

Fine
WoodWorking

Build a router table
into your tablesaw, p. 50



Tools & Shops

ANNUAL ISSUE

**Turn any garage
into a great workshop**

**Classic chest
for hand tools**

TOOL TEST

**Big bandsaws
for less**

**Cutting-edge
first aid kit**

**How many routers
do you need?**

**Roy Underhill's
favorite tools**



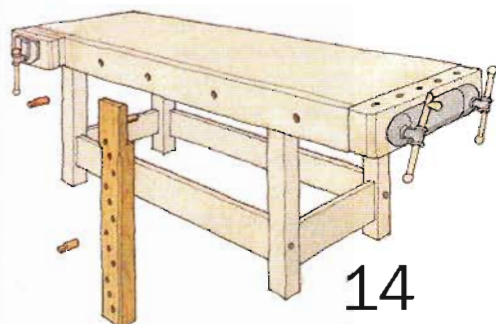
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A Taunton Publication

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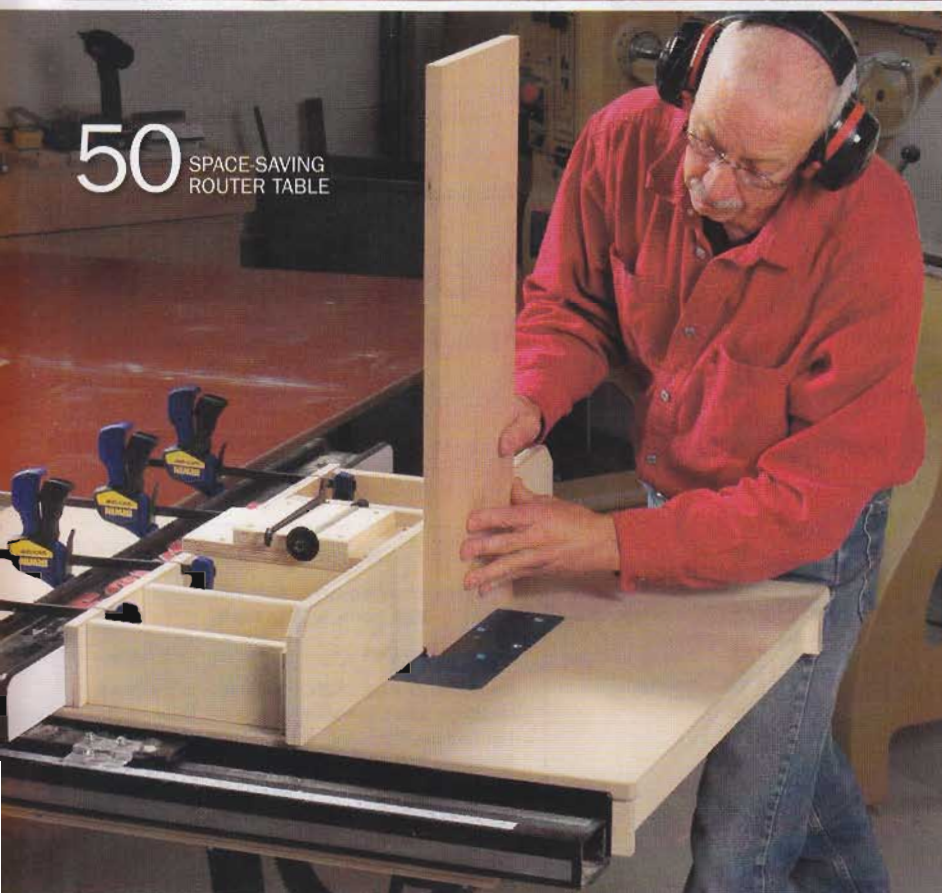
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on the web

THIS MONTH ON **FineWoodworking.com/extras**

Visit our Web site to access free Web tie-ins, available October 28. While you're there, don't miss our collection of free content. Including tool reviews, an extensive project gallery, and must-read blogs.



Free eLetter

Get free plans and more by signing up for our eLetter at FineWoodworking.com/newsletter.



VIDEO: Shop Makeover Tour

Tour Michael Pekovich's revamped garage shop (p. 28) and scope out other great workspaces in our gallery of shops from around the world.

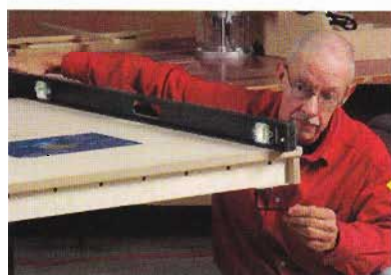


VIDEO: Frame Pictures Like a Pro

November 22: Whip out custom picture frames with tips from our free video series—just in time for the holidays.

Shop Questions: Ask John White

Our shop guru is on tap to answer your questions about tools, maintenance, and even his new router table (p. 50).



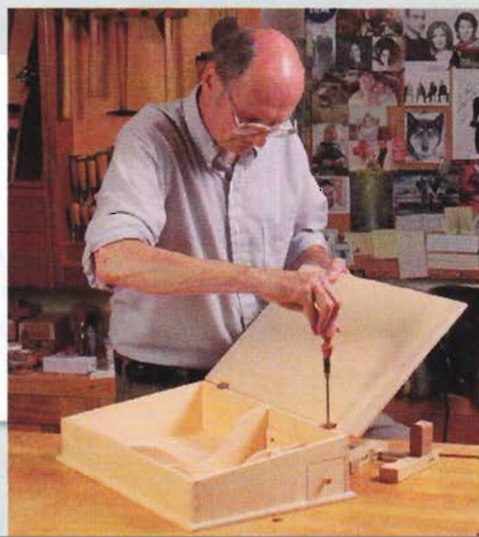
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Build a Shaker Lap Desk

The perfect holiday gift: This Christian Becksvoort project features an inkwell drawer for a touch of nostalgia, but the desk can also store a laptop to serve a thoroughly modern purpose. Includes:

- Through-dovetails
- Breadboard ends
- Downloadable plan



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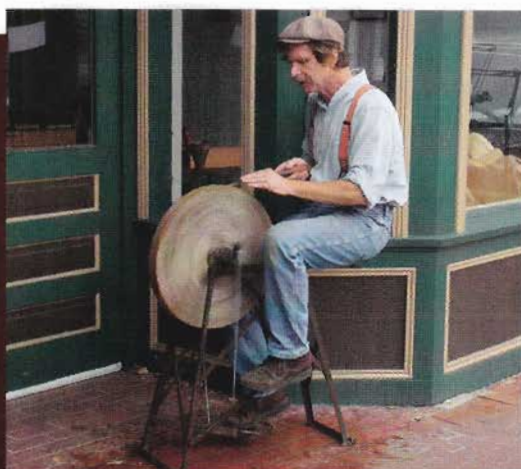
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contributors

Roy Underhill (*Handwork: "The Woodwright's Favorite Tools"*) is the host of the PBS series *The Woodwright's Shop*, now in its 30th season. He's also the author of many books on traditional woodworking, most recently *The Woodwright's Guide: Working Wood with Wedge and Edge* (The University of North Carolina Press, 2008). A former master craftsman at Colonial Williamsburg, Underhill recently opened The Woodwright's School in Pittsboro, N.C. (woodwrightschool.com). For the past year he has been restoring an old mill where he plans to continue his lifelong love of working wood using the old hand ways.



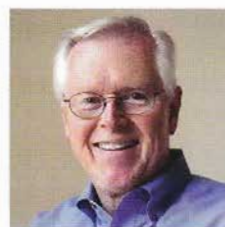
Roland Johnson (*"Step Up to a Serious Bandsaw"*) is a passionate, self-confessed gearhead who's drawn to iron. But that magnetism isn't just for power tools; he's been known to cling to old hand tools as well (*"Make a Bargain-Basement Plane Perform Like Royalty"*). A professional woodworker for more than 30 years, Johnson's been a contributing editor to the magazine for six years, and specializes in tool tests and evaluations.

Working in small spaces comes naturally to **Stelios L.A. Stavrinides** (*Shop Design: "Think your shop is small?"*). The Web graphic designer lives in Nicosia, on the Mediterranean Island of Cyprus—one of the world's smallest nations. Stavrinides, who describes himself as a self-taught, weekend woodworker, says he hopes to one day build a 300-sq.-ft. "dream shop" that he envisions as both workspace and teaching facility. Now that's a big idea.



Steve Brown (*"North Bennet Street Tool Chest"*) is a 1990 graduate of the Cabinet and Furniture-Making program at the venerable Boston school. He spent nine years as head of the department and is starting his 12th year as an instructor. He is an adviser and will be an occasional guest on the new PBS woodworking show *Rough Cut—Woodworking with Tommy Mac*. Brown lives in Manchester, Mass., with his wife and sons.

Patrick Sullivan (*"Cutting-Edge First Aid"*) started his career in emergency medicine and migrated to internal medicine. Before retiring last year, he served as chief of medicine and chief of staff at two hospitals. A lifelong woodworker, he is building an entertainment center and a fireplace surround for his new house in California, but still has not found a permanent home for all his tools. And in case you're wondering, he does indeed patch up his own injuries at home.



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

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

Fine Woodworking

Advertising Senior Vice President	Stephen Glannetti 203-304-3569 sglannetti@taunton.com
Advertising Director	Peter Badeau 203-304-3572 pbadeau@taunton.com
Senior National Account Manager	Linda Abbott 203-304-3538 labbett@taunton.com
Associate Account Manager	Kimberly Parrilla 203-304-3590 kparrilla@taunton.com
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Spotlight

Issue No. 211
March/April 2010
p. 38

NO RIGHT OR WRONG WAY TO USE CONTRASTING WOODS

I am a longtime reader of the magazine and Web site. I have always valued *FWW* as a skill-builder and a technical resource. But I was disappointed with you for the first time when I read Garrett Hack's article on how to use contrasting woods. I have a fine-art background, and in art, there is no right way—only a critic's opinion. When I read the article, I felt a wet blanket being spread over a large group of up-and-coming woodworkers. Never once did I read "in my judgment" or "it is my opinion."

—KENNY BOND, Madison, Wis.

Editor replies: Please accept our apologies if Hack's advice came across as more critical than constructive. You can blame us editors for that. We write all the headlines, for example, and we sometimes get carried away trying to grab people's attention. I know that Hack's intention was to be helpful and thought-provoking rather than rigid and dogmatic. And I'll bet we cut a few "in my opinions" and such out of the text in our usual effort to tighten things up.

In general, readers should take each article as one person's opinion. We use more than 100 different authors each year, and they don't always agree. In fact, that variety of perspectives is one of *FWW*'s strengths.

Please investigate manufacturers' technical support

I enjoy your tool reviews, but one thing you never cover is a company's technical-support service. They might make a great table saw, but if you can't get technical support from them several years down the road, is it really the best saw? Why not compare a company's daily hours of technical support versus their customer service, or find out if the support is easy to access? For example, is it a toll-free number? How about trying to contact various well-known companies and see how successful you are at obtaining technical support, or how easy it is to find out how to get a tool serviced in your area?

This doesn't need to be done for every tool you test, but it would be a good idea for the costlier items.

—ANGELA WEEKS, Burbank, Calif.

Editor replies: *You are right. Technical support is very important, and some companies do it better than others. I don't know if we could follow the technical support for several years after a tool is introduced, but many of your other suggestions are very feasible. We'll consider all of them for future tool tests.*

Festool is good and expensive

If someone were to give me the Festool OF2200 router and accessory kit (the Best

Overall winner in "Heavy-Duty Plunge Routers," *FWW* #214), I would graciously accept it, but if the gift took the form of the \$1,100 it would take to buy the Festool, I'd sooner buy the DeWalt DW625 and, perhaps, three fine handplanes. By the way, the excellent Bosch edge guide, which you recommend as a \$40 option, fits the DeWalt just fine. As for your Best Value recommendation of the Hitachi, how many woodworkers old enough to drive really want a tool that looks like a preview for the next Transformers movie?

—HOWARD SKILLINGTON, Winston-Salem, N.C.

Correction

In a chart in "Tool Test: Air Filters" (*FWW* #213) we gave misleading information about the total amount of dust in the air, and thus the overall performance of the units. Our meter measured only the dust from 0.1 to 10 microns in size, nothing larger. So after using the table saw, router, and sander with no dust collection in place, it stands to reason that there was much more dust in the air than the 3 to 5 mg/m³ shown in the chart. In retrospect, we should have tested for the total amount of dust, in order to give a more complete assessment of these units.

Bottom line: While these units reduced the levels of airborne dust in our tests, they did not bring it down to safe levels. So labels and headlines in the article that read "Clear the air and protect your lungs" and "Air filters get the job done" were misleading. Proper dust collection at the source is the only way to reduce airborne dust to a safe level, and we regret giving any other impression. We have reworked the online version of the article to correct these mistakes.

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Fine Woodworking magazine seeks a journalist with a passion for woodworking. You'll be based in our Connecticut headquarters, but you'll travel monthly to visit talented furniture makers around the country. Photography and video skills are a plus. Go to <http://careers.taunton.com> to apply. Attach a cover letter, resume, and pictures of your woodworking projects and shop space.

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To contact us:

Fine Woodworking
The Taunton Press
63 South Main Street,
PO Box 5506, Newtown,
CT 06470-5506
Tel: 203-426-8171

Send an email:

fw@taunton.com

Visit:

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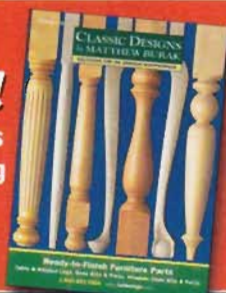
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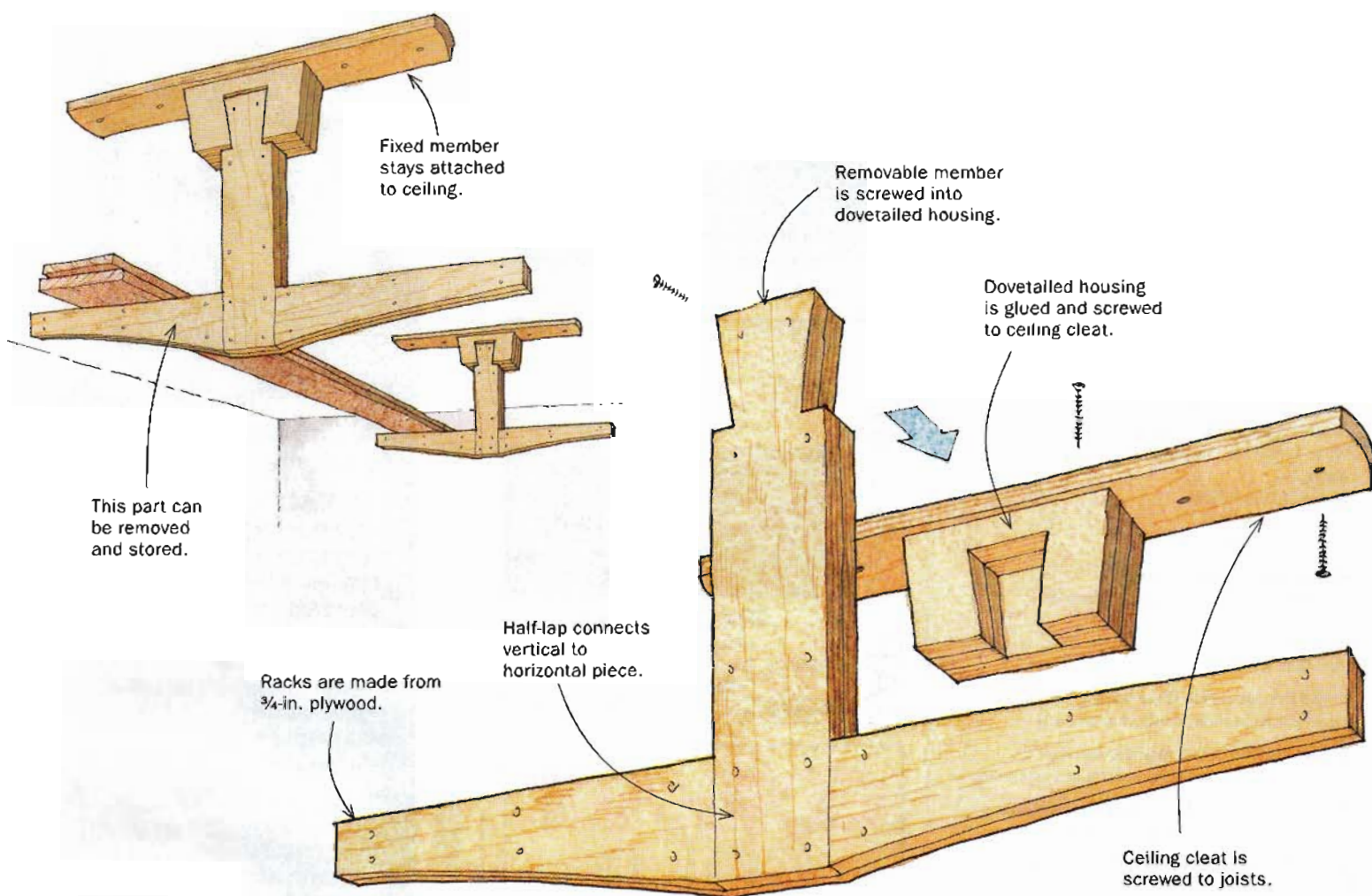


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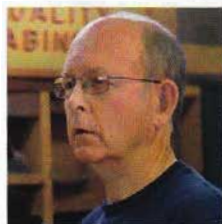
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methods of work

EDITED AND DRAWN BY JIM RICHEY



Best Tip Overhead rack for project lumber



In his 44 years woodworking, Jim Whetstone has made 1,127 pieces using wood from all over the world. His basement workshop is small, but he manages to get the most out of the space (see FWW #91, pp. 58-59).

I needed additional lumber storage for a large project, but the existing storage in my small shop was full. To get around the problem, I designed and built a temporary rack for the project wood. It allows easy access to the lumber without being in the way, and it can be removed and put away until needed again.

The rack has two main parts: a fixed member that consists of a dovetailed housing and a mounting cleat, and a removable member that holds the wood. The fixed member is screwed to the ceiling joists and the removable member fits into the dovetailed housing and is screwed in place.

The 22-in.-wide, 12-in.-tall rack is laminated from 3/4-in. plywood. The fixed member is a three-piece lamination. The removable member is laminated from two

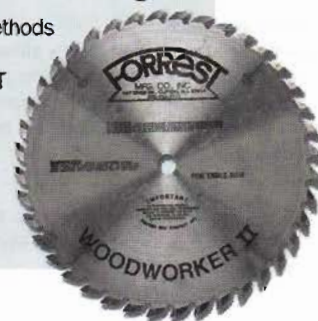
pieces of plywood, and I used a half-lap where the horizontal piece meets the vertical piece, gluing and screwing them together.

The rack holds a lot of weight but can be easily removed and stored when not in use.

—JIM WHETSTONE, New Cumberland, Pa.

A Reward for the Best Tip

Send your original tips to Methods of Work, Fine Woodworking, PO Box 5506, Newtown, CT 06470, or email fwmow@taunton.com. We pay for every tip we publish; the best tip also wins a Forrest Woodworker II combination blade.



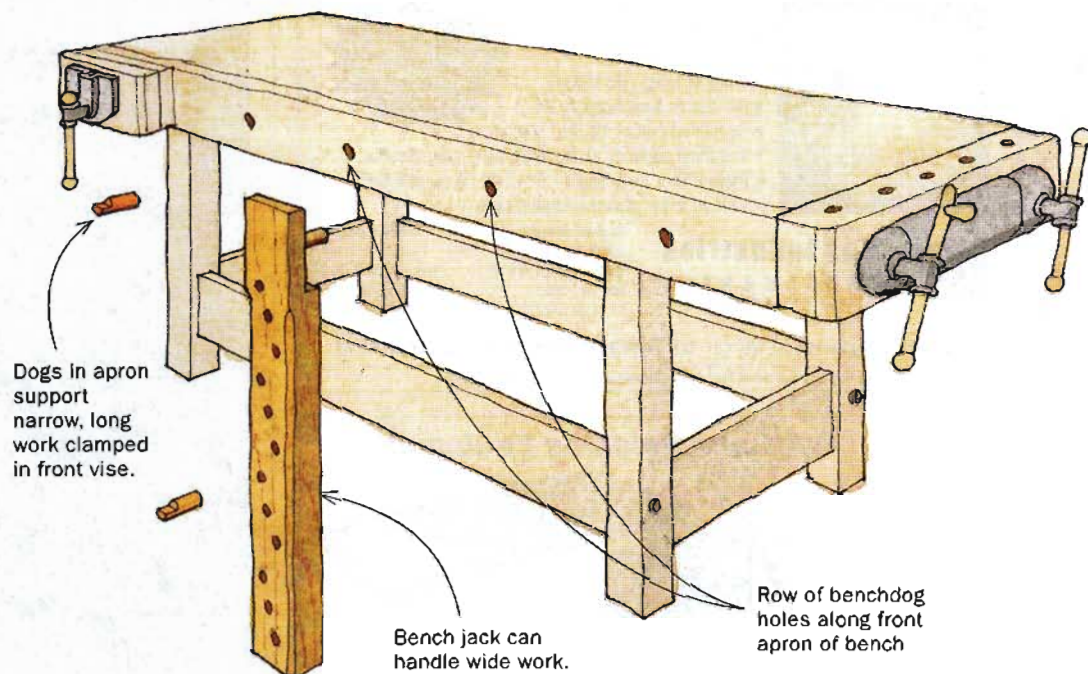
methods of work continued

Use dogs and a bench jack to support long boards

A row of dog holes drilled in the side of a workbench provides a quick and solid way of supporting long boards for edge-planing. Simply install a benchdog or two in the holes, clamp the workpiece in the front vise, and you're ready to go.

You can also use the dog holes to install a plug-in bench jack, which is simply a vertical support piece with a series of dog holes on its face. The bench jack provides a way of supporting wider items, such as doors for edge-planing or linging.

—TIM NOTT, Planioles, France



Knee paddle cuts power safely

One day after having a board bind up in my tablesaw and almost kick back, I looked into installing a paddle-style shut-off switch, sometimes called a panic switch. A commercial version I found would have required major alterations and rewiring. So I built this oversize maple paddle and attached it to the saw above

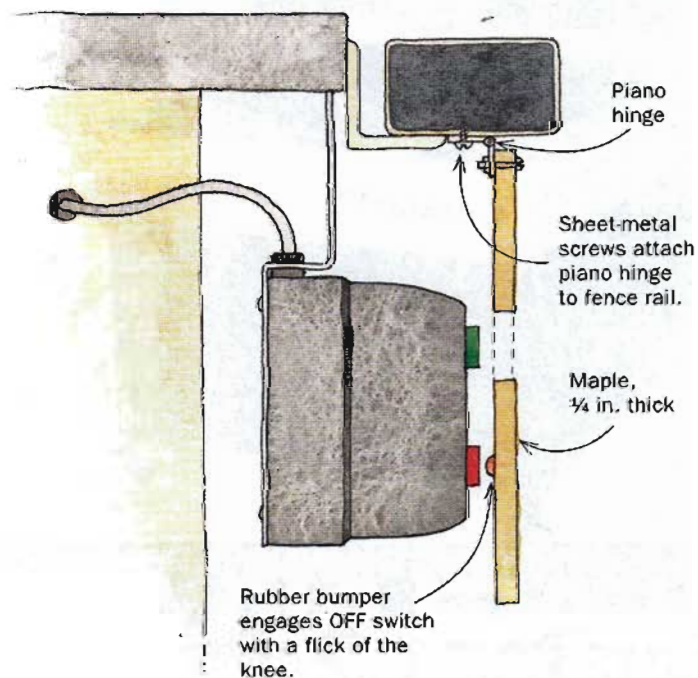
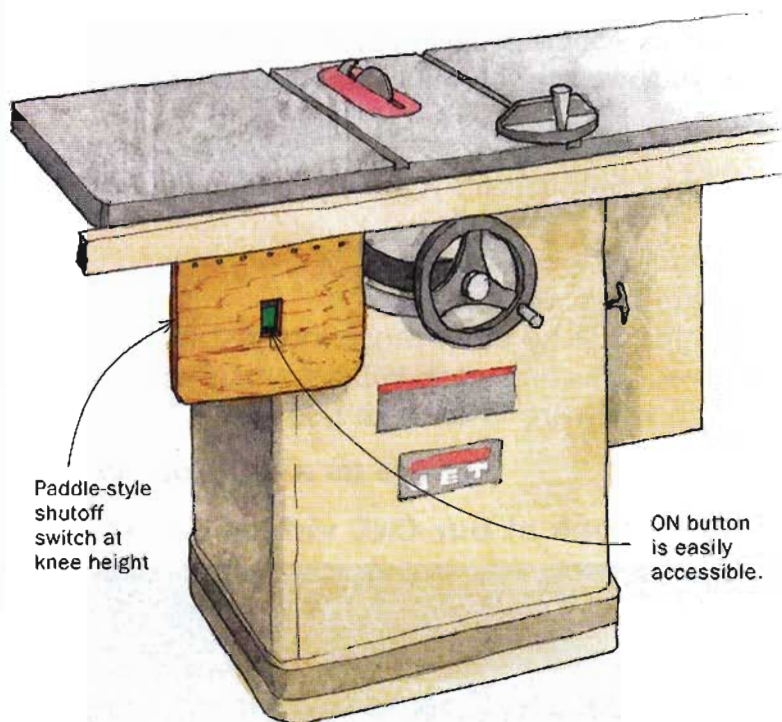
the existing switch housing. This concept should work with almost any push-button switch as long as you can find a convenient place to attach the paddle.

It's very easy to operate. At the end of a cut, a mere flick of my knee cuts off power with both hands still safely above the table and on the workpiece. A rubber

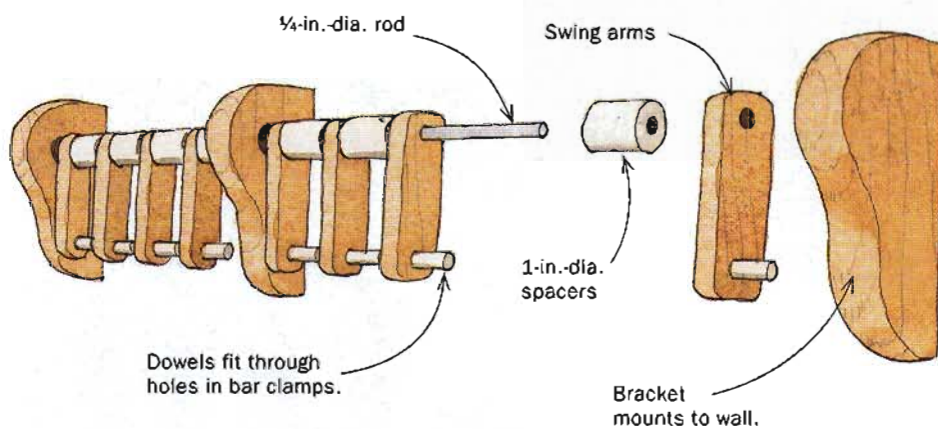
bumper (available at most hardware stores) installed over the OFF switch ensures that the paddle hits the switch.

I installed similar switches on my jointer, router table, and bandsaw.

—ANDREW JOHNSON, Boise, Idaho



methods of work continued

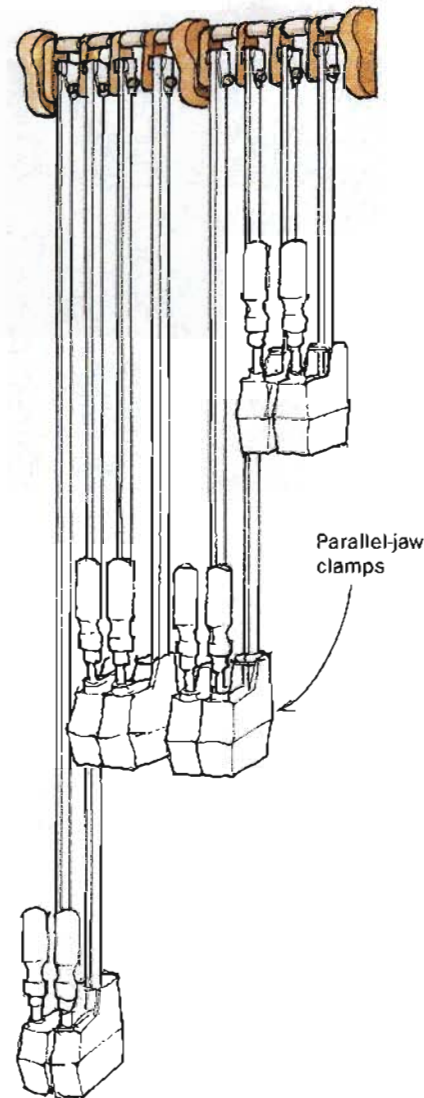


Rack for storing parallel-jaw clamps

In my small basement shop, I had to find a way to store some Bessey clamps without taking up too much space. Because Bessey-brand clamps (and some similar parallel-jaw clamps) have a large hole through the end of the bar, it occurred to me that a swinging arm would be an efficient means to hold them. I built a rack, and it works quite well.

The rack consists of several arms that are strung together like beads on a metal rod. The arms are spaced apart on the rod with center-drilled 1-in.-dia. dowels, and the 1/2-in.-dia. dowels in each arm fit the holes in the clamp bars. The entire assembly is supported by wooden brackets. To remove a clamp, grab the bar, lift the swing arm away from the others, and slide the clamp off the dowel.

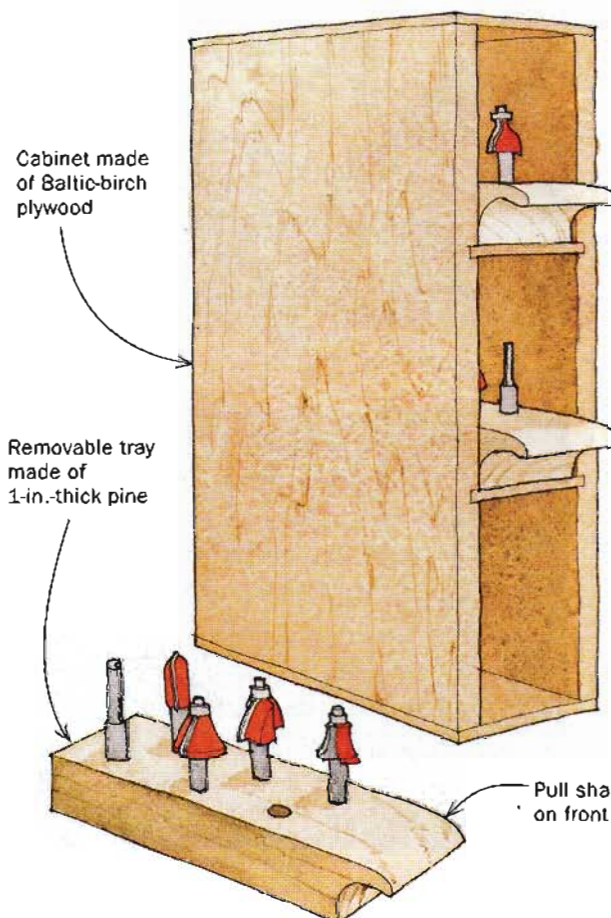
—DAVID UNDERWOOD, Wellesley, Ont., Canada



Quick Tip

It is common practice to make a new zero-clearance tablesaw insert from a factory insert with a pattern-following bit in a router. Most articles recommend joining the old insert to the new blank with double-sided tape. I find it a lot easier to attach the two pieces with four screws through the leveling holes. This approach is quicker and cheaper, and it also marks the new insert for its own leveling holes.

—KONRAD PLACHTA,
Tasmania, Australia



Storage trays and cabinet for router bits

This quick project provides compact, convenient storage for router bits. The cabinet is made from Baltic-birch plywood. The trays are made of 1-in.-thick pine, with the front edge shaped to form a pull. You can easily withdraw a tray for individual bit selection or pick up the entire cabinet when working at another location.

—RICHARD BOWEN,
Seymour, Conn.

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LARGE TILTING TABLE

The table is big (14 in. deep by 20 in. wide) and tilts forward as well as side to side.

THE DRILL PRESS HASN'T CHANGED MUCH since the first electric-powered one was built in the early 20th century. So I was happily surprised to see several key innovations on Delta's new 18-in. drill press, model 18-900L.

In a nod to woodworkers, they improved the table's capacity and holding power. The extralarge rectangular table is better than the typical small, often round tables favored mostly by metalworkers. T-slots in the table accept hold-downs (not included) that make it easier to clamp workpieces. A fairly generous flat area underneath the perimeter better accepts the jaws of woodworking clamps.

The table has another strong feature. Like most drill-press tables, it tilts 90° to the left and right for angled drilling. But this one also tilts

forward to 48°, offering the added convenience of being able to drill at compound angles—a plus for chair-makers.

Although it doesn't offer variable speed, the machine makes it easy and fast to change between the 16 speed options. In an improvement over the pulley systems typically found on drill presses, on the Delta you just slide a lever to the right to release the belt tension. To change speed, slip a pair of belts onto the appropriate pulleys, then release the tension lever, which automatically re-tensions the belts.

Model 18-900L has plenty of power: I was able to drill a 2-in.-dia. by ¾-in.-deep hole in

hard maple in just 8 seconds. The quill stroke on this machine is a very generous

6 in. Most drill presses have a stroke that's less than 4½ in., forcing you to position the table twice for deep holes.

A spring-loaded depth stop is another clever touch. Setting the stop is quick, easy, and accurate. The same type of stop locks the quill in place.

The machine also has a very accurate laser system, which helps you align the bit with a layout mark on the workpiece.

For more information, go to deltaportercable.com.

—Tom Begnal is a retired associate editor of *Fine Woodworking*.

DELTA 18-900L

Street price: \$830

Motor: ¾ hp

Chuck: ⅝ in.

Chuck to post: 8 in.

Quill stroke: 6 in.

Speed range: 170–3,000 rpm

Runout: 0.001 in.

Speed change: Very easy

Depth set: Very easy



■ ACCESSORIES

A better mounting plate for router tables

IF YOU'RE BUILDING A ROUTER TABLE, one of the most important pieces of hardware is the table insert, which is designed to hold the router and provide a smooth, level surface to guide the workpiece into the bit safely.

The problem with most of these plates is the insert rings, which you have to change when you use different-size bits. Some models use a plastic wrench to lock and unlock the ring with a twist. On others, you have to screw the ring into place. Not very convenient.

Incra's MagnaLock mounting plate makes things much easier. The MagnaLock harnesses the power of rare-earth magnets to hold the insert ring in place. You just pop in the ring and remove it by levering up an edge with an Allen key.

The aluminum plate itself is thick (a full $\frac{3}{8}$ in.), strong, and perfectly flat. It comes with nine leveling screws that allow you to correct

for any minor mistakes made while routing the rabbet for the plate. You can also level the insert rings easily, if needed.

The plate is made to fit a number of routers, but you'll have to drill the access hole for above-the-table height adjustments. You also could buy a blank plate and drill your own mounting holes. Both options sell for \$77 each (woodcraft.com). For more information, visit incra.com.

—Tom McKenna is senior editor.

Easy in, easy out. Rare-earth magnets lock the insert ring in place. To remove it, just lever up the ring with an Allen key.



■ HAND TOOLS

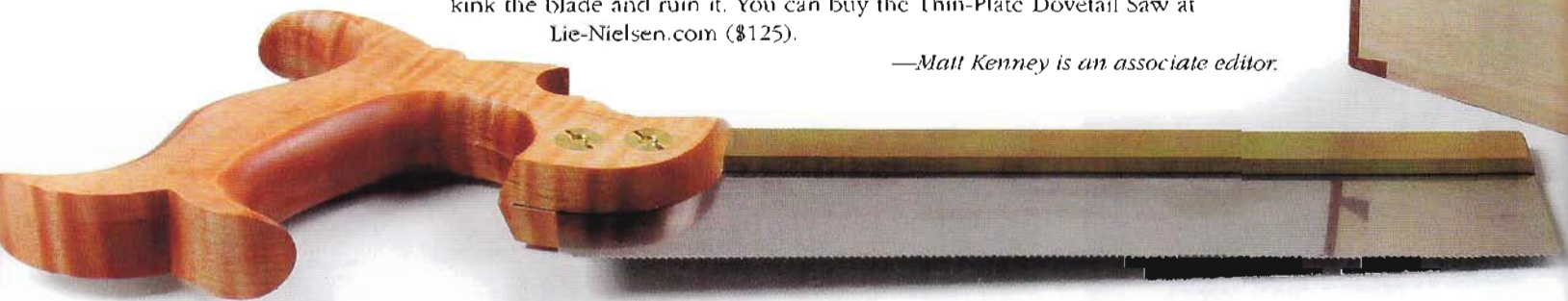
Nimble dovetail saw makes extrafine cuts

THE BIG NEWS HERE is not that Lie-Nielsen is selling a new dovetail saw, but that the saw's blade is just 0.015 in. thick. That's not much thinner than Lie-Nielsen's standard dovetail saw (0.020 in. thick), but the difference is noticeable.

Less effort is needed to use the thinner saw and it cuts quicker. I hand-cut dovetails with tiny, delicate pins—there is usually less than $\frac{1}{8}$ in. between the tails. After cutting one side of the pin socket with a normal dovetail saw, I'm left with no end grain to cut into, which makes it tricky to start the cut. However, with Lie-Nielsen's thinner saw, I can easily fit two kerfs into the end grain between the tails. That makes for more accurate and less finicky dovetailing. Note that because the saw's blade is so thin, it's critical that you use solid sawing technique with it. If you use a gorilla touch, you could

kink the blade and ruin it. You can buy the Thin-Plate Dovetail Saw at Lie-Nielsen.com (\$125).

—Matt Kenney is an associate editor.



■ BITS & BLADES

Smart Bit makes screw-and-plug joinery faster, easier

THE SMART BIT TOOL from Starborn Industries can help you hang our counterbored holes in a jiffy. It comes with three 1/8-in.-dia. bits, a stub bit, and the counter-boring tool with hex shank.

The Smart Bit is designed to make screw-and-plug joinery even faster. And it succeeds. The tool cuts an 8.5-mm-dia. (about 5/16-in.) hole, which is perfect for most wood and dry-wall screws, and it leaves a very clean rim.

Although the Smart Bit is designed to work with the Pro Plug System (a separate kit that includes fasteners and plugs; \$41), it's much cheaper to make your own plugs. Cutting your own plugs also makes it a breeze to get seamless grain matches, if that's what you're after.

