a microbevel on the cutting edge of a chisel.

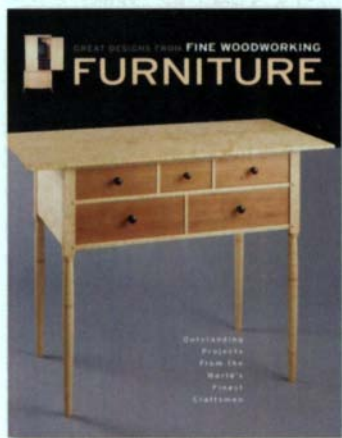
Ernie Conover's sharpening DVD, produced at his woodworking school in Ohio, casts a wider net. This is a video about sharpening plane blades, chisels, carving tools, scrapers, saws, drill bits, scissors, and much more. Conover also gives lessons in the metallurgy behind tool steel, the grades of sharpening stones, the use of the grinder, and which files to use for what.

—William Duckworth, contributing editor



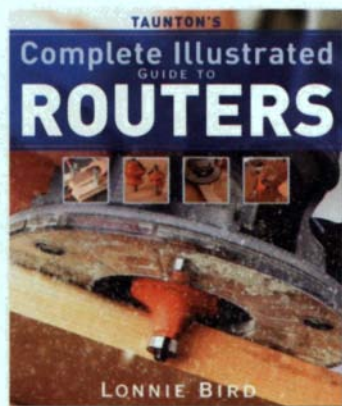
New From The Taunton Press

The Taunton Press has introduced several woodworking books covering a variety of skills and projects. For information, go to www.FineWoodworking.com.



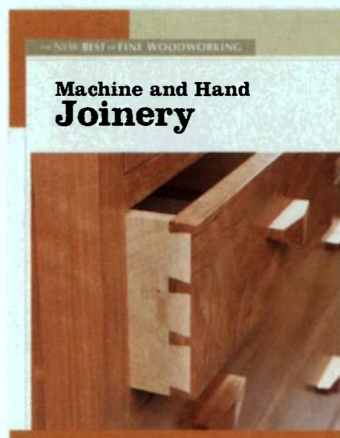
Great Designs from Fine Woodworking: Furniture
\$24.95 paperback; 218 pp.

This volume includes more than 65 projects with drawings and how-to instructions. Included are all types of furniture for the bedroom, dining room, and living areas, as well as the home office and patio.



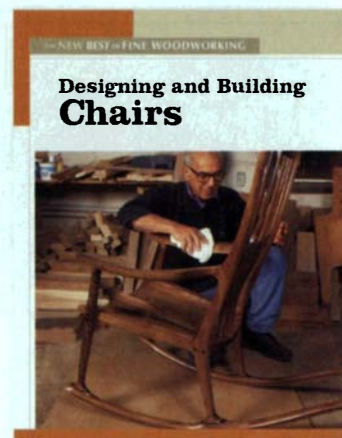
Taunton's Complete Illustrated Guide to Routers
by Lonnie Bird.
\$24.95 paperback; 233 pp.

This volume begins with the basics of choosing a router and the variety of available bits. It also thoroughly covers common router operations, router tables, edges and moldings, joinery, and a variety of shaping techniques.



Machine and Hand Joinery
\$17.95 paperback; 153 pp.

The 20 *Fine Woodworking* articles collected in this volume offer expert instruction on all kinds of joinery, from hand-cut dovetails to using shopmade slot-mortising machines.



Designing and Building Chairs
\$17.95 paperback; 155 pp.

This collection of articles includes advice from chairmaking masters Brian Boggs and Sam Maloof, among many others. More than a half-dozen projects are accompanied by articles on chairmaking basics and detailed techniques for compound joinery and making chair arms and seats.

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Furniture Mill

Furniture maker Gregg Lipton stumbled upon his dream shop while mountain biking in the woods in Cumberland, Maine, in 1990. It was an old, cedar-shingled structure perched over the spillway of a dam in the Piscataqua River, and it was for sale. Supported by a 16-ft.-tall, dry-stacked fieldstone foundation, the timber-frame building had been a water-powered sawmill for almost a century—from 1865 to 1956—before being converted into a spartan summer house. Along with lumber, the mill had once produced masts, oars, and other parts for ships, which explains the ship's knees employed as brackets beneath the building's collar ties. Lumber still flows through the shop at a good clip, but these days it leaves in the form of Lipton's striking furniture.



Pro Portfolio Visit FineWoodworking.com for an audio slide show of Lipton's historic shop.

—Jonathan Binzen

Photos: Jonathan Binzen; inset photo courtesy of Gregg Lipton