Fine Woodworking

Winter 2004/2005
No. 174

Tools & Shops

ANNUAL ISSUE

Window into a master's workshop

Tool test: 14.4-volt drills

Smart layout for small shops

Safer tablesaw

Preventing shop fires

Jimmy Carter on woodworking

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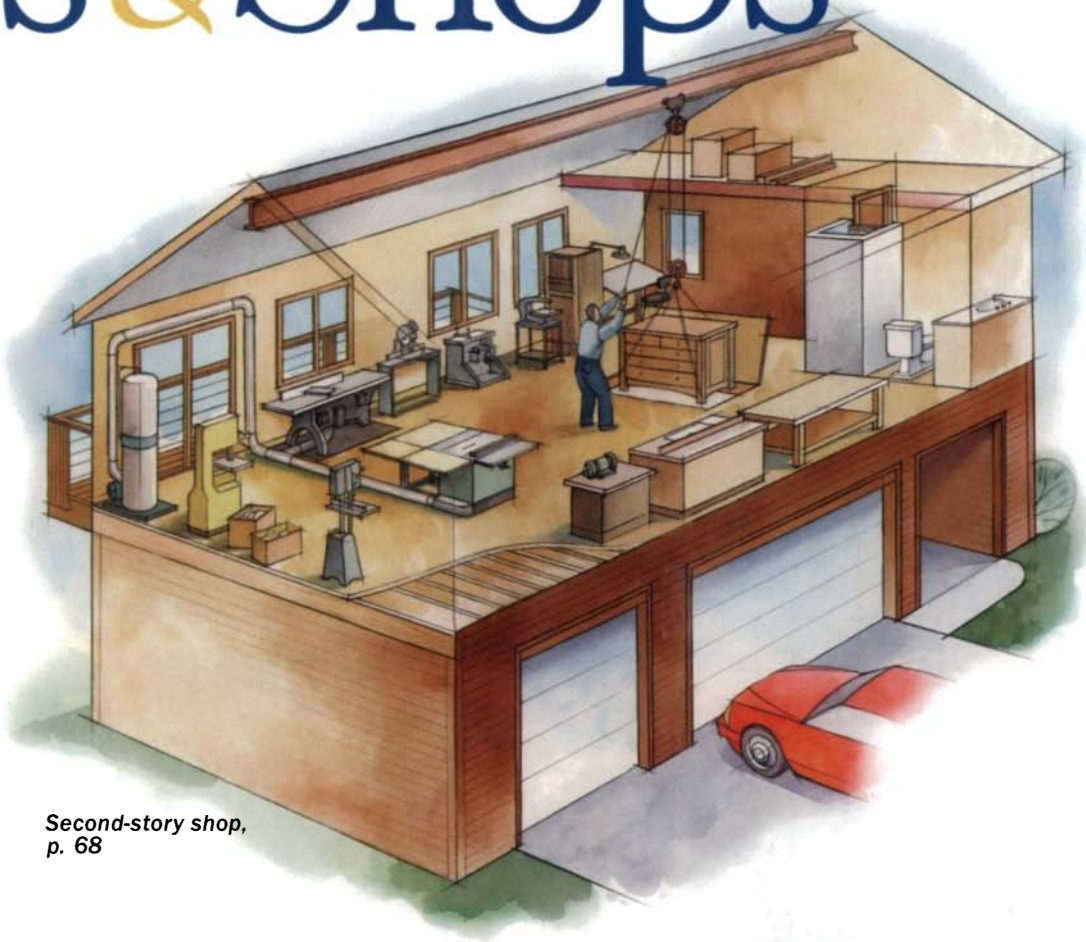

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Eugene Landon builds reproduction furniture in a shop that bridges the 18th and 21st centuries. *See p. 36.*
Photo: Michael Pekovich

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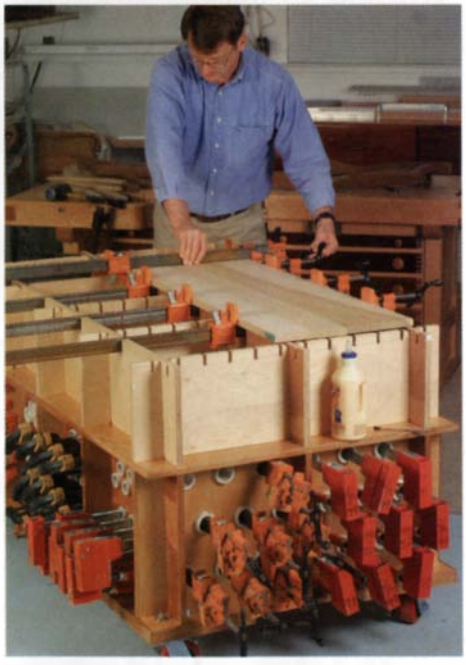

Mobile clamp cart and assembly bench, p. 60

14.4v cordless drills, p. 40

The Taunton Press
Inspiration for hands-on living®

Contributors

Roland Johnson ("14.4v Cordless Drills") is a contributing editor who regularly performs tool tests for *Fine Woodworking* at his home shop in Sauk Rapids, Minn. Johnson's fascination with motors and gears goes well beyond power tools. He is the author of *Automotive Woodworking* (Motor Books International, 2002), and you often can find him in the garage behind his woodshop fiddling with his 1928 Model A roadster pickup, which he affectionately refers to as his "highboy." In hot-rodder speak, a highboy is a roadster with "no fenders and lots of power," Johnson noted.

Jimmy Carter ("Jimmy Carter on Woodworking") was first featured in *FWW* #46 (1984). Since his last appearance in the magazine, Carter has been busy building furniture and homes for Habitat for Humanity, and he's taken up painting. In 2002, the Norwegian Nobel Committee awarded Carter the Nobel Peace Prize for his decades of untiring effort in finding peaceful solutions to international conflicts, advancing democracy and human rights, and promoting economic and social development. In spite of all the success he has achieved as a naval officer, farmer, governor, president, statesman, and Nobel laureate, Carter remains simply an aspiring woodworker at heart, and we welcome him back to our pages.

Bruce Ryden ("Fire Safety in the Shop") learned about fighting fires as a young man in the U.S. Navy. After his time in the service, Ryden worked as a fire marshal near Minneapolis/St. Paul, Minn. He also worked as a certified fire investigator, trained to sniff out what went wrong and why. After his retirement a couple of years ago, Ryden and his wife traded in the Minnesota winters for an easier life in the western North Carolina mountains, where he spends a lot of time working on his house and doing volunteer work in the Pisgah National Forest.

Since he was introduced to woodworking by his neighbor at the age of 9, **Gary B. Foster** ("Convertible Clamping Workstation") always has had a place in the family garage to work on projects. After retiring in 1999 from a 28-year career as a biomedical engineer, Foster built a 1,040-sq.-ft. dream shop behind his home, where he spends his free time building furniture for friends and family.

Paul H. Breskin ("A Shop on Top") was romanced by the craft of woodworking 50 years ago in a junior-high-school woodshop class. Among the projects he built back then was a desk that gets regular use to this day. After college, he spent six months at the Swedish State School of Arts, Crafts, and Design studying furniture design and construction. Upon returning to the United States, he began a career in banking. Breskin retired in 1994. A few years ago, he discovered cowboy action shooting, a sport that celebrates the history of the American cowboy by blending shooting, period costumes, and a love of the Old West.

Although **Eugene Landon** ("A Workshop Steeped in History") has a security system to protect his collection of hand tools, a far more reliable deterrent are the two German shepherds, Chippendale and Queen Anne, who greet any visitor with barking of impressive volume. Spending a day with Landon is a wonderful experience: You can examine the antiques he is repairing, listen to him talk about 18th-century furniture makers, and watch as he re-creates their furniture in his shop. You also can take a class with Landon at the Olde Mill Cabinet Shoppe in York, Pa. (www.oldemill.com), but enroll early, as most of his classes are filled by repeat customers.

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Letters

Flaming finish ignites concern

I find it disturbing that you published the article "An antique painted finish" (Finish Line, *FWW* #172, pp. 117-118). Setting on fire a piece of furniture that is covered in solvent is just insane. No matter how careful one is, accidents will happen. For a magazine to propose this is irresponsible. After all, you do subscribe to safety guards and eye protection, but then turn around and say that it's okay to play with fire.

The other point I want to make is roof tar is meant for exterior use. It is not made to be sat on or touched. This is not healthy.

Please be a bit more careful in the articles you publish.

—Peter Besharah, via email

EDITOR REPLIES: As we say in our safety warning, don't attempt something you are not comfortable with. Finishing with fire has inherent risks. To learn more about fire safety, read the article "Fire Safety in the Shop" (pp. 55-59).

Physics 101 and sliding doors

In his article, "Sliding Doors for Furniture" (*FWW* #172, pp. 58-61), Seth Janofsky implies that reducing the area of contact will reduce the quantity of friction between the sliding door and the lower track. This is in direct conflict to proven principles of physics. The coefficient of friction is based on the composition of the mating surfaces and stays the same respective of the surface area. Only two things can change the quantity or amount of friction. Change the weight of the sliding object or change the material of at least one of the mating surfaces. Except for the small weight change that the rabbet induces, the total quantity of friction will stay the same. Therefore, the door will have the same resistance to movement with or without the rabbet.