What I love about this tool is the fact that there's no stop

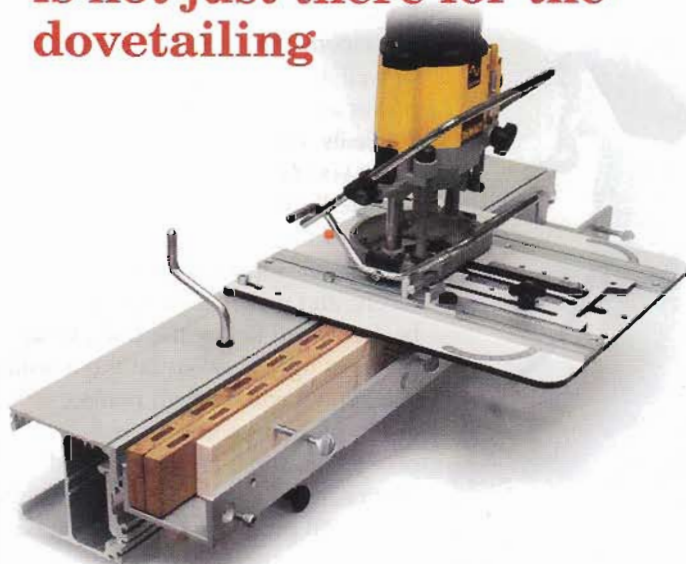
collar to fuss with to adjust the depth. Instead, it has an integrated stop collar that stops spinning when you've reached full depth. The stop collar can't be adjusted, but it's just right for 3/4-in. stock, even with shallow dadoes.

The Smart Bit Tool sells for \$20 (Amazon.com). For more information about the complete Pro Plug System, visit starbornindustries.com/smart-bit.

—T.M.



the WoodRat[®] is not just there for the dovetailing

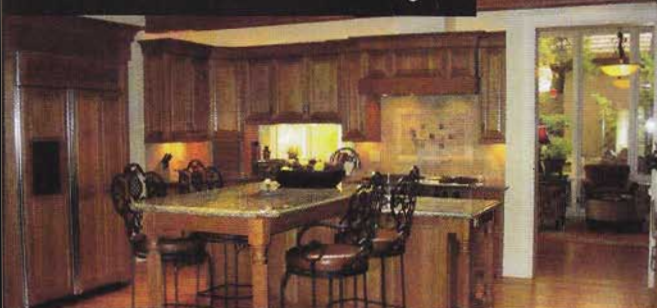


The MR4 Mortise rail clocks in the size and position of any number of mortises, on up to four stiles in one quick and accurate set-up. It makes a perfect fit for the round ended tenons.

go see the movie - www.woodrat.com

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A drill press will make you a better woodworker

A HANDHELD DRILL CAN'T MATCH ITS POWER AND ACCURACY

BY ASA CHRISTIANA

There's no disputing the usefulness of a handheld drill. It's perfect in situations when you need to bring the tool to the work. It can drill pilot holes and drive screws at the bench or inside cabinets.

But that flexibility comes at a cost. A handheld drill is prone to tearout and lacks the power to drive larger bits. And even with careful layout, drilling in exactly the right place at the right angle can be hit-or-miss.

To do your best work, you need a drill press.

The drill press is all about control. It lets you precisely determine the placement and angle of the hole as well as its depth. It also provides power and leverage to drive the bit easily, even in hard stock, and it lets you raise and lower the bit repeatedly without altering the shape of the hole.

The table supports the workpiece nicely, and makes it easy to place a backer board below the hole, which prevents ugly blowout on the bottom side. You'll end up with perfect holes, plus counterbores and countersinks that are precise and chatter-free.

The drill press is a useful machine, but not an especially expensive one. It's designed for metalworking, so even the less-expensive models have plenty of power and stability for woodwork. And they are hard to damage, so it is easy to find a good used one. I bought a big,

Start by expanding the work surface. A larger table will give you plenty of room for bigger workpieces. Store-bought versions include a fence.

strong benchtop model out of the local classifieds for \$100.

You won't want to throw out your cordless drill, but once you have a drill press in your shop, you'll appreciate the power, accuracy, and control of a real drilling machine.

First things first

The first thing to do with a new drill press is to fit it with an auxiliary table. That's because the typical drill-press table is too small to support big workpieces. The stock table also has a big hole in the center for bit clearance. That big opening allows far too much tearout on the bottom of the workpiece.

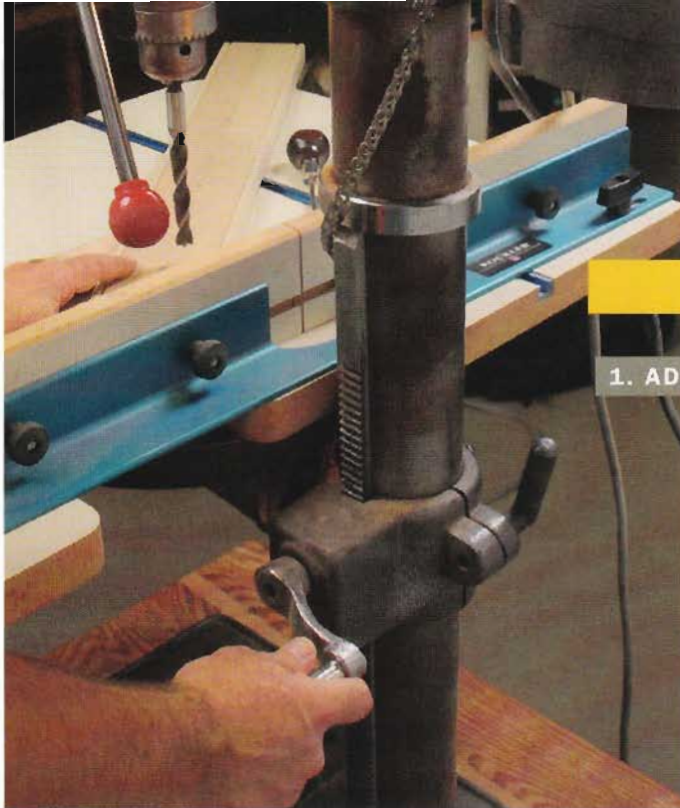
To eliminate that problem, and to give yourself plenty of room to work, you can install one of the snazzy auxiliary tables available in woodworking catalogs. These typically feature accessories like zero-clearance plates in the middle, and handy fences that lock down quickly and accurately. Or just make your own table. It can be as simple as a piece of MDF, with the occasional fence clamped on for repetitive work. Two other accessories you'll love are a clip-on light (the top of a drill press tends to cast a shadow on the work area), and a foot-activated switch.

Know the controls

The three adjustments you'll make most often are speed, table height, and plunge depth. Each of these takes less than a minute.

You can buy a variable-speed model for on-the-fly speed changes—and spend a lot more money—but I think the old-fashioned pulley-style machines offer plenty of speed settings for woodworking tasks.

On pulley-driven drill presses, you'll find a speed guide somewhere near the top of the machine, often inside the pulley cover. The recommended speed varies with the size of the bit. To quote *FWW* contributing editor Roland Johnson, "Basically, you should not run any bit faster than 3,000 rpm, and you should slow the speed considerably for bigger bits. For example, a 1-in.-dia. bit



Setting up

1. ADJUST THE TABLE HEIGHT

You can raise or lower the table to accommodate any drilling task. Set the height so you'll have enough room for the bit to clear the work, but not so much travel that it makes drilling inconvenient.

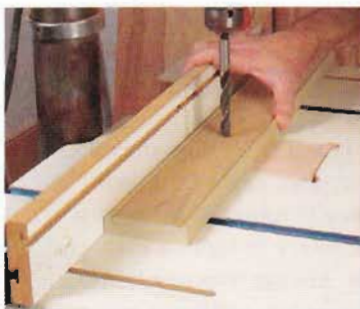


2. SET THE DRILLING DEPTH



A stop on the drill-press column (far left) lets you make repeated cuts at the same depth. Mark the desired depth on the side of the stock, plunge the bit to that point, then adjust and lock the depth stop. Plunge the bit once more to be sure it stops at the right spot.

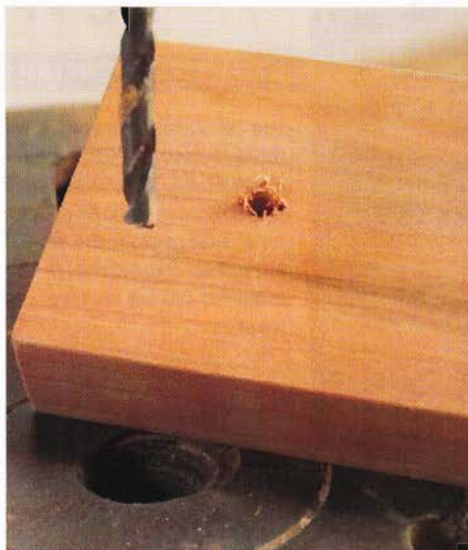
3. ADD A FENCE FOR ALIGNMENT



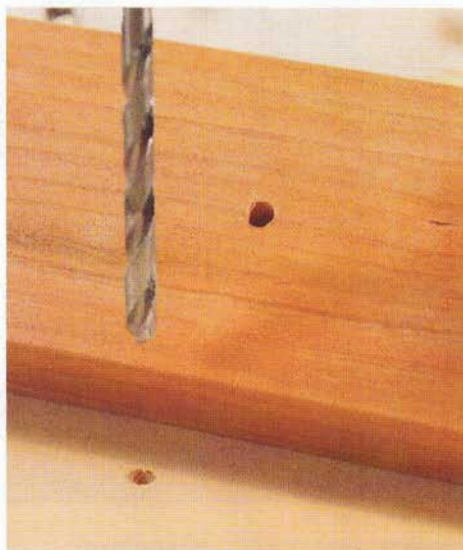
Once you've established the distance between the bit and the edge of the workpiece, you can lock down the fence and drill dozens of holes in a row.



Drilling tips

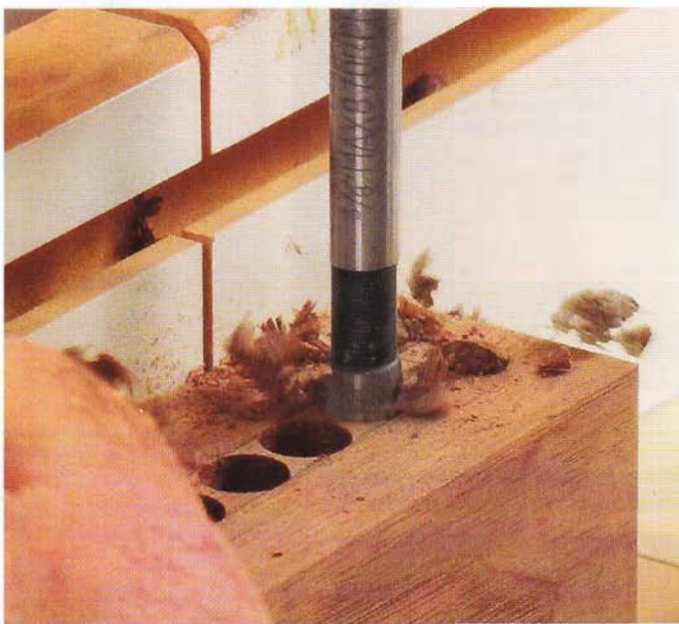


How tearout happens. If the surface fibers are unsupported where the bit exits the work, you'll get tearout on the bottom of the piece. (Board is inverted to show tearout.)



Prevention is painless. Placing a backer board underneath the workpiece supports the surface fibers, resulting in a cleaner rim at the exit.

A tip for efficient drilling. Most bits tend to clog with chips. To prevent this, pull the bit partially out of the work to clear the chips. But don't bring the bit all the way out of the work or you risk tearing the rim.



should run at 300 rpm to 500 rpm in hardwood."

After setting the speed, put the bit in the chuck and tighten it. Unlike modern handheld drills with keyless chucks, most drill presses still use a keyed chuck that must be tightened manually to hold the bit in place. Be sure the bit isn't bottomed out in the chuck, or hung up between two of the three jaws.

The chuck is self-centering, meaning that all three jaws move in unison when the key is turned. This means it is not necessary to tighten each jaw individually. Always remove the chuck key right away! You don't want any surprises when you hit the "on" switch. Also, find a way to keep track of the chuck key. Mine hangs on a chain, but I've also seen lots of ideas for

chuck-key holders, using magnets, pen caps, etc.

Now, with the bit in place and the workpiece on the table, you'll know where to set the table's height. For deep holes, you want the tip of the bit just above the workpiece so you can take advantage of the drill press's full plunge depth.

Finally, if you are not drilling all the way through the workpiece, you'll need to set the depth stop. This is easy, too: Mark the desired depth on the side of the stock, plunge the bit down to that point, spin the depth stop down until it is snug, and lock it there. Plunge the bit once to be sure it stops at precisely the right spot, and you are set.

Location, location

Another great thing about a drill press is that you can put a fence on it. This means that once you've dialed in the distance between the bit and the edge of the workpiece, you can lock down the fence and drill dozens of holes in a row. Add a stop block to the fence, and you've locked in the hole location in both directions.

I still recommend laying out the holes carefully (or at least the first one in a series) using a crisscross mark, and sighting carefully along both axes as you bring the tip of the bit down. When it looks perfect, turn on the machine, and touch the tip down lightly to double-check the position. Fine-tune the fence or the stop if necessary.

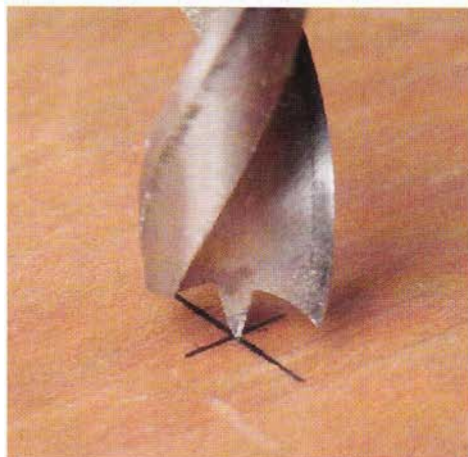
Even if I have only one hole to drill, I still use the fence in most cases. If nothing else, it keeps the stock from spinning when the going gets tough. By the way, the lower the fence the better; tall fences sometimes get in the way of the crank handles.

How to drill clean holes

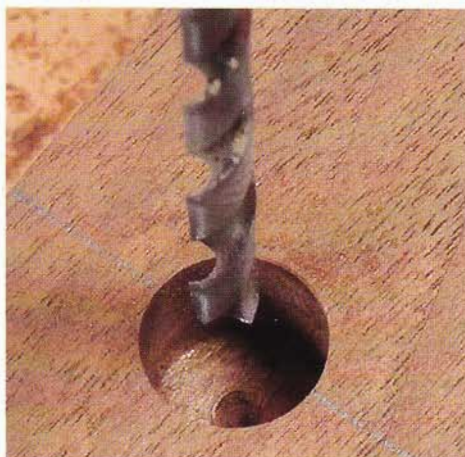
Even with all this heavy-duty drilling hardware at your fingertips, getting the best results calls for some attention to the details.

To avoid burning the stock, be sure to use a sharp, high-quality bit. Also, don't set the bit speed too

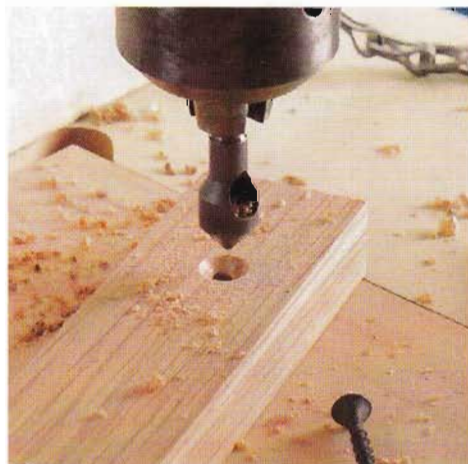
Bits matter, too



Get a set of brad-point bits. Brad-points center easily on a mark, tend not to wander, and will handle most of your drilling tasks in wood.



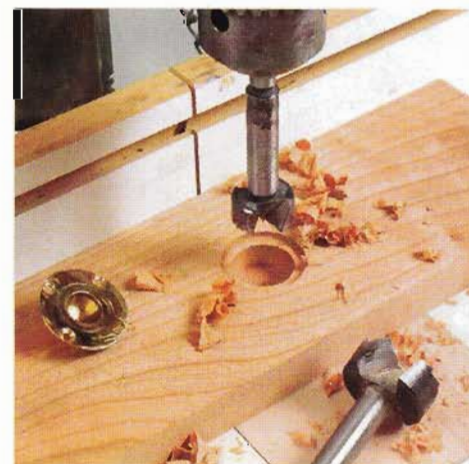
And a set of twist bits. You'll need them to drill metal and plastic. They also stay centered well when drilling a small hole below a larger one.



Cleaner countersinks. The drill press makes it easy to bore even countersinks of precise depth. The single-edge type with a diagonal hole through the tip makes chatter-free cuts.



Fun with Forstners. With the drill press's control over location and depth, it's an ideal setup for mortising with a Forstner bit, which can drill partial or overlapping holes (left) without wandering. The drill press also handles large Forstner bits, making it easy to drill holes as large as 2½ in. diameter. The hole's flat bottom makes it ideal for applications like this hardware mortise (right).



How to use a plug cutter. Use a thick board so the cutter doesn't go through (left). Then use the bandsaw (right) to free the plugs. A piece of tape keeps the plugs on the table.



in the middle, and these can be flipped around to find a fresh surface. Or you can loosen the drill-press table and shift it sideways.

A simpler approach is just to keep a big piece of MDF or plywood on the table, shifting it around to find a fresh surface. When it becomes riddled with holes, you can just replace it.

There are lots more things you can do with your drill press, like tilting the table or making ramp-like jigs to drill angled holes, but I'll leave it to you to discover those. □

Asa Christiana is editor of *Fine Woodworking*.

Turn Your Garage Into a Real Workshop

Make it comfortable and you'll spend more time there

BY MICHAEL PEKOVICH





I set up shop in the two-car garage of my Connecticut house when I started at *Fine Woodworking* 13 years ago. Coming from California, I wondered why so many folks in this area chose to work in their cramped basements rather than their spacious garages.

But when November came around, I understood. The propane heater I had installed was no match for the un-insulated roof and walls, cold concrete floor, and leaky garage doors. After emptying a 60-gal. propane tank in less than a month, my shop quickly became a three-season workplace and its floor space was increasingly devoted to bikes, camping gear, and chicken feed.

With access to the *Fine Woodworking* shop at work, I asked myself if I even needed a home shop, but after sharing the shop for years and watching rust develop on my woodworking machines at home, I finally decided I really needed my own heated workspace. This meant insulating the floors, walls, and ceiling, hanging and finishing drywall, and installing new doors. I also bought a manufactured shed to house all of the non-woodworking items that had been slowly encroaching on my workspace.

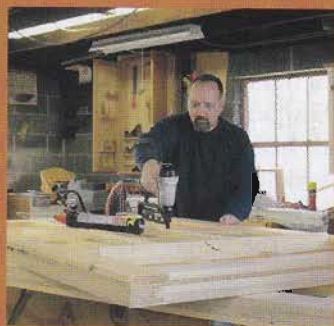
I'm a woodworker, not a carpenter, so a lot of the tasks on this project were new to me. Fortunately, with the folks at *Fine Homebuilding* just down the hall, I had access to decades of collective building knowledge. Admittedly, some of the building solutions I came up with might not be realistic on a typical building site where speed and efficiency dictate how to accomplish every task, but they made sense to me as a woodworker on a very tight budget. I hope they make sense to you, too.

Two garage doors—two different approaches

It was easy to see I was losing many of my heating dollars through the gaps in the garage doors. Weatherstripping and insulation kits are available for doors in good repair, but my old rotting doors had to go. The question was how to replace them. I thought about a set of steel insulated doors, but I didn't like the idea of hoisting open a roll-up door in the middle of winter and letting the cold air rush in.

Instead, I decided to replace one of the overhead doors with a normal walk-out door. This would

4 steps to a warmer shop



1. Install new doors



2. Add a wood floor



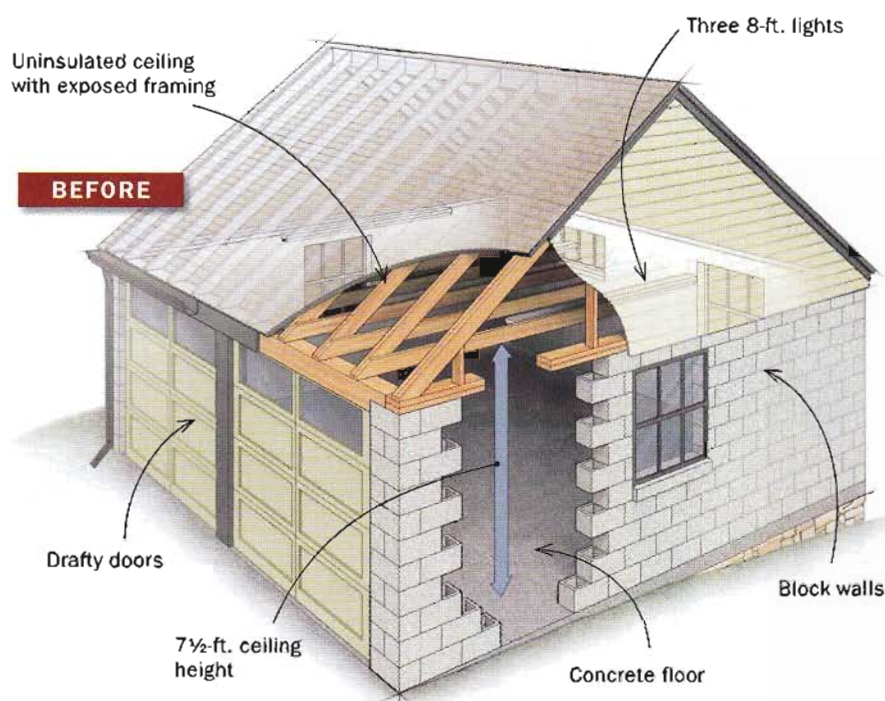
3. Finish the ceiling



4. Insulate the walls

THE BIG PICTURE

With its drafty doors and concrete floor, Pekovich's uninsulated shop was limited to warm-weather woodworking. Even in the summer, the low ceiling, dark walls, and minimal lighting made the space feel cramped and dreary. By adding insulation, improving the lighting, and replacing the garage doors with shopmade carriage doors, he transformed the space into a comfortable, year-round workspace.



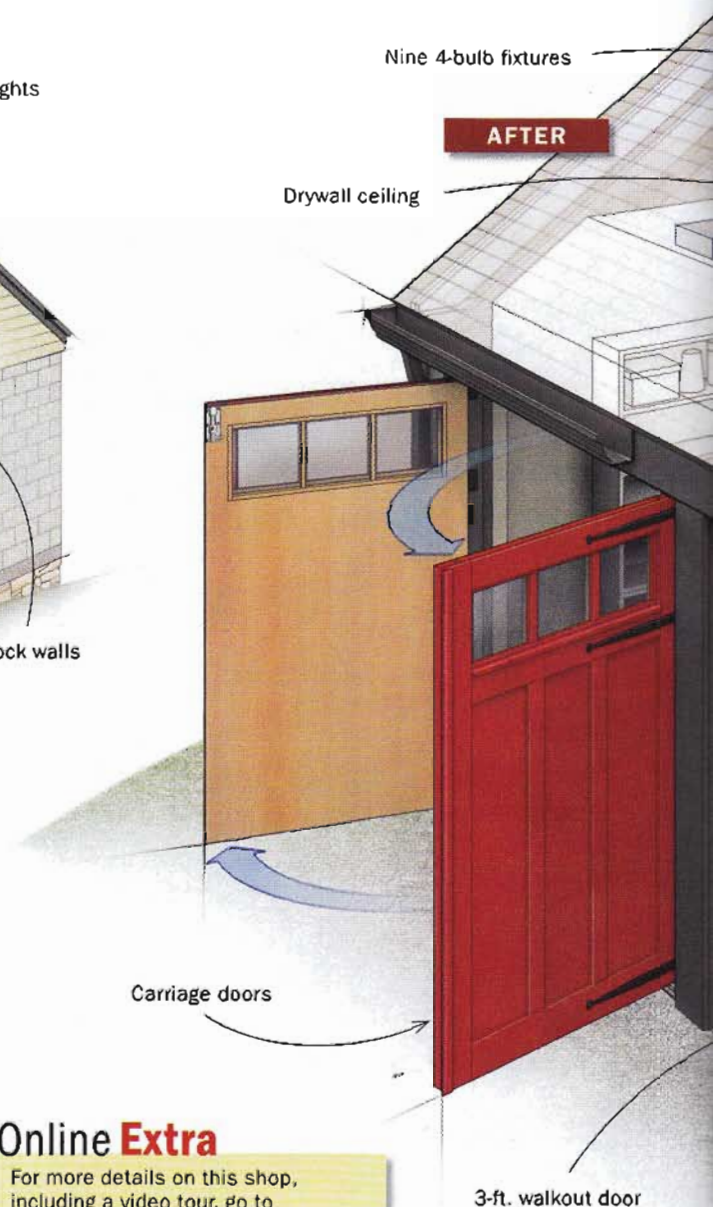
provide easy entry and create a few extra feet of much-needed wall space. I did this by framing in a pair of narrow panels that would flank an inexpensive, prehung steel entry door.

Each panel consists of a 2x4 frame faced with CDX plywood (rated for exterior use). The frame is filled with rigid insulation and covered with drywall on the interior face. To dress up the exterior, I glued and nailed pine boards to the plywood for a frame-and-panel look. Windows with square corbels below the sill added an Arts and Crafts element that would complement my home's bungalow style.

For the second bay, I needed a different approach. Even though I never intend to park a car in the space, I still wanted to leave a door wide enough to drive through in case we ever decide to sell the house. I also like the idea of having a large opening for machinery and lumber, and letting in sunshine on nice days.

Instead of a roll-up door, I opted for a pair of swing-out carriage doors. I thought the carriage doors would be easier to weather-seal and would offer more insulation. Eliminating the garage door's overhead tracks would also give me additional headroom and provide greater flexibility with the lighting layout. After getting a quote of \$4,000 for professionally made doors, I decided I could make my own.

Carriage doors anyone can build—I wanted the doors to be lightweight, well insulated, and really rigid to resist sagging over time. True frame-and-panel construction didn't seem to be a good



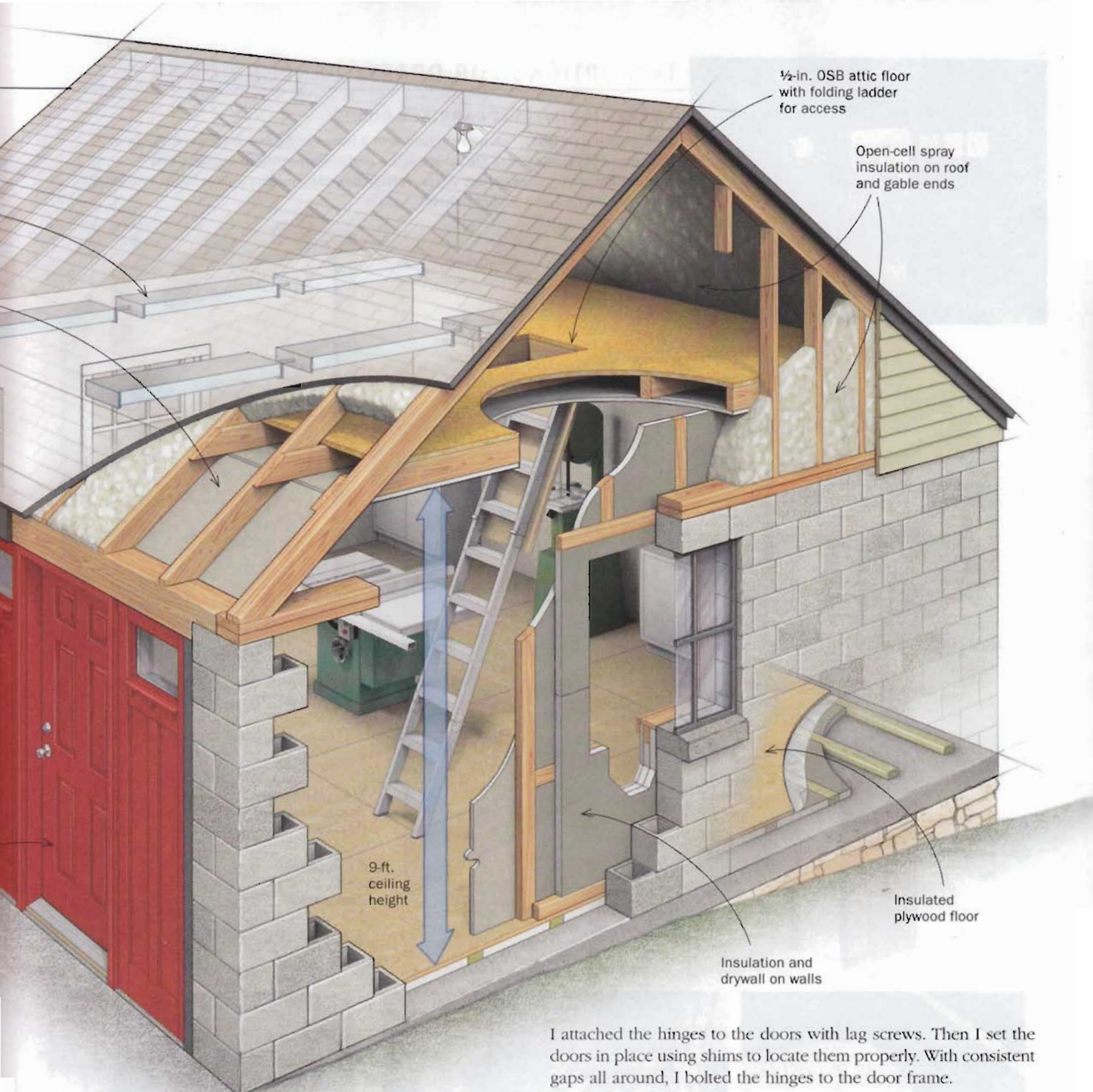
Online Extra

For more details on this shop, including a video tour, go to FineWoodworking.com/extras.

way to accomplish any of those tasks. Instead, I chose a torsion-box design consisting of a solid-wood frame with plywood on each face, similar to the way a hollow-core door is made. This would create a very rigid structure with plenty of room for insulation.

I started with a 1½-in.-thick poplar frame joined with stub tenons. Long tenons aren't necessary; in fact, biscuits would work fine, because all the strength comes from the plywood skins. I used a dado blade to cut a ½-in.-wide by 1-in.-deep groove in the frame parts. I also used the dado blade to cut stub tenons on the ends of the parts to fit the groove. The frame was glued and screwed through the tenons.

I filled the cavity with rigid insulation and glued and nailed plywood to each face. This created a very rigid torsion box that should



resist sagging for many years. The outer face is 1/2-in. plywood while the inside face is 1/4-in. plywood to help keep the weight down. I added windows and framed the outside face with 3/4-in.-thick lumber for a frame-and-panel look similar to the other bay. The final result is 48-in.-wide door that weighs less than a typical solid-oak entry door, and at \$300, is far cheaper than a custom-built door. The guys at *Fine Homebuilding* were impressed.

I mounted the doors with long strap hinges that are plenty strong and look great. They were also very easy to install. First,

I attached the hinges to the doors with lag screws. Then I set the doors in place using shims to locate them properly. With consistent gaps all around, I bolted the hinges to the door frame.

A wood floor is warm and easy on the feet

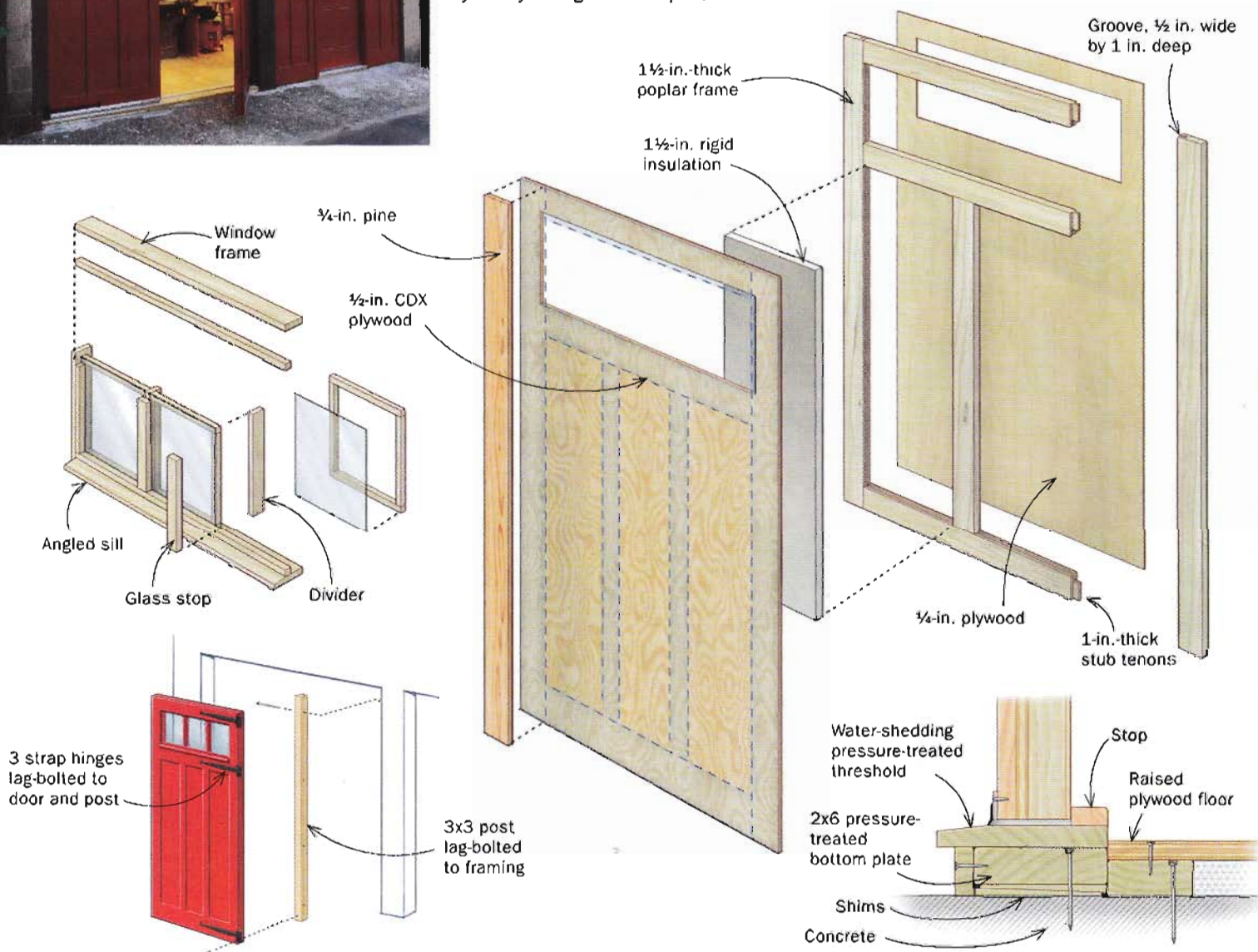
For the floor, I took a cue from an article on shop flooring by Scott Gibson ("Low-Cost Shop Floor," *FWW* #160). I glued and nailed pressure-treated 2x4s to the concrete floor, placing rigid insulation in between. The insulation I used was the same thickness as the 2x4s, so I spaced the sleepers 24 in. on center. Normally a spacing of 16 in. would be necessary to prevent the floor from sagging under the weight of heavy machines, but since the rigid insulation has good compressive strength, 24 in. is fine. Before screwing the 3/4-in T&G (tongue-and-groove) plywood in place, I stapled



TWO OPTIONS FOR DRAFTY GARAGE DOORS

MAKE LIGHTWEIGHT CARRIAGE DOORS

Filled with rigid insulation and covered with a frame-and-panel treatment, Pekovich's shopmade carriage doors are an attractive and energy-efficient upgrade over conventional overhead garage doors. Torsion-box construction makes them lightweight yet very strong—and simple to build.



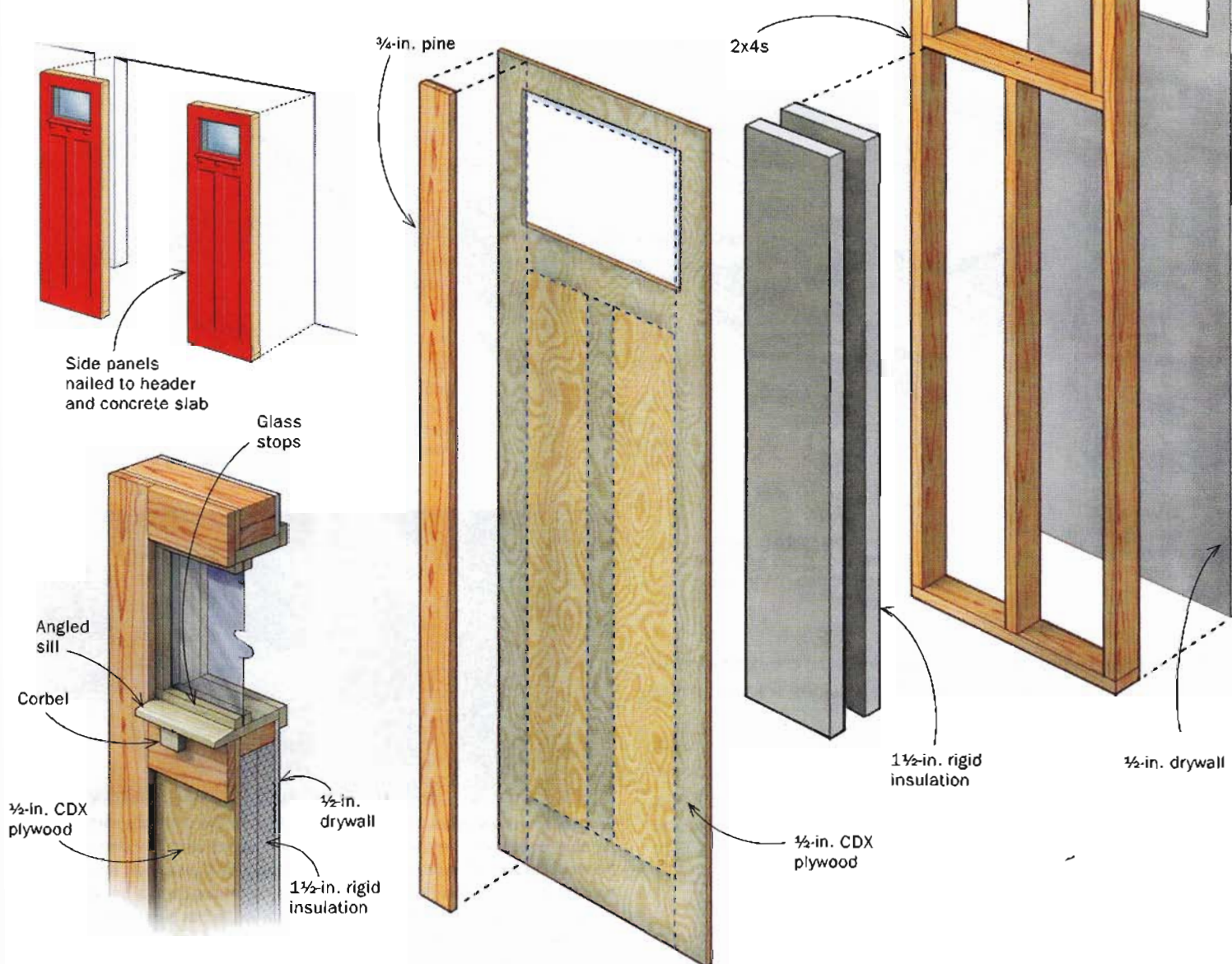
Poplar frame, plywood skin. A groove in the center of the 1 1/2-in. thick poplar stock receives stub tenons formed on the ends of the rails with a dado set (left). Although most of the strength comes from the plywood skins, stub tenons help keep everything square during the large glue-up (right). Once the glue dries, the interior compartments are filled with 1 1/2-in.-thick rigid insulation.



Pine dresses up the plywood. Pekovich applied flat pine pieces to create a frame-and-panel effect and an Arts and Crafts look.

FRAME IN A WALKOUT DOOR

Compared to a garage door, a 3-ft. (prehung) steel entry door makes it easy to come and go and its smaller opening reduces heat loss. Side panels flanking the walkout door were used to shrink the garage's original 8-ft. opening. They also provide additional light and boost curb appeal.



6-mil plastic over the insulation to act as a vapor barrier, just as Gibson recommended.

I moved as much as possible out of the shop by filling an 8-ft. by 12-ft. portable storage container (pods.com) that was dropped off in my driveway before construction started. Unfortunately, some machinery didn't fit, so I had to install the floor in two parts, moving the equipment from one side to the other. Installation would have been easier in an empty shop, but I was able to get the entire floor done in a day. The new floor is warmer, easier to sweep, and much kinder to my feet and joints.

Enclose the ceiling for a brighter, warmer shop

The ceiling posed a challenge. I like the looks and reflected light provided by an enclosed ceiling, but the bottom of my ceiling joists were now only 7½ ft. off my new plywood floor. The space

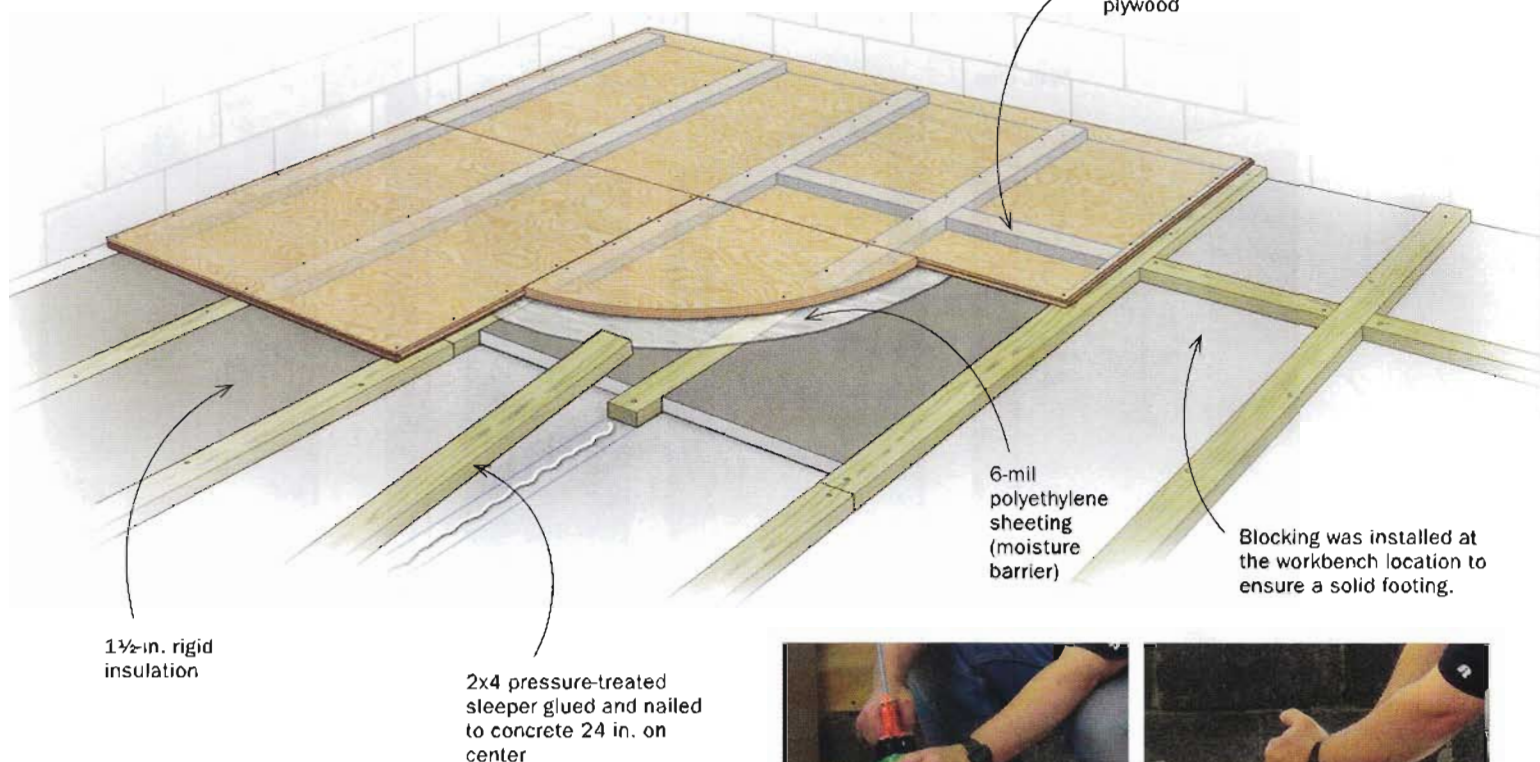
felt more cramped and claustrophobic. My first thought was to spray insulation on the underside of the roof and leave the ceiling joists open. The insulation contractor said I'd still need to cover the insulation with plywood or drywall if the joists were left open, so I decided to look into raising the joists and enclosing the ceiling.

I spoke to the local building department about my situation and an engineer in the department concluded I could raise the ceiling joists 2 ft. without creating structural problems. I had always thought of building inspectors as something best avoided on small home-improvement jobs, but on this project, they were a big help.

Again, I'm a woodworker, not a carpenter, so the idea of raising ceiling joists was a little scary. Fortunately, the actual process wasn't that bad. I was able to reuse the existing joists by cutting them one at a time and nailing them in their new location (some

PLYWOOD FLOOR ADDS WARMTH AND COMFORT

A plywood floor installed over rigid insulation is easier on the knees and helps dampen noise and vibration from shop machines. Three coats of polyurethane protect the plywood from spills and wet shoes and make sweeping easier.



local codes don't allow the reuse of materials, so check first). One smart thing I did was to rent a cordless Paslode framing nailer from my local home center.

The final ceiling is a lofty 9 ft. While the floor plan didn't grow, the shop now has a more spacious feel and by adding some 1/2-in. OSB (oriented strand board) on top of the ceiling joists, I have some much-needed storage above the ceiling. To access that space, I installed a fold-down attic ladder and wired a light in the attic. For insulation, I decided to spray the underside of the roof with open-cell foam insulation. Since my rafters are only 6 in. deep, I only was able to achieve an R20. But since foam practically eliminates air movement, which experts say is the real nemesis in heat loss, it should perform very well.

When it came time to reinstall the lights, I decided on an upgrade. I replaced my three old 8-ft. two-bulb fixtures with nine 4-ft. four-bulb fixtures, effectively tripling the amount of light in the shop. With the addition of the white ceiling and walls, my shop now glows like a beacon.

Basement approach to wall insulation

The walls of a typical frame-construction garage are easy to insulate. But the walls of my shop are concrete block, so I used an insulation method more suited to a basement shop, but with a modern twist. Rather than frame out the concrete wall in the typical fashion with studs on edge and the insulation in between, I took a different approach.

On the advice of Rob Wozak, an expert on green construction at *Fine Homebuilding*, I started by covering the masonry wall

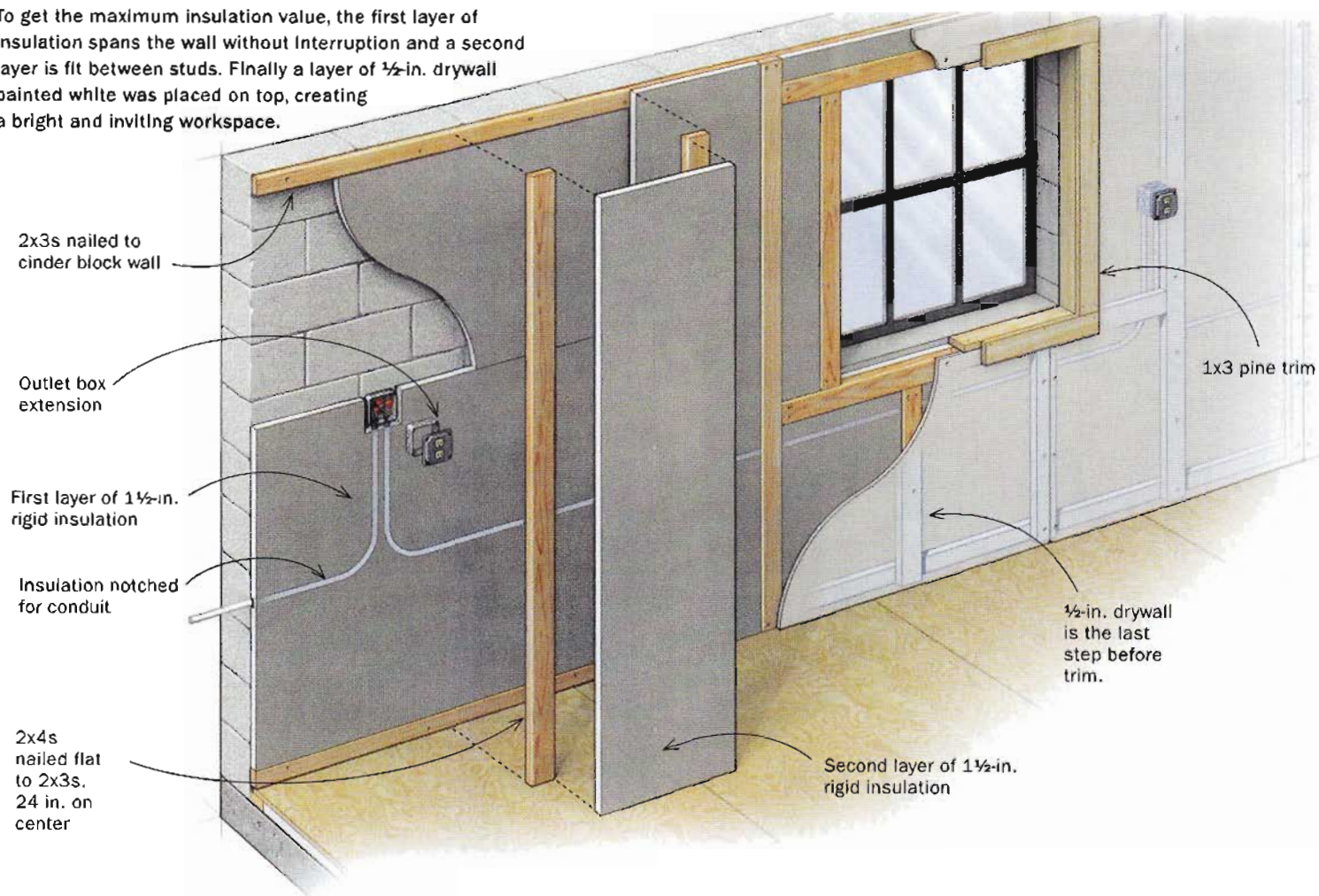


Simple process. Working from one wall toward the opposite wall is an easy way to ensure the 2-ft. by 8-ft. foam panels and 2x4 pressure-treated sleepers fit tightly together. After applying a generous bead of construction adhesive (left), Pekovlch uses fasteners from a powder-actuated tool to keep the sleeper in position while the glue sets (right). Then the whole floor is covered with a layer of 6-mil polyethylene and 3/4-in. tongue-and-groove underlayment-grade plywood (bottom).



HOW TO INSULATE CONCRETE WALLS

To get the maximum insulation value, the first layer of insulation spans the wall without interruption and a second layer is fit between studs. Finally a layer of ½-in. drywall painted white was placed on top, creating a bright and inviting workspace.



with a continuous layer of rigid insulation, wedging it between a top and bottom plate that I nailed to the block wall. Over that, I attached the studs flat against the insulation, nailing them to the plates. From there, I installed a second layer of insulation between the studs and finished with drywall. Installing the studs on edge would have created a thermal bridge from the block wall to the drywall, reducing the insulating properties of the wall. The continuous layer of insulation between the block wall and studs acts as a thermal break and should result in lower heating bills. The finished wall is only 3½ in. thick but boasts an R-value over 20.

A true transformation

What started as a long-overdue insulation job ended up as completely transformed workspace. In replacing the doors, I wasn't looking to beautify my home, but the result is a quaint backyard shop that's bright and inviting.

It's not just the shop that has had a makeover. I've also picked up a few new skills. I've done some serious framing and remodeling. I've acquired new drywall skills and an appreciation for those people who do it well. Basic wiring is no longer a mystery to me. But, as much as I've enjoyed the new challenges, I'm happy to put my tool belt aside and get back to woodworking. □

Michael Pekovich is Fine Woodworking's art director.

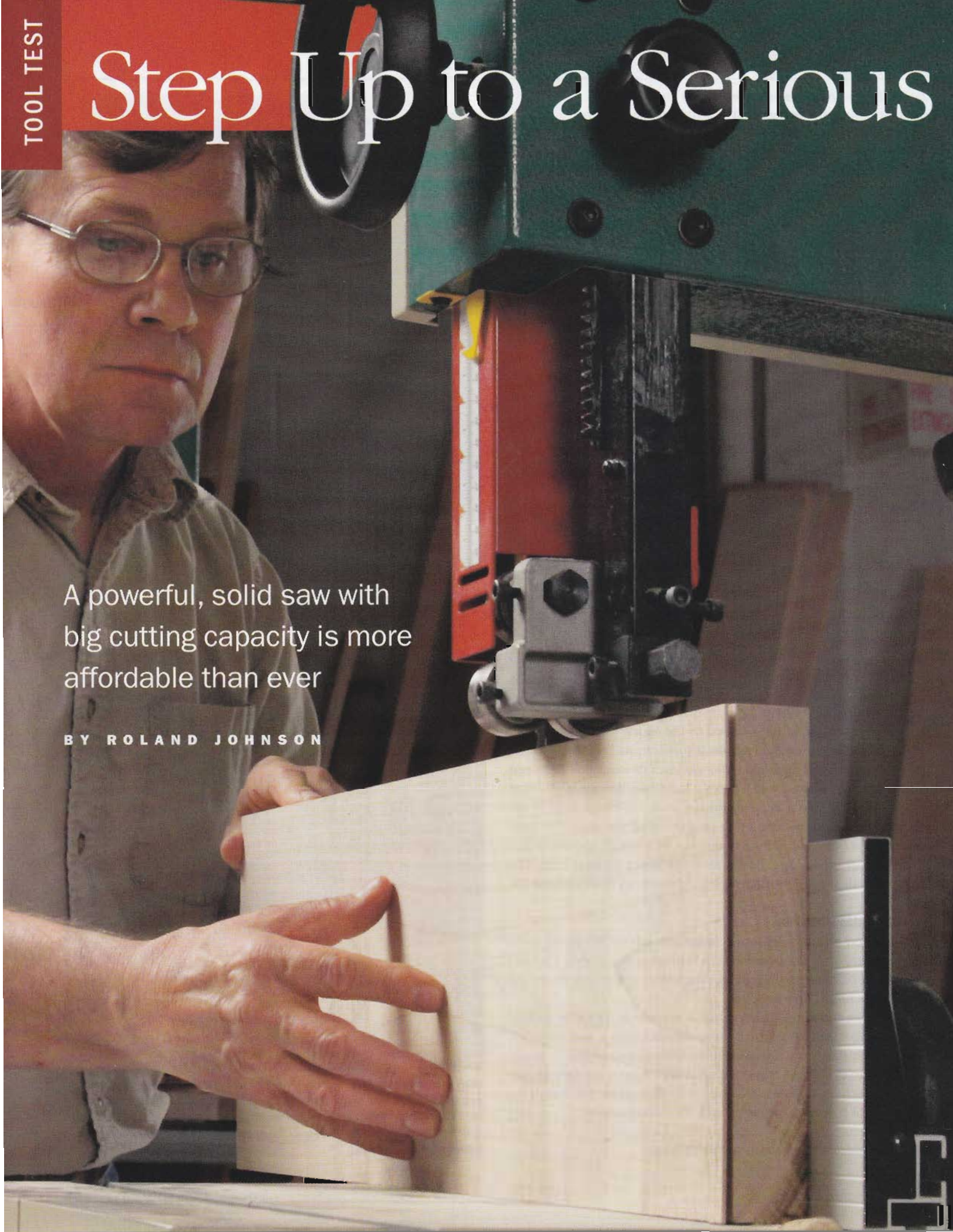


Wall Insulation in two layers. With 2x4 nailers already installed top and bottom, the first layer of insulation is put up horizontally and then studs are turned sideways and placed on top. A second layer of insulation is fit between the studs. Use spray foam to seal any gaps between the framing and insulation.

Step Up to a Serious

A powerful, solid saw with big cutting capacity is more affordable than ever

BY ROLAND JOHNSON



Bandsaw

Benefits of a bigger saw

Even though you can boost a 14-in. bandsaw's resaw capacity to 12 in. with a riser block, a bigger saw will still outperform it in a number of key areas.

BIGGER WHEELS

The bigger wheels not only provide greater throat capacity, but they also have more inertia for smoother operation and less bogging down. The larger diameters also mean you can use bigger, thicker blades.

BEEFIER GUIDES

Larger roller guides and Laguna's ceramic guides provide more surface area and better control for larger blades.

LARGER TABLE

Tables are larger, generally about twice as big as the table found on a 14-in. machine. This means better support for all kinds of cutting tasks.

STRONGER FRAME

A sturdier frame is especially valuable for ripping large stock and resawing. All the machines tested weigh close to 400 lb. or more, which is twice as much as an ordinary 14-in. machine.

MORE POWER

All the saws in the test have large motors rated between 1¾ and 3 hp, compared to the ¾ hp or 1 hp motors found on most 14-in. saws.



I'm sure you had great expectations when you added a riser block to your 14-in. bandsaw, but a riser block doesn't provide additional power for big resaw cuts, or stiffen the saw's frame, or help with an undersize table. Fortunately, I discovered several steel-frame bandsaws priced under \$1,600 with 12 in. of resaw capacity while researching my new book on bandsaw techniques and maintenance (*Taunton's Complete Illustrated Guide to Bandsaws*, on sale in November 2010).

With these new, bigger machines, you can realize your dreams of making big book-matches and large veneers. And once you have

one, you'll wonder how you ever got by without it. In fact, one of these extra-capacity machines will likely be the last bandsaw you'll ever need.

Resawing 12 in. requires plenty of power, so we chose eight models with at least 1¾ hp. I put them through a series of tests to judge their power, cutting ability, and build quality.

Sturdy guide post equals a straight cut

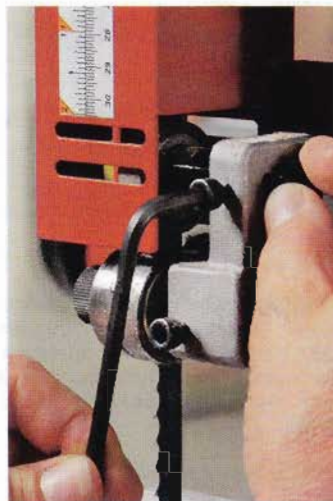
The first thing I check when evaluating a bandsaw, particularly one with big resaw capacity, is the rigidity of the upper guide

Big saws: The important things

GUIDES



Tool-free is faster. Jet's easily adjustable roller guides move without tools and stay put when locked down.

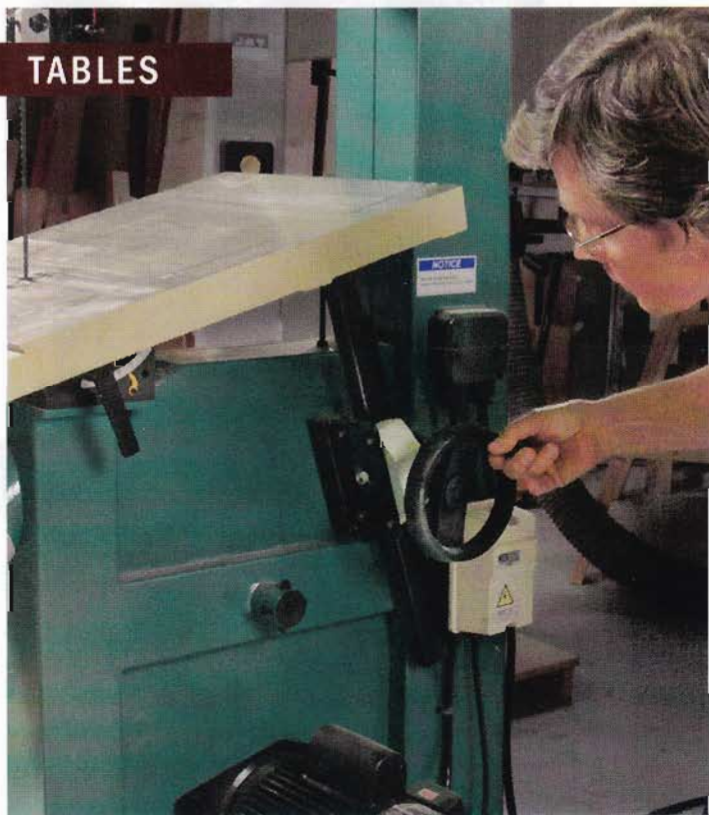


Some guards get in the way. Blade guards on the Grizzly and Shop Fox saws partially obscure the thrust bearing, making it more difficult to set the right gap.



A little pinch. Designed to run with slight pressure on the blade, Laguna's ceramic side guides are easy to set and give excellent blade support.

TABLES



Crank it up. About 20 percent larger than its closest competitor, the 19-in. by 27-in. table on the larger Grizzly saw is easy to tilt thanks to a rack-and-pinion mechanism.

post. If the guide post flexes, the blade will twist and bind, resulting in a wandering cut. Other than a dull blade, this is the number one cause of bad bandsaw cuts.

To measure guide post flex, I placed the guides 9 in. above the table to simulate an average resaw height. Then I applied 6 lb. of force to the blade and measured the deflection. While zero deflection is the goal, I've found that a sharp blade and a moderate feed rate can compensate for about 0.005 in. of flex.

Straight post is important, too—For good blade support, the upper guides should always be kept close to the workpiece. But if the upper guide post isn't parallel to the blade, the guides will have to be readjusted every time the guide post moves up or down. So, after checking the guide posts for flex, I used a dial indicator to measure the position of the guides at the top and bottom of their adjustment, both front to back and side to side.

It should be easy to adjust blade guides and fences

With the exception of the Laguna's ceramic guides, all the saws in the group have heavy-duty roller guides. I like that Laguna's ceramic guides can be in direct contact with the blade, making setup easy and quick. Roller guides need to be a couple thousandths of an inch away from the blade to keep the rollers from constantly spinning. On the downside, the upper Laguna thrust guide requires a wrench for adjustment and you need two different wrenches to adjust the lower guides.

The Jet's guides are a favorite too, because they can be adjusted without tools and they stay in position as you tighten their mounts. Grizzly's guides adjust with a single wrench and stay put during tightening. Unfortunately, both the Grizzly and Shop Fox saws partially obscure the upper thrust guide behind the blade guard.



FENCES

Back to basics. Jet's fence is sturdy but low-tech: Truing and drift adjustments require a wrench, but the fence stays put and slides easily.



Get my drift? With star knobs holding a thick bar that turns on a pivot, both Grizzly machines make it easy to angle the fence to correct for drift.

Steel City's blade guard makes it tough to see the thrust and the side guides. Last, I found the Rikon, Shop Fox, and Steel City guides tedious to set because they move as they're tightened.

With an easy adjustment for drift and a two-position auxiliary fence mounted to a cast-iron primary fence, Grizzly's two models easily have the best fence setup. I also liked Laguna's two-position fence. Rikon has a two-position fence too, but even in the tall position it's too short (2½ in.) for resawing.

All offer plenty of power and control

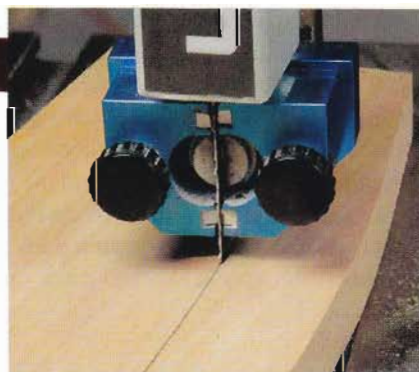
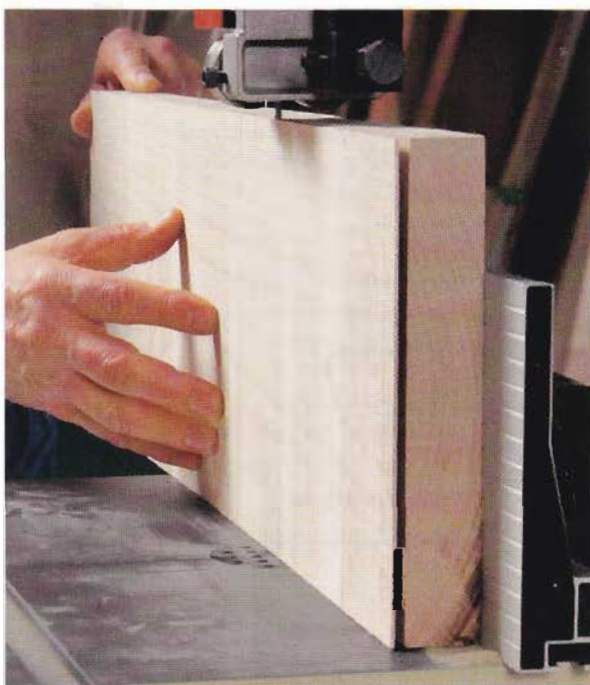
To gauge the power of these machines, we resawed 8-in.-wide by 2-ft.-long maple blanks into ¼-in.-thick veneers. To level the play-

ing field, we equipped all of the saws with SuperCut ¾-in.-wide, 0.032-in.-thick, 3-tpi hook-tooth blades (supercutbandsaw.com). All the saws handled this task with ease. Even the 1½-hp Jet did a good job, despite my overly aggressive feed rate.

To test the saws' ability to cut curves and the performance of their side blade guides, we switched to SuperCut ¼-in., 6-tpi hook-tooth blades and made a series of long, sweeping cuts and tight S-curves. All of the saws and guides handled the task with ease, but the blade guards on the Jet saws, the Rikon, and the Steel City slightly obscure the cut line with the guides set close to the workpiece. Steel City and Rikon tried to improve cut-line visibility through their guard with little plastic windows, but distortion and

CUTTING

Great resaw cuts all around. All the saws had no problem splitting 8-in. blocks of 8/4 soft maple into perfect ¼-in. slices of veneer. Before cutting, Johnson aligned the blade and guides properly, and trued the fences by setting them parallel to the blade.



Where's the line?

Compared to the wide-open view on the Laguna saw (top), visibility of the cut line is hampered on the Steel City saw (bottom), despite the acrylic window that is meant to help. The Jet and Rikon saws had similar problems.



Head-to-head

ONE LAST TOUGH TEST



Push on the post. Johnson used a push-pull gauge to apply 6 lb. of force to the upper guide post and measured the deflection with a dial indicator. All the saws passed the test, which is probably why they handle big resaw cuts so well.

dust make them tough to see through. Laguna, Grizzly, and Shop Fox provide a wide open view of the cut line.

Brakes and tension scales are nice perks

Bandsaw brakes are a good idea, because big bandsaws can take the better part of a minute to come to a stop. Both Grizzly saws have electronic motor brakes that stop the blade within 2 seconds. The Laguna and Steel City saws have mechanical brakes actuated by a foot pedal. Laguna's foot brake also has a switch that kills the motor. The Jet, Rikon, and Shop Fox saws don't have brakes.

The Jet, Rikon, and Steel City saws have blade-tension gauges that show the right setting for specific blade sizes, and they proved accurate. The Grizzly saws, the Laguna, and the Shop Fox have a graph that doesn't directly relate to blade size, but it does provide a way to record the settings after you've worked them out.

The saws I like best

While all of the saws are capable machines, I pick the Grizzly G0514X2B as best overall. It has good power, a huge table with sturdy trunnions, a great fence, and an electronic brake. I also really like the Jet saws with their smooth power, easily adjustable blade guides, and rigid frames. If you don't have 240-volt power, the 1¾-hp Jet is an excellent choice. The Laguna is also a capable saw with great guides, but given its 14-in. wheels, it doesn't have the throat capacity of the other larger saws.

The best value was an easier choice. The Grizzly G0513X2B has the same features as its big brother, except a smaller table and throat width and a motor that's 2 hp instead of 3 hp. I think the motor size is a non-issue. For \$1,100, it's a whole lot of saw. □

Roland Johnson is a contributing editor.



GRIZZLY G0514X2B

The big Grizzly has a powerful motor, a huge table, and an electronic motor brake. The guides are also very good and its two-position fence is the best of the bunch. It would be nice if the tires were white or yellow to aid blade tracking without opening the door, but that's nitpicking.

Street price: \$1,495

Motor: 3 hp, 240v

Fence: Two-position, 6 in. / ½ in. tall

Wheel size: 19 in.

Table size: 19 in. by 27 in.

Guide-post flex: 0.004 in.

Source: grizzly.com



GRIZZLY G0513X2B

The 17-in. Grizzly is a very good value. It has a smaller motor, table, and wheel size than its bigger brother, but the saw works well and has the same great fence as the larger Grizzly.

Street price: \$1,100

Motor: 2 hp, 240v

Fence: Two-position, 6 in. / ½ in. tall

Wheel size: 17 in.

Table size: 17½ in. by 24 in.

Guide-post flex: 0.004 in.

Source: grizzly.com



JET JWBS 18QT

Jet's saws have excellent tool-free roller guides and sturdy frames. But there's no brake, which will slow you down between cuts and setups. This is the only 120-volt machine in the test and it performed just fine, even when resawing.

Street price: \$1,500

Motor: 1¼ hp, 120v

Wheel size: 18 in.

Fence: Single-position, 3½ in. tall

Table size: 19 in. by 19 in.

Guide-post flex: 0.003 in.

Source: jettools.com



JET JWBS 18QT3

Jet's 18QT3 is nearly identical to the 18QT, but it has a 3-hp motor and an illuminated power switch. All the other features and specs are the same. This is one of the two most expensive machines in the test.

Street price: \$1,600

Motor: 3hp, 240v

Wheel size: 18 in.

Fence: Single-position, 3½ in. tall

Table size: 19 in. by 19 in.

Guide-post flex: 0.005 in.

Source: jettools.com



LAGUNA LT14 SUV

This is the only 14-in. machine in the test, and its small footprint would be an advantage in smaller shops. The saw cuts well, and has the only motor-connected foot brake in the group. The guides are Johnson's favorite. It also includes a mobility kit.

Street price: \$1,495

Motor: 3 hp, 240v

Wheel size: 14 in.

Fence: Two-position, 3½ in. / ½ in. tall

Table size: 16 in. by 20 in.

Guide-post flex: 0.002 in.

Source: lagunatools.com



RIKON 10-345

This machine has yellow tires for easier blade tracking, and good-looking metal handwheels for guide-post and tension adjustments. Drawbacks include a short fence and blade guides that are a little finicky to adjust.

Street price: \$1,400

Motor: 2½ hp, 240v

Fence: Two-position, 2½ in. / ½ in. tall

Wheel size: 18 in.

Table size: 19 in. by 21 in.

Guide-post flex: 0.007 in.

Source: rikontools.com



SHOP FOX W1707

This saw shares a strong resemblance and many features and parts with the smaller Grizzly. But it doesn't have a brake or Grizzly's excellent rip fence, and the table wouldn't hold its position when bumped with a big board.

Street price: \$1,065

Motor: 2 hp, 240v

Fence: Single-position, 4 in. tall

Wheel size: 17 in.

Table size: 17½ in. by 24 in.

Guide-post flex: 0.003 in.

Source: woodstockint.com



STEEL CITY 50250

The Steel City is a capable basic machine. Unfortunately, it has a short rip fence and the table tilts when it's banged with a large board. It is one of the two most expensive machines in the test.

Street price: \$1,600

Motor: 2 hp, 240v

Fence: Single-position, 2½ in. tall

Wheel size: 18 in.

Table size: 20 in. by 20 in.

Guide-post flex: 0.008 in.

Source: steelcitytoolworks.com



The North Bennet Street Tool Chest

Learn what the students learn as you build
a handsome home for your hand-tool collection

BY STEVE BROWN

Originally conceived simply as a place to put your tools, the tool chest project has become a familiar step in the two-year Cabinet and Furniture Making curriculum at the North Bennet Street School. Though simple in design and appearance, it challenges our students in genuine and surprising ways. They learn the value of planning the order of tasks; fitting the actual pieces, not just working from the drawing; and choosing between various methods and techniques.

This tool chest is the students' first major project, so we've narrowed the parameters to make sure that the focus stays

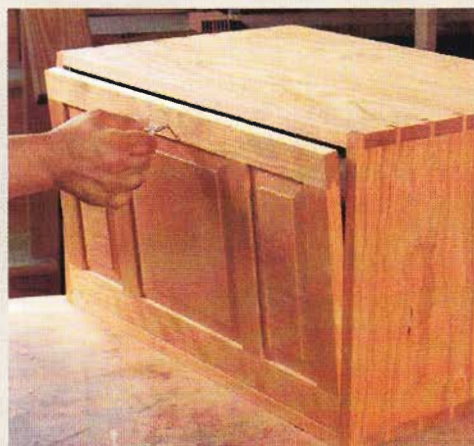
on the craftsmanship and not the overall design and dimensions. Primary woods can be maple, cherry, walnut, or mahogany. Choices for secondary woods are soft maple, poplar, and pine (for drawer parts only). We allow students to use highly figured woods only for the panels. This tool chest (16 in. deep by 24 in. wide by 14 in. tall) is at the small end of our size range, but students can build them up to 18 in. deep by 30 in. wide by 17 in. tall. Drawer size and configuration is another place where individual designs vary, and so is the frame-and-panel lid.

The typical chest starts with a drawing, scaled or full-size, and consists of a

through-dovetailed carcass with dovetailed drawers running on mortise-and-tenoned divider frames. (For a complete article on our method for dovetailing and also making drawers, see former instructor Janet Collins's article in *FWW* #157). The lid provides a means of locking the box as well as an introduction to setting a full-mortise lock. Above the top divider is a space to put the lid when the box is unlocked.

Although every aspect of building this tool chest—from the dovetails to the ship-lapped back—creates a valuable learning experience, I can't go into all of it in one article. Here, I'm going to focus on machining the dados and rabbets, fitting and

LID STOWS AWAY



A secure lid. A lock mortised into the top edge and two pins on the bottom hold the lid in place.



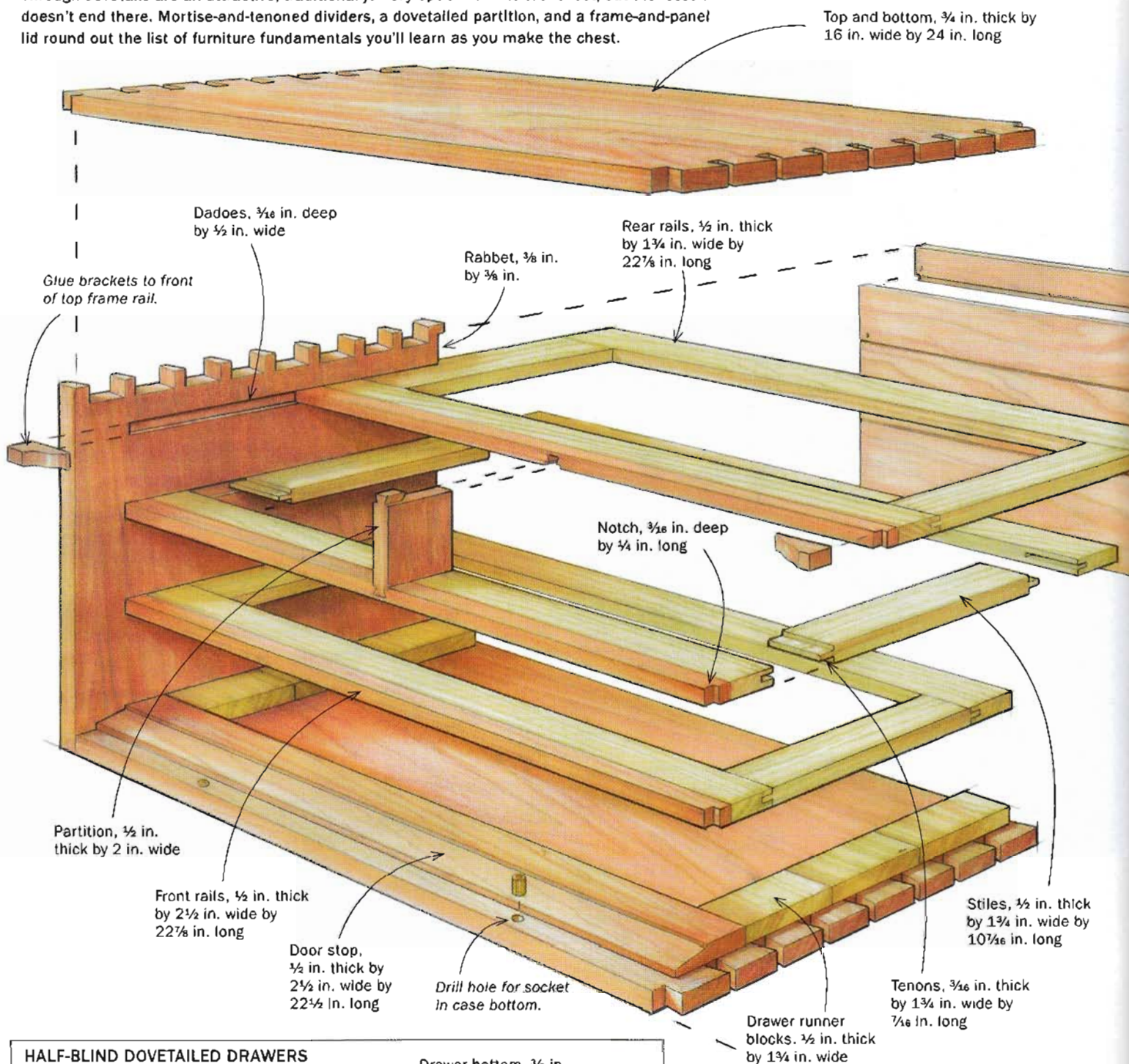
Dedicated storage space. When not locked in place, the lid tucks neatly away in the space between the top drawer and the top of the chest.