Decreasing the surface area of contact concentrates the friction and increases the abrasion factor. The end result of this procedure is to accelerate the wear and hasten the destruction of the finish in a very visible area. When we wax a surface, we reduce friction because the coefficient of friction of the wax is less than the coefficient of friction of the wood.

—Scott Schimmelpfennig, Sandy, Utah

SETH JANOFSKY REPLIES: I don't dispute your knowledge of physics, but I never used the term "friction" when describing what makes sliding doors work well. Most important are the fit of the sliding surfaces and the prevention of conditions that will interfere with smooth sliding. Crud and consequent abrasion in the track are serious potential problems, and the solution is to let the door float above the bottom of the groove, as described. Last, I've not found wear to be an issue in my hardwood cabinets, but as I pointed out, you can put the rabbet on the back in the Japanese way if you prefer.

Choose ABS pipe carefully

In Methods of Work (*FWW* #172, p. 18, 20) there is a tip for making an air-powered glue applicator. The applicator uses a section of ABS pipe to hold glue, and then the section is pressurized with air. Rigid plastic pipe never should be used for compressed gases unless it is specifically labeled for such. The ordinary ABS used as drainpipe is not suitable for compressed gases. The problem with rigid plastic is that if the pipe shatters under pressure, plastic shrapnel can be flung outward with very high speed.

—Michael Bruss, Davis, Calif.

More on the perfect drill press

I agree with Ed Mullikin's letter (*FWW* #172, p. 10) on drill presses for woodworkers, and I'd like to add a few items to the "wish list."

I'd like to see longer quill travel. Woodworkers often need to drill deeper holes than metalworkers. Most drill presses have less than 4 in. of quill travel, which is usually more than adequate for metalworking but often is too little for woodworking jobs. All drill presses also should come with quill locks.

—Bill Blackman, Raleigh, N.C.

Video tip proves helpful

The video on your Web site that ties into Brian Boggs' article "Sharpening and using card scrapers" (A Closer Look, *FWW* #172, pp. 26, 28, 30) is excellent. I thought I knew all about scraper sharpening, but this video taught me even more.

—Mike Andersen, via email

A differing opinion on bar clamps

I disagree with some of Tim Albers' findings in "Bar Clamps, Head to Head" (*FWW* #172, pp. 62-68). Gross Stabil clamps in the 48-in. range were so impossible to open or close that I returned them for a full refund. Bessey K Body clamps are flawed because the teeth on the top of the bar get embedded with glue just like the Gross Stabil models. Jorgensen Cabinet Master Clamps are by far the best of the K-body-type clamps. They slide smoothly and are easy to clean up. As for flex and deflection, just don't overtighten them.

—A. James Leeds, Northridge, Calif.

Corrections

Due to an editing error, a Q&A answer ("Inlay, marquetry, and boulle work," *FWW* #165, pp. 94, 96) had some incorrect historical references. Intarsia is an inlay technique that was developed during the Middle Ages. The long-handled knife dates back to that era, not to 350 B.C.

The article "CAD on a Budget" (*FWW* #172, pp. 54-57) incorrectly inferred that the software application DesignCAD 3D MAX V14 came with three training CDs. The product comes with one training CD; the other instructional CDs cost extra.

Writing an article

Fine Woodworking is a reader-written magazine. We welcome proposals, manuscripts, photographs, and ideas from our readers, amateur or professional. We'll acknowledge all submissions and return those we can't publish. Send your contributions to *Fine Woodworking*, P.O. Box 5506, Newtown, CT 06470-5506.

About your safety:

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

—Anatole Burkin, editor

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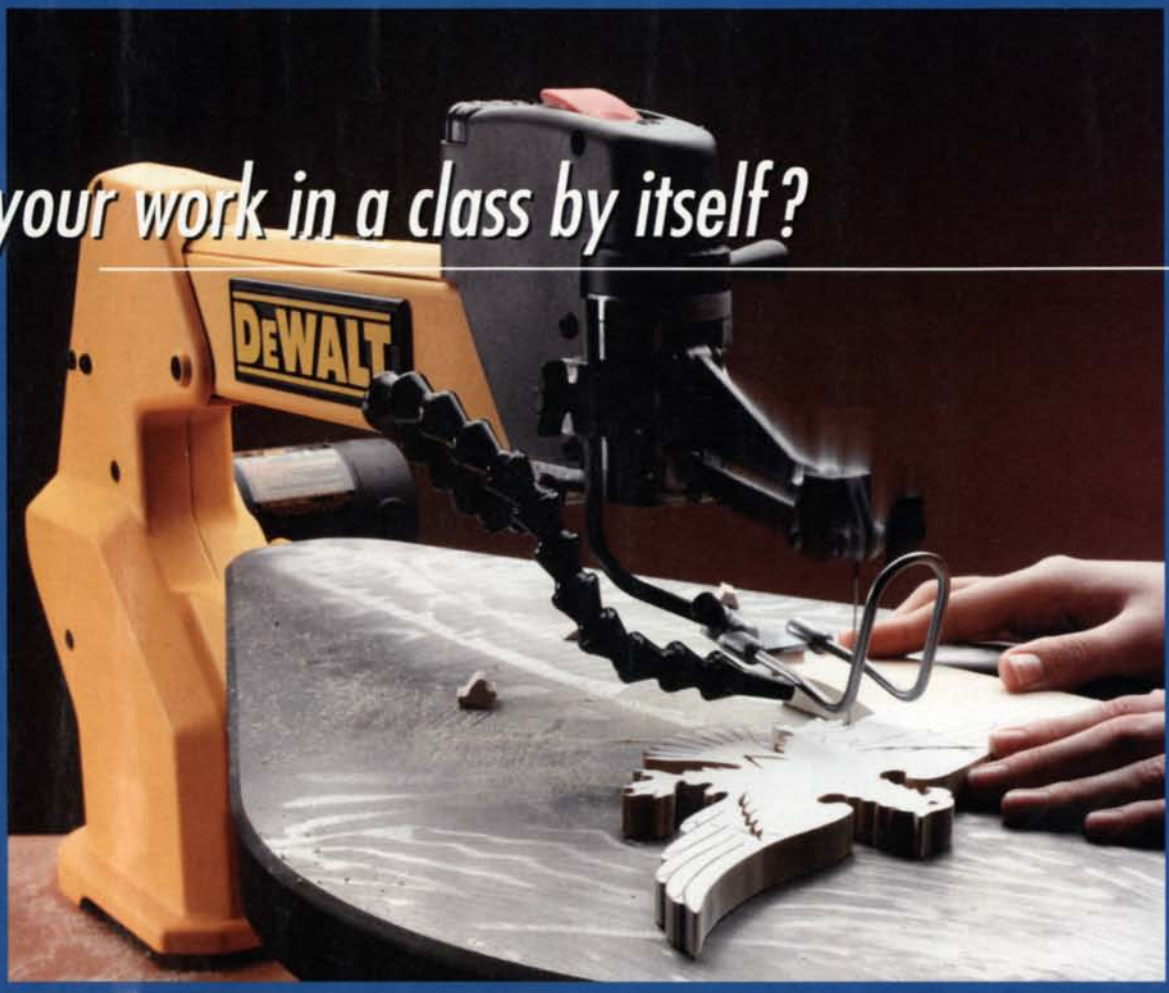

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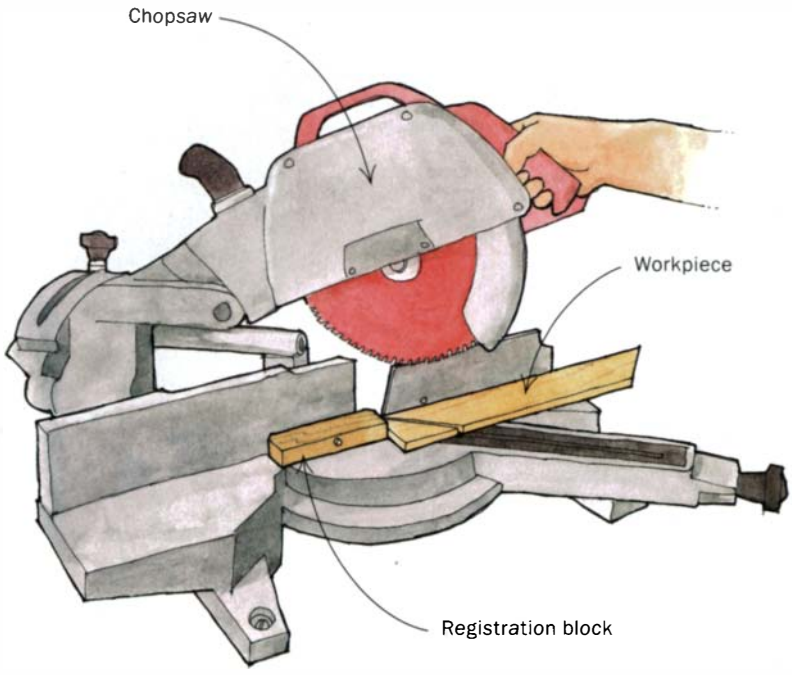
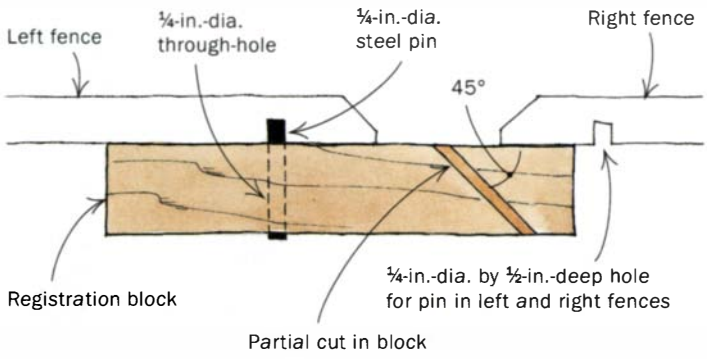
Methods of Work

EDITED AND DRAWN BY JIM RICHEY

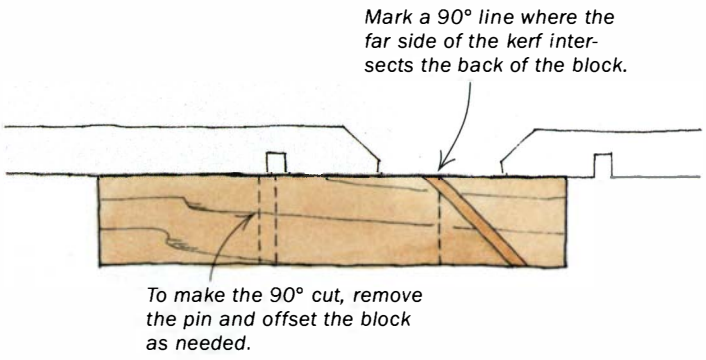
Chop mitered pieces to precise lengths



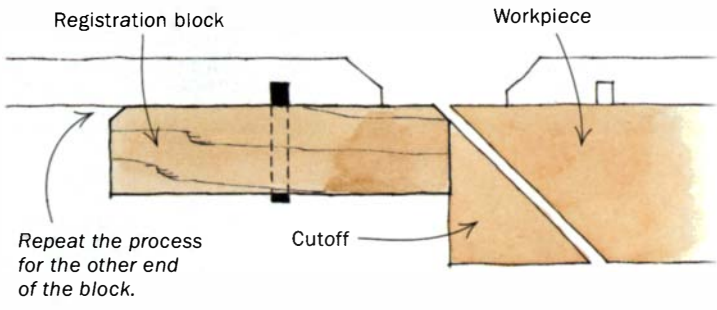
1. To make the registration block, drill a ¼-in.-dia. hole into a piece of hardwood. Then drill into the chopsaw fence through this hole. Affix the block to the fence by inserting a metal pin into the hole, and make a partial cut at 45° in the block.



2. Mark a line on the block that intersects the sawkerf at the back edge, remove the pin, and trim the block to that line.



3. For precise miters, first cut the workpiece to length, then butt the workpiece against the registration block and cut the miter.



With this easily made registration block, you can avoid the tricky process of cutting mitered stock to the right length. To use it, first chop the workpieces to the desired length with the blade setting at 0°. Then set the blade to 45°, install the registration block, and trim a miter from one end. The registration block ensures that the mitered workpiece will measure exactly the same length as the square-cut workpiece. To miter the other end accurately, install the block on the other side of the blade.

You don't need precise measurements to make the registration block. Use a drill press to cut a ¼-in.-dia. hole through a scrap of hardwood. With a portable drill, transfer that hole through the block into the left and right fences. The exact distance from the sawblade to the hole is not important; just be sure to start with a wood block that is long enough on each side to overlap the saw's cut line.

The next step is to press a ¼-in.-dia. steel pin into the wood block, leaving about ½ in. of the pin projecting from the surface. After engaging the pin in the hole in the left fence, swing the chopsaw to 45° on the right side and cut partway into the block. Remove the block from the saw and mark a square pencil line across the block, beginning where the kerf intersects the back edge of the

A reward for the best tip

Until retirement, Thomas Koazalka worked as a manufacturing engineer, so tool design is old hat to him. His chopsaw registration block shown here is simple to make, easy to use, and works like a charm. For his winning tip, Koazalka receives a pair of 14-in. tenon saws (one rip, one crosscut) made by Adria Toolworks (www.adriatools.com), a total value of $300. Send your tip (along with a photo or sketch) to: Methods of Work, Fine Woodworking, PO Box 5506, Newtown, CT 06470. If published, we pay $50 for an unillustrated tip; $100 for an illustrated one. And if your tip is picked as the winner, you get the tenon saws, too.

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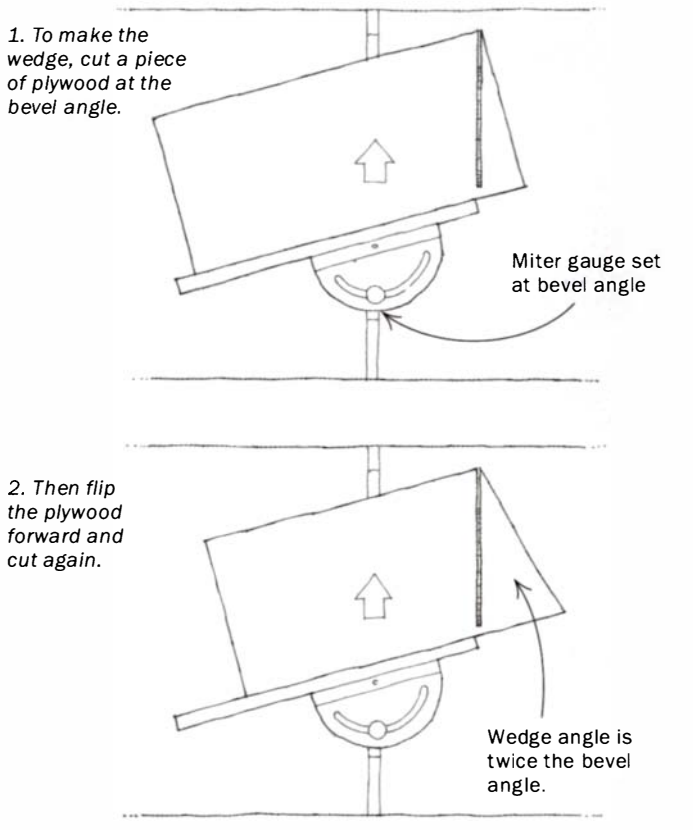
block, as shown in the drawing on p. 14. Return the block to the left fence and complete the 45° cutoff. Finally, set the saw at 0°, remove the pin, and cut off the waste up to but not including the pencil line on both ends. Then swing the saw to the 45° left setting and do the same thing with the block on the right fence.

Reinsert the pin, and the registration block is ready for use. Cut stock to the right length first before installing the block on the left and right fences to cut the miters at both ends of the workpiece.

—Thomas Koazalka, Hicksville, N.Y.

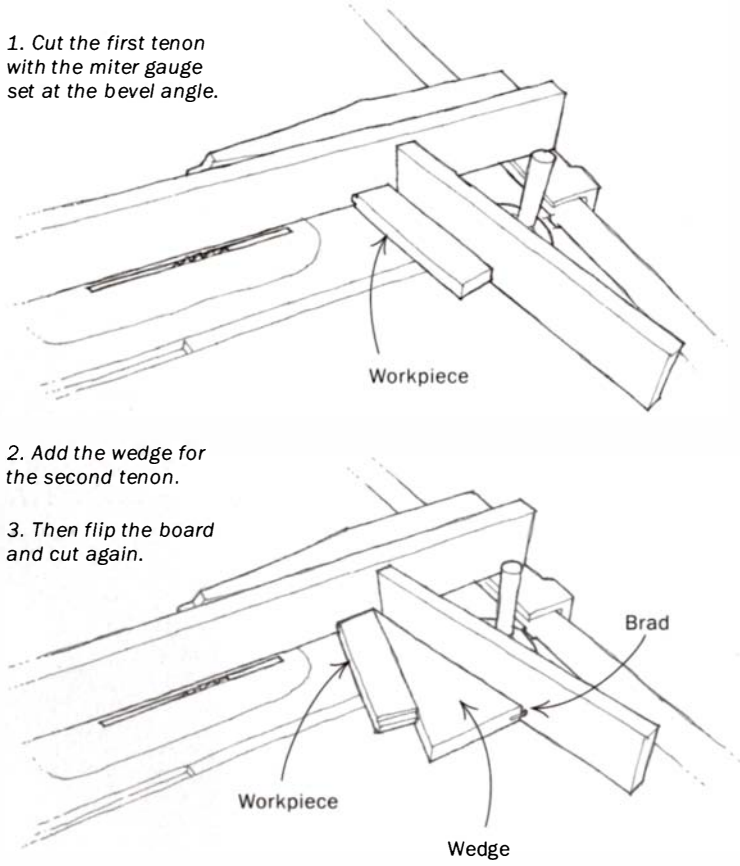
Large wedge for cutting angled tenons



For right-angle workpieces, cutting tenons on the tablesaw is fairly straightforward—just set the miter gauge at 90°, position the rip fence as a stop, and remove the waste with repeated cuts. The process gets trickier, however, for angled tenons.

Setting the miter gauge to the desired angle allows for cutting only one shoulder. And changing the miter-gauge angle for the opposite side is time-consuming. However, this simple wedge-shaped insert (drawing above) makes it easy to cut angled tenons.

Working from plans or a full-scale layout, set the miter gauge to the angle at which the tenoned piece joins its mate. Cut a scrap piece and adjust the miter gauge until it is set just right. Next, you need to cut a wedge insert with an angle twice that of the joint angle. To do this, first cut an 8-in.- or 10-in.-wide piece of plywood or particleboard at the joint angle. Then flip over the piece and cut off a wedge from the same end. The wedge will have an angle that measures twice the joint angle, and you can use the wedge with the miter gauge to make the tenon cuts on the second side of the angled workpieces. If necessary, secure the wedge to



the miter-gauge fence with a brad, a screw, or a dowel to keep it from shifting around during use.

To use the wedge, cut the first tenon cheek using the miter gauge at the angled setting and the rip fence as a stop. Then place the wedge insert against the miter-gauge fence, turn over the workpiece, and cut the second tenon cheek. The shoulders will match exactly.

—Lloyd Marsden, Sheridan, Wyo.

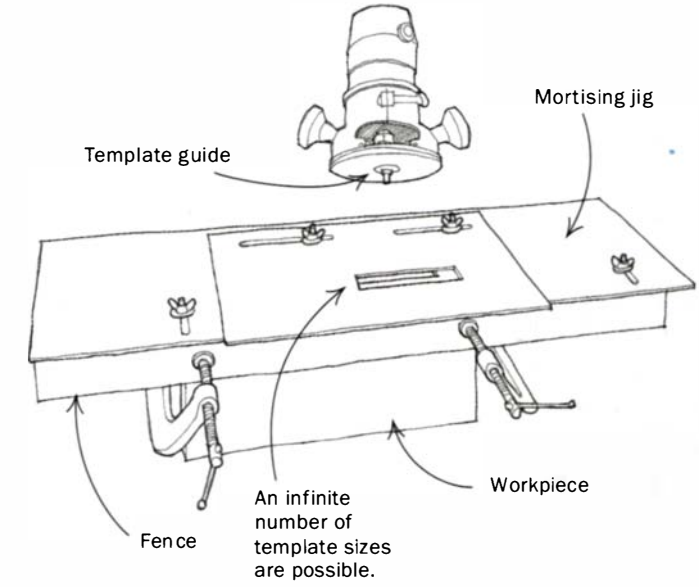
Quick tip: To apply wipe-on finishes, I make small custom pads out of the replacement pads sold for paint edgers. I cut them to a workable size, about 1 in. by 1½ in., and then mount them to a block of wood with double-sided tape to make a handle. I pour a small amount of finish in a saucer, load the pad, and apply it to the workpiece with long, low strokes that just kiss the surface.

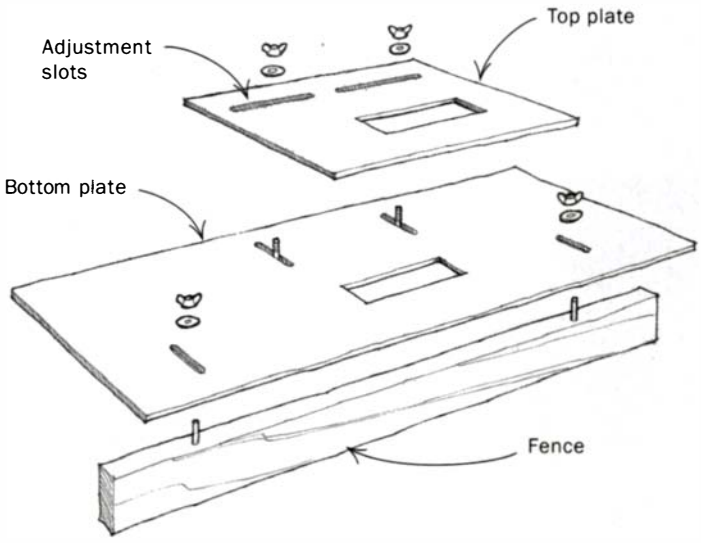
—John Buckham, Wauchope, NSW, Australia

Router jig cuts many different mortises

This simple, self-contained mortising jig is used with a template guide in a router to cut mortises of nearly any size.

The jig is made from two pieces of ⅛-in.-thick medium-density fiberboard (MDF). The smaller top plate rides on a larger bottom plate and adjusts with paired slots and ¼-in. bolts fastened with wing nuts. Because the paired adjustment slots are at right angles to each other, the rectangular cutouts in the plates can be combined to create an infinite variety of template sizes. The adjustable fence attaches to the bottom plate with wing nuts, which tighten ¼-in. bolts through a pair of slots. I cut all of the slots and the rectangular cutouts using a straight bit in a table-mounted router





fitted with a fence. When cutting a mortise, I install a ½-in. outside-diameter template guide in the router and a ¼-in. spiral-cut bit, for an offset of ⅛ in. Be sure the two plates are square to each other before locking them down.

—Michael Walker, Sherwood Park, Alta., Canada

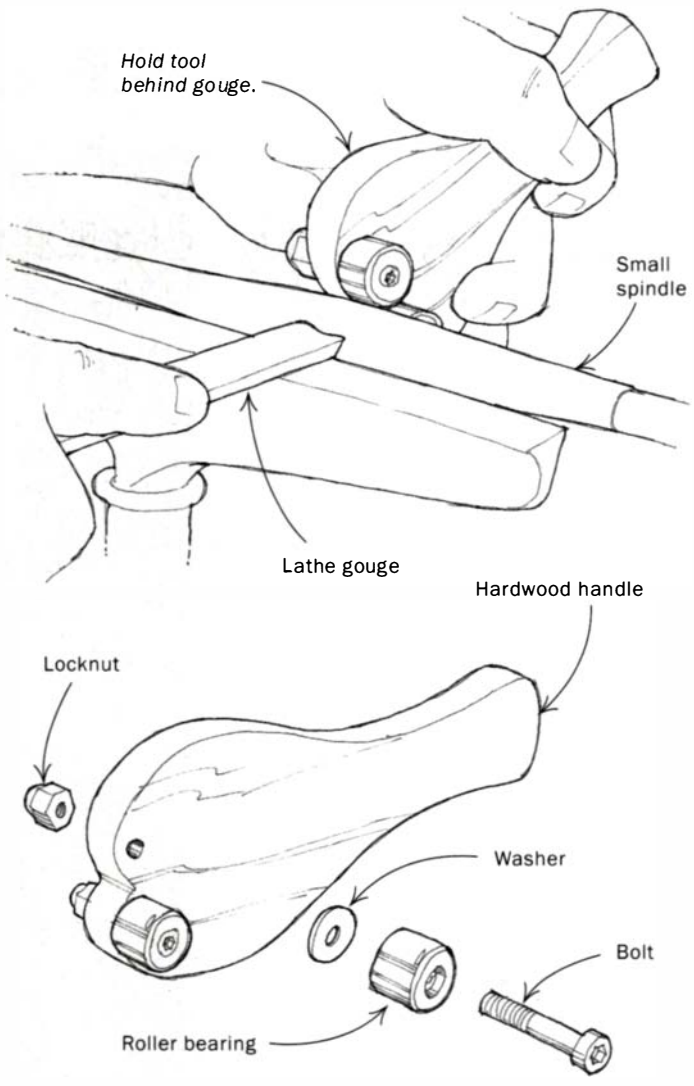
Quick tip: The felt pads made to cover furniture feet, protecting the floor, also make great clamp pads. Sold at most hardware stores, the pads have an adhesive backing that permanently adheres to a clean surface. For pipe clamps, I buy the felt pads in sheets and cut them to fit the clamp heads. For smaller clamps, I buy the felt disks.

—Jim Dion, Lawrenceville, Ga.

Handheld spindle stabilizer

This little stabilizer for the lathe is simple to make and to use. With small spindles, I have more control using this device than I would using a bed-mounted steady rest. One advantage is that I can reduce chatter by moving the device to where the knife is cutting the workpiece.

To make this stabilizer, simply cut a scrap of wood in the shape shown in the drawing below and install two roller bearings. I used McGill-brand guide rollers because I already had them on hand; however, bearings from your local machine dealer or auto-supply shop will do. I recommend that you use bearings with a ⅞-in. outside diameter, ¼-in. inside diameter, and 5/16-in. width, or something close to those sizes. Make the handle from a scrap of hardwood about 6 in. long and ⅝ in. thick, and shape it to fit your



hand comfortably. Drill holes through the bottom portion of the wood handle so that the bearings will have a ⅛-in. gap between them. Also, they should stand proud of the working end of the handle by about ⅛ in. Install a washer between the bearings and the wood handle so that the bearings won't rub against the wood.

To use this tool, hold it against the back side of the spindle while holding the gouge in your other hand, as shown in the drawing above. Move the stabilizer to the area being worked and apply pressure equal to the gouge pressure to cancel any chatter. The stabilizer works best on smooth surfaces. For rough areas of a spindle, you'll probably need to use both hands on the gouge and move a little slower.

—Stephan Speltz, Rollingstone, Minn.

BY JOHN YURKO

A layout kit for small shops

You're ready to lay out your new shop: You have the space built, outlets in the wall, lights hung, and a wood supply ready to turn into heirloom pieces for family and friends. You have most of the machines, benches, and cabinets, with plans to buy or build what you don't already own. You can't wait to get the shop in working order.

Don't rush into the process. The first layout is likely to remain in place until you move again. If any major workflow and dust-collection problems arise, they probably will just be tolerated. With careful planning, though, you can take advantage of the opportunity to get the layout right the first time.

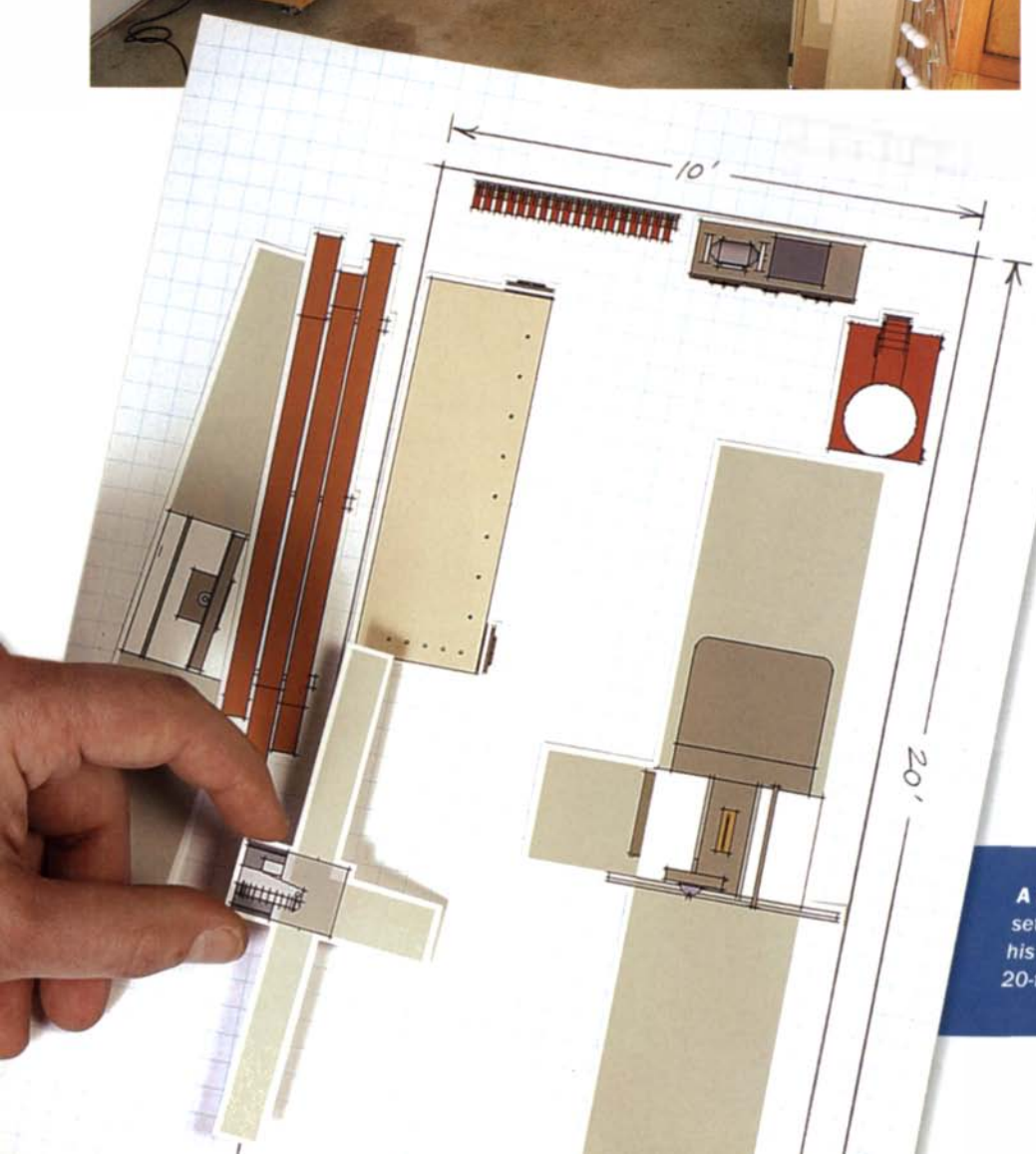
I faced this situation recently when I moved my woodshop from a spacious two-car garage below my office into a smaller 10-ft. by 20-ft. space at home. Because of this downsizing, layout was more important than ever.

A photocopier is all you need

To plan my shop, I used a modeling program on my computer, but you can use the drawings I created to plan an efficient shop on paper. Photocopy the images on the facing page and arrange them on graph paper to create a plan view of your shop. Take the time to work out the most efficient placement of benches, cabinets, and machines, taking into account infeed and outfeed zones as well as ducting for dust collection.

You don't have to go as far as I did, but I found it valuable to use three-dimensional modeling, which allowed me to plan my shop vertically as well—highlighting, for example, leftover wall space for mounting storage units, tools, and jigs. If you want to try the computer program, see the story on p. 24.

The drawing and paper shuffling were well worth the time. Woodworking in my small shop is now efficient and enjoyable. I've been able to make large projects such as

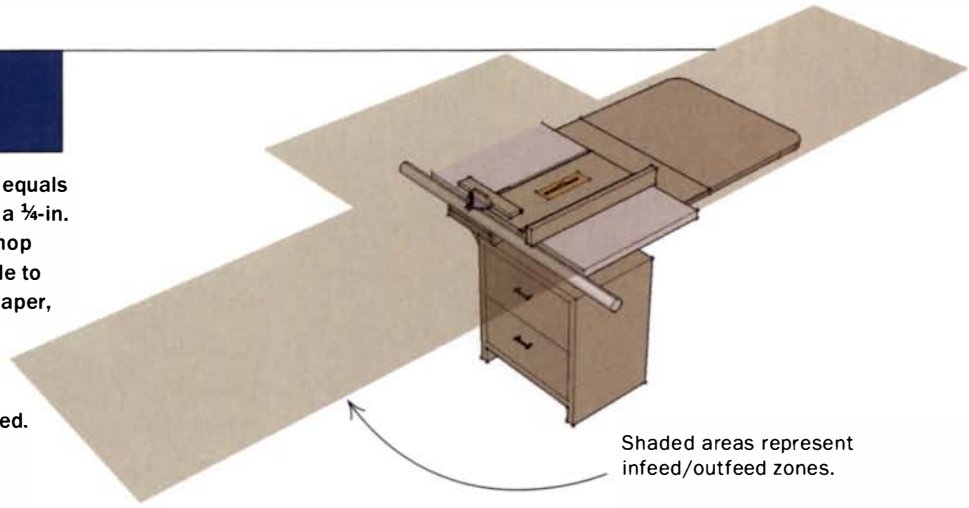


A little planning makes a big difference. By setting up his shop first on paper, Yurko fit all of his essential hand and power tools into a 10-ft. by 20-ft. space.

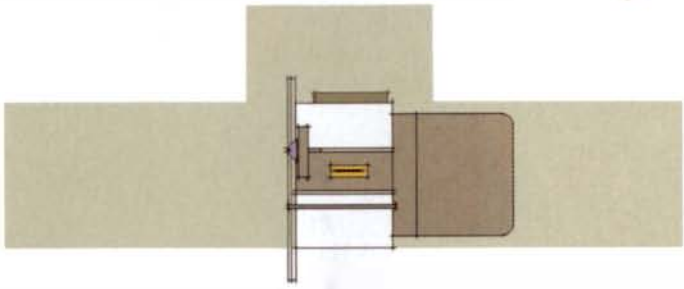
Photos: Asa Christiana; drawings: John Yurko

USE THESE TEMPLATES TO ARRANGE YOUR SHOP

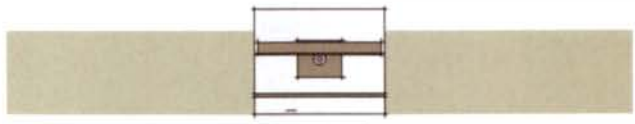
Start by laying out your shop to 1/24 scale (or 1/2 in. equals 1 ft.), which should work well on graph paper with a 1/4-in. grid. Then photocopy these models of common shop fixtures, enlarging them to 200% (or from 1/48 scale to 1/24). When cutting them out to arrange them on paper, be sure to include the infeed and outfeed zones. Note that slight adjustments to adjacent fixtures can bring worksurfaces to the same height, allowing them to share space for infeed and outfeed.



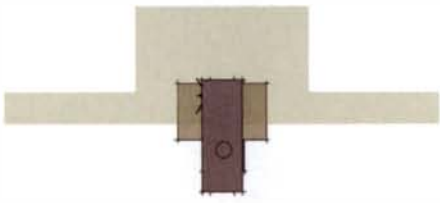
Shaded areas represent infeed/outfeed zones.



Tablesaw

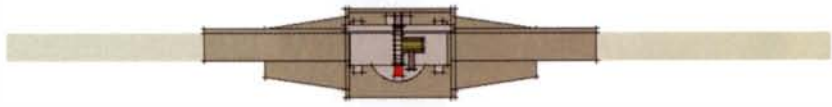


Router table

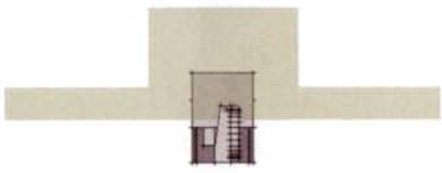


Drill press

Jointer

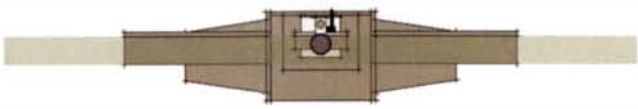


Miter saw

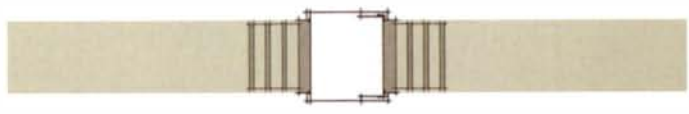


Bandsaw

12-in. planer



Mortiser



15-in. planer

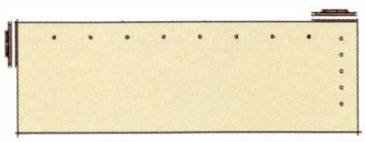
Dust collector

Clamp storage

Compressor

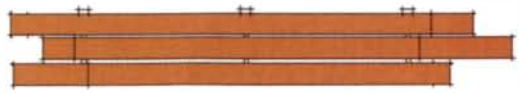
Cabinet

Sharpening station



Workbench

Scale: 1/4 in. = 1 ft.



Lumber rack

Use computer modeling for paper-free planning in 3-D

You have a few options for planning your shop space: The first is simply to photocopy the two-dimensional models provided on p. 23 and use them to create a scale layout of your shop floor. You also can go to my Web site (www.yda-online.com/shopmodels.htm) and download two-dimensional images of each tool to be used either on paper or on the computer. As a third alternative, you can download the same modeling program I used, and create three-dimensional plans.

The program is called Sketchup 4.0 (a demo version is available at www.sketchup.com, which allows 8 hours of free use). The program is easy to learn and use, even for a computer novice. If you download and learn Sketchup, feel free to go to my Web site and download my 3-D models for your own use, or use Sketchup to create your own.

By the way, I have used Sketchup to design every piece of furniture and cabinetry I've built over the last few years, even working out joinery details and making color choices on the computer. And I know of many other woodworkers across the country who have discovered Sketchup and put it to good use.

Go three-dimensional for the ultimate plan. *Creating his own three-dimensional CAD models allowed Yurko to plan vertical space as well as floor space, helping him locate spots for essential lumber, accessories, shelves, and cabinets.*

cabinets and a king-size bed with few compromises in workmanship or speed.

What I learned

I've seen many shops that are similar in size to mine, and most make serious compromises on machines yet still are choked with stuff. A typical solution is settling for bench tools or omitting some machines altogether. But I was determined not to settle, nor to lose my ability to mill rough lumber to custom sizes.

When I began to arrange my shop on paper and on the computer screen, I realized that, in a small shop, moving wood is easier than moving machines. So I ignored the idea of setting up the space for workflow—for example, creating adjacent, sequential zones for lumber storage, rough dimensioning, final dimensioning, joinery, and so on. That workflow concept is more appropriate for larger or commercial shops.

My first priority was to fit essential machines and fixtures in the space, including a tablesaw, miter-saw station, drill press, bandsaw, benchtop planer, benchtop disk/belt sander, compressor, router table, and workbench. My second goal was to keep them as stationary as possible.

It was immediately apparent that the key to this design challenge would be infeed and outfeed space for each machine. These spaces can overlap, but it takes careful planning to make sure nothing gets in the way.

Basically, I created a linear outfeed area, which includes the miter-saw station with folding wings, tablesaw with folding outfeed table, and my large router table, all in a line along the 20-ft. wall and set at the

Everything within arm's reach. *Using two- and three-dimensional CAD models, Yurko crafted a bench area that packs in hand tools, air tools (and a compressor), a sharpening station, and hardware storage.*

same height. The miter-saw station converts easily for use with a mortiser—with workpiece support on both sides—and it also accepts a minilathe. I even planned a location for all of the tools, blades, and jigs used with the tablesaw: on the operator side, for easy access.

Along the opposite long wall are the planer, combination sander, drill press, bandsaw, workbench, and compressor. Each tool has dust-collection hookups and storage space to keep the relevant tools, bits, blades, and fixtures nearby. The planer is the only tool I have to roll out into the middle of the room to use, which takes about a minute, including connecting the dust-collection hose.

Using the three-dimensional models, I also realized that even though the bandsaw's table must be higher than the adjacent workbench, I can support large pieces with a shopmade roller support clamped in the bench's front vise.

Pros and cons of a small shop

For all of my planning, I must admit there simply was no room in my shop for some tools. I struggled to find a place for my wide jointer and eventually decided against shoehorning it in, instead making a fixture for my router table that joints edges quite well. My scrollsaw, the bulk of my wood supply, and some storage cabinets didn't make the cut either. These remain in a nearby room.

In many ways it's more enjoyable to work in a small space. Because most everything is only a couple of steps away, I'm much less fatigued after an evening of woodworking. The hours I spent planning have already saved me many hours of precious shop time. □

John Yurko is an architect and hobbyist woodworker in Asheville, N.C.

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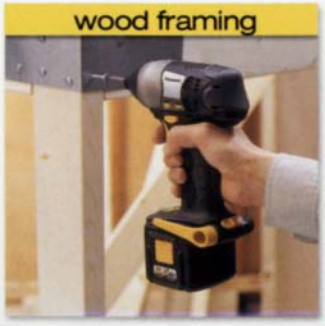

*Using impact driver's hard torque mode: 345 wood screws (dia. 5/32" x 1/2") into yellow pine or 340 self-drilling screws (dia. 5/32" x 1/2") into sheet metal (t = 1/16").

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READER SERVICE NO. 92

Finishing sander has quick-change paper system

I prefer using a palm sander, or finishing sander, rather than a more aggressive random-orbit sander. Because a finishing sander cuts more slowly, it gives me greater control over the outcome. Also, finishing sanders can get into corners, which is something the round pad on a random-orbit sander cannot do.

The biggest disadvantage of finishing sanders always has been the time-consuming inconvenience of loading up a new sheet of paper. Bosch has solved that problem with the new SheetLoc system on its No. 1297D sander.

Pushing a large spring-loaded button on the front of the tool makes the sander accept the leading edge of the paper, letting the trailing edge fall where it may. On the back of the tool, a lever system with a pivoting steel bar smooths out the sandpaper and clamps it tightly in place. With this system, it's not necessary to fold the edge of the paper or to get it lined up exactly right in order for it to fit properly, as I've had to do with every other finishing sander I've ever used. The device is simple and ingenious.

The Bosch sander isn't perfect. Its on/off switch is too small, and the dust-bag attachment requires an extra piece if you want to hook up the sander to a shop vac. But for the time and aggravation it will save over the lifespan of the tool, the SheetLoc system alone is reason enough to buy one of these sanders. The manufacturer's suggested retail price is $95, but if you shop around, you can buy this tool for about $55.

—David Sorg writes frequently about finishing topics. His Web site is www.finefurniturefinishing.com.

A locking lever. *With the SheetLoc system, a spring-loaded device on the front of the tool holds one edge of the paper in place. Then a steel bar draws the paper tight and secures it to the sander.*

Holes help collect dust. *Put holes in a fresh sheet of paper using the plastic punch plate.*

Photos, except where noted: Rodney Diaz; this page (bottom left and right): Mark Schofield

Titebond III is much more than waterproof

I've been a fan of Titebond's original yellow wood glue for years, and I can't recall any glueline failures that could be attributed solely to the adhesive. But a few years ago I was lured away from my trusty yellow glue by the company's new Titebond II, advertised as having the benefits of Type II water-resistance. I wasn't sure what that meant, nor why I thought I needed a water-resistant glue; most of the furniture I build is meant to stay indoors.

Gluing with Titebond II proved problematic. My shop in Minnesota is 50°F to 60°F in winter, and the glue has a chalk point of 55°F. The chalk point is the temperature at which the glue dries to a flaky, nonadhesive powder rather than a translucent adhesive film. After enduring a few failed glue-ups, I abandoned Titebond II. I ended up switching back to Titebond's original yellow glue, which I've been happy with ever since.

But now there's Titebond III Ultimate Wood Glue. It has an even better, Type I water-resistance (which translates to "waterproof" on the label), coupled with a 47°F chalk point and a 10-minute assembly time. The water-resistance is still no big deal for me, but a glue that offers low-temperature application and an open time about twice as long as other yellow glues is worth trying out.

Before committing to a project, I tested Titebond III glue on ¼-in.-thick maple cut into 2-in.-wide strips, and I was pleased with the results. I applied the glue at about a 5-mil thickness (wet) to the glue area of each strip, using a standard mil-gauge to measure it. Half of the test strips were clamped together after one minute; the remaining strips were left open for 10 minutes and then clamped under pressure. The second group of samples was noticeably dry when clamped together after 10 minutes. I observed very little squeeze-out, but the bond held.

My experiments were less than scientific, yet they were enough to convince me that Titebond III is a very good woodworking glue. When wet, the glue goes on as a light beige color, and it dries to a darker, medium-brown tone that is compatible with most woods, resulting in an almost invisible glueline.

What I like most about Titebond III glue is that I can use it in colder temperatures, and it gives me more time to assemble a project.

—Chris Minick is a chemist and a consulting editor for Fine Woodworking.

Hand-cut rasps leave a smoother surface

Auriou, a French company that has been producing high-quality, hand-cut rasps since 1856, is one of the few companies in the world still doing so. These abrading tools are used for sculptural shaping and detail work. Unlike a file, which has long rows of teeth across the width of the tool, rasps have smaller teeth cut all over the face. Auriou makes an array of rasps in different shapes and sizes, all with varied stitching (the number of teeth) and grain (the size of teeth). They also make left- and right-handed versions.

One advantage of hand-cut rasps is the way the teeth are positioned on the surface of the tool. Because the placement of the teeth varies, the result is a chatter-free cut. Auriou rasps, unlike machine-made rasps, have teeth up to the edges of the tool, allowing you to cut all the way into a corner. The teeth also extend to the tapered tip of the tool, enabling use in hard-to-reach places.

I tested an 8-in. Auriou cabinetmaker's rasp (with a fine No. 13 grain cut, flat on one face, half-round on the other) on some Chippendale chairs I was working on. The rasps made quick work of cleaning up and perfecting the shapes on the pierced back splat and sculpting the crest rail.

Woodworkers who do a lot of sculpting and shaping may want to consider the advantages of Auriou rasps. The only disadvantage of these rasps is their cost. The cabinet rasp I used sells for $80, roughly twice what you'd pay for a quality machine-made tool. Auriou rasps are available from www.toolsforwoodworking.com (800-426-4613) and from www.thebesthings.com (800-884-1373).

—Chris Gochnour makes furniture in Washington, D.C.

Photo, this page (bottom): Matthew Berger

An inexpensive and accurate depth gauge

The Gauge/1 depth gauge has worthwhile features not limited to its accuracy and low price. The tool comes with a novel blade lock that works beautifully, and the plastic molding is shaped like an I-beam in section and appears to be unbreakable.

To use the depth gauge, place the frame over the item to be measured, slacken the blade, gently slide it into contact, and then push the lever to lock the blade in place. The gauge is relatively stable as it straddles a router bit or a sawblade for measuring depth of cut, but I found it had to be steadied sometimes. The range of vertical measurement is 3 in., which is more than necessary for any router bit but maybe a little too modest for a sawblade. The footprint between the two legs is 2 5/16 in.

Simple but effective depth gauge. The cam lever at the top of the tool locks the stainless-steel rule in place.

In good light, measurements can be read to the nearest 1/32 in. or millimeter using a magnifier. The reflective blade, however, isn't ideal; a matte finish would be easier to read.

The Gauge/1 costs $10 (859-485-2080; www.trend-usa.com).

—Pat Warner is the author of The Router Book *(The Taunton Press 2001).*

Vornado is a compact and quiet shop fan

Vornado Air Circulation Systems recently introduced a new heavy-duty shop fan. Its polypropylene body on a steel base has a removable grille for easy cleaning. The unique design concentrates airflow and puts it where you want it. With a choice of three speeds, the Vornado is quieter than a standard box fan. You can buy one for $100 (plus shipping) directly from the manufacturer at www.vornado.com, or call them at 800-234-0604.

—William Duckworth is an associate editor.

Excellent new spokeshave

It used to be that when you spent a few dollars on a new spokeshave, you still had several hours of tune-up time ahead of you. Not so with this new spokeshave made by Kansas City Windsor Tool Works. The A-2 steel blade is sharpened before it's shipped, and the tool is tuned for optimum performance.

The first things I noticed about this spokeshave were its beautiful curly-maple body and its light weight. The position of the cutting edge can be finely adjusted in relation to the inlaid brass sole, or wear plate. The low-angle blade makes it easy to maintain the edge because the bevel side is hollow-ground. This spokeshave excels on end-grain cuts.

You can buy one for $100 from either the maker (816-523-8745; www.kcwtw.com) or from the Tools for Working Wood catalog (800-426-4613; www.toolsforworkingwood.com).

—Curtis Buchanan makes chairs and teaches woodworking in Jonesborough, Tenn.

Smooth ride. This spokeshave can produce a smooth surface on both hardwoods and softwoods, and it excels on end grain.

Photo, this page (center right): Curtis Buchanan

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BOSCH

A Workshop Steeped in History

Modern maker of 18th-century furniture offers some tips on working smart

BY EUGENE LANDON

Eighteenth-century shop lives in the 21st century. *Though only antique hand tools are readily visible on the walls of his shop, Landon does employ modern machinery in his reproduction work.*

When someone enters my shop, invariably they feel as if they've stepped back in time. The walls are lined with antique hand tools, the floor is made from wide pine boards, and period furniture pieces are all around in various stages of construction or repair. Visitors who are woodworkers are the first to notice the modern chopsaw, the tablesaw, and, upon closer investigation, a nearly buried heavy-duty thickness planer. Their reaction is sometimes relief: "He's one of us after all—he does use power tools."

I'd be the first to admit that I have a serious tool-collecting habit. Like all collectors, I love the anticipation of attending an auction or tag sale and finding an heirloom tool. My favorite old tools are a rosewood marking gauge and a ½-in. Marples chisel with a boxwood handle. When I discovered a few years ago that this model was being discontinued, I quickly bought several more so that I'd have a lifetime supply. My most valuable tool is probably one of my 19th-century plow planes.

Unlike pure collectors, I still use my old tools; that's how I justify my huge collection. All molding is done with a combination of molding planes and carving tools, so, not surprisingly, I have large collections of both. Most woodworkers are taught to make the carving or molding fit the tool, but when you are making exact reproductions, it has to be the other way around.

There is one kind of hand tool that I believe is better new than old: Modern metal bench planes are infinitely superior to antique wooden ones. Both planes give an identical finish, but unlike wooden planes, metal planes aren't affected by changes in humidity. I don't have to waste time setting up a metal plane each time I use it.

Tools are stored for convenience, not for display

When it comes to tool storage, each tool must be easily recognizable and readily available. If the tools look good lining the walls, so much the better. I don't keep anything locked away in display cases. And I

Hand-tool heaven. *Landon justifies his huge collection of molding planes (above) by using them to cut all of his moldings. He also owns an extensive collection of carving tools for use on work such as this cartouche (right) that will adorn the top of a secretary.*

prefer to store carving tools in drawers on a rolling cart so I can move them to where I need them.

A dozen drawers under my main workbench store tools, but most of the ones I use regularly are stored on a shelf behind the bench, and sometimes even on the bench. I don't believe in wasting time fetching and returning tools just for the sake of keeping the benchtop clear.

Some storage methods simply evolved after many years working in my shop. For example, I store my files in a cross section from a tree branch to keep them close at hand. I don't have to open a door or a drawer to get at them, and despite their numbers, I know the location of each one.

Several benches allow working at an optimal height

When you are young, a comfortable place to work is a luxury; when you get to my age, it is a necessity. Most woodworkers' benches are too low. In the 18th century, all wood was planed from rough to finish by hand. But to plane away machine marks, less downward force is required, so it is more comfortable to work at a higher bench.

For carving, my Emmett patternmaker's vise is ideal. It can grasp odd-shaped workpieces and hold them at whatever angle is best for carving. I prefer to carve in natural light, so my benches are positioned to take advantage of light from the windows. Because my shop is deep in the woods, though, I usually end up using a desk lamp for extra light.

The top of my main workbench bears the scars from well over 30 years of use. I can see little point in having a pristine surface on a bench—the perfect wood surfaces leave the shop. I bought the bench used, added the storage drawers underneath, and raised the height to a more comfortable 36 in., which also matches the height of the carts in my shop.

Making the 18th-century masterpiece

What motivates me to come into this workshop each day? It certainly is not because I want to be remembered by posterity; none of my pieces are signed. In part, I am motivated by my love for this style of furniture. I admire the craftsmanship that went into the original pieces, and if in a century's time an expert can't tell my piece from an original, then I will be well pleased. □

Eugene Landon makes 18th-century furniture near Williamsport, Pa.

Faithful vs. fast

No piece of furniture leaves my shop showing anything but the marks left by hand tools, even the insides of joints that never will see the light of day again. I also know, as any professional does, that time is money and that it pays to use power tools to make a piece as quickly as possible. Solving this contradiction—making reproduction furniture fast, and making it as faithful as possible—dominates the way I work.

A PLAN AND A RECORD OF EACH PIECE

Making faithful reproductions requires dead-accurate plans. I photograph, measure, and trace the carving of an original piece, then create templates for all of the components. When I'm finished, all of these documents are filed away should I ever need to build the same piece again.

I often wonder how an 18th-century woodworker might have tackled a problem. One technique I am particularly proud of is using rawhide as a template for making identical carvings. I haven't found conclusive evidence that this method was followed in the 18th century, but the material was readily available, and I can't think of what else furniture makers back then would have used. Thin, damp rawhide is tightly bound around an existing carving and left for 24 hours. When the material dries, an impression remains. I cut away the surplus rawhide, leaving a perfect template, which I shellac to preserve. Using this method, I can lay out identical carvings on a set of chairs very quickly.

NATURE PREPARES MY LUMBER FOR MACHINING

A piece of furniture begins life behind my shop, where I air-dry thousands of board feet of hard- and softwood. I leave the stacks stickered and exposed year-round, which improves the color of the heartwood, although the sapwood rots. After two or three years, I dry the wood more in my electric kiln.

After I cut the boards to length, I joint and thickness them by machine, leaving about 1/16 in. in thickness to be removed with a handplane. Many 18th-century pieces were made from boards 2 ft. or 3 ft. wide, which I try to use where appropriate. Such magnificent boards, however, don't fit in my 16-in. planer. I take extrawide lumber to a large commercial shop that has a 48-in. planer.

THE BANDSAW AND LATHE TAKE OVER

Every cabriole leg starts out on my 20-in. bandsaw, a wonderful tool made by the American Saw Mill Machinery Co. and dating from goodness knows when. I use this machine far more than the tablesaw for cutting straight-grain sections from a board, multiple chair parts, and cabriole legs. I use only a ¼-in. blade. My 18th-century colleagues would have employed a bowsaw, but mine stays hanging on the wall.

My lathe, made by Hill, Clarke and Co., has babbitt bearings and is at least 100 years old. I commonly turn finials, the feet of cabriole legs, and the quarter columns found on many period case pieces. Many woodworkers try to create these columns from a single piece of wood, which means they can't make through-flutes and must carve the end of each flute by hand. I copy the 18th-century woodworkers, who turned the bases and caps for an entire piece of furniture from one piece of wood, and then plowed the flutes with a No. 2 round molding plane before assembling the whole column.

Photos: Mark Schofield

TOOL TEST

14.4v Cordless Drills

We look at torque, stamina, and overall performance

BY ROLAND JOHNSON

KEY FEATURES TO LOOK FOR

All of the 14.4v drill-drivers tested are powerful tools that can bore large holes and drive screws. But a few features and high-quality parts can make the difference when shopping for one of these tools.

CHUCK

Single-sleeve keyless chucks with an automatic shaft lock can be tightened with one hand (below left). The double-sleeve chucks (below right) require two-handed tightening.

GRIP AND BALANCE

Look for a handle that isn't too large for your hand. If you have the chance, try the fit before buying. Also, a drill-driver that is a little nose heavy can help you control the tool while drilling and driving.

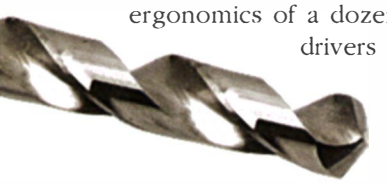
BATTERY

Avoid battery mechanisms that are difficult to operate or require that you have a big hand in order to release the battery from the drill. Johnson prefers an easy-to-release battery over one with a longer run time.

I bought my first cordless drill in the mid-1980s thinking it would be great for those outdoor projects where no electricity was available. It quickly exceeded my expectations and became one of the handiest tools in my shop. At the same time, cordless drills had a profound effect on the portable power-tool industry, forging the way for many cordless tools to come.

Technology has changed cordless tools for the better since my first 9.6v Makita, especially in the areas of power, size, and cost. Manufacturers say that sales of 14.4v drill-drivers are outpacing lower-voltage models because they have more power and stamina than a corded drill and are reasonably lightweight and compact, making them appropriately sized for most woodworking tasks.

I spent a few weeks in my shop drilling, driving, and comparing the features and ergonomics of a dozen 14.4v drill-drivers from several major manufacturers. Two clear categories emerged. For just less than $100, you can get a tool that will power through common drilling and driving tasks but that lacks stamina and heavy-duty parts. The drill-drivers in this category include those from Black & Decker, Delta, Hitachi, Ryobi, and Skil. Then there are the drill-drivers that cost closer to $200. These beefier tools provide more power and stamina than you need for most tasks in a woodshop. The manufacturers of the higher-priced drill-drivers I tested are Bosch, DeWalt, Makita, Milwaukee, Porter-Cable, Ridgid, and Sears. (For more on the specs and performance of each tool, see the chart on pp. 46-47.)



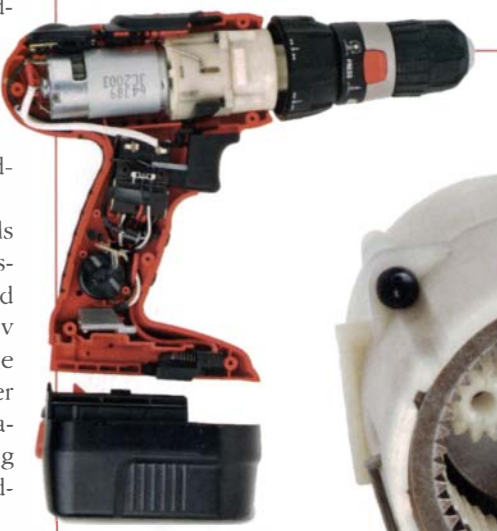
Stamina will cost you

The first characteristic I looked at was stamina, which determines how long you can use a drill-driver before you need to swap its battery. While each tool came with two batteries, there still is a benefit to getting more out of each charge. I conditioned all of the batteries following manufacturer-recommended procedures. Each battery went through five charge/recharge cycles to achieve peak power.

On a fresh charge, all of the drill-drivers

What's the difference?

$90

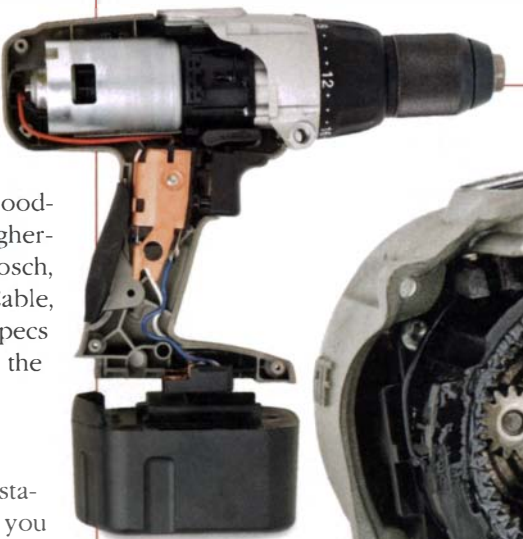


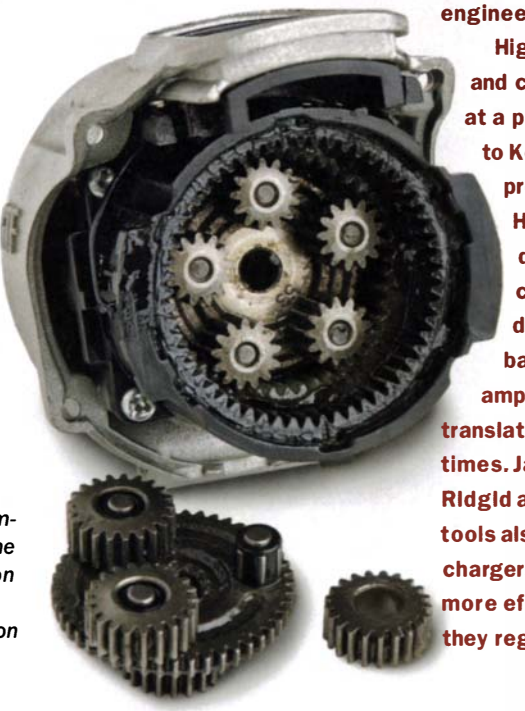
Black & Decker's transmission assembly is mostly plastic, but metal is used for select components.

There are two levels of pricing among the drill-drivers I reviewed. For less than $100, you can choose from models aimed at the do-it-yourself crowd. For roughly twice that amount, you can buy a professional-grade drill-driver with higher-quality parts and plenty of stamina.

David Johnston, director of product development for construction tools at Porter-Cable/Delta, said the professional-grade tools benefit from high-quality features, such as single-sleeve chucks with carbide jaws, all-metal gears, substantial gear housings, as well as better motors and bearings than those in less-expensive drill-drivers. He also pointed out that there are fewer gimmicks (see p. 43) on professional-grade tools, with the higher cost of the tool paying for better engineering and materials.

$170





Porter-Cable's drill-driver features all-metal gears in its transmission assembly. Additionally, one set of gears spins on roller bearings, further reducing friction between parts.

High-quality batteries and chargers also come at a price, according to Kevin Fairchild, a product manager in Hitachi's cordless-drill division. That company's costlier drill-drivers feature batteries with higher amp-hour ratings, which translate to longer run times. Jason Swanson of Ridgid added that pricier tools also include battery chargers that are faster and more efficient in the way they regulate a charge.

Photos: Matt Berger

Most batteries recharge in an hour or less

Simple arithmetic proves that you likely will spend just as much time using your cordless drill-driver as you will charging the batteries. So it is important that the battery charger included with your drill is of good quality and easy to use.

Except for the Ridgid and the Black & Decker, each charger will power up a battery in one hour. Ridgid's charger can charge two batteries at once, and each takes just a half-hour. The Black & Decker, meanwhile, comes with a three-hour charger. The chargers for Delta and Skil failed during our tests but were replaced with functioning units by the manufacturer.

The method for releasing the battery from the drill-driver is also something to be concerned with. Some of the tools have batteries that drop from the handle, while others have batteries that slide off the handle. Neither design is better. However, the larger the battery, the more cumbersome it is to remove. I found the low-profile batteries on the Makita and Milwaukee were easy to grasp, while the Bosch battery was a bit of a handful.

Drop-release batteries. *About half of the drill-drivers tested have batteries that drop from the handle. This design can be cumbersome if the battery is large, as you have to stretch your hand around the battery to release it.*

were able to run 2½-in.-long #8 wood screws into sheets of medium-density fiberboard (MDF) and blocks of hard wood longer than my arm could bear.

So rather than measuring stamina by driving screws until