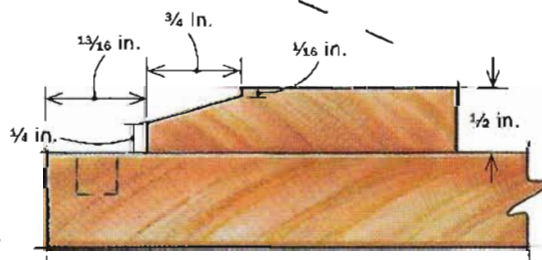
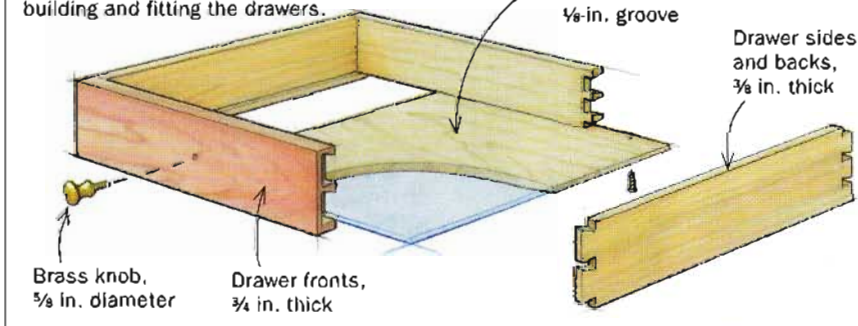
DOVETAILED TOOL CHEST

Through-dovetails are an attractive, traditional joinery option for this tool chest, but the lesson doesn't end there. Mortise-and-tenoned dividers, a dovetailed partition, and a frame-and-panel lid round out the list of furniture fundamentals you'll learn as you make the chest.

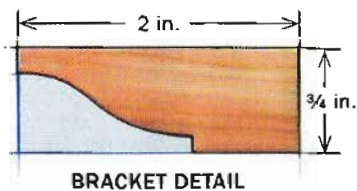


HALF-BLIND DOVETAILED DRAWERS

Wait until the case is completed before building and fitting the drawers.

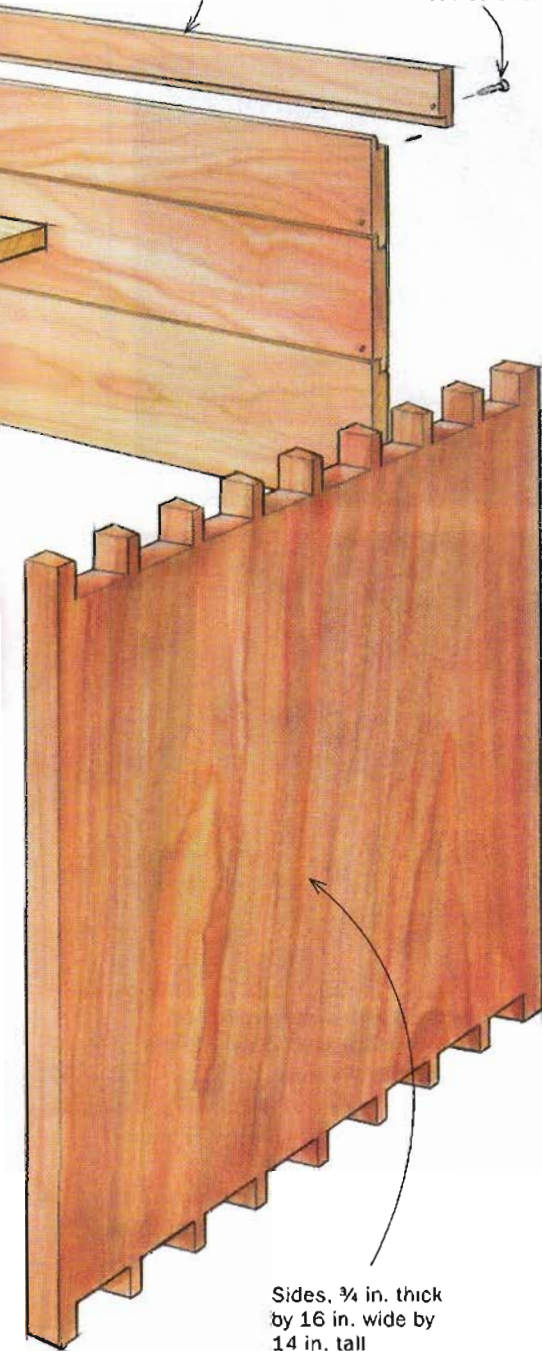


DOOR-STOP DETAIL



Shiplapped back boards,
3/8 in. thick by 23 1/4 in. long

Secure back boards
with round-head screws.



installing the horizontal dividers, cutting and fitting the vertical dovetailed partition, and installing the lid and its hardware. Not designed to be portable, the chest looks great on a countertop, or fits neatly under a typical workbench.

Plenty of learning opportunities

There is nothing stronger than a dovetailed carcass, and dovetails are one of the fundamentals of woodworking. So the choice for the carcass joinery is a natural. With the panels cut to length and width, the dovetails can be laid out, cut, and fitted all by hand. At NBSS, we start with pins and then scribe and fit the dovetails. Once all four corners are dry-fit, we check the case for square before laying out the dados and rabbets. A very important component of the layout is that the front and back edges of the case must be flush to serve as consistent reference surfaces. (For more on through-dovetails, see Christian Becksvoort's "My Favorite Dovetail Tricks," *FWW* #171.)

How to cut stopped dados safely on the tablesaw—The dados hold the divider frames securely. But they also provide the opportunity to learn layout principles and techniques, as well as safe and effective ways to make plunge and stopped cuts.

The key is to reference from the inside surfaces of the case while it is dry-fitted, with joints closed and the case square. From the inside face of the case bottom, use a marked story stick to transfer the dado locations to the inside faces of the case ends.

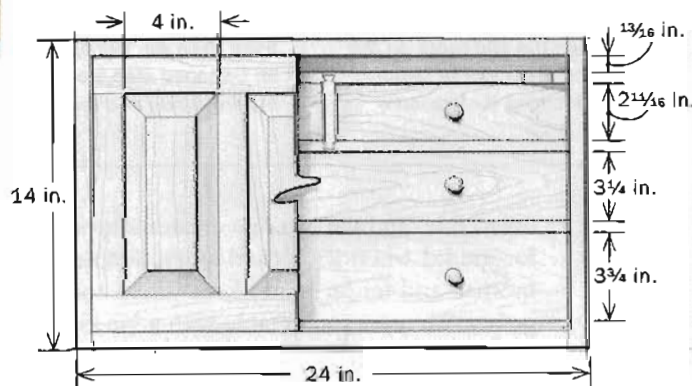
Use a marking gauge off the front edges of the case to lay out the front end of the

stopped dado. Because the front is already flush, the front edges of the divider and the drawer fronts will lie in the same plane, in front of the stopped dados. The dado will run out the back edge, so it will show in the rabbet until it is covered by the shiplapped back.

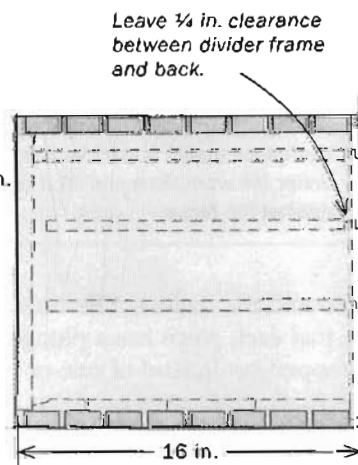
Once the dados are laid out, I cut them on the tablesaw with a 1/2-in.-wide dado set because it's faster and easier than cutting them with a router. One of the most important safety rules in the NBSS shop is that we never do stop-cuts on the tablesaw without a clamped block backing up the workpiece. The process requires careful layout, labels to help with orientation, and mental focus. Because you are working on the two opposite sides and it's safest to keep the end of the panel closest to the dado against the rip fence, each pair of dados involves one plunge and one stopped cut. So for every dado you are either plunging in at the front and running out the back, or starting through the back and stopping at the front. Mark the fence to show the extent of where the blade will cut to know where to stop and start.

We finish the dados with a router plane for consistent depth, and square up the ends to the layout lines with a chisel.

Rabbets are the next step—After the dados, cut the rabbets for the case back. The rabbets in the top and bottom run all the way through. I lay out my pins so they are at least as wide as the rabbet, and that allows me to run the rabbet through them. The sides get stopped rabbets on each side. I cut them on the tablesaw as



FRONT VIEW



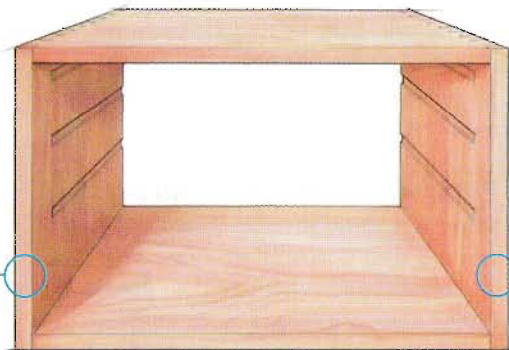
SIDE VIEW

A lesson in drawer dividers

North Bennet method

STOPPED DADOES ON THE TABLESAW

Most woodworkers do these with a plunge router, but a dado set is faster. To keep the same reference end against the rip fence, make these stopped cuts in both directions.



LEFT-SIDE DADOES: CUT THEN LIFT



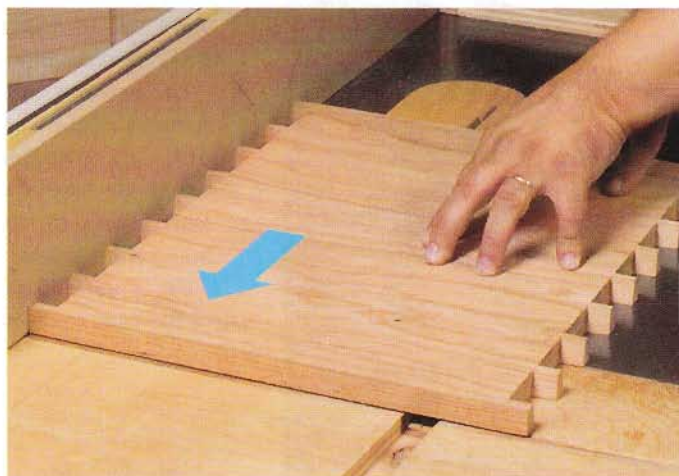
Go then stop. Start cutting into the side. When the end mark on the workpiece meets a mark on the fence, use the miter slot to reach under the workpiece and lift it off the blade, keeping the pressure against the fence.

TIP EASY LAYOUT

Dry-fit and use a story stick for layout. The story stick has one clean end and knife nicks along the edge to indicate the dados. Reference from the inside faces of the sides and the bottom. Then carry the marks to the back of each side.



RIGHT-SIDE DADOES: DROP THEN CUT



Stop then go. The opposite dado cuts begin with a plunge cut. With an L-shaped stop block backing up the workpiece, pivot down into the moving blade and then cut through the back of the side.

I would the dados. The only difference is that each piece has a plunge cut and a stopped cut instead of one or the other.

Drawers run on mortise-and-tenoned frames

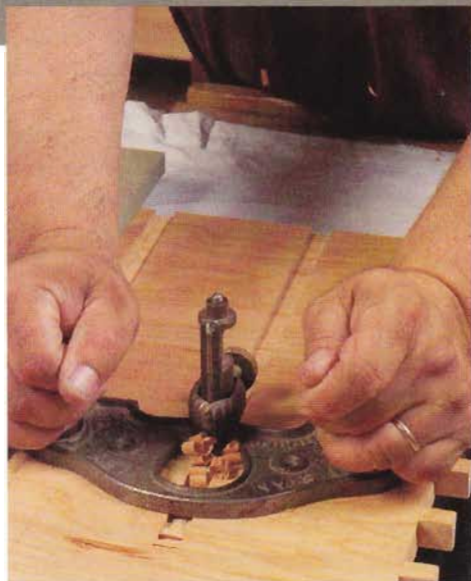
The drawer dividers live in the dados in the sides and provide a place for the draw-

ers to ride, and the top one creates a spot for the lid when it's tucked away. Simple mortise-and-tenon joints keep them together. We use a router table with a $\frac{3}{16}$ -in. bit for the mortises and cut the tenons on the table saw. When milling the parts, leave them slightly thick so their fit in the dados can be fine-tuned with a handplane.

After gluing up the frames, clean up the glue, flush the joints, and skim any mill marks with a handplane. Check the length of the frame to the space from dado to dado. Trim the frame if needed. Test-fit the thickness of each frame to its dado. If the frame has been skimmed, plane only the bottom of the frame to fit. Once each

FIT THE DIVIDER FRAMES

Simple mortise-and-tenon frames are carefully fit into the dados and notched at the front, but not glued in until later.

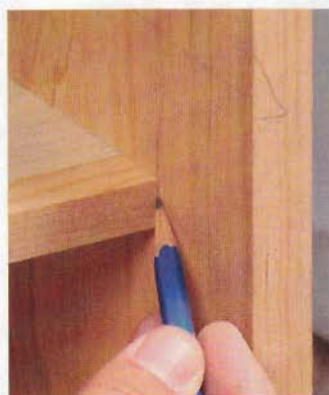


Hand tools complete the dados. Square the end of the dado with a chisel, and clean out the bottom with a router plane.

frame fits in its dado, skim the front edge of each frame with a handplane, and then lay out the notch and trim with a handsaw. Check the front edges for alignment relative to the case front. If both the stopped dados and the frame notches were laid out and executed carefully, the frames' front edges should lie in a plane. If not, adjust them.

The top drawer divider is laid out so there is enough space above it to store the lid. It also has brackets attached to the front, which act as a stop for the lid. They lie in the same plane as the stepped stop at the bottom of the case, which I make by gluing a slightly oversize block to each side of the front of the divider, shaping it at the bandsaw, and cleaning it up at the bench.

Bottom drawer runs on a different system—You've created the spaces for the lid and most of the drawers, but the bottom drawer space isn't complete. The bottom drawer rides on a stepped stop (which is also a transition from the plane of the drawer fronts and door stop) and blocks glued in behind it. The dimension between the front edge and the top filler or step has to be accurate, as does the position of the piece in the case. An effective way to guarantee this is to make the distance between the steps a hair larger than needed. Dry-clamp the stop in place, according to the back step. Then glue in the first block behind the stop,

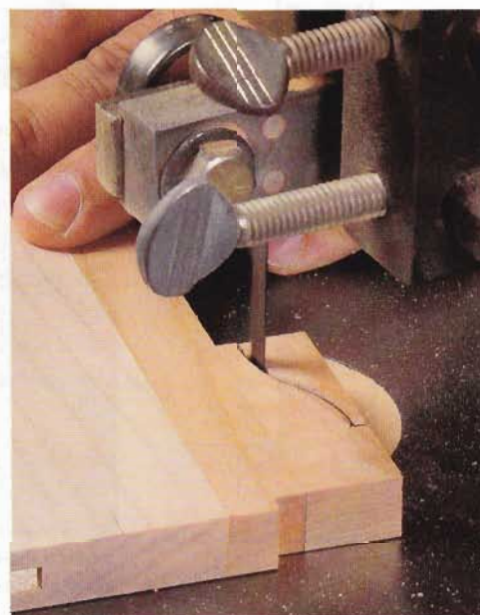


Test-fit the dividers. If the fit needs adjustment, plane the bottom face of the frame to fit. That way, if there is tearout or any other issue, it won't be noticeable. With the dividers pushed up against the end of the dado (far left), lay out the notch and use a handsaw and chisel to cut it (near left).

ADD BRACKETS TO THE TOP DRAWER DIVIDER



Glue, then shape. It's easier to glue oversize blocks to the frame and then shape them than it is to shape tiny pieces on the bandsaw and then try to clamp these irregular parts to the divider.



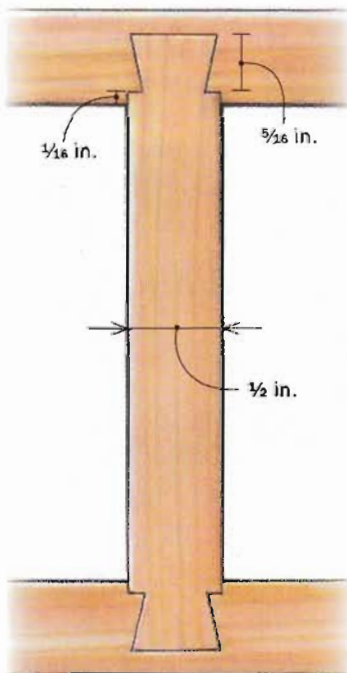
Dovetailed partitions by hand

When there are only one or two vertical partitions, Brown cuts their small dovetails by hand.

North Bennet method



Dry-fit and use a story stick. Use the story stick to mark the near side of the partition (above) and then the actual partition to mark the far side. Now remove the two dividers and cut the shallow dadoes in them. Before fitting the partition into its dadoes, clamp in a spacer block (right). Base it on the space at the ends of the drawer pocket.



DOVETAILED PARTITION



Angled guide block makes the dovetail easy. Chop the dovetail, transfer the location to the divider, and cut the socket.

making sure not to glue the stop yet. Now you can check and adjust the front stop as needed and accurately position it when gluing it in.

Dovetailed partition—A requirement of the project is that one level of drawers be divided by a vertical dovetailed partition. Before gluing the divider frames in, lay out and fit the dovetailed partition. Again, use a story stick to establish its location. Often a student's first inclination is to align one divider with the other and mark the top and bottom of the partition. Our method is to use a story stick and reference off one of the inside faces of the case. The results are more consistent this way.

Locate the first side of the dado for the partition. The shoulders of the dovetail are sunk into a 1/8-in. dado in the dividers. This registers the partition and gives it rigidity that the dovetail alone doesn't.

After notching the partition so that the shoulders bottom out in the dado, the front 1/2 in. of the partition becomes the dovetail. Make the dovetail and, using a sharp pencil, scribe the socket lines onto the dividers. These lines are transferred to complete the socket layout. Once sawn and pared to the lines, the dovetail is test-fitted to the socket. If adjustments are needed, do them to the socket.

With dividers and partition fitted, dry-clamp everything so you'll know your procedure and what clamps are needed. Glue is only applied to the front 3 in. to 4 in. of the dado. The rest of the frame needs to be free enough for the case to expand and contract. The clamps should be ready to pull the frame tight to the front given the real possibility of the joint grabbing before it closes fully.

A handsome lid and well-fitted drawers

Size the lid frame to fit the lid space created in the front of the case. After making the frame, dry-fit it and mark the groove depths on the face of the frame to outline the panel sizes. This provides the exact size for the panels.

Raise the panel on the tablesaw and then fit it by hand with a rabbet plane. Pre-finish the panels before gluing them into the frames.

A well-fitted drawer is a hallmark of our program. We want a drawer that slides in and out easily and quietly, with only enough clearances for its function and wood movement.



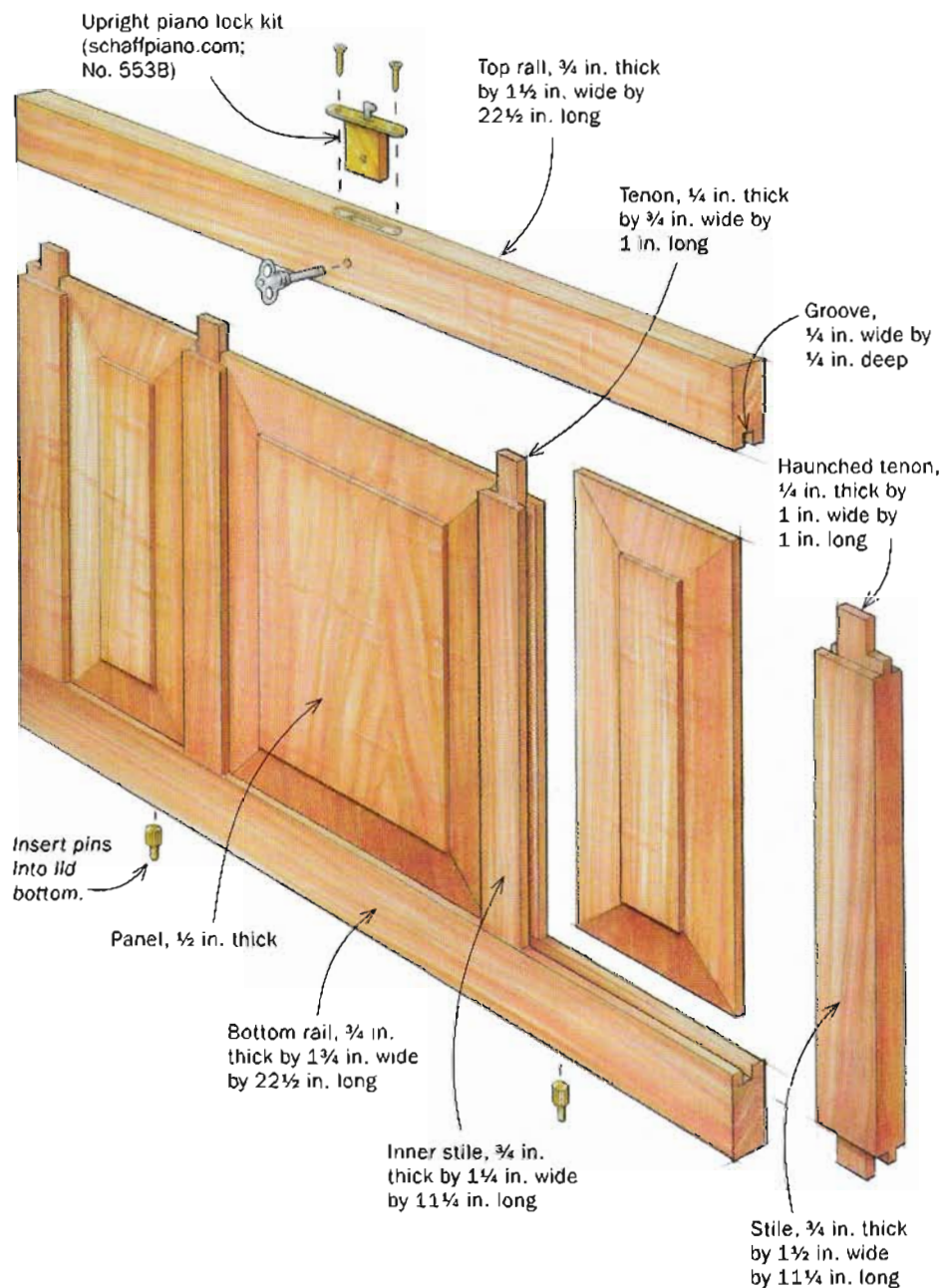
Prefinish the panels. Brown applies the polyurethane finish to the panels before gluing them into the frames so seasonal movement doesn't expose unfinished wood.



Pins and sockets keep the lid in place. Basic brass hardware (rockler.com; No. 32334) is pressed into holes drilled into the case and lid bottom.

Lid is a good place to show off grain

The panels are the only place where students are allowed to use highly figured wood, and these molded panels are an ideal place to showcase beautiful grain.



First, fit the drawer parts to their corresponding spaces. You want no gaps at this point. I cut the drawer back $\frac{1}{32}$ in. shorter than the front to aid in the fitting process. Once the drawer is dovetailed and glued up, check it for wind by setting it on a flat surface. If needed, correct it with a smoothing plane before fitting.

As for the back of the chest, I make the shiplapped parts on the tablesaw with a dado set and install them by counterboring and using round-head screws.

Add the hardware and finish

The lid is held in place by pins and sockets on the bottom edge and the full-mortise lock in the top edge. I put the lid in place to lay out the location of the pins and sockets and drill the small holes, and then the hardware simply presses into place.

The lock set is a matter of a deeper mortise with a shallow hand-cut mortise so the whole piece sits flush in the lid, and a shallow strike plate mortised in the top to catch the bolt.

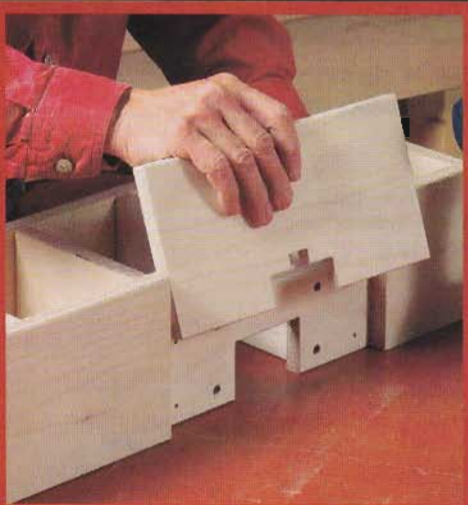
Before applying finish I handplane, scrape, and sand the chest up to P220 grit. I use shellac and wax on the interior and areas of sliding contact. On the exterior, I wipe on Minwax Fast-Drying Polyurethane. After the first coat, I sand with P400 grit. After the second coat, I smooth the surface with steel wool and wax with Boston Polish butcher's wax. □

Steve Brown is the head of the woodworking department at NBSS.

Space-Saving Router Table

It's the old tablesaw extension trick,
but done right this time

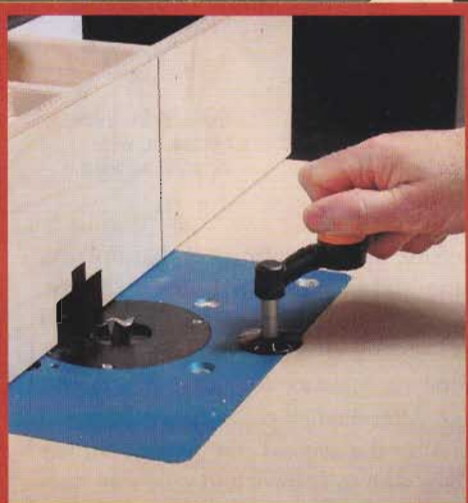
BY JOHN WHITE



Versatile fence



Great dust collection



Up-top adjustability





I've seen many tablesaw extension wings turned into router tables, and it's not a bad idea on paper. You get an indispensable woodworking machine without consuming an extra inch of shop space. And, you can take advantage of the solid, accurate fence already in place on the saw (or so you think).

But it's not enough to simply drop a router plate into the melamine extension wing. For one thing, the rip fence is not ready for routing. Not only is it too short for vertical jobs like sliding dovetails, but the bit must be buried in the fence for most tasks, and screwing a couple of scraps to the back of the rip fence just doesn't cut it. Dust collection also is a problem, because there's no efficient way to collect from above the table. And single-layer tables eventually begin to sag under the weight of the router.

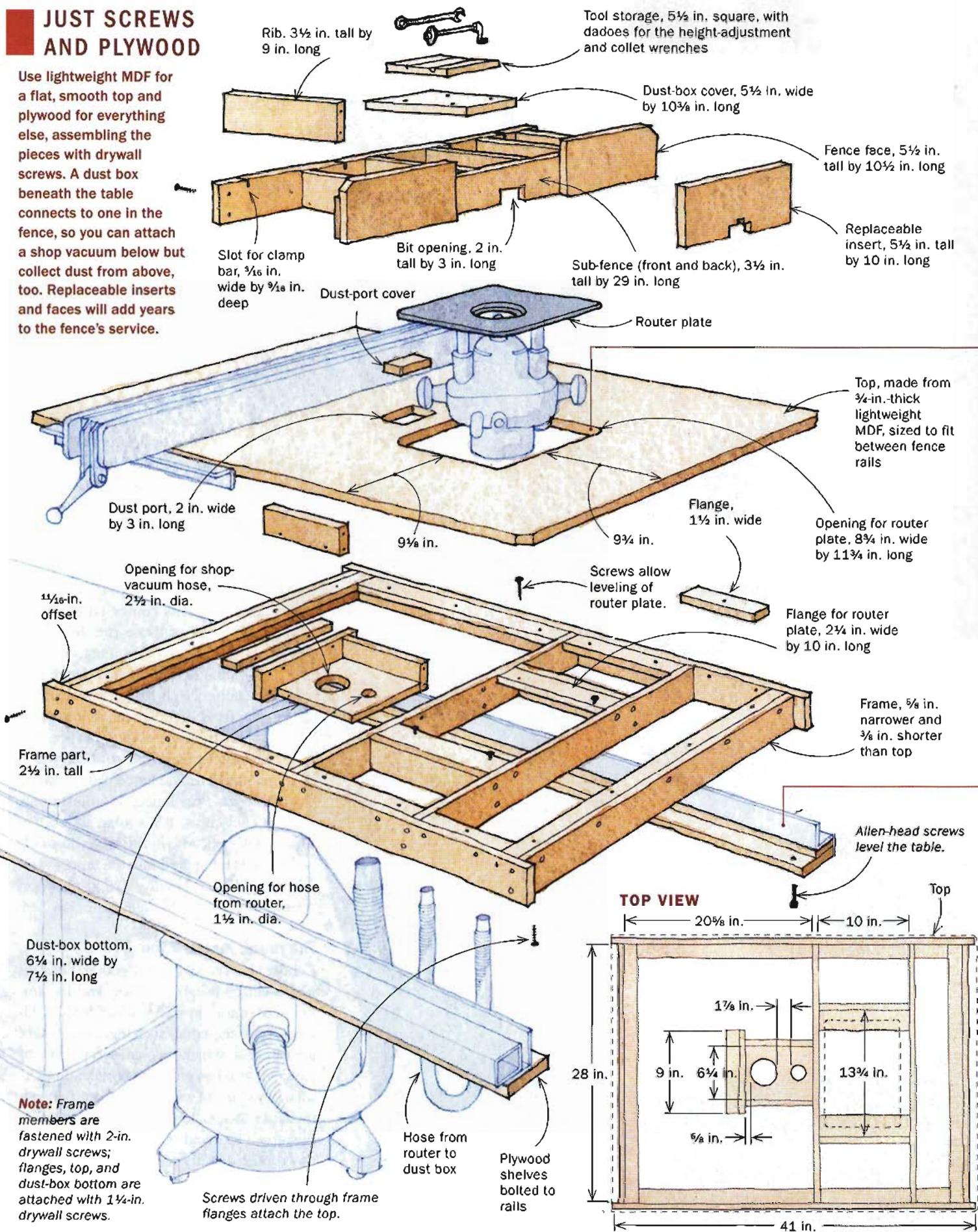
This router table solves all of those problems and a few more. First, it has a simple but effective fence that is tall enough for vertical routing. There is a replaceable insert, so you can bury bits in the fence and get zero-clearance routing when you need it. The fence clamps to the tablesaw's rip fence, so adjustments are easy. Plus, it's a snap to put on and take off. Above-the-table dust collection is integrated into the fence—and it really works. Finally, a rigid plywood frame under the table eliminates sag.

The router matters, too

I chose the Triton TRC001 router, because it specializes in table-routing and has impressed editors in past tool reviews. It allows above-the-table bit changes and height adjustments, which will save you hours of hassle. It also has great dust collection of its own, so you can catch dust from beneath the table, too, making most jobs practically dust-free. To avoid the hassle of attaching the router directly to the table, I used a predrilled router plate from Rockler (rockler.com, \$60). I used Baltic-birch plywood for the table's support frame and fence because

JUST SCREWS AND PLYWOOD

Use lightweight MDF for a flat, smooth top and plywood for everything else, assembling the pieces with drywall screws. A dust box beneath the table connects to one in the fence, so you can attach a shop vacuum below but collect dust from above, too. Replaceable inserts and faces will add years to the fence's service.



it is stable and holds screws very well, and I used lightweight MDF for the top because it routs well and makes a smooth, durable work surface. One sheet of each is more than enough to make the entire table.

Make the table first

The table has two parts: a large top and its underlying frame with integrated dust collection and support for the router plate. Make the frame and then the top.

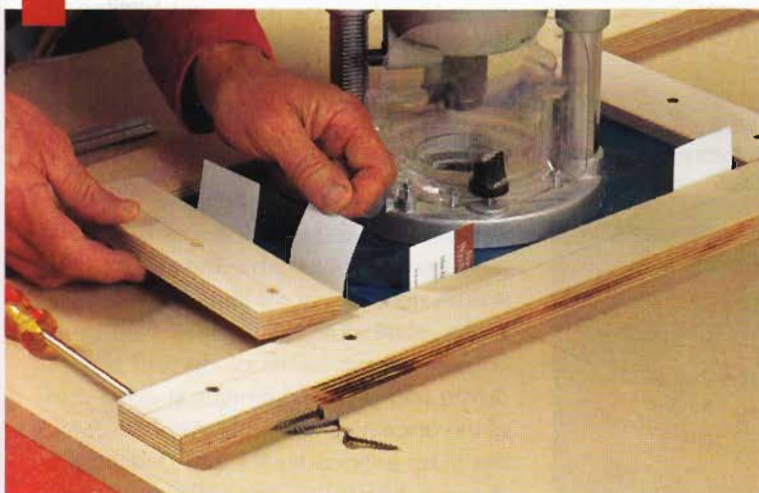
The frame is a simple affair. Strips of plywood—all ripped to the same width—are

butt-joined and held together with 2-in.-long drywall screws. The joint is strong and no glue is needed. After assembling the basic frame, attach the flanges. Use 1¼-in. drywall screws, driven in from the outside of the frame, and pre-drill clearance holes and countersinks. Finally, assemble the frame for the dust-collection box. The box's bottom gets two holes: one for the hose that runs to your shop vacuum and one for the hose that runs from the router to the box. Running both hoses into this box means that a single

shop vacuum can collect dust from above the table (through a port routed in the top) and below it without joining three different hoses to one another.

You'll need to rout two openings in the table, one for the router plate and one for the dust port, but neither is difficult. Begin by laying out their locations on the underside. For the dust port, simply attach template strips on your layout lines, rough-cut the opening, and rout it flush to the strips. The opening for the router plate must be more precise, but I have a great trick for

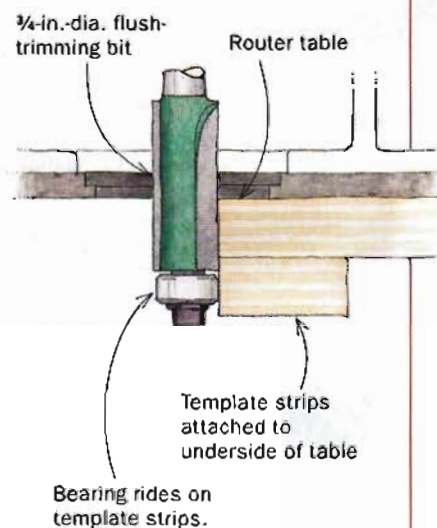
MAKE AN ACCURATE OPENING FOR THE ROUTER PLATE



Build a routing template around the plate. Press the plate firmly against two sides, but use business cards between the plate and the other two sides. The extra space makes it easier to get the plate in and out.

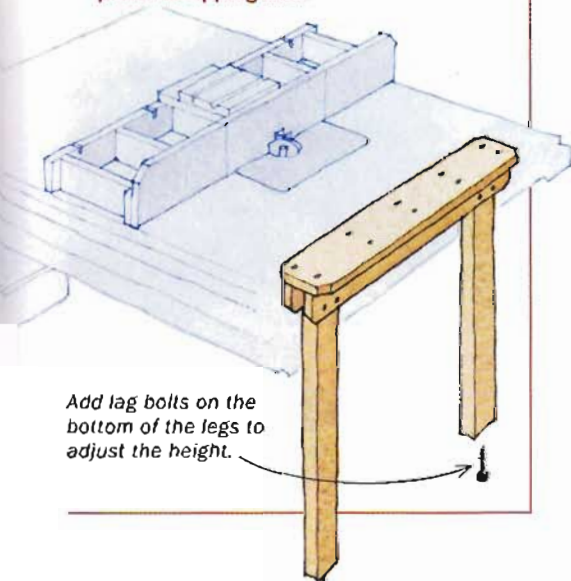


Rout the opening flush to the template. Cut away most of the waste with a jigsaw, leaving about ¼ in. to be removed by a bottom-bearing, flush-trimming bit. Use a ¼-in.-dia. bit so that the corner radius matches the radius on the plate's corners.



ADD LEGS FOR SUPPORT

If your extension table doesn't have legs already, you might need to add some. The table's cantilevered weight could be enough to make your saw prone to tipping over.



HAVE A SMALLER TABLESAW EXTENSION?

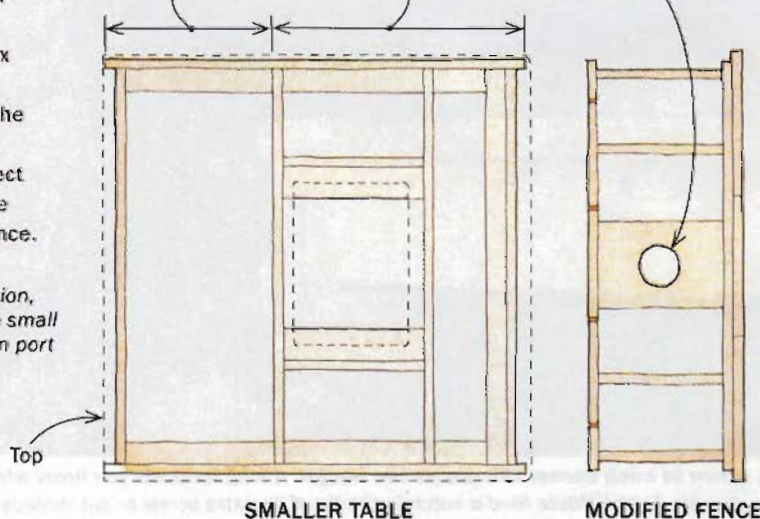
If your saw has 30-in. rails, there won't be enough room to fit a dust-collection box behind the opening for the router plate. Instead, collect dust from the top of the fence.

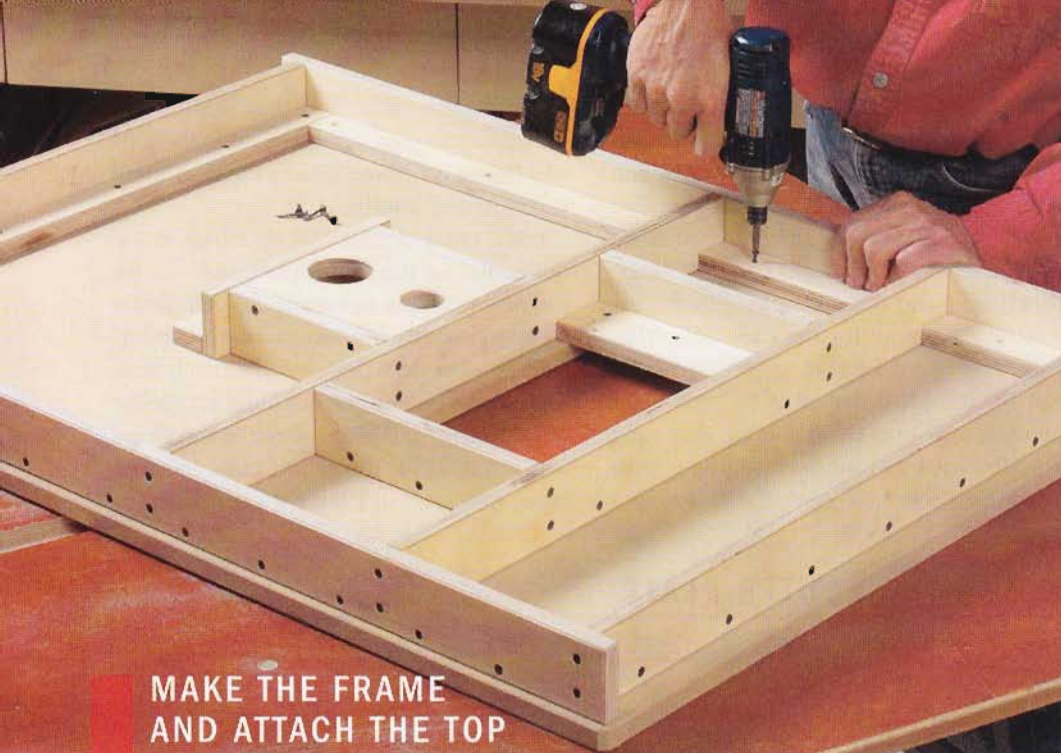
**For this version, don't rout the small dust-collection port in the table.*

Shrink the area behind the plate so that the table fits the shorter rails.

Keep dimensions from the router plate forward the same as for the larger table.

✓ Drill a hole in the dust-collection box cover for the shop-vacuum hose.





MAKE THE FRAME AND ATTACH THE TOP

Solid assembly. The flanges serve double duty here. Not only do you screw through them, but they also provide a good bearing surface for the top, which helps to keep it flat.



Plywood shelves support the table. Use nuts and bolts to attach the plywood shelves to the fence rails (left). Lower the table into place (right). It rests on the plywood shelves and gravity holds it in place.



A screw in each corner fine-tunes the height. A long level lets you know when you've got it right. White filed a notch in the tip of an extra screw to cut threads in the plywood.

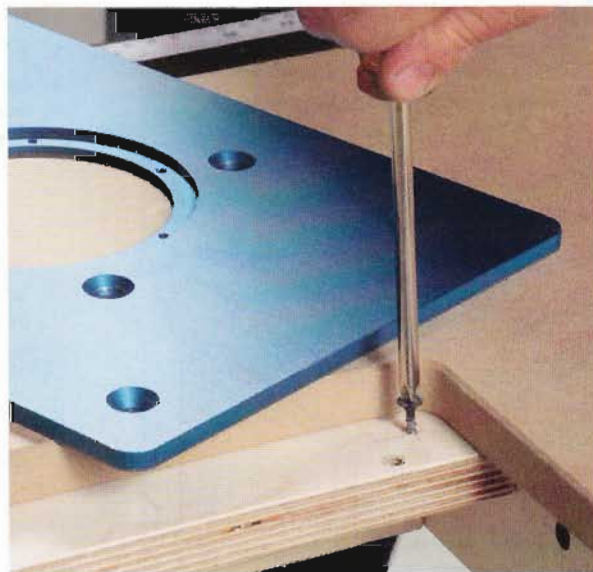
that (see p. 53). After both openings are routed, attach the frame to the top.

Make the fence and install the table

The fence is assembled just like the frame, with butt joints and screws. Before you screw it together, cut a bit opening in the front sub-fence and slots for the clamp bars in the rear one. The fence faces are screwed to the sub-fence with 1 1/4-in. drywall screws, six per face. The replaceable insert fits between the two faces and is screwed in place. To create suction at the bit opening, attach a cover over the center bay created by the ribs, which sits over the dust port. Finally, cut two dados in a square of plywood—for storing the wrenches—and screw it to the cover.

To ease installation, I bolted plywood shelves to the underside of the fence rails. Next, I drove four Allen-head screws up through the shelves—one for each corner of the table—and set the table in place. I then laid a 6-ft. level across the saw's table and the router table and adjusted the screws until they were level. I leveled the router plate in a similar way, resting its corners on the heads of drywall screws driven into plywood flanges at either end of the opening in the table. After attaching the plate to your router and dropping it in place, attach the dust-collection hoses, clamp the fence to the saw's rip fence, and you're ready to do great work and do it faster. □

John White is a former shop manager at FWW.

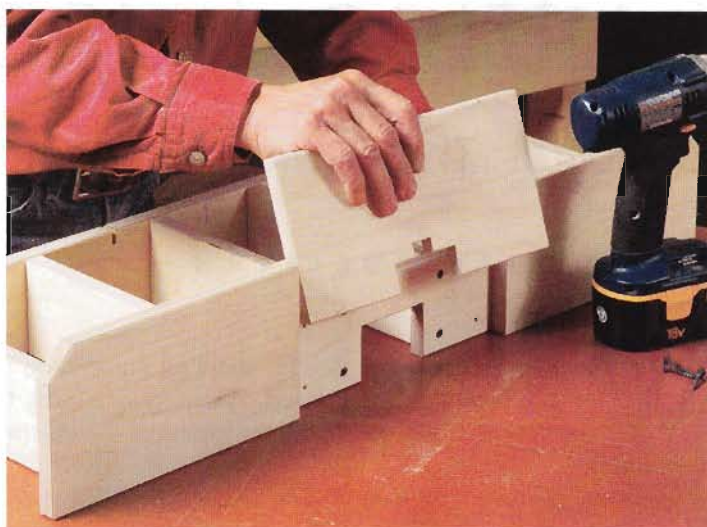


Same trick for the router plate. To level the router plate, White uses a drywall screw in each corner. The drywall screw will thread its own hole.

ASSEMBLE THE FENCE



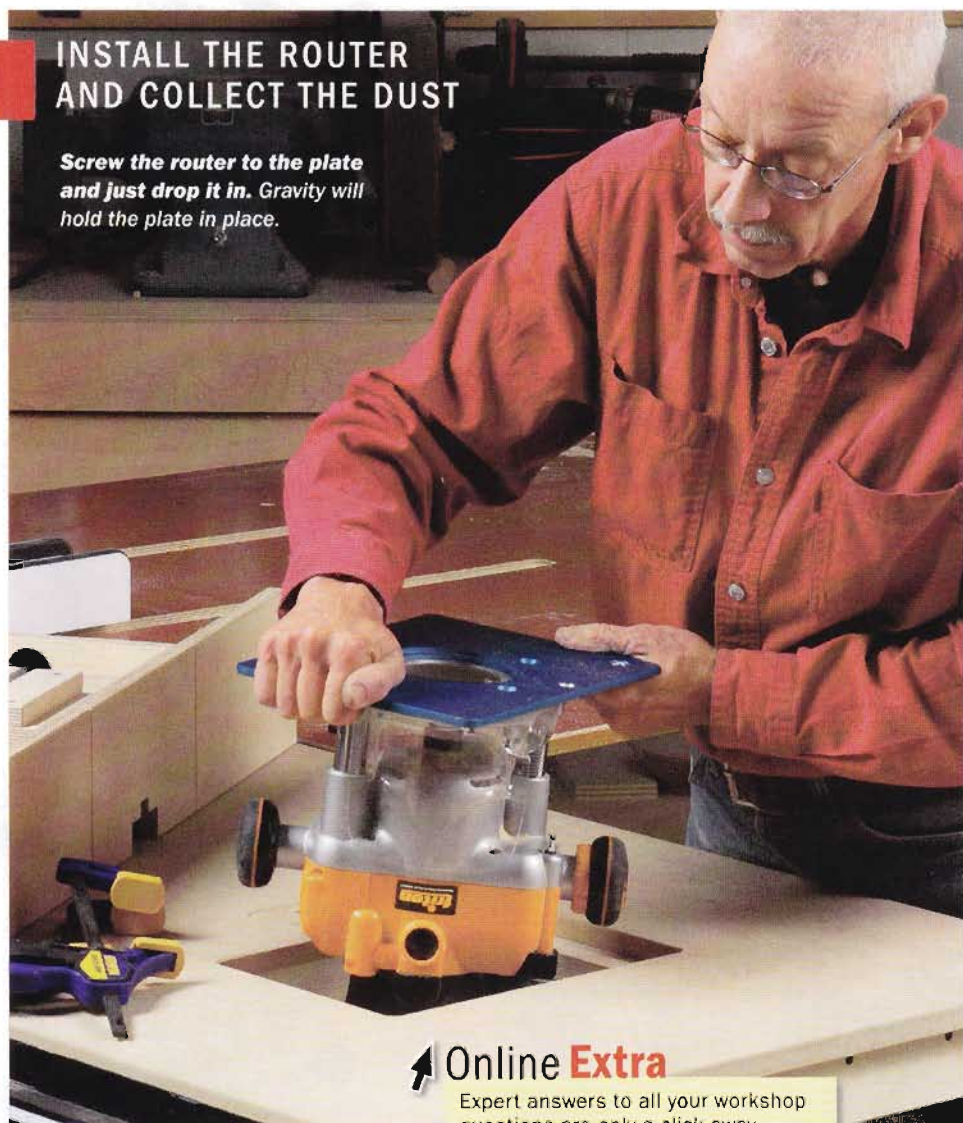
Ribs make the fence rigid. Clamp a plywood spacer next to the rib so that it remains vertical as you screw it in place.



Insert is replaceable. Four screws hold it in place from behind. Make one for each of your most common bits to eliminate tearout. The tall fences on both sides can be replaced, too.

INSTALL THE ROUTER AND COLLECT THE DUST

Screw the router to the plate and just drop it in. Gravity will hold the plate in place.



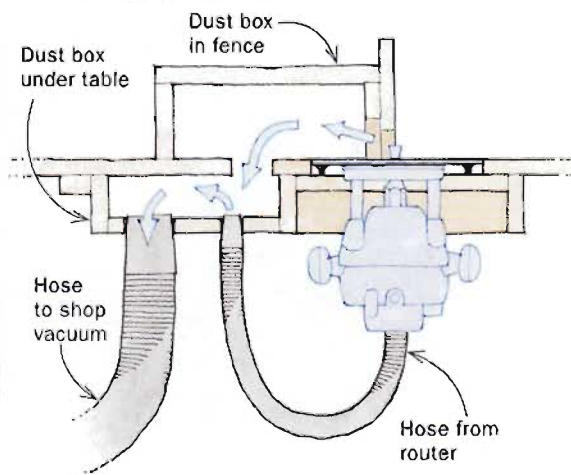
Online Extra

Expert answers to all your workshop questions are only a click away. Ask shop guru John White at FineWoodworking.com/extras.



Hook up the dust collection. A shop vacuum is strong enough to collect dust from above the table and from the router at the same time, leaving very little behind.

DUST COLLECTION



Cutting-Edge First Aid

ER doctor: Throw away your old kit and forget what you've been told

BY PATRICK SULLIVAN

Woodworkers spend a lifetime handling razor-sharp tools, power equipment with exposed blades, and boards that harbor splinters and fasteners. In this environment, there's always the risk of an injury.

Usually woodworkers cut their fingers, and occasionally the palms of their hands. Although the hand often will recover from minor injuries even if it receives no care at all, recovery is faster with less scarring and less risk of infection if it's treated properly. For more serious cuts and eye injuries, however, what you do first can have an impact on the rest of your life.

As a woodworker and physician, I understand the types of injuries that are common in the shop, and I know how they should be treated. Forget the first-aid kits offered in drug stores. Forget much of the



Build a custom kit

A first-aid kit for woodworkers looks very different from the kits sold in drugstores. It contains materials for closing cuts, flexible coverings for wounds, tools for removing splinters, and eye wash.

Many of these products are available from multiple manufacturers.

- | | |
|-----------------------|--------------------|
| 1. Coban tape | 7. Magnifying lens |
| 2. Glue syringe | 8. Steri-Strips |
| 3. Eye wash | 9. X-Acto knife |
| 4. Tegaderm bandages | 10. Krazy Glue |
| 5. Band-Aids | 11. Scissors |
| 6. Examination gloves | 12. Tape |
| | 13. Tweezers |



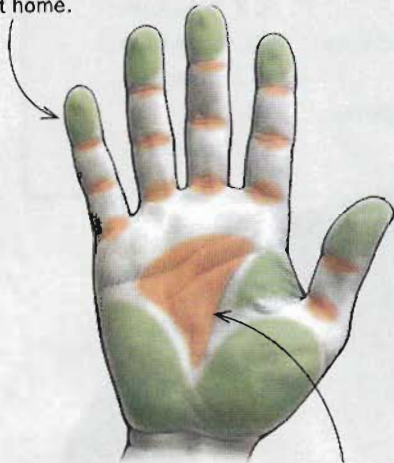
misguided advice found in popular manuals. The woodworking environment is unique, and I'll tell you about some specialized equipment and supplies that work well there. I'll also show you a few tricks on treating wounds—from stopping bleeding to cleaning to bandaging—based on proven medical principles. In the end, you'll learn how to treat injuries in a way that gets you back to work as soon as possible.

Patrick Sullivan is an internal medicine specialist with extensive emergency room experience. Now retired from his medical practice, he has more time for woodworking.

Do you need a doctor?

VULNERABLE AREAS OF THE HAND

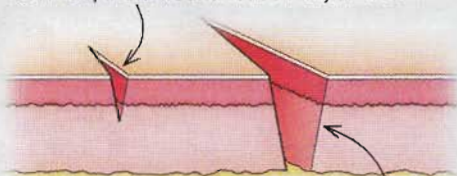
Areas highlighted in green contain very few vulnerable structures, such as tendons. Unless the wound obviously penetrates into a bone or joint, cuts here typically can be treated easily at home.



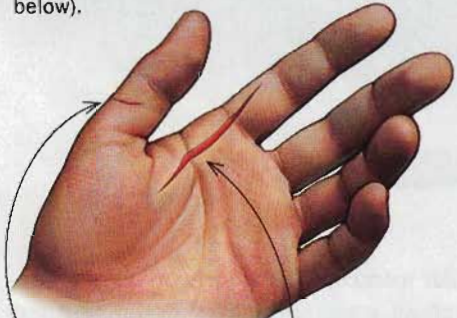
Areas in red, however, contain tendons. Deep cuts in these areas are likely to have damaged the tendons or tendon sheaths and should be examined by a doctor.

IF THE CUT WON'T CLOSE, GET IT STITCHED

Cuts that do not slice all the way through don't require stitches because the lower layer of skin keeps the wound reasonably closed.



The cut on the right penetrates all the way through the skin, revealing the fat beneath. A deep cut like this that's under 1 in. long usually can be treated at home; if it's longer than 2 in., the wound needs to be stitched. In between 1 in. and 2 in., the decision to get stitched depends on the location of the wound (see below).



The cut on the thumb can be treated at home. It is short, and although deep, tends to close itself. Normal hand movements will not apply stress to the wound.

The cut on the palm and index finger begs for stitches. It is long and deep and in a location where every hand activity will stretch the wound apart.

How to handle most cuts

1

SOAP AND WATER

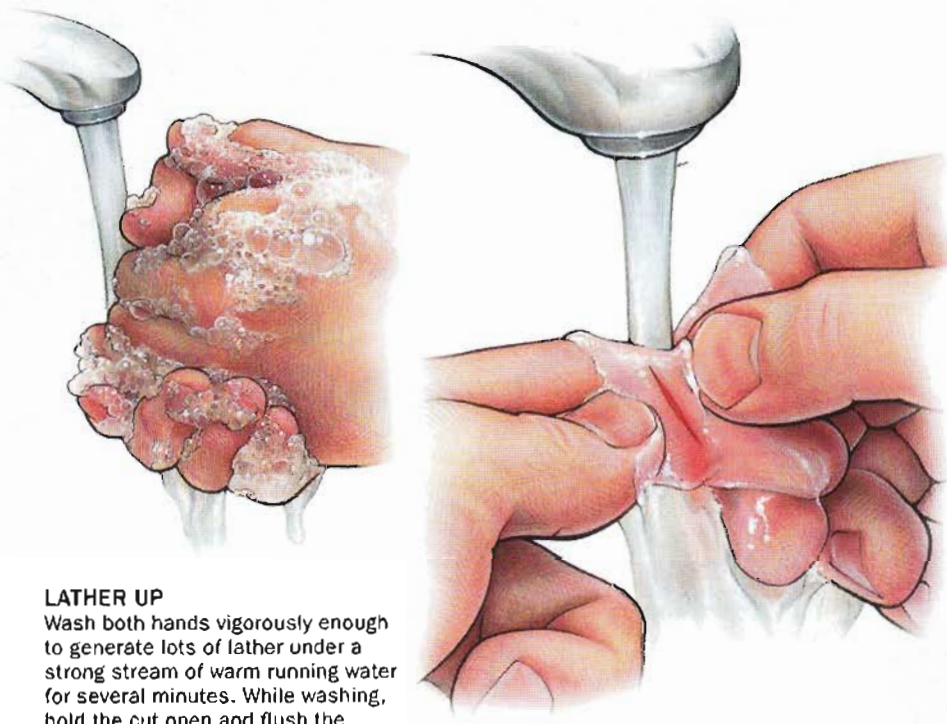
The enemy of healing is infection. The germs that live on lumber and tools generally do not cause disease; essentially, all the risk is from bacteria you already carry on your skin. A wound allows those skin germs to reach the more vulnerable tissue beneath the skin. The problem gets worse if there is dirt, sawdust, debris, or dead tissue in the wound.

The most effective treatment for all wounds is immediate washing with soap and clean water. (You can skip this if you need to go to the emergency room, because they will clean it there). Washing drastically reduces the number of germs, and takes away dirt and debris in which bacteria can hide and multiply.

I have seen several Internet pictures and videos that show first-aid techniques in which they advocate wiping the wound clean with a damp paper towel or gauze pad. This is the most ineffective way to wash a wound.

The surest way to clean a wound is to hold the cut under running water for several minutes and lather thoroughly. If soap is not available, plain water will do a credible job. Wash every wound, whether you can see contamination or not. Waterless hand cleaners and antiseptic solutions may be better than nothing, but they are not a proven substitute for washing. If you can wash effectively, you do not need these products.

Doctors and first-aid manuals in the past have routinely recommended the use of an antibiotic ointment, but recent surgical research proves that clean wounds need no antibiotic if they are washed well and closed promptly. Moreover, the ointment preparation discourages the formation of a scab, which is the most effective wound closure available. Skip any antibiotic ointment unless dirt and debris were driven into the wound and cannot be washed out.



LATHER UP

Wash both hands vigorously enough to generate lots of lather under a strong stream of warm running water for several minutes. While washing, hold the cut open and flush the wound for at least a minute. Ignore any bleeding this may cause. Dry both hands on a clean paper towel.

2

FIVE MINUTES OF PRESSURE

After washing the wound, you need to stop the bleeding. Apply pressure directly over the wound for five minutes *without* interruption to help form a clot. If you peek, the clock starts all over again.

WRONG



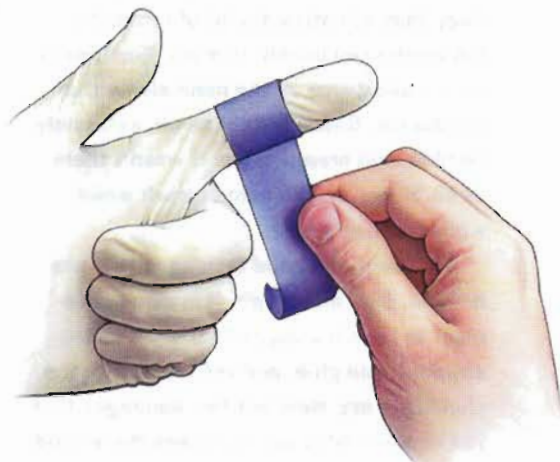
RIGHT



TIP

WHEN YOU CAN'T STOP WORKING, USE A GLOVE

If you get a minor cut, say, while you're in the middle of a glue-up, you don't have to stop working. Put on an examination glove, and wrap masking tape snugly around the finger directly over the cut. The glove keeps blood off the woodwork, and pressure from the tape will usually stop the bleeding in 5 to 10 minutes. After removing the tape and glove, wash your hands thoroughly, and close and dress the wound.



BE DIRECT

Don't be afraid to touch the cut. Apply pressure directly over the wound (right), not below it (left).

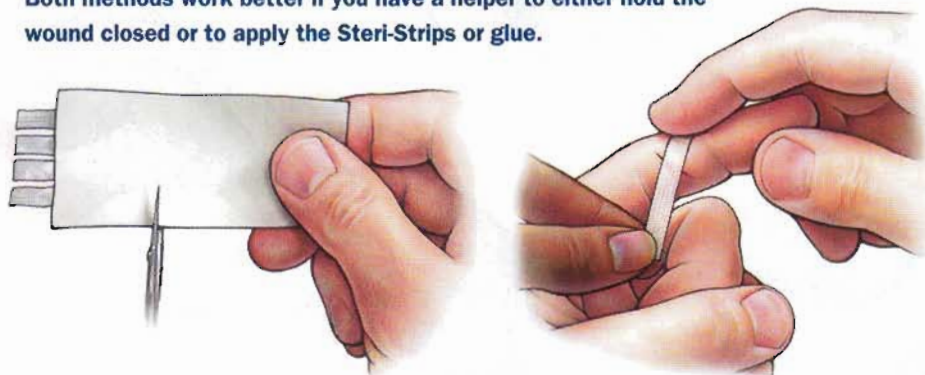
3

CLOSE THE WOUND BEFORE BANDAGING

When you get cut, keeping the two edges of the wound firmly closed will help it heal rapidly. Cuts from sharp tools penetrate cleanly, which makes them easier to close and faster to heal. Wounds with frayed or crushed edges (such as those made by a spinning tool) take a bit longer to heal. In either case, you want to wash and close the wound to pull the sliced skin back together.

Standard adhesive bandages cover the wound but don't securely close it. As soon as you start using your hands, skin movement will reopen the cut. Hospitals often use a specialized tape product called Steri-Strips, which you can buy without a prescription in most drugstores or online.

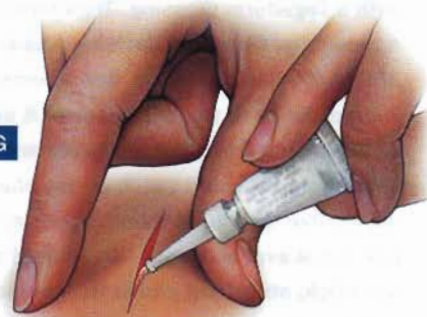
It is also possible to glue wounds closed with ordinary cyanoacrylate glue. Both methods work better if you have a helper to either hold the wound closed or to apply the Steri-Strips or glue.



ADHESIVE-BACKED STERI-STRIPS KEEP CUTS CLOSED

Dry the skin around the wound, then cut the strips to length. Remove the paper backing, and apply. Adhere the strip to one side of the cut, push the wound edges together so they just meet, and stick the strip down on the other side.

WRONG



RIGHT



A DIFFERENT KIND OF GLUE-UP

Cyanoacrylate glue works for closing a wound. But the job is not like butting two boards together. Do not apply glue inside the wound. Instead, push the skin edges together and spread a thin layer of glue across the top of the skin, interrupting the glue at short intervals to preserve flexibility. Don't use the activator spray that comes with some glues.



4

SMARTER BANDAGES

If you go to an emergency room with a hand injury, you'll come home with a huge, fluffy bandage that will attract a lot of sympathy but render you unable to work. Emergency rooms use gauze as the main element of bandaging. Gauze is light as air, extremely flexible, and breathes like it wasn't there at all. However, you cannot work wood while wearing gauze.

Woodworkers need bandages that are flexible, thin, and tough. It is also convenient to have bandages that shed water, sawdust, and glue, and yet breathe so the skin stays dry. Here are two bandages that you can use after you've closed the wound or after you've come home from the ER.

The first option is to cover the area with a Tegaderm dressing. Tegaderm is a transparent medical dressing (made by 3M) that's flexible, tough, and stretchy. It is great for hand wounds because it can be conformed to a number of shapes and is so smooth that it won't catch on any sharp edges, like an adhesive bandage can. This product is available with and without a non-stick, absorbent pad in the center. Many wounds will seep a small amount of serum in the first few hours after bandaging, and the absorbent pads are useful then. Later, they may be unnecessary.

This might be all you need. If you have to handle rough lumber, or do work that applies a lot of friction or abrasion to your hands, consider wearing leather or fabric gloves to protect the dressing.

Injuries that involve the palm or the webs between the fingers are very hard to bandage. For these areas, cover the closed wound with Tegaderm, and then wrap Coban around the hand as necessary. Coban is a very stretchy bandage that sticks to itself, but not to anything else. It is excellent for bandages involving the palm or wrist, because it stretches greatly, but always remains snug.

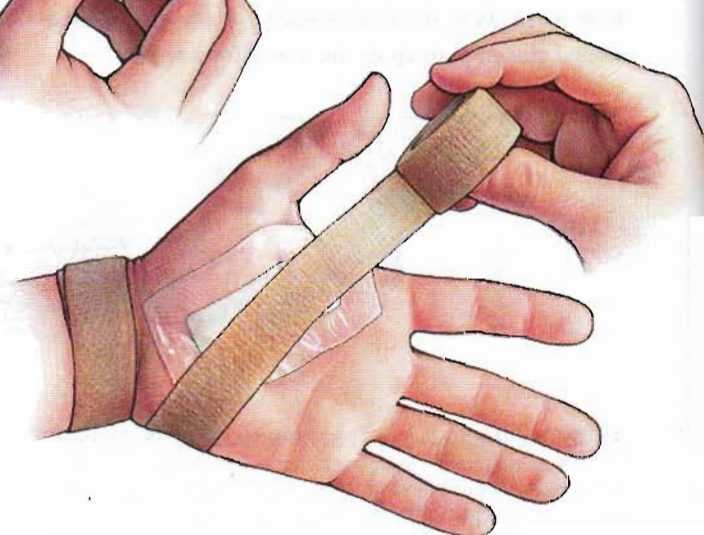


BETTER THAN A BAND-AID

After closing the wound with a Steri-Strip, apply a Tegaderm bandage. Put on the bandage and then peel off the paper frame. If you need to cut the bandage to a smaller size, do it while all the backing paper is still in place. The bandage is thin and flexible, allowing nearly full knuckle movement.

WHEN YOU NEED MORE HOLDING POWER, USE COBAN TAPE

It's hard to keep a bandage in place on the palm of your hand, so wrap the dressing with Coban tape (1 in. wide usually is sufficient). First take a couple of wraps around the wrist. This serves to anchor the whole bandage. Then continue with several wraps around the palm. End the Coban on the back of the hand or wrist, where it will receive the least rubbing.



Punctures

WASH AWAY DEBRIS

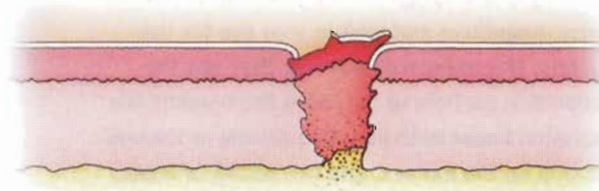
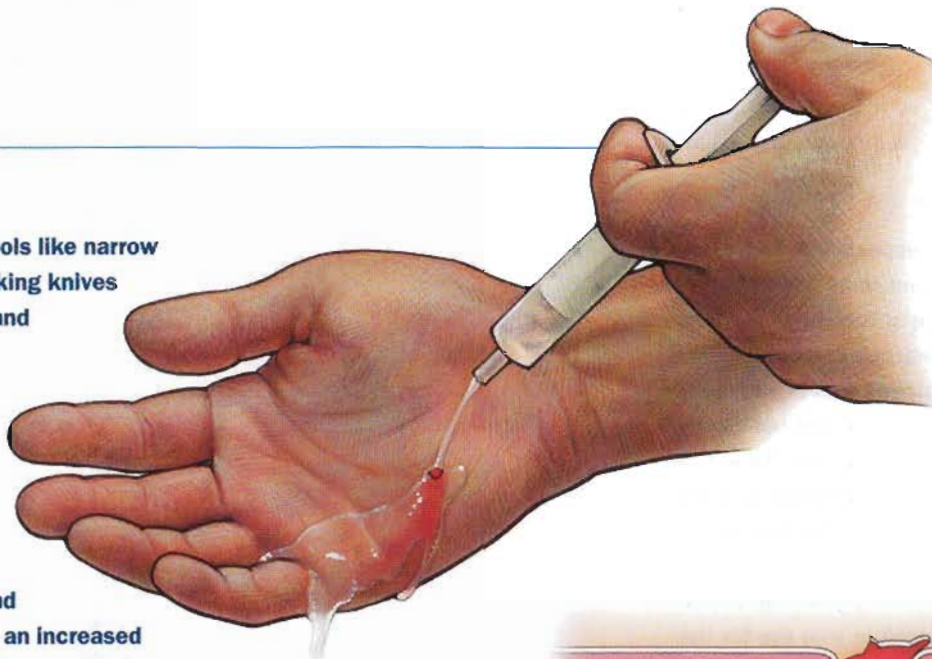
Punctures from clean, sharp tools like narrow chisels, scratch awls, and marking knives should pose very little hazard and require very little treatment (unless they penetrate into joints or cut tendons). The wounds tend to close themselves. Wash thoroughly and apply a small bandage until bleeding stops.

If you have a puncture wound caused by a dull tool, you have an increased chance of infection (see drawing, right). First wash the area thoroughly. As you wash, flush out the wound with water using a squeeze bottle or glue syringe. Apply Tegaderm with an absorbent pad. If the wound becomes more puffy and painful over a period of several days, have it seen by a doctor.

Puncture wounds carry a very small risk of tetanus. You were immunized against tetanus in childhood, but your immunity needs a booster every 10 years. Keep this up to date.

DEEP CLEANING

As you wash, open the wound as much as possible, and squirt water in with a squeeze bottle or a glue syringe. Don't be bashful about the amount of water. You want to flush the wound vigorously enough to get rid of any debris at the bottom of the puncture.



DULL TOOLS CAUSE MORE HARM

Punctures from dull tools like screwdrivers leave more crushed and damaged cells, and the dull edge often pushes the skin, dirt, and debris back into the wound, creating more chance for surface skin bacteria to be lodged in underlying tissue. These wounds really need to be flushed out.

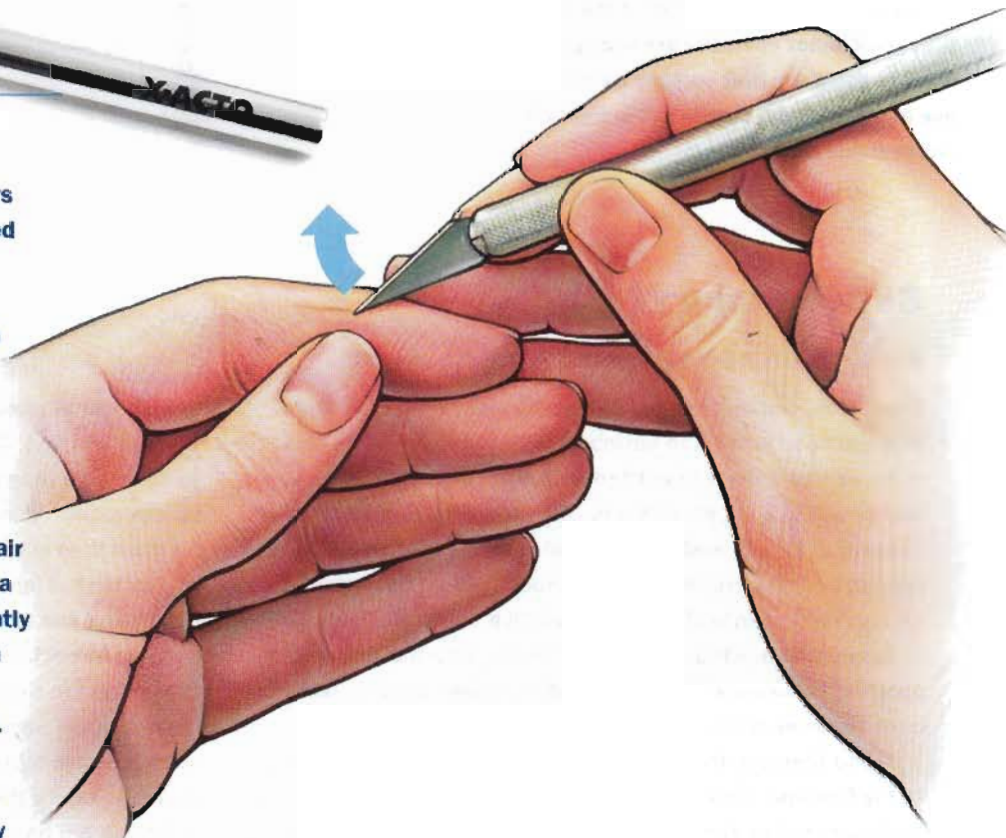
Splinters

PULL OR SLICE THEM OUT

Everyone who works with wood has had splinters in their skin, and virtually everyone has struggled to remove them. If you have trouble seeing the splinter, use magnifying glasses, whether it's a pair of inexpensive reading glasses or visor-type magnifiers that you can wear over eyeglasses. These magnifiers may come in handy for other shop uses, too, like working with small parts or chiseling to a line in tight spaces between dovetails.

Usually you can pull out the splinter with a pair of tweezers. However, if a splinter has tunneled a long distance under your skin, you'll have to gently slice the skin to reach it using a No. 11 blade in either a disposable scalpel or an X-Acto knife. After slicing, pull out the splinter with tweezers.

Be sure to wash your hands and the blade thoroughly before you probe around in the skin. Sterility is not necessary, but cleanliness is very important. Usually no dressing is needed; but if you had to dig so deeply that the wound bleeds significantly, then dress this as you would a cut.



STUBBORN SPLINTERS NEED TO BE SLICED OUT

To reach long slivers that tunnel through the skin, use an X-Acto knife with a No. 11 blade. First wash your hand and the blade. Insert the back of the blade along the top of the splinter, and gently slice open the skin with the tip of the blade. Slice along the splinter's length to expose it as much as possible, then pull it out with tweezers.

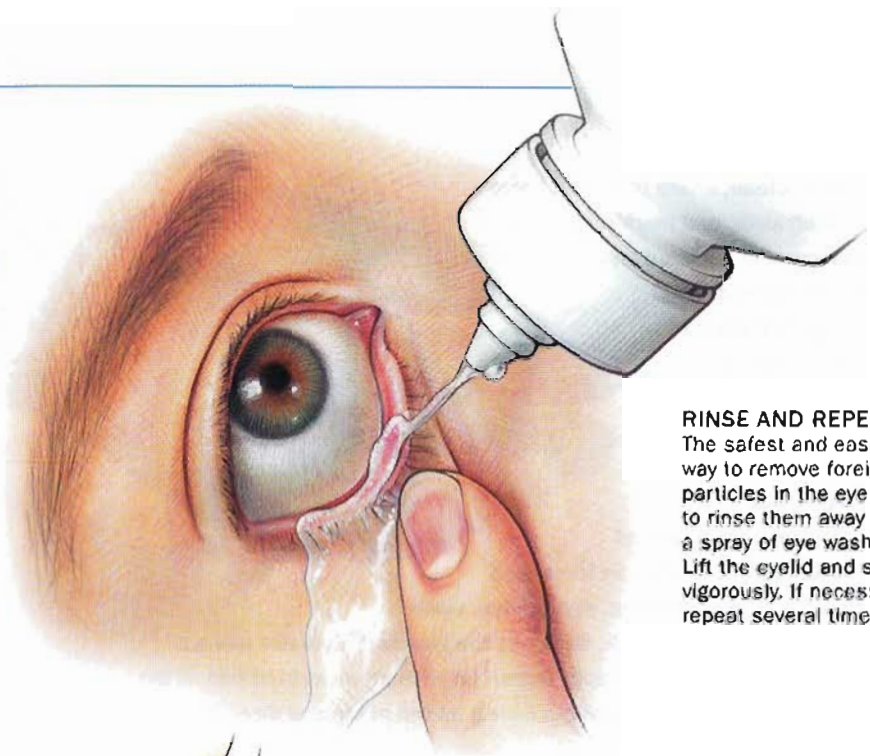
Eyes

RINSE CAREFULLY OR SEE A DOCTOR

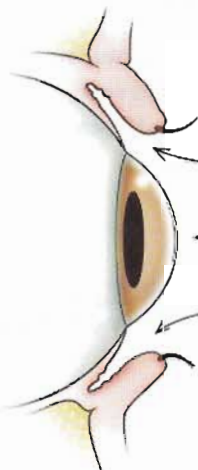
When you cut wood, especially with a router or tablesaw, sawdust (and sometimes other material) will fly. If some of that small debris ends up in your eye, your natural tears will usually wash it away. If the debris digs in and resists being washed away by tears, the best answer is to retract the eyelid away from the eyeball, and flush the eye with an eye-wash solution.

Get someone to help you. Lie on your back—it is hard to flood the eye with solution while you are upright. Have your helper put on your magnifiers and look in your eye for the debris. Regardless of whether they see the offending particle or not, have them squirt the solution under both lids. Use towels or tissues to sop up the excess, and use plenty of liquid. If that does not work, do it again. If repeated irrigation of the eye does not dislodge the particle, seek professional help. Never use tweezers or hard instruments in the area of the eye.

If there is so much spasm of the eyelids that you cannot open the eye enough to see what is going on, that suggests a more serious eye injury, and you should get immediate professional help.



RINSE AND REPEAT
The safest and easiest way to remove foreign particles in the eye is to rinse them away with a spray of eye wash. Lift the eyelid and spray vigorously. If necessary, repeat several times.



If particles embed themselves in this area, it is safe to try to wash them out at home.

If particles embed themselves in the clear layer over the iris and pupil (the cornea), have the eye examined by a doctor. Even tiny scratches in the cornea can lead to vision impairment.

If particles embed themselves in this area, it is safe to try to wash them out at home.

Serious injury?

WHAT TO DO AS YOU HEAD TO THE HOSPITAL

Some woodworking injuries demand professional care. Cuts that are deep enough to obviously penetrate into joints or bone, or that appear to cut tendons, should be treated by a doctor within a couple of hours. These injuries require the removal of foreign material embedded at the bottom of the wound, and may require special suturing. They also carry greater risks of infection, and preventive antibiotic treatment is sometimes needed. For these wounds, stop the bleeding by applying pressure with a gauze pad or a clean paper towel and have someone drive you to the emergency room.

If you tangle with a power saw, that is going to mean a trip to the hospital. There is little that can or should be done in the shop, other than applying pressure to the wound and arranging for rapid transportation to the hospital. If you cut off some part of your hand, press directly on the wound to stop the bleeding,

seal the amputated part in a zippered plastic bag, and get to the hospital fast. Don't try to drive yourself. If that trip is going to take more than an hour, carry the plastic bag in some ice or cold products from your freezer. Amputated fingers can survive for more than six hours.

Any kind of injury to the eyes is scary. Any injury that penetrates the eyeball or cuts through the eyelid must be seen by a specialist. If tiny flecks of wood or metal embed themselves in the cornea (the clear layer overlaying the iris and pupil) have them removed in the ER. When in doubt about any eye injury, you should have the eye examined by a pro. Tape a gauze pad or a tissue over the closed eye while you are on your way to the hospital. This discourages the eyelids from moving, which usually reduces any discomfort.

How Many Routers Does Your Shop Need?

For most people,
the answer is three

BY JEFF MILLER

Doing a quick inventory of my shop recently, I discovered that over the years I have accumulated nine routers. Nine! How did that happen? Does the average woodworker really need that many routers?

The short answer, happily, is no. Still, the argument for having more than one router is powerful. You can leave one in your router table and have another for hand-held work. Second, adding a router with particular strengths can make certain tasks much more convenient, whether you're cutting edge profiles with large, heavy bits or routing shallow hinge mortises on narrow stock.

There are many router types available, but which ones do you really need? I'll suggest two approaches. Either one will tackle a wide range of work, but the first is kinder to your wallet.

For good value, start with a combo kit

A combination router kit (we reviewed them in "Router Combo Kits," *FWW* #173), is a very cost-effective way of setting up your shop for both table and hand-held routing. The kit comes with one router motor and two bases—one fixed, one plunge. This lets you mount the fixed base in a table and keep the other for topside use.

I recommend putting the fixed base in the table, mainly because the plunge base is so much more versatile for topside use. Second, when the router is mounted in the table, it's often easier to adjust bit height with the fixed base than it is with



1 One in a router table

Whenever possible, you should do your routing on a table. Moving the workpiece against a solid fence and table is simply more accurate than moving the router.



2 One that can plunge

There are lots of tasks that can't be done on a router table, such as most stopped cuts, and cuts in the middle of large surfaces. For those jobs you'll need a handheld router, and a powerful plunge router will handle them all.



3 And one in the hand

While you can live without a small "trim" router, the truth is that many routing tasks are light ones, and this compact tool acts like an extension of your arm.

Kill two birds with one combo kit

A combination kit will handle both table and topside routing and costs much less than two separate routers. So you'll have plenty of money left over for a good-quality trim router. Also called laminate trimmers, these small, simple, one-handed routers are easy to set up and even easier to use.



One in the table



The fixed base lives in the table. Attach the base to the router-table insert (left). Look for a combination kit that offers through-the-table height adjustment (center). The table's flat surface and square fence simplify dozens of tasks, like routing precisely along a narrow edge (right).



One that can plunge



The plunge base is best for handheld routing. The motor switches quickly between the two bases for topside use (above). The plunge function lets you lower the bit safely into the work while the tool is running. This allows you to make stopped cuts like the dados at right, and do them in several passes.



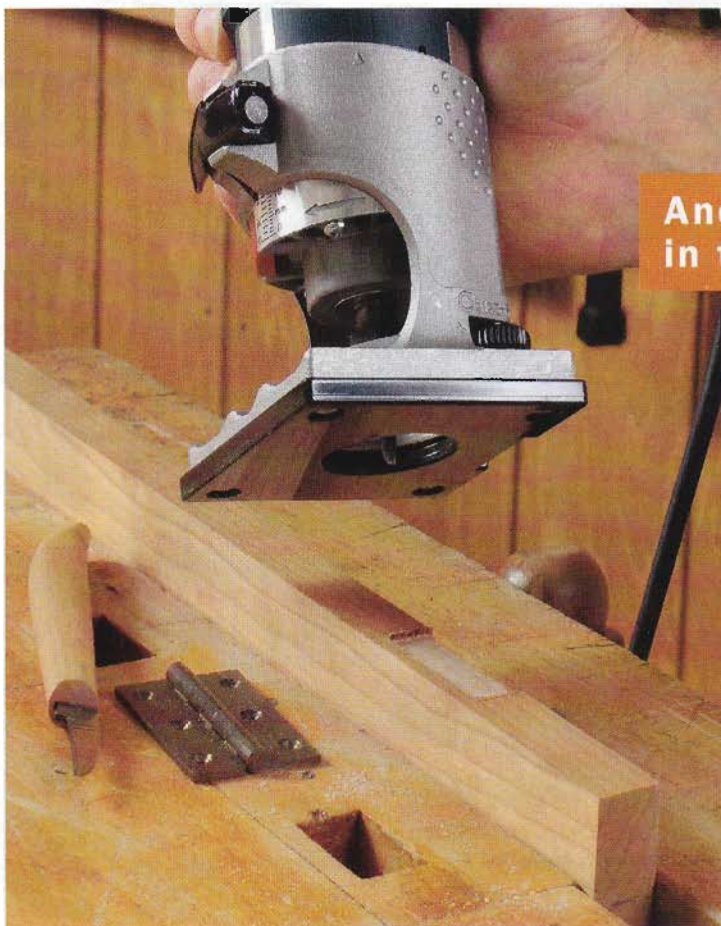
the plunge. This makes for an economical choice—you can find a good combination kit for around \$200, saving \$50 to \$100 or more compared with the purchase of two individual routers of a similar size and power.

To the combo kit, add a trim router. Although its limited horsepower confines it to lighter-duty tasks, it is much easier to control than a larger router. It is also limited to working with 1/4-in.-shank bits, but its lower torque and one-handed size are perfect for hinge mortising, inlay, and small edge profiles like chamfers and roundovers. It's great for any task that doesn't call for large bits, deep cuts, or lots of horsepower.

With this package of routers, you can tackle almost everything.

Stepping up

The combination kit is a great value, but it does force a few compromises. For one, switching one motor between table and topside is much less convenient than having two individual routers. Second, in most combination kits, the motor is limited to 2 hp or 2 1/4 hp. If you cut deep mortises with your router or work with large shaping or panel-raising bits, you should consider investing in more horsepower. A heavy-



And one in the hand

Hinge mortises and much more. The easily balanced trim router is perfect for this application, which requires delicate control and good visibility. You'll also love it for flush-trimming face frames, inlay work, and when you need to chamfer or round over all the edges on a project.

Stand-alone routers are a heavy-duty upgrade

A router combo kit will cover your table- and handheld routing needs, but not as well as two separate routers will. A router designed for table use makes above-the-table bit changes and height adjustments easier, and also collects dust efficiently. A dedicated plunge router offers better height and plunge adjustments. And both offer bigger motors for smoother cuts.



Large router designed for router tables



Trim router for detail work

Large plunge router for handheld routing



One job to do. A dedicated table router stays put, ready for action at a moment's notice.

One in the table



Easy adjustments.

This Triton router (TRC001) was a favorite in past reviews of table-mounted routers. It includes an automatic spindle lock that makes above-the-table bit changes a breeze.



Bigger bits.

In addition to more convenient features, a heavy-duty table router easily removes a lot of stock safely in one pass, as with this panel-raising bit.



One that can plunge

Serious power. These maple bed posts require a mortise $\frac{1}{2}$ in. wide and $1\frac{1}{4}$ in. deep. Tasks like this call for serious routing power, and extra heft helps too.

duty plunge router like those reviewed in *FWW* #214 ("Heavy-Duty Plunge Routers") will typically come with better features than the plunge base in a combo kit. You'll get height adjustment that is easier and more accurate, a smoother plunge mechanism, and a handle-mounted power switch. Also, the $\frac{3}{4}$ hp motor will provide smooth, effortless action on the heaviest cuts.

As another step up from the combination-kit approach, I'd recommend getting a router built to be installed in a table. Routers of this type—all of which come with a through-the-table lift—were reviewed in *FWW* #189 ("Routers for Router Tables"). This lets your router table become a dedicated shop tool with excellent controls, like a tablesaw, instead of something you have to fuss with for 15 minutes just so you can spend 30 seconds cutting an edge.

Again, add a trim router to this combination and you're set to tackle the full range of routing tasks. □

Jeff Miller (furnituremaking.com) builds furniture and teaches woodworking in Chicago.

Still not satisfied? There's always room for more

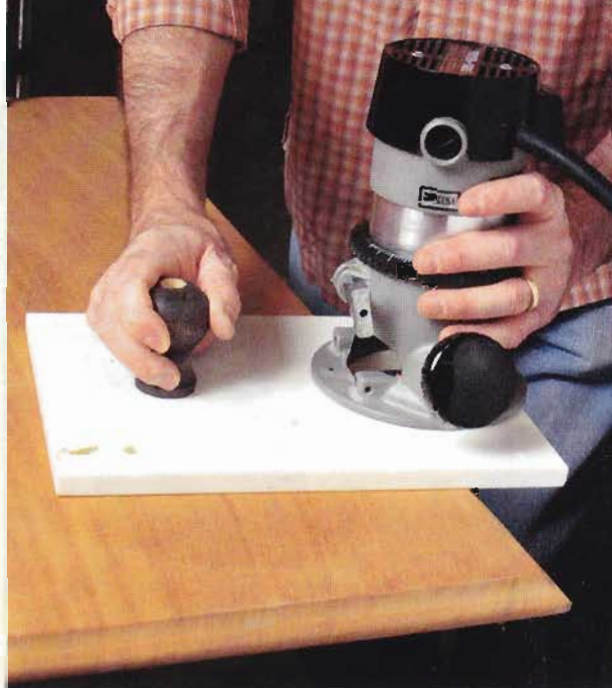
Even with three versatile routers in your shop, there are some situations when it can be nice to have another router or two dedicated to specific tasks. Many woodworkers, especially pros, settle into patterns of work, and do certain jobs over and over.

A fixed-base router makes a great fourth router because it's less expensive and very simple to operate. The assembly typically has a low center of gravity and handles easily. The motor also slides into the base in a way that makes depth adjustment simple.

In my case, I often cut edge profiles with larger bits. So I keep a fixed-base router set up with an extrawide base that has a handle to help prevent tipping. I don't use it for anything else.

Or suppose that you regularly cut dovetails with a jig or cut sliding dovetails with an edge guide. You might want to have a router set up with a straight bit to clear the waste and another one set up with the dovetail bit to cut the socket.

A router for every router bit? Now that's excessive.



Add a fixed-base router. An extra router can be dedicated to a single task. Miller keeps an offset base on one of his routers for better balance when molding edges.



If one is good, two are better. You will simplify tasks that require two bits, like sliding dovetails, by using a pair of routers. In this setup, with the router base riding a fence, the routers should be identical.

Make a Bargain-Basement

Smoothing a board with a handplane is one of the most pleasurable processes in a woodworking shop. I love the feel of a well-tuned plane gliding across the surface, with whisper-thin shavings rising from the tool's throat. And there is no faster way to create a glass-smooth, dead-flat surface for finishing.

A common misconception among many new woodworkers is that you need an expensive plane to get the job done. But you don't need to spend a fortune to catch the hand-tool wave.

Rejuvenating an old Stanley Bailey plane, whether it's a garage-sale find or an eBay purchase, is a great way to get started handplaning without breaking a slim woodworking budget. Tearing a plane down to its bare chassis and building it back to blueprint specs not only creates a great performing plane, but also gives you an insight into how these wonderful bench mates work.

I have rebuilt dozens of Bailey planes for friends and for myself, and I've given more than 100 seminars on the subject. With my step-by-step approach, you'll turn a chunker into a classic. Best of all, you don't need special tools to get the job done.

Why Baileys are a bargain

Stanley was making two styles of bench plane in the late 19th and early 20th centuries: the Bailey and the Bed-rock. The Bailey came first. It was considered a working-man's plane, so it was produced in significant numbers and had a lower price point. The more refined Bed-rock followed and because there were fewer made, the tool was more expensive than the Bailey. Today,

Even a pauper can own
a prince of a plane

BY ROLAND JOHNSON



Plane Perform Like Royalty

that price differential remains. While you'd be hard-pressed to get a Bedrock for under \$100, you can purchase a restorable Bailey plane for under \$40, including shipping. So with a small investment in labor, you end up with a great tool at a great price.

When a bargain becomes a bummer—A used handplane is a bargain only if it's serviceable. Inspect the plane for obvious flaws. Buying from an online source such as eBay is tricky because you have to rely on photos and the honesty of the seller. Some damaged or missing parts, such as knobs, totes, chipbreakers, and lever caps, can be replaced easily (see "Where to buy," below). A lot of the tools will have some rust, which often is easy to remove and repair. But if it's so bad that parts have seized up or are seriously pockmarked, you may want to pass on the tool.

Take a close look at the castings. If you see cracks in the plane body, especially on the sole in the area around the throat, walk away from the tool; it will be more useful as a paperweight. You also should be real cautious about buying a plane in which the body has obvious welds or repairs.

Small nicks around the throat are signs of normal aging and wear and are easy to file away. But avoid a tool that has nicks larger than, say, 1/8 in., because the plane body is probably toast.

Start with a cleaning

You can get that used Bailey performing like a star with just a few hours of work. Start

WHERE TO BUY REPLACEMENT PARTS

HIGHLANDWOODWORKING.COM

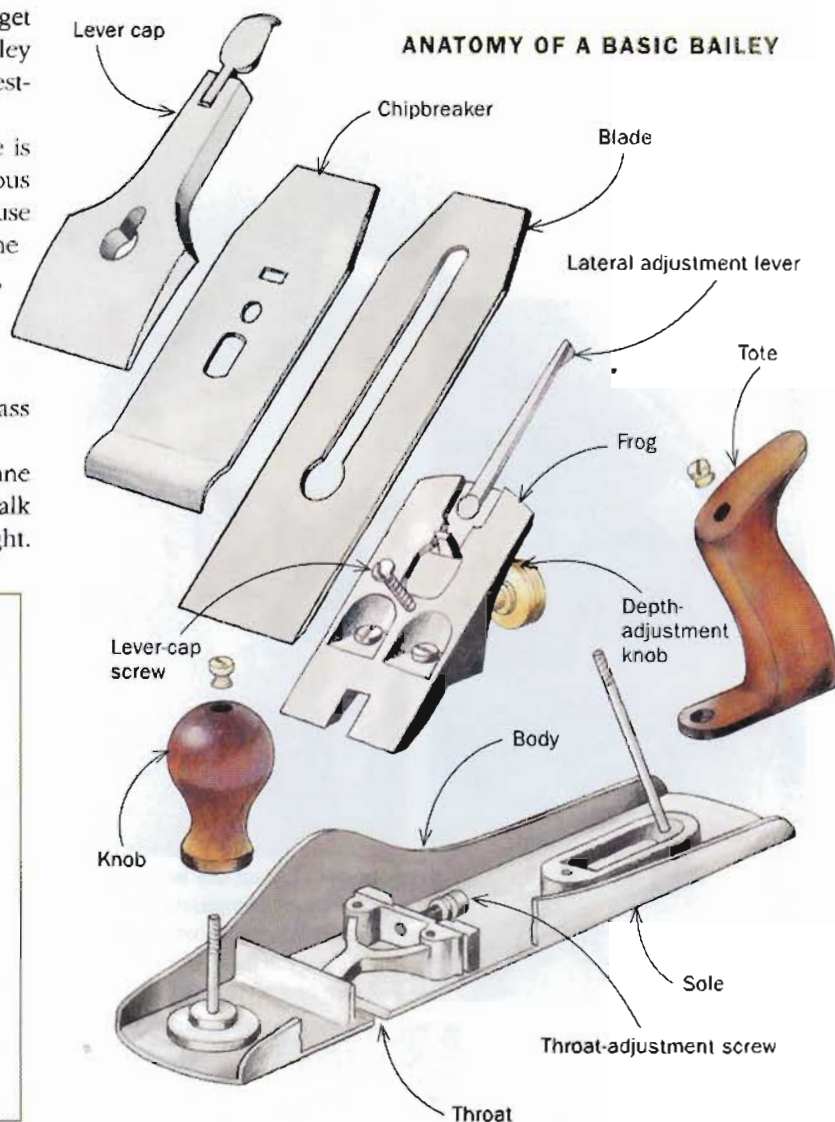
Blades, chipbreakers, knobs, and totes

ANTIQUE-USED-TOOLS.COM

A wide assortment of original and replacement Stanley parts

STJAMESBAYTOOLCO.COM/STANLEY.HTML

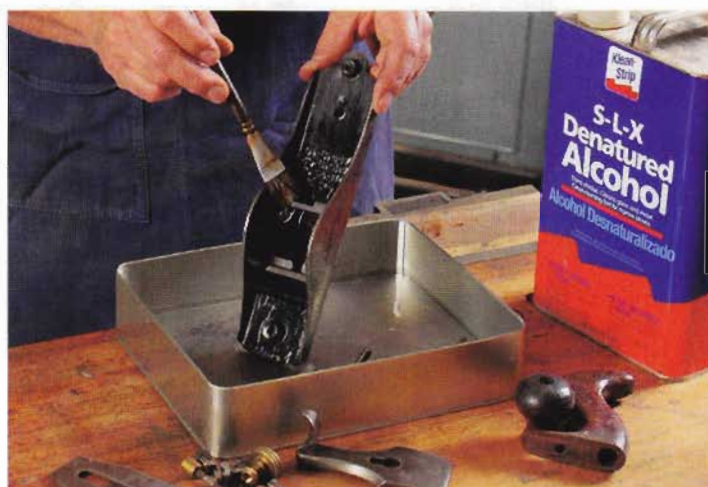
Reproduction Stanley plane parts



TAKE IT APART AND CLEAN IT UP



Naval Jelly sinks rust. Be sure to get it into crevices and even threaded areas. Let it sit for 10 to 15 minutes, then rinse off the parts in water.



Follow with an alcohol bath. Soak and scrub all the parts in denatured alcohol. Dry and then lubricate threaded parts with camellia oil.



by dismantling the plane. If the plane is rusty, slather on some naval jelly (Amazon.com), a rust-removal product. Then give all the parts a thorough washing and scrubbing in denatured alcohol. Let them dry, and then coat them with a light oil such as camellia oil.

You can refinish the knob and tote, if they are in a bad way. I use shellac, simply because it is easy to repair or refresh and wears well.

Solid frog makes a solid plane

The frog of a bench plane supports the blade assembly in the plane body. The frog in a Bailey-style plane rests on four points.

If there is any inaccuracy in the machining of the frog or the plane body, the frog, and in turn the blade assembly, will not be fully supported and could move slightly under cutting pressure, which will cause blade chatter.

To seat the frog precisely and firmly to the bed of the plane, first coat the mating surfaces of the frog

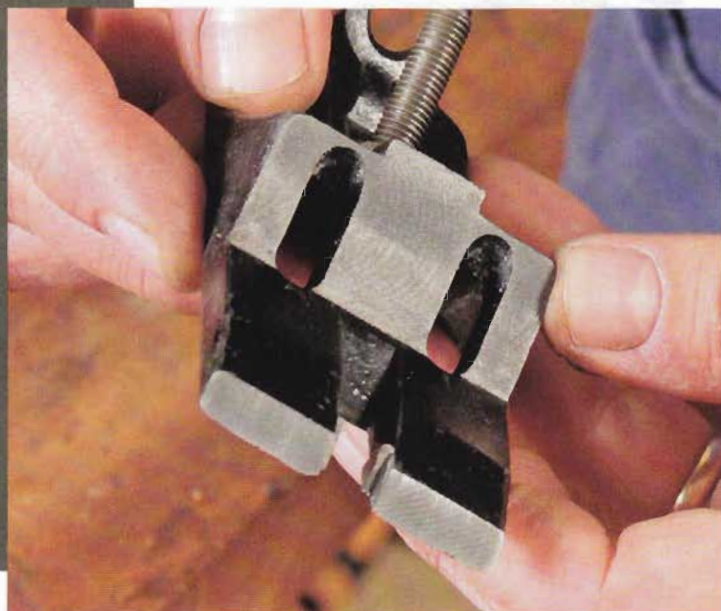
TUNE UP THE FROG

SEAT IT

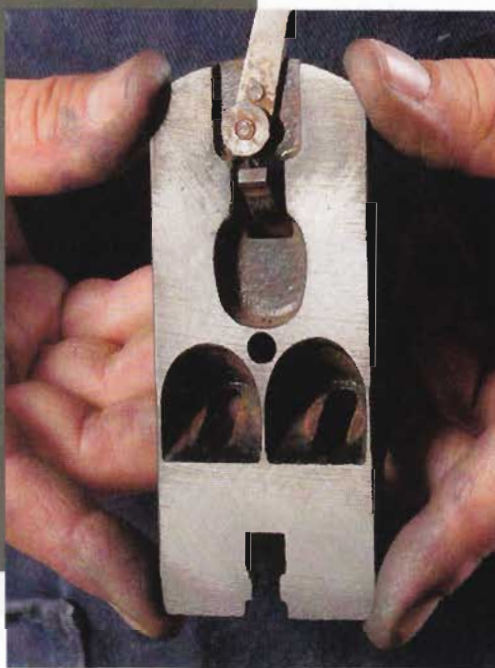


Seat the frog on the body. Apply valve-grinding compound to the four mating surfaces where the frog meets the body (left). Rub the frog fore and aft (above).

FLATTEN THE TOP



Grind until it shines. Check your progress as you go. You're finished lapping when an even rub pattern shows on all the contact points.



A flat frog is a good frog. Flatten the area from the lever-cap screw to the bottom. Johnson starts with 120-grit paper glued to a granite plate with spray adhesive. He works through to 220 grit until all the high spots are removed.

and the plane body with valve-grinding compound (Permatex 80037, available at most automotive-supply stores). Then simply rub the frog fore and aft in the plane body, keeping even, moderate pressure on the frog, until all four points mate evenly and firmly. Clean off the grinding compound using denatured alcohol and a small, stiff brush.

The frog also must be flat across the top. The best approach to flattening it is to rub it on sandpaper adhered to a dead-flat surface, such as a granite block, a piece of plate glass, or a cast-iron tabletop. Begin with 120-grit paper and work through to 220 grit. If needed, you can start with a more aggressive sandpaper and work up through the grits.

Use compressed air to blow out any filings or grit from any threaded holes (do this after you flatten or bed any parts to prevent debris from ruining threads as you reinstall the screws). Coat the fresh surfaces and threaded parts with camellia oil and wipe off the excess. Now you can reinstall the frog on the plane body.

Flatten and sharpen the blade

In my experience, the blades on these planes are good quality steel. Most often you just need to clean them up and sharpen them. But if the blade is really beat up, particularly if it has lots of deep rust pockmarks, forget the salvage job and buy a replacement. Note that a replacement blade may not fit correctly in a Bailey plane, so check with the blade manufacturer for tips on fitting their blade to your plane.

Flatten both sides of the blade and then sharpen it. When flattening the back, or heel side of the blade, you don't need a polished finish. I usually start with 120-grit paper and work up to 320 grit. Concentrate on the area from the keyhole to the bevel. The front, or toe side, of the blade should be polished to as fine a surface as the bevel.

Fine-tune the chipbreaker

The chipbreaker does just what its name implies—it breaks chips. Positioned directly behind the cutting edge, the front of the chipbreaker forces the shavings to break or curl up and away from the throat, preventing them from clogging it. The constant breaking/curling action also works to prevent tearout.

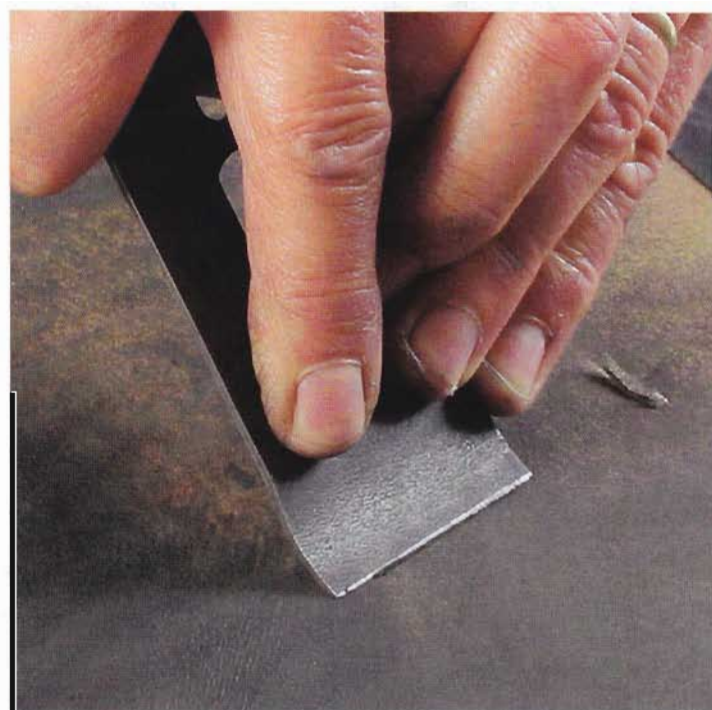
For it to work properly, the chipbreaker must be tuned to meet the back of the blade perfectly. The goal is a knife edge so that the chipbreaker body exerts maximum spring pressure along the entire width of the blade when the chipbreaker and blade are secured together.

Start tuning by sanding the bottom of the front edge flat. I use 220-grit sandpaper on a granite stone. If the bottom is in bad

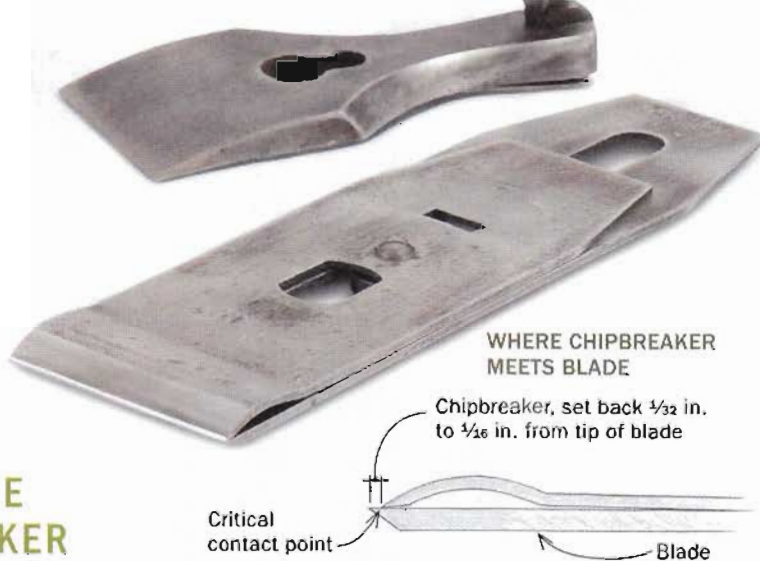
POLISH THE CHIPBREAKER



Mind the gap. Any gaps between the chipbreaker and blade (left) will catch and jam chips. Holding the chipbreaker so that its end is below the tip, rub the bottom of the front edge on 220-grit sandpaper adhered to a flat surface (above). The goal is a knife edge that meets the back of the blade all the way across (right).



Smooth the curve. Polishing the top front of the chipbreaker helps chips slide by smoothly.





shape, you may have to start with coarser paper. To check your progress, put the blade and chipbreaker together and hold the assembly in front of a white sheet of paper or light background. Look for any gaps between the blade and chipbreaker; keep working until they are gone.

Once you're finished working the bottom, polish the top front of the chipbreaker, which will help the curls of wood glide over the curved surface.

FLATTEN THE SOLE

Reassemble and lube. Assemble the plane before you flatten the sole.

Be sure to lubricate threaded parts and the lever cap as you go.



Tweak the lever-cap screw

Make sure the bottom surface of the head on the lever-cap screw is smooth. Often a pair of pliers has been used on the screw sometime during its life, creating a rough edge. Remove any small burrs; otherwise, the lever cap won't slide easily past the screw nor will the head hold the lever cap accurately. After smoothing out the burrs, lubricate the parts with camellia oil.

Tension the plane before truing the sole

The final steps are to flatten and fix up the sole of the plane. At this point the plane should be completely assembled, be sure the blade is backed off inside the body. Cast iron is slightly flexible and can move a bit from pressure exerted on it, so having the plane assembled and "tensioned" will ensure accuracy during this step.

Get the sole flat by running the plane over sandpaper glued to a flat substrate. If the bottom is scarred and badly out of flat, start with 80 grit. Otherwise, begin with 120 grit, then move up through the grits to 400.

Once you have the sole flat, ease all of the edges with a mill bastard file.

Rough throat? Smooth it with a file

The throat area must be flat with a crisp, straight edge to help hold down the grain of the board in front of the blade while making a pass. If the plane has small nicks or a wear curve at the front edge of the throat, the blade could lever up the grain, causing **tearout**.

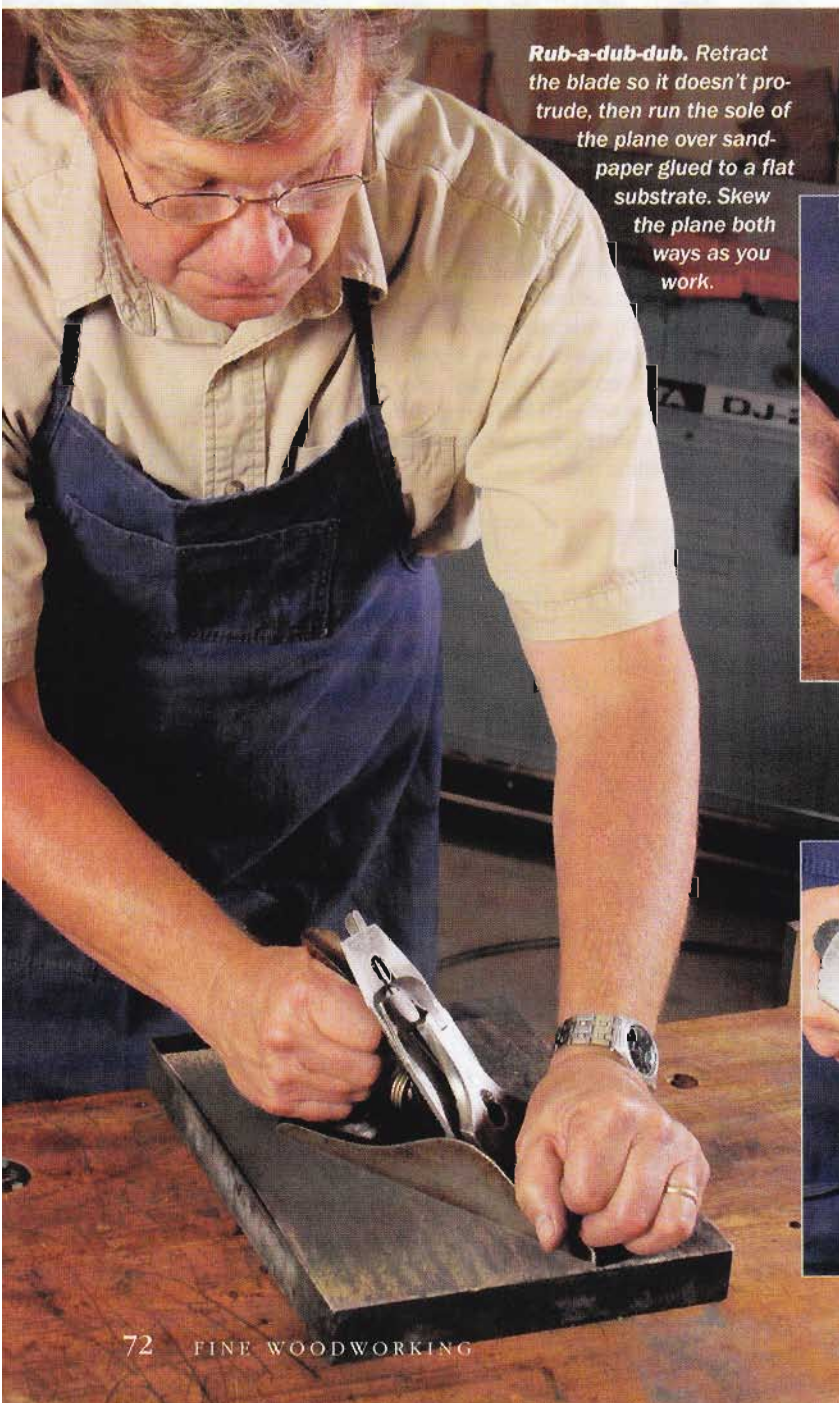
Use a mill bastard file to dress the edge flat, carefully holding the file perpendicular to the bottom of the plane body (sole).

Once that's done, add a light coat of camellia oil on the sole, which will keep the new surface slick and free of rust.

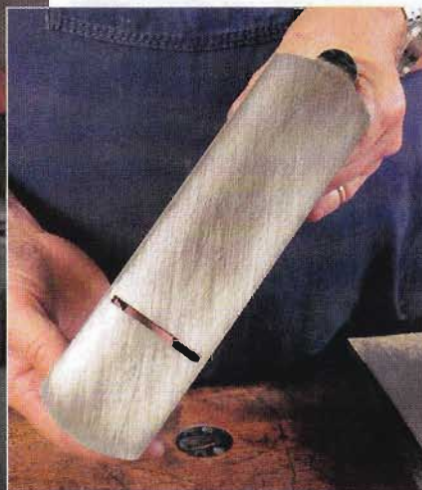
Some tips on setup

After you've finished rehabbing the plane, hone the blade

Rub-a-dub-dub. Retract the blade so it doesn't protrude, then run the sole of the plane over sandpaper glued to a flat substrate. Skew the plane both ways as you work.



Progress is easy to see. Work the sole until all high spots (above) are removed. When you're finished (below), lubricate it with a light oil, such as camellia oil.



REFINE THE ROUGH SPOTS



Soften the edges. After flattening the sole, ease the corners with a mill bastard file.



Remedy for a rough throat. If the throat has small nicks, dress the edges carefully with a mill bastard file. Be sure to hold the file perpendicular to the sole.

READY FOR TAKEOFF

Dial in the throat opening. When reassembling the plane, adjust the frog to create a tight opening between the blade and the front of the throat. For most work, $\frac{3}{32}$ in. is plenty.



to perfection. When reassembling the blade and the chipbreaker, set the chipbreaker about $\frac{1}{16}$ in. or less from the tip of the blade.

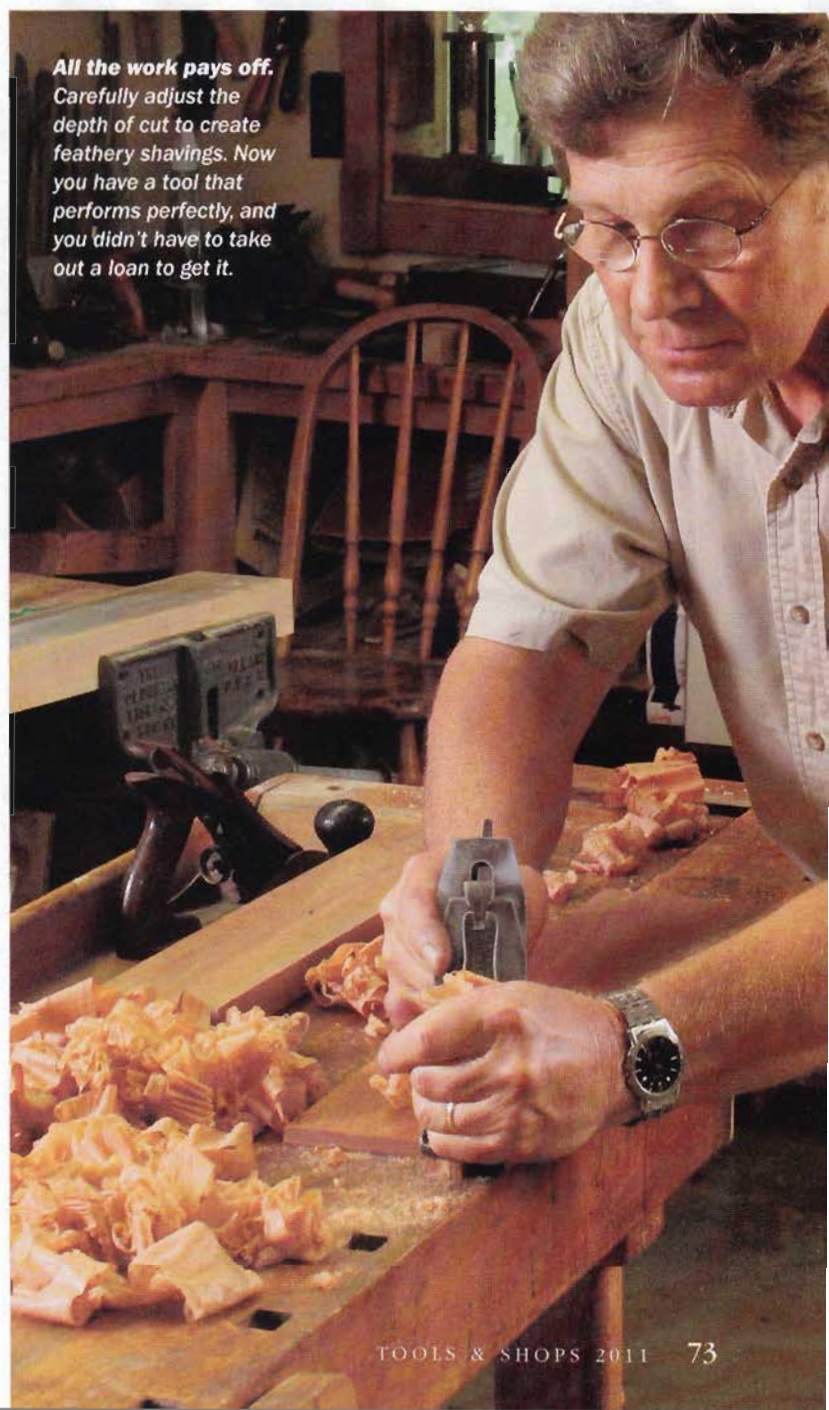
Now adjust the throat opening. First, just break the screws loose so that the frog can move. Place the blade assembly on the frog, and add the lever cap with the lever in the down position. Tighten the lever-cap screw until it just touches the lever cap, and then give it about a quarter turn more. The lever should be easy to open and close but will still offer sufficient pressure to keep the blade assembly in place.

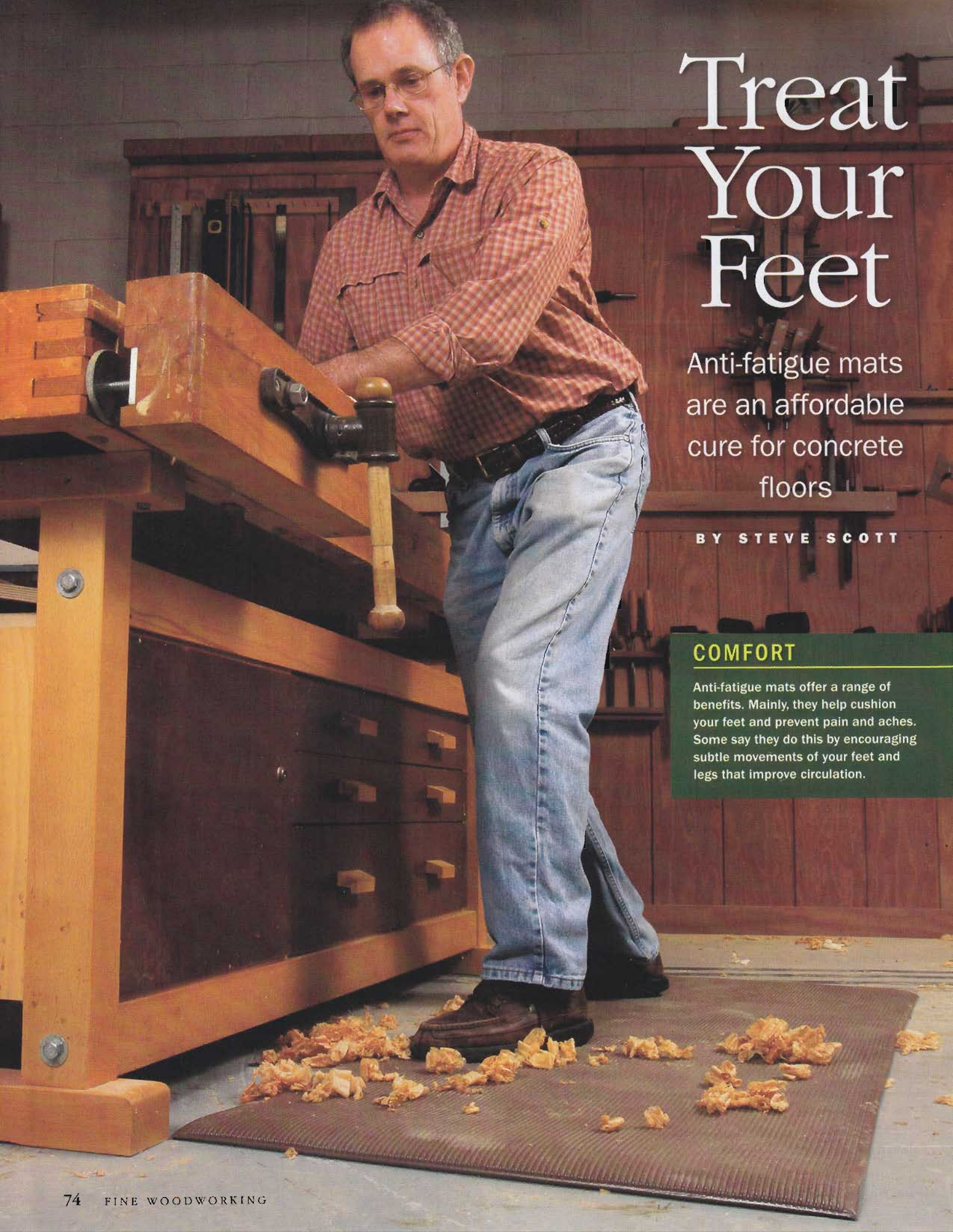
Now turn the frog-adjustment screw, which is located behind the frog, to move it forward or backward. For most work, a throat opening of about $\frac{3}{32}$ in. between the tip of the blade and the front of the throat will be sufficient. A narrower opening will help you tackle more difficult woods. When the desired opening is reached, remove the lever cap and blade assembly and tighten the frog-holding screws just enough to hold the frog securely in place.

Now, with a carefully restored plane and a razor-sharp blade, you're ready to tackle any wood like a pro. And you'll have a reliable tool for life. (For more tips on setting up and using a smoothing plane, see Fundamentals: "Handplaning 101," *FWW* #204.) □

Roland Johnson is a contributing editor.

All the work pays off. Carefully adjust the depth of cut to create feathery shavings. Now you have a tool that performs perfectly, and you didn't have to take out a loan to get it.



A man with glasses, wearing a red and white checkered shirt and blue jeans, stands in a workshop. He is leaning over a large wooden workbench, which has a vise and a hammer on it. He is standing on a brown, textured anti-fatigue mat. The floor is covered with wood shavings. The background shows a wooden wall with various tools hanging on it.

Treat Your Feet

Anti-fatigue mats are an affordable cure for concrete floors

BY STEVE SCOTT

COMFORT

Anti-fatigue mats offer a range of benefits. Mainly, they help cushion your feet and prevent pain and aches. Some say they do this by encouraging subtle movements of your feet and legs that improve circulation.

Any woodworker who spends long afternoons on a concrete floor in the basement or garage knows there is a physical price to pay for enjoying one's hobby. Research confirms that standing on a hard floor for hours at a time will leave you with achy feet, legs, and back. Concrete is a punishing surface.

The solution is to put something more forgiving between your feet and the concrete. In *FWW* #174, we looked at a variety of shop flooring options including interlocking tiles of PVC or wood composite. And in this issue, art director Michael Pekovich shows how to install a shop floor of 3/4-in. plywood over 2x4 sleepers.

But what if you don't want or can't afford a whole new shop floor? The common answer for most people is anti-fatigue mats, those rubbery slabs that go underfoot where you spend the most time standing. With a little digging, I uncovered a wide range of choices. But before whipping out

the Taunton Press credit card, I did a bit of research to see what the experts say.

They really do work

There are no standards—industry, government, or otherwise—for what constitutes an “anti-fatigue” floor mat. In general, they are made of rubber or closed-cell foam and they range from 3/8 in. to 1 in. thick. But studies show that these mats do prevent pain in the feet and legs. One recent study at the University of Pittsburgh concluded that anti-fatigue mats made a significant difference, and especially so when the test subjects stood for more than two hours.

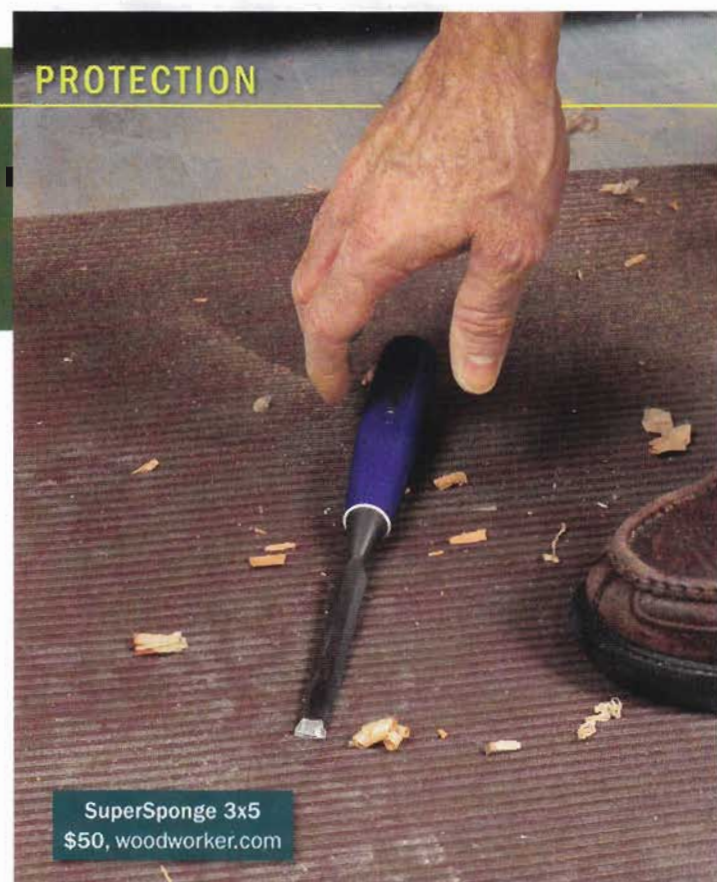
Exactly how they work is a bit of a mystery, however. Apart from providing a simple cushion between foot and floor, one theory holds that the mat's resilience encourages subtle movements of the feet and legs that help promote circulation. This keeps the blood from settling uncomfortably in your lower limbs.

In any case, anti-fatigue mats have become a staple of workplace design, said Tom Waters, a senior safety engineer at the National Institute of Occupational Safety and Health. The mats are recommended for grocery checkers, assembly-line workers, kitchen staff, operating-room nurses—just about anyone who spends most of the workday standing in one place.

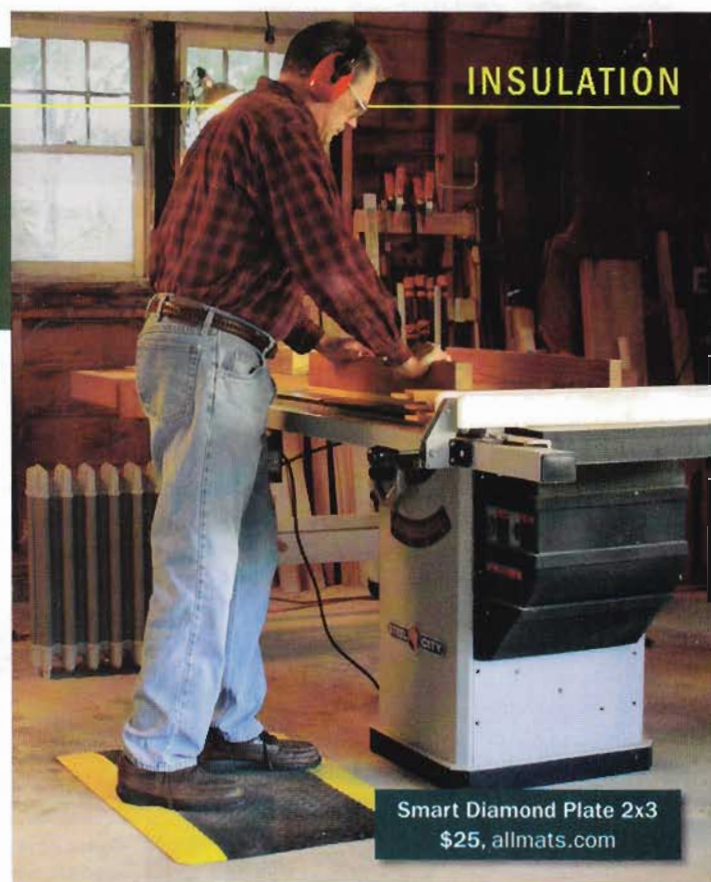
Woodworkers swear by them, too. Marc Adams spent nearly \$4,000 to put mats on the concrete floor at each of his school's 65 student benches. He credits the mats—made of 1/2-in.-thick foam—with making a full day at the bench much less taxing.

Deneb Puchalski considers a mat essential for the hand-tool demonstrations he does for Lie-Nielsen Toolworks. The demos typically take place in convention spaces with concrete floors. Before he began using the mats, he says, “my feet and legs would be a mess.”

Steve Scott is an associate editor.



Soft landing. A mat's cushioning helps prevent serious damage to chisel edges, squares, and other tools.



Cold floor, warm feet. A mat is a barrier between your feet and a chilly concrete slab.

What to look for

Once I found out that mats really work, the next step was to find out whether some work better than others. They do. The good news is that a ½-in. foam mat will probably work just fine for you. Here's what to look for.

MATERIAL

RUBBER

Solid rubber mats are extremely durable, but most don't provide as soft a cushion as foam.

Modular Diamond Plate 3x3
\$44, allmats.com

Mats are most often made either from solid rubber or from closed-cell foam. For the home shop, foam is best. Solid rubber offers terrific durability, but is quite firm underfoot and heavier than foam. These attributes are great for constant use in an industrial setting, but less crucial in a garage or basement. A foam mat provides a better balance of support and cushioning for less-intensive use.

FOAM

A good foam mat has a little more "give" than solid rubber, but enough resilience to prevent pain and fatigue.

Comfort King Supreme 3x4
\$63, woodcraft.com

THICKNESS

Mark Redfern, an ergonomics researcher who authored the Pittsburgh study, suggests looking for a foam mat that's ½ in. thick or so and relatively firm. A mat that's too thin or soft will bottom out, compressing so much that your foot is basically resting on concrete again. A mat that's too thick and soft, he suggests, can make for unsteady footing. Regardless of thickness, experts agree it's worth looking for a mat with gently beveled edges, which are less likely to catch a toe and send you sprawling.

COVERING

The sponge at the heart of most foam mats wouldn't stand up long to abrasion caused by shoes, dust, sharp chips, and tool edges. For this reason, the sponge is typically bonded to an outer skin of textured vinyl. Marc Adams reports that the vinyl-covered mats in his school have stood up to more than four years of heavy use with no serious damage. Still, for greater protection, some manufacturers offer mats with an armor-like layer of rubber or semi-rigid plastic. These are pricier but easier to sweep off.

SOFT SHELL

A soft vinyl cover keeps the foam free of dust and safe from abrasion by shoe treads. It should be fine for most shops.

Anti-fatigue mat 2x4
\$27, rockler.com

HARD SHELL

A layer of rubber or flexible plastic about ⅛ in. thick gives the foam better protection against sharp edges and abrasion.

Invigorator 2x3
\$39, matsmatmats.com

Foam at heart. The rubber covering is durable and creates a nicely beveled edge.

TOO THIN

Not enough cushion. At ¼ in. thick, this yoga mat doesn't put enough foam between you and the concrete.

TOO THICK

Overkill. An extra-beefy mat like this 1-in.-thick model isn't dramatically more comfortable than a ½-in. or ¾-in. mat. But it will make your footing less stable.

What size and where to put them

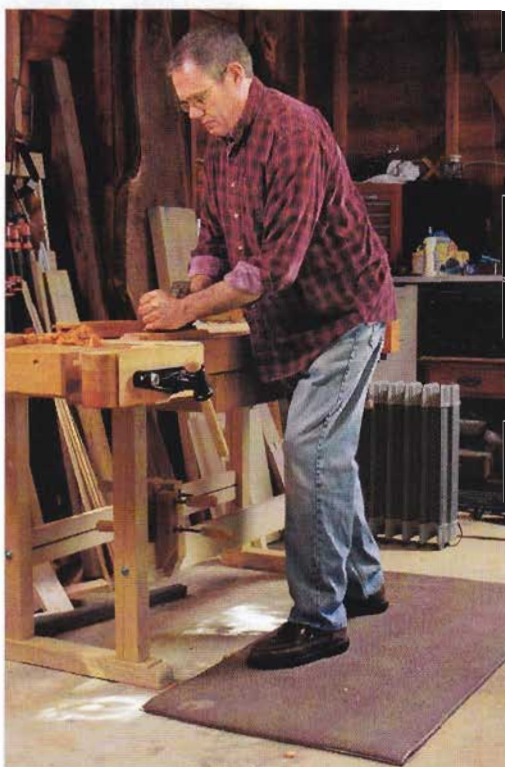
The cost-conscious among us may be drawn to a small mat, and this is fine. A well-made 2x3 mat—the smallest commonly available—will cushion your feet just as effectively as a larger one. But a larger mat offers much more maneuvering room. A 2x3 mat might be perfect at the drill press, but it's not the most adequate runway for the back-and-forth travel you'll do at your bench.

If you had enough money, you could put one of these mats at every workstation in the shop. But let's assume you're working on a budget and will be doing this one piece at a time. Consider the type of work you do and where you spend the most time in the shop. Here are our suggestions, in order of priority:

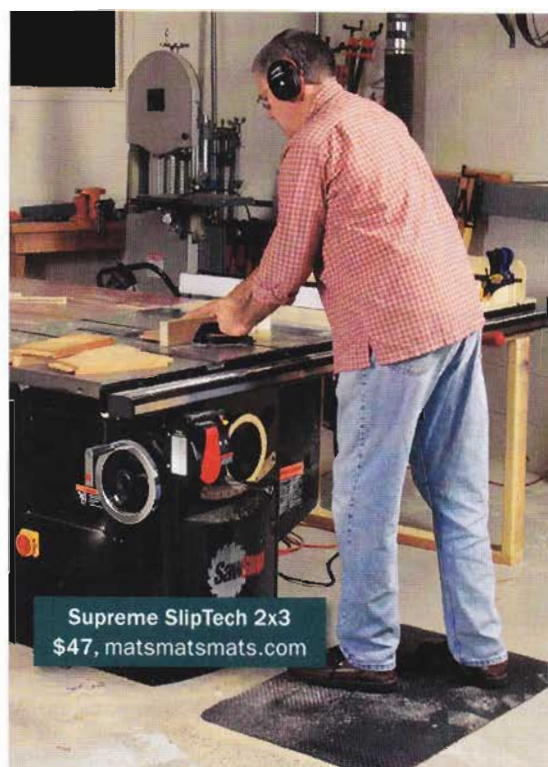
The bench—This is a natural starting place. Any work you'll do at the bench is typically slow-paced (fitting joinery, surfacing by hand, etc.) and requires a lot of time and attention. Because you'll move back and forth from front vise to end vise, a 2x5 or larger mat is a good size.

The tablesaw—The saw's versatility for both milling and joinery means it's in use nearly every time I visit the shop. But it's the joinery cuts—small scale and repetitive—that will have you standing at the saw for a long time. For those, a 2x3 mat fits the bill.

Other tools—Share a smaller mat, or place individual mats at the bandsaw, router table, chopsaw, and drill press.

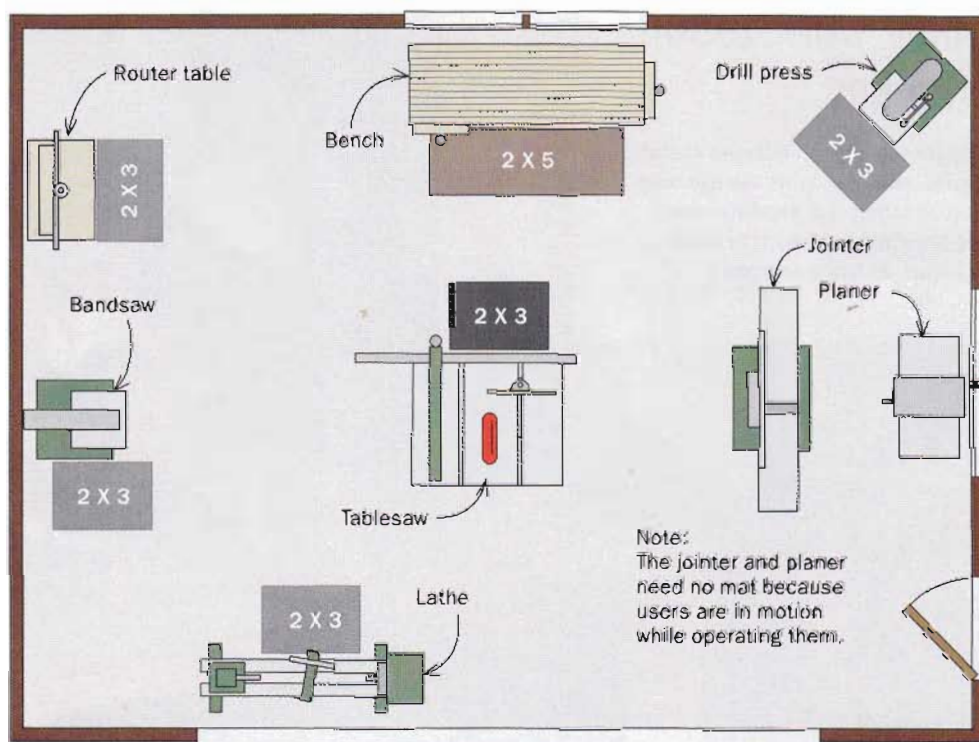


One for the bench. A long mat like this one from Woodworker's Supply (see p. 75 for source information) offers support for tasks like planing long stock that require the full length of the bench.



Supreme SlipTech 2x3
\$47, matsmatsmats.com

And one for the tablesaw. This 2x3 mat offers plenty of standing surface for stationary tasks like cutting joinery or trimming parts to final size.



PLACING MATS AROUND THE SHOP

A mat comes in handy anyplace in the shop where you stand still for extended periods of time while working. The top priorities are the bench and tablesaw, but you should also consider putting mats at the bandsaw, drill press, and certainly the lathe. They are less crucial at the jointer or planer, where you walk back and forth during use.

Think your shop is small? Think again

BY STELIOS L.A. STAVRINIDES

At the very least, starting a woodworking shop requires two things: good woodworking tools and adequate space. Where I live, on the Mediterranean island of Cyprus, both are in short supply.

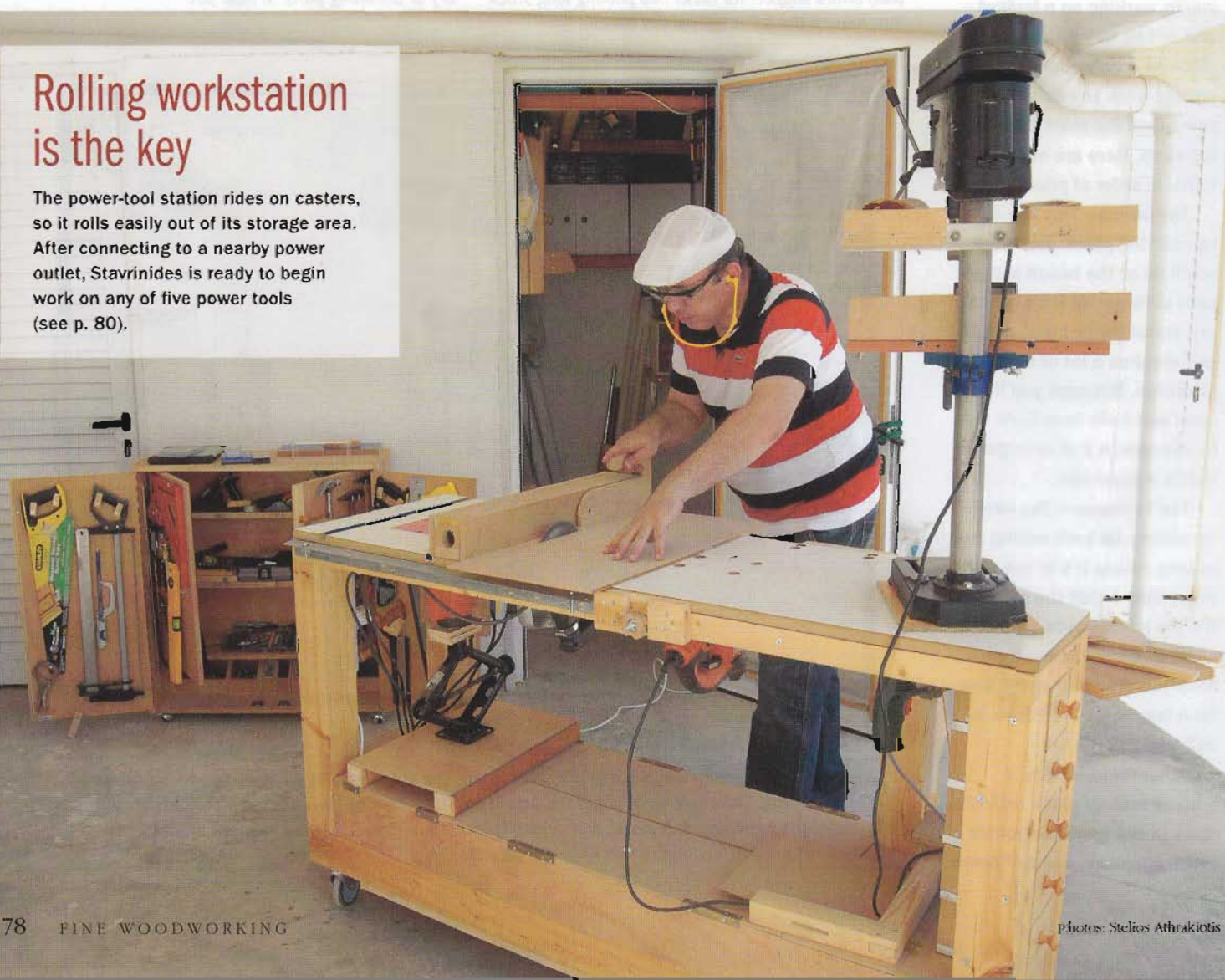
But I love woodworking, and I didn't want to let these problems stand in my way. So, using SketchUp, I designed a fully functioning shop that would fit into a 5-ft. by 5-ft. storage room when not in use.

To make it work, I converted the portable power tools I already had into stationary machines, mounting them on a compact,



Rolling workstation is the key

The power-tool station rides on casters, so it rolls easily out of its storage area. After connecting to a nearby power outlet, Stavrindes is ready to begin work on any of five power tools (see p. 80).



HOW TO FIT A WHOLE HOBBY INTO A 5X5 CLOSET

Stavrínides packs all of his woodworking tools and supplies into this storage room in the parking area of his apartment building. The room measures approximately 5 ft. square and 8 ft. high—a little more than twice the volume inside Volkswagen's modern Beetle.

CABINETS

An old, narrow bookcase mounted horizontally and fitted with doors holds fasteners, glue, finishing supplies, and safety gear. The larger, wall-mounted cabinet is stocked with router bits, featherboards, hold-down clamps, and miscellaneous gear.

THREE-DRAWER CHEST

The top drawer is for sketches, computer printouts, and woodworking plans. The middle drawer holds tool manuals and small accessories that come with the tools. The bottom drawer provides storage for sandpaper of all types—sheets, circular pads, and rolls.

ROLLING WORKSTATION

One end of the cart is angled to allow access into the space.

CLAMP STORAGE

A section of upper shelf serves as a rack for C-clamps and small pistol-grip clamps. Larger pipe clamps and parallel clamps are stored flat on the shelf itself. In all, the space holds about 65 clamps of varying types.

SHELVES

Three levels wrap around three walls to provide storage space for lumber, hardware, supplies, a first-aid kit, and other tools including power drills, a biscuit joiner, and a mortising attachment for the drill press.

LUMBER STORAGE

A narrow box with an angled, open top holds cutoffs of varying lengths and tucks under the lower shelf.

rolling bench. This bench houses five major tools: tablesaw, router table, jigsaw, drill press, and disk sander. And it leaves plenty of space in my store room for lumber and other tools.

Of course, the shop has limits. I don't have a jointer or a planer, so I have to start with stock that is already jointed flat and milled to thickness. Also, the tools must be rolled out into the covered parking area of my apartment complex for use. It's not good for cold weather, but fortunately, we have very little of that here.

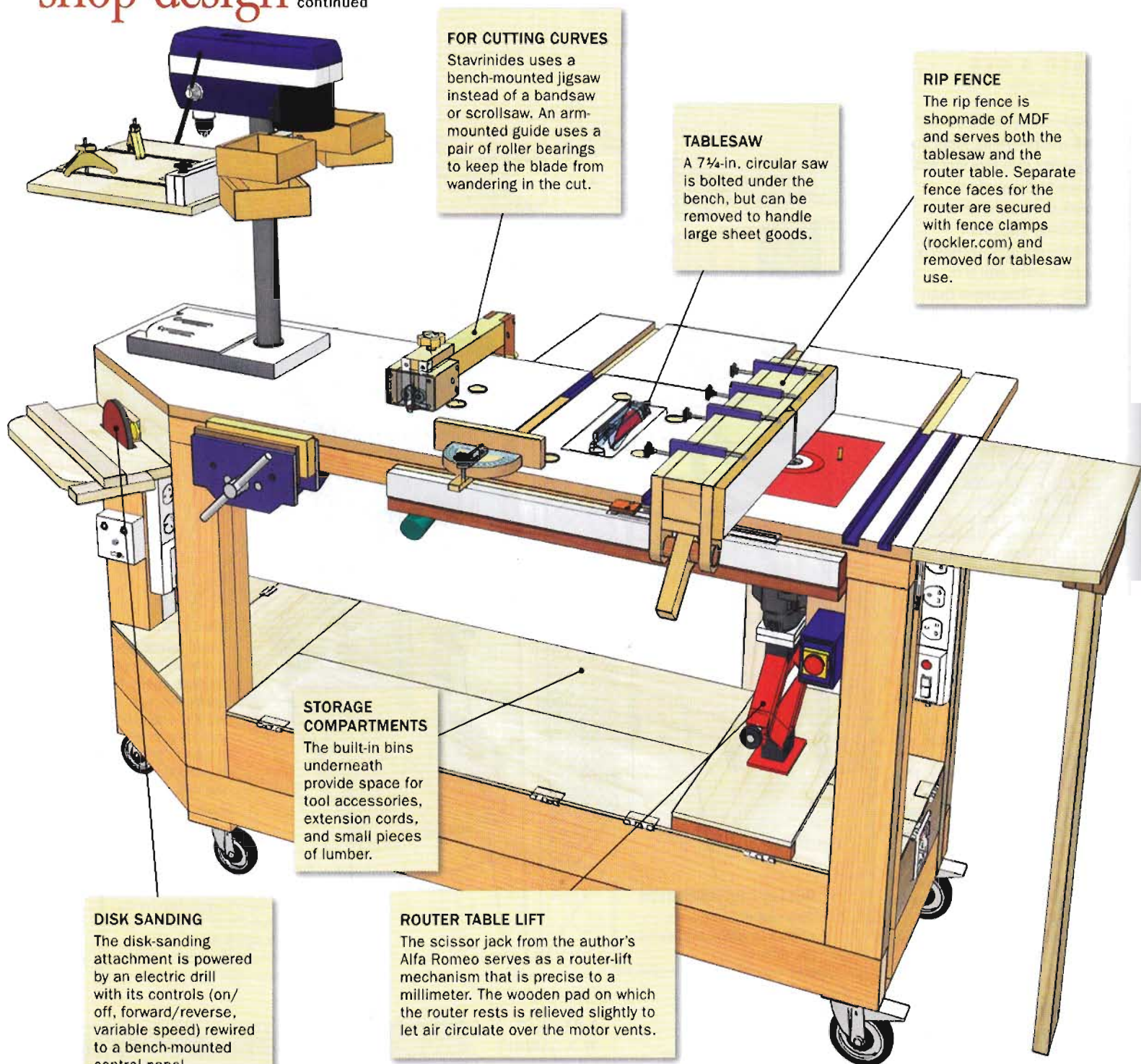
Apart from those drawbacks, my little shop can do a lot of woodworking. Here's a look at how it works.

Stelios L.A. Stavrínides is a graphic Web designer and woodworker in Nicosia, Cyprus.

A CABINET IN A CABINET

Interior doors provide space to hang more tools inside this rolling storage piece, which measures 32 in. square by 13 in. deep. To get the most out of the space, Stavrínides planned the tool layout on paper first.





FOR CUTTING CURVES

Stavrindes uses a bench-mounted jigsaw instead of a bandsaw or scrollsaw. An arm-mounted guide uses a pair of roller bearings to keep the blade from wandering in the cut.

TABLESAW

A 7¼-in. circular saw is bolted under the bench, but can be removed to handle large sheet goods.

RIP FENCE

The rip fence is shopmade of MDF and serves both the tablesaw and the router table. Separate fence faces for the router are secured with fence clamps (rockler.com) and removed for tablesaw use.

STORAGE COMPARTMENTS

The built-in bins underneath provide space for tool accessories, extension cords, and small pieces of lumber.

DISK SANDING

The disk-sanding attachment is powered by an electric drill with its controls (on/off, forward/reverse, variable speed) rewired to a bench-mounted control panel.

ROUTER TABLE LIFT

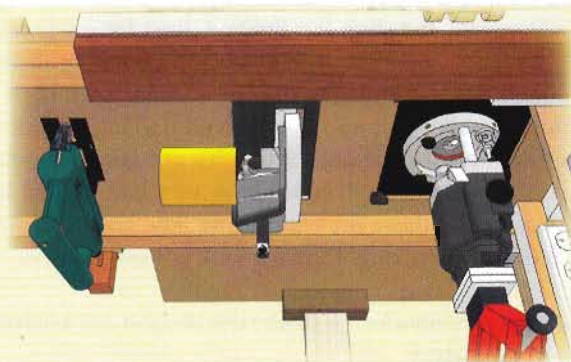
The scissor jack from the author's Alfa Romeo serves as a router-lift mechanism that is precise to a millimeter. The wooden pad on which the router rests is relieved slightly to let air circulate over the motor vents.

ROLLING WORKSTATION: THE BIG IDEA INSIDE THE SMALL SHOP

Stavrindes designed this power-tool bench on wheels to serve multiple functions and fit inside his storage space. The bench, 20 in. wide by 59 in. long, is built on a frame of 2x4 and 2x2 lumber, with a plywood skin and a ¾-in. MDF top surfaced with plastic laminate for durability. In addition to the power tools, the bench also features a vise, five small drawers for accessories, and eight electrical sockets.

WHAT'S UNDER THE HOOD?

A table-mounted array of portable power tools serve as standard shop machines. Shown here are the jigsaw, circular saw, and router.

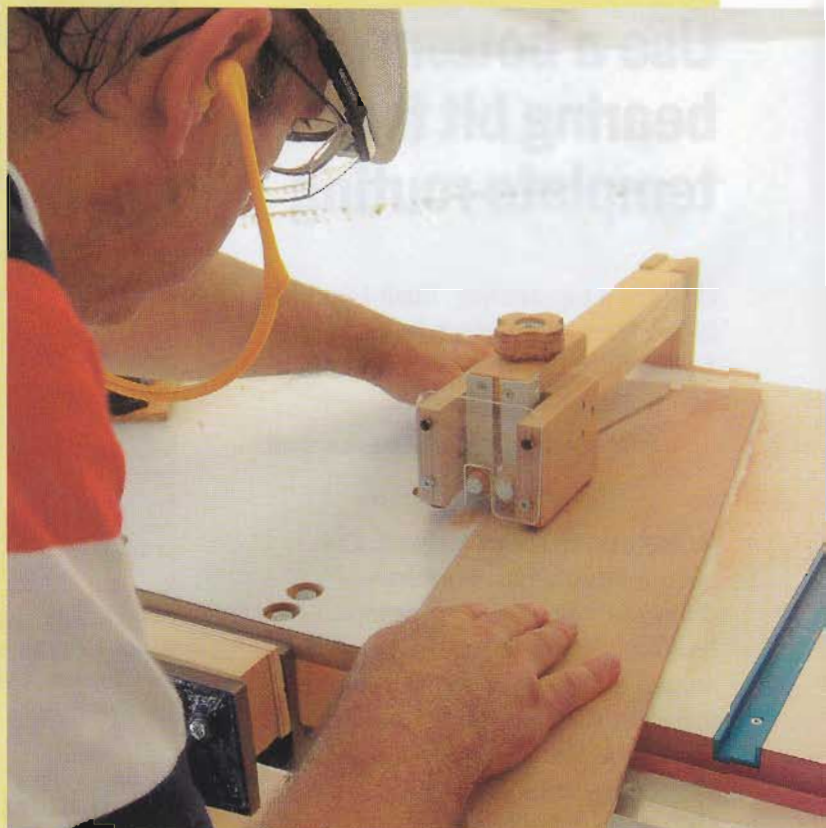


The power-tool bench at work

For this article, Stavrinides used the tablesaw, jigsaw, and sanding station in his rolling bench to create a router template for a decorative drawer front. He then used the template to shape the workpiece on the router table.



The circular saw yields straight, clean cuts. Note that the rip fence doubles as a router-table fence and includes dust collection.



For curves, the inverted jigsaw. Stavrinides recommends investing in high-quality blades. His shopmade guide assembly keeps the blade straight and vertical during the cut.



Fair the curve at the sanding station. A flip-up table supports the work. The sanding attachment uses hook-and-loop pads and is powered by a variable-speed electric drill.



Shape the workpiece at the router table. The author's version doesn't have through-the-table height adjustment, relying on automotive technology instead (see drawing, facing page).

Use a bottom-bearing bit for template routing

Q: I use a top-bearing, flush-trimming bit for template routing, but it keeps digging into the workpiece. What can I do to prevent this?

—RON EDWARDS, Santa Monica, Calif.

A: HERE'S THE SHORT ANSWER: Use bottom-bearing bits. They have a distinct advantage over their top-bearing cousins. As the router moves around the template and workpiece, there is a chance that the router will tip outward as you shift your grip, because the power cord snags, or because it's just not your day in the shop. If that happens when you're using a top-bearing bit, the cutting edge is forced into your workpiece, taking a divot from its edge and ruining it. If the same thing happens with a bottom-bearing bit, there is no harm because the cutting edge moves away from the workpiece.

Another good tip for template work or edge-profiling is to use a D-handle router base or a wider baseplate that lets you concentrate more pressure on the side of the router that is supported.

—John White is a former shop manager at Fine Woodworking.

Ask a question

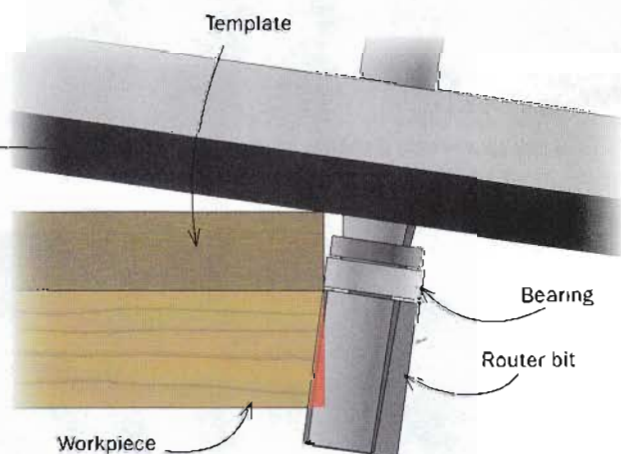
Do you have a question you'd like us to consider for the column? Send it to Q&A, *Fine Woodworking*, 63 S. Main St., Newtown, CT 06470, or email fwqa@taunton.com.



Routers can be unstable when template routing. Because its cutters are pulled away from the workpiece if the router tilts downward, a bottom-bearing bit lessens the chance of damage (see below).

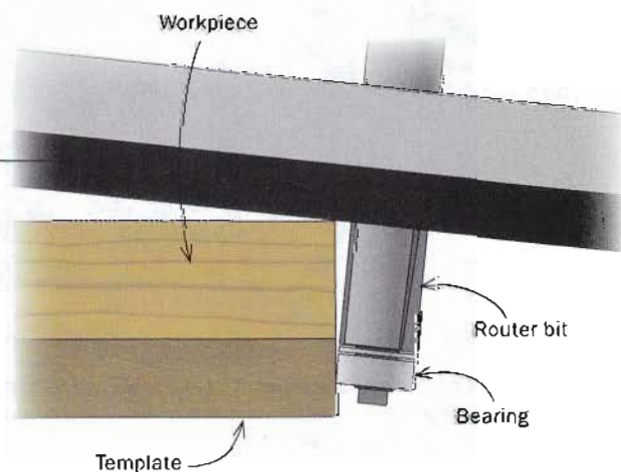
TOP-BEARING BITS CAN DAMAGE WORKPIECE

When the router tips over the edge of the template, the bit is driven into the workpiece, ruining it.



BOTTOM-BEARING BITS TIP AWAY FROM TROUBLE

Because the cutters are above the bearing, they move away from the workpiece when the router tips over the edge. The workpiece isn't damaged.



Smoothing plane is first choice for gnarly grain

Q: I have some figured hardwood that I'm having trouble planing with my No. 4 smoother. Would I be better off using a scraper plane?

—ALLEN WINSTON,
Kennewick, Wash.

A: A SMOOTHING PLANE is the better choice, so give yours another chance first. Sharpen the cutting edge, then hone it on an 8,000-grit stone. Close the plane's throat tightly, leaving just enough room for very thin shavings. This should work with most figured woods. When it doesn't, increase the blade's cutting angle. For most planes, that means honing a 5° to 10° back bevel on the iron. With a Lie-Nielsen smoother, you could change to a higher-angle frog instead. If you are still getting tearout, then resort to a scraper plane or card scraper, which because of their very high angle of attack do not cause tearout.

—Deneb Puchalski teaches plane use and sharpening for Lie-Nielsen Toolworks.



Standard smoothers are up to the job. Even on grain prone to tearout, a No. 4 smoother with a sharp blade leaves a finish-ready surface.

Moisture meter tells when lumber can be used

Q: How do I know if the kiln-dried lumber I order from out of state needs to acclimate to my shop before use?

—JOSEPH ZEH,
Worthington, Mass.

A: FIRST, YOU NEED A MOISTURE METER, so buy one if you don't have one already. Then, find a piece of lumber that has been in your shop for at least a year and use the meter to determine its moisture content. Next, determine the moisture content of the delivered wood. If the difference between them is more than 2% to 3%, the delivered wood needs to be acclimated to your shop. How long depends on how great the difference is. A difference around 5% should disappear in just a few weeks. Check the wood weekly, and use it when the difference is around 2% to 3%.

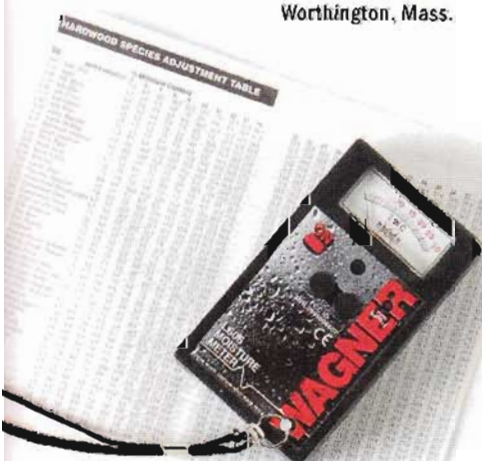


Moisture meter removes doubt. Ideally, the moisture content of new lumber should match the moisture content of wood already acclimated to your shop.

However, if you work in less-than-ideal conditions, like a damp basement or unheated garage, you should use the new wood immediately and get the finished piece into a kinder environment (like

an air-conditioned house). Letting wood acclimate to a damp space with 12% to 14% MC will only make things worse in the long run.

—Christian Becksvoort is a contributing editor.



Flatten an oilstone to clean it

Q: My oilstones no longer sharpen as effectively as they once did, and seem to be clogged. How can I rejuvenate them?

—BILL PLANTZ,
Westlake, Ohio



Don't toss your old stones. Instead, take a few minutes to flatten and clean them.

A: EVENTUALLY, ALL OILSTONES CLOG with bits of worn grit and steel, and that keeps them from sharpening. To undo the clogging, lap your stone on a flat, abrasive surface, like a coarse diamond plate or some P-180 grit wet-or-dry sandpaper on a piece of thick glass. Use a lot of lubricant. I prefer kerosene, because it does a good job flushing away swarf and worn grit. I watch for the color to brighten over the entire stone to know when I'm done, but you also could draw a cross-hatch over the stone's surface. When all of the pencil lines are gone, you're done. Finally, flush the stone well with kerosene.

—Garrett Hack is a contributing editor.



A little elbow grease. Use kerosene as a lubricant and flatten the stone on a coarse diamond plate. The stone will work much faster and produce perfectly straight edges.

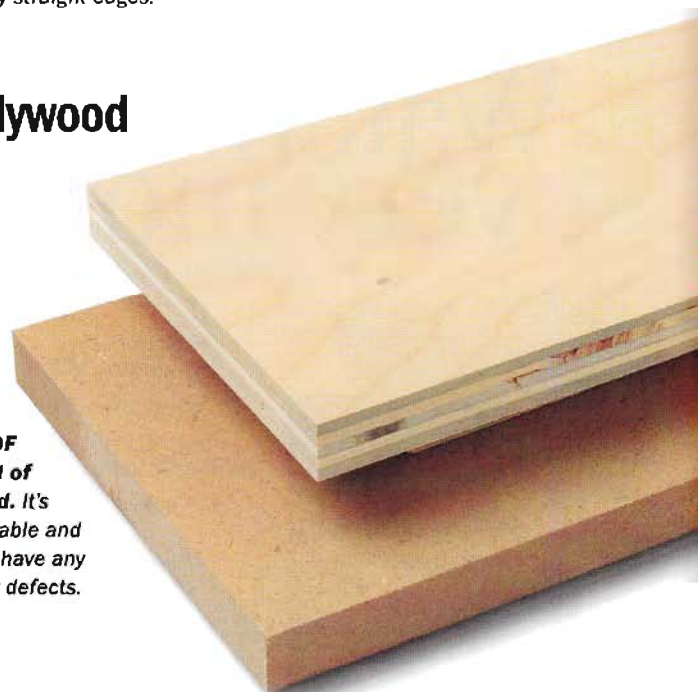
For veneering, MDF is better than plywood

Q: Following Thomas Schrunk's advice on shopmade veneers (Q&A, FWW #210), I am making a table with a veneer top. What's the best material for the substrate?

—NIC BEAUMONT,
Cleveland, Ohio

A: MEDIUM-DENSITY FIBERBOARD (MDF) is the best material for veneering, because it is uniform in thickness and density, and does not contain any internal voids. With MDF, what you see is what you get.

That's not the case with plywood. The plies used to make the core are rotary-sliced—a knife cuts a thin, continuous sheet of wood from the circumference of the log as it is turned on a giant lathe. Rotary-cut plies create two problems. First, because the density of a tree's grain can vary from one side of the tree to the other, the strength and density of the resulting ply is inconsistent. Second, the grain



Use MDF instead of plywood. It's more stable and doesn't have any voids or defects.

of a rotary-cut ply is largely plainsawn, which means it is more prone to move with changes in humidity and is less stable as a result.

The internal plies also might contain voids and defects that

eventually could telegraph through the outer ply and show up in the veneer.

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



The Woodwright's favorite tools

'IF I WERE A VIKING,
THESE ARE THE TOOLS
I'D BE BURIED WITH'

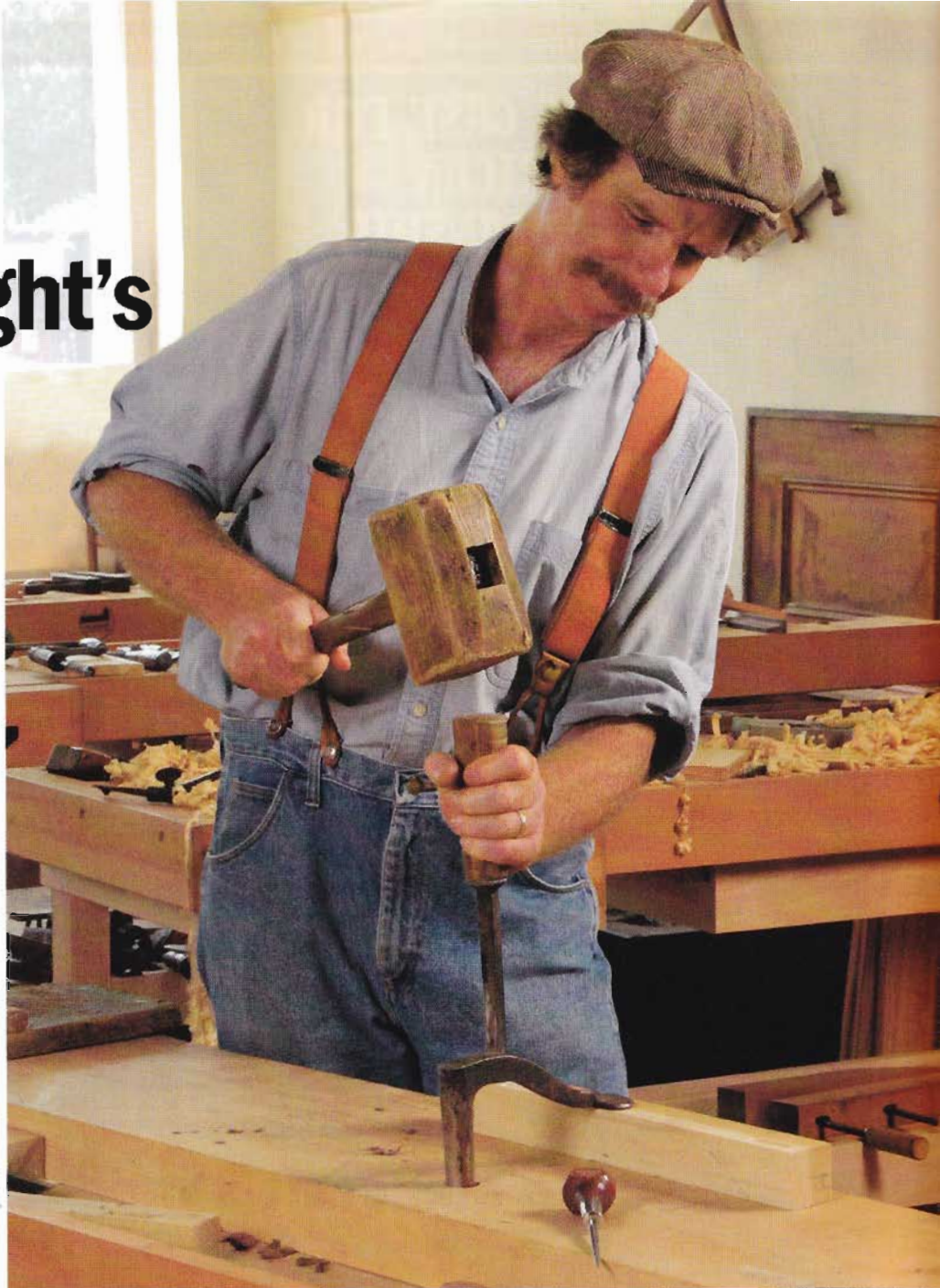
BY ROY UNDERHILL

Over three decades of teaching traditional woodworking, I have adopted a big, quirky orchestra of tools—all beechwood and brass, rosewood and steel. I have great regard for them all, but I'd be lying if I didn't confess to having favorites.

All of my favorites are brilliant work partners, but each does a little bit more for me than just get the job done. I can't help but smile when I pick up an 1875 D-9 ripsaw and hear its crisp basso continuo as it carries its kerf down the length of a plank. Other tools speak to me of days of hard labor—the raw handprint worn into the beech of an old plane that is otherwise black with tallow and linseed oil.

Some of these classic hand tools are unique and some are cookie-cutter castings. Some you can buy with a card and a click, and some, like the shaving horse and spring-pole lathe, you'll have to make for yourself. Each one is a noble instrument of long service that would certainly serve you equally as well, but if I were a Viking, these are the ones I'd be buried with.

Roy Underhill, star of PBS's *The Woodwright's Shop*, also runs a woodworking school in Pittsboro, N.C. (woodwrightschool.com).



Nothing holds like a holdfast

The holdfast is a versatile bench helper. Set it in a benchtop hole, slide the work under it, give it a whack with a mallet, and all the force of the blow is captured, locking the wood to the benchtop. When your work is done, a tap on the back of the holdfast springs it free.

The delightful holdfast works as well today as it did when the venerable Joseph Moxon described it in 1678 in his book *Mechanick Exercises: or the Doctrine of HandyWorks*: "Its office is to keep the Work fast upon the Bench, whilst you either Saw, Tennant, Mortess, or sometimes Plain upon it."

The "sometimes plain" qualification comes from the fact that the holdfast bears down on the very surface that you probably want to plane. For chamfering or rabbeting the edge of a piece held on the benchtop, though, it does just fine. You also can bore holdfast holes through the front legs and skirt of your bench. One or two holdfasts can then position a plank perfectly for edge-jointing.



For leveling a board, I like the hungry scrub plane

Some say flattening a board by hand is drudgery. I'm different. I savor the task. For leveling a board, no hand tool tops a scrub plane. The rounded iron shaves a trench across the grain and cuts very, very fast. Working back and forth in short strokes with the cool, splintery shavings spewing up over your hands as the plane hogs away wood, you look as if you were scrubbing a floor—and soon feel like it, too.

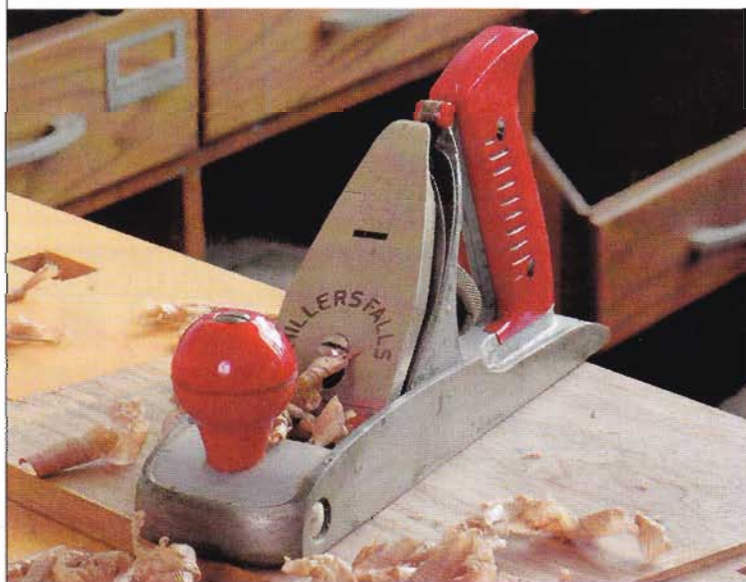
I own several scrubs, but I favor an ancient wooden jack plane that was forced into a lifetime of scrubbing long before it came to me. It probably dates from the 1830s because it has a single laminated iron made by William Ash, an English maker. Perhaps the beech body is English too, but it is far too battered to tell. In any case, it's thoroughly American now. When the original tote broke, the user replaced it—not with a sawn-out piece of beech, but with a piece made from the crotch of a dogwood branch. American dogwood is tough enough anyway, but choosing this crotch with the grain flowing around it like a ship's knee has to be the work of a fellow countryman.



The Buck Rogers smoother is an outrageous plane

When I'm not using respectable beech, coffin-shaped smoothing planes, I smooth with an outrageous plane—a tuned-up 1955 Millers Falls, red-knobbed, No. 709—the legendary “Buck Rogers.” Designed in 1948 by the Huxtable brothers and sold by the Millers Falls Co., the Buck Rogers smoother was intended not for the hands of fine furniture makers but for returning GIs in the post-war boom years. The body is cast iron, and the one-piece frog and handle assembly are of tough aluminum alloy. The bright red fore and aft grips are “unbreakable” Eastman Tenite.

As well as the frog and handle assembly that renders the iron dead solid, it has a huge depth-adjustment wheel. Just sitting on my bench, the Buck Rogers looks like it's going 300 miles an hour. It's a strange visitor amid the Victoriana of the other vintage hand tools I own—and it works like a jet-age charm!

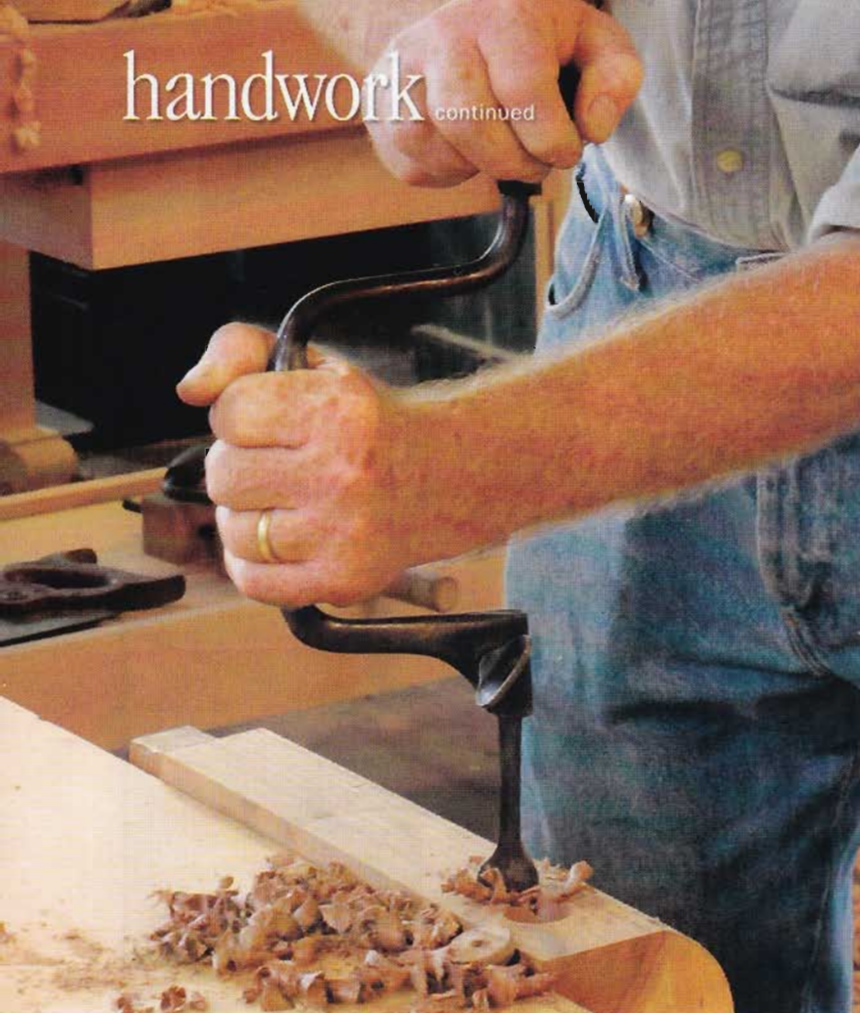


For rabbeting, the moving fillister plane is a champ

Despite the temptations of metal planes, I have never used anything that cuts a cross-grain shoulder as well as a wooden moving fillister—a 19th-century gem made by H. Chapin and Sons.

The skewed iron shaves the cross-grain with a shearing cut and draws the fence tight to the edge of the wood. The fence exposes only the width of the blade that you need. Riding just ahead of the iron, a little vertical nicker severs the cross-grain to keep a clean shoulder, and the shoulder of the plane is made of hard boxwood inserted into the beech body. A brass depth stop controlled by a screw completes this marvelous instrument.

The moving fillister won't cut end grain like a shoulder plane, and the fence makes it difficult to use on the cheeks of tenons. But for rabbeting, along or across the grain, the moving fillister is a champ.



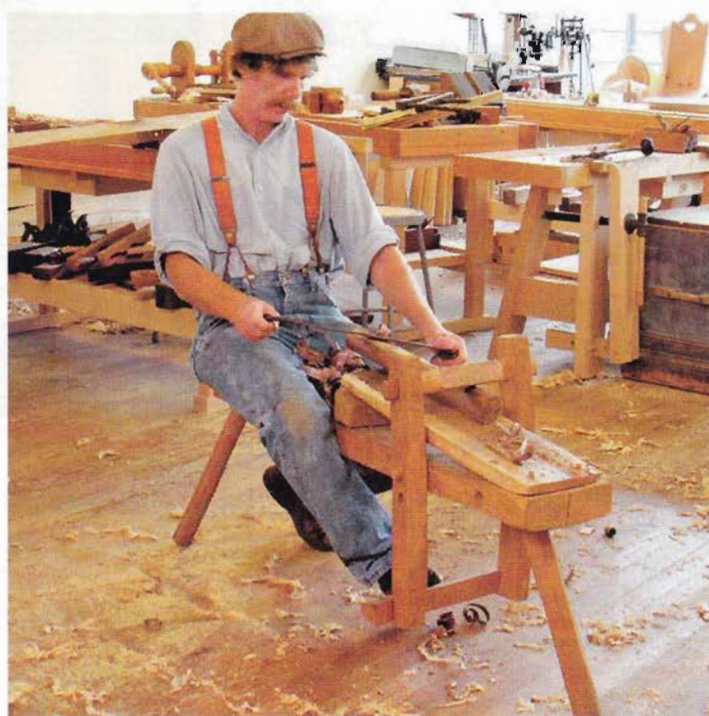
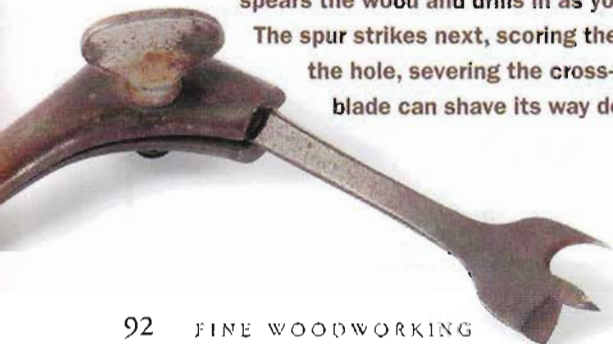
Spofford brace and center bit bore holes with style

A Spofford-chucked bit brace is cool. While other bit braces rattle, ratchet, and reverse with nickel-plated knurling on their screw-barreled chucks, the Spofford brace just clamps your bit in clamshell jaws with detached self-confidence. Made by the Fray company of Bridgeport, Conn., in the late 1800s, the Spofford brace is defined by the forged, split jaw tightened by a single transverse thumbscrew. It's a clean forging, but Spoffords are not just iron and irony—the rosewood pad and the pewter rings on the crank handle give these braces an effortless, understated panache. When you have a boring job to do, it sure helps if you have a cool tool working along with you.

Chuck up a center bit in a Spofford brace, and you're working with elemental efficiency. Ideal for boring shallow holes, the business end of the bit has just three simple elements: a central pike, a cross-grain scoring spur, and the main blade. The pike

spears the wood and drills in as you crank the brace.

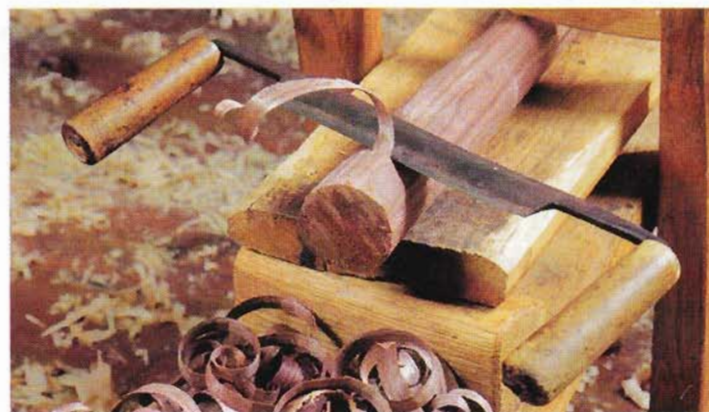
The spur strikes next, scoring the circumference of the hole, severing the cross-grain fibers so the blade can shave its way down into the wood.



Drawknife and shaving horse, an inseparable pair

There are few more personal tools than your shaving horse and drawknife. They're a fast pair, too. The horse is essentially a foot-operated vise that allows you to reposition the wood as you work. And where a handplane takes the same metered shaving with every stroke, the drawknife is a free blade, controlled only by constant feedback and minute muscular adjustment through every stroke. Sitting on a shaving horse with a drawknife in your hands, you can get talking with someone, look down, and discover that you've made a chair by mistake.

I work with a variety of drawknives and use both the solid-headed shaving horse favored by coopers, and the gate-headed "bodger's horse" (shown here) used by chair makers. In both forms, the harder you pull, the firmer the grip. The power flows from the drawknife into your hands, through your body and down to your feet, up through the lever of the shaving horse, and then back into the blade. It's a full circle of strength, and even if there's nothing mystical about it, no one can deny that it's wonderful.



Disston rip saw sings as it cuts

In every young person's life, if they're lucky, they'll light on a tool that just clicks with them. My epiphany came while I was ripping pieces of oak flooring with a Disston saw, found at a flea market for a few dollars. The speed and ease of the saw impressed me first. But then I listened. On every downstroke, it spoke out with a crisp, rising burr; on every upstroke, it rang with a faint echo of the moan the saw makes when bent into an S and plunked with my thumb. It was speaking to me, singing to me—all I had to do was work and listen.

The points create a slightly finer cut at the toe, giving it an easier start and accounting for the rising note of each stroke. Even the applewood handle is special—the large opening gives you a grip for two-handed use—something you might not appreciate for the first 5 ft. of ripping.

It sings, it talks, it even cuts wood. To many, it may seem a sorry fate to discover that your tool of destiny is a big hand-saw, but 35 years later, I've got no complaints.



Pole lathe is a powerful, precise turning tool

Properly built, a spring pole lathe is a powerful and precise machine—a reciprocal tool with a cutting stroke and a return stroke—just like a plane or a handsaw.

But you can't just cobble one together. The frame must be solid, the centers polished, and the spring pole lively. The downward push of your foot on the treadle pulls the cord wrapped around the work, giving it the forward spin for the cutting stroke. Raising your foot then lets the spring pole rewind the cord, ready for the next cut. With the tension adjusted properly, the spring pole does not excessively resist your down stroke, yet spins the work quickly back, even giving your foot a little lift.

The lathe I built, based on a design I found in a 17th-century German technical encyclopedia, is solid, compact, and infinitely adjustable. Sliding the collar joining the two ash poles back and forth quickly changes the tension from wimpy to wow!

This little lathe is a rock-steady workhorse with the added benefit of the delighted look on people's faces when they try it for themselves—another true believer born every time.

how they did it

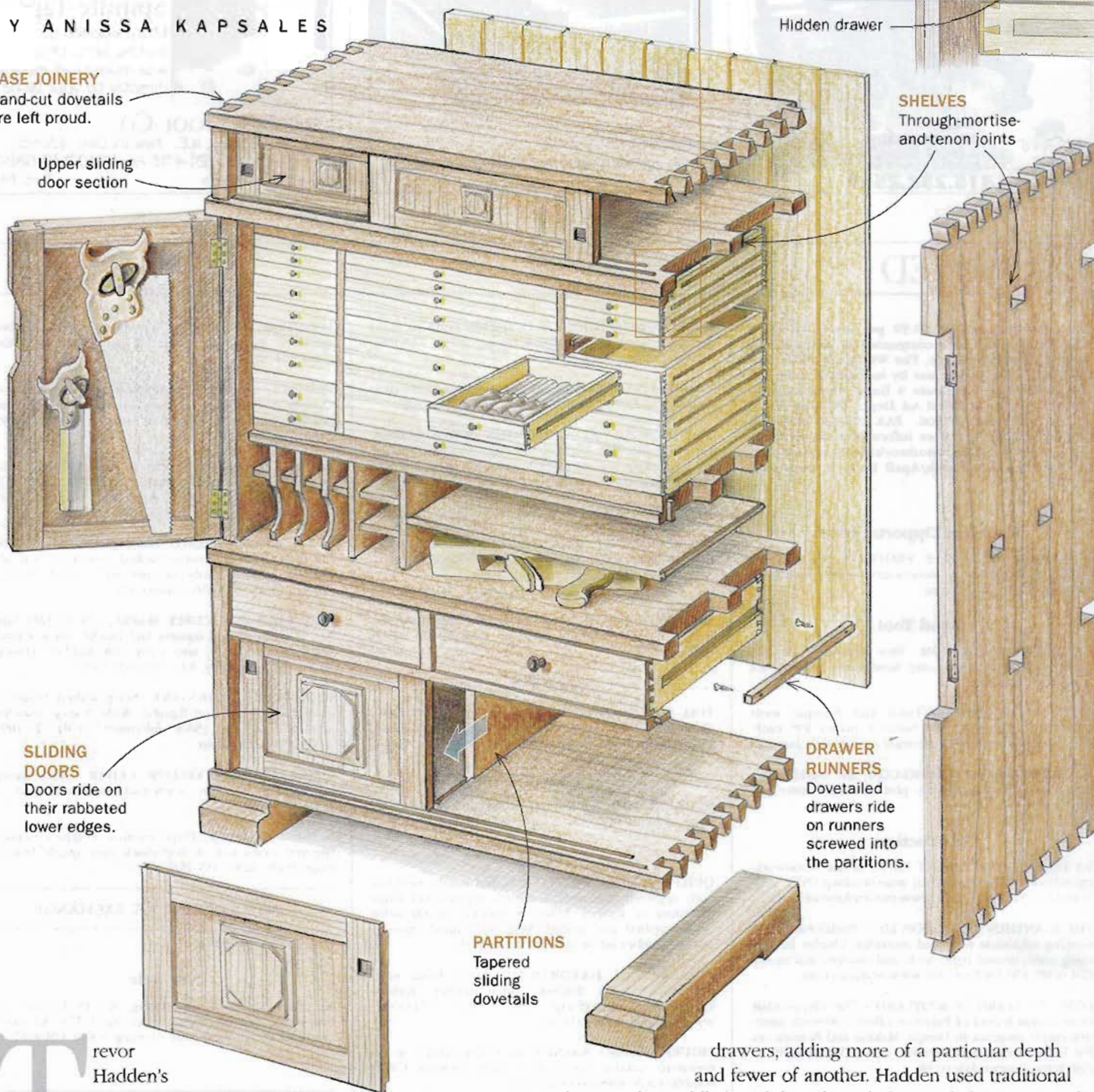
An A+ tool chest

BY ANISSA KAPSALES

CASE JOINERY

Hand-cut dovetails are left proud.

Upper sliding door section



SECRET DRAWER

False rail is friction fit and held in place by two bullet catches.

Open lower drawer to remove rail and access hidden drawer.

Hidden drawer

SHELVES

Through-mortise-and-tenon joints

SLIDING DOORS

Doors ride on their rabbeted lower edges.

DRAWER RUNNERS

Dovetailed drawers ride on runners screwed into the partitions.

PARTITIONS

Tapered sliding dovetails

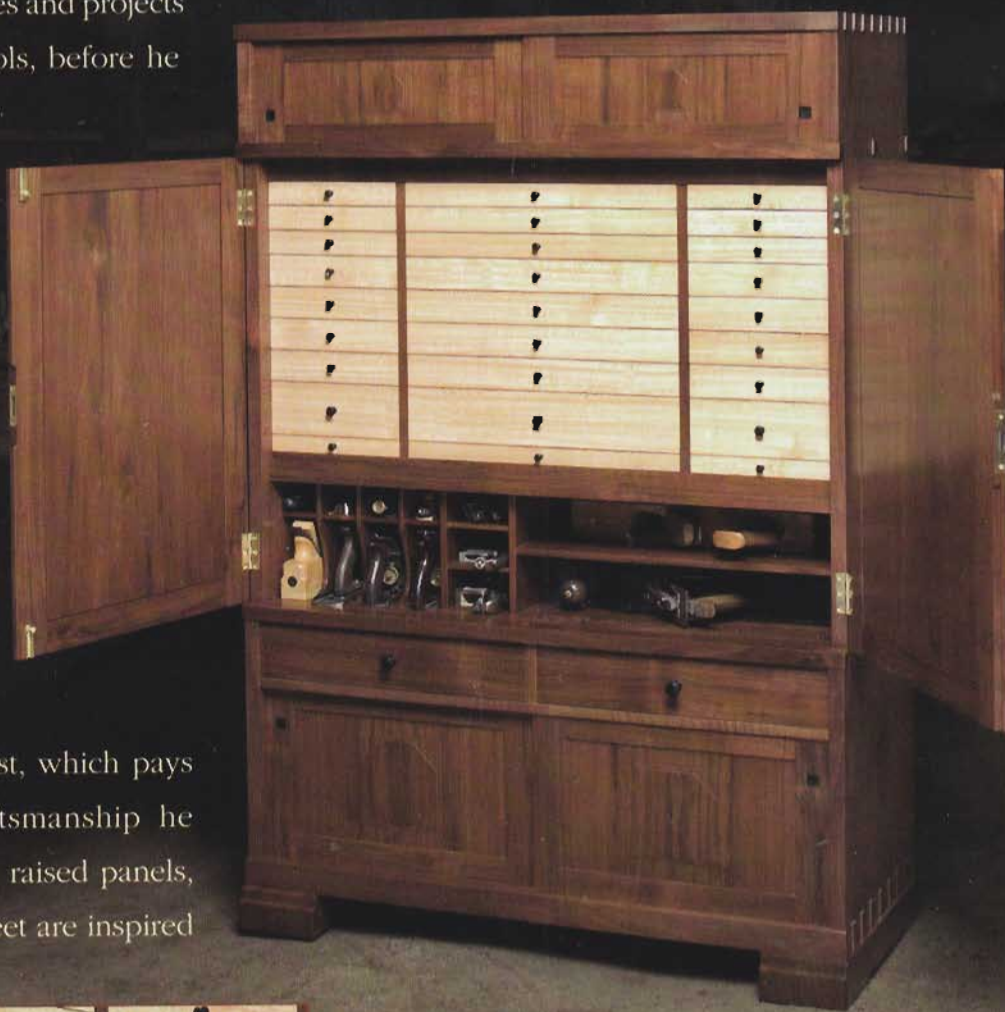
Trevor Hadden's training with Michael Cullen not only yielded the woodworking knowledge and skills he needed to go it on his own, but also culminated in the Arts and Crafts tool chest seen on the back cover. The design is loosely based on Cullen's, but Hadden tailored the anatomy to his own tools, enlarging some

drawers, adding more of a particular depth and fewer of another. Hadden used traditional doors in the middle but sliding doors below and above to avoid the opening and closing arc. However, he didn't veer from tradition in the construction, using hand-cut dovetails, mortise-and-tenon joinery (through and hidden), wedged tenons, and tapered sliding dovetails to keep the case solid and functioning smoothly for years to come.

A Case for Apprenticeship

Trevor Hadden was seven months into a two-year apprenticeship before he was allowed to use power tools. For the first month, he had practiced at flattening, tuning, and sharpening his planes, chisels, and saws.

Then came six months of exercises and projects performed solely with these tools, before he flipped the switch on his first machine. Hadden's exacting tutor was California furniture maker Michael Cullen, who based the program on his own training under Englishman David Powell, who himself had trained in the workshop of the legendary English Arts and Crafts furniture maker Edward Barnsley. For the final project of his apprenticeship, Hadden designed this tool chest, which pays tribute to the legacy of craftsmanship he inherited. The chest's octagonal raised panels, protruding dovetails, and sled feet are inspired



by details Hadden admired on Barnsley furniture. And the layout of the interior combines elements from the tool chests of both Cullen and Powell. The skilled student used air-dried claro walnut for the case, blue gum eucalyptus for the drawer fronts, and ebony for the turned drawer pulls.

—Jonathan Binzen

Photos: Don Russel

How They Did It Turn to p. 98 to see a detailed drawing of Hadden's tool chest and learn about the joinery.

Pro Portfolio For an audio slide show tracing the origins of Hadden's tool chest, go to FineWoodworking.com/extras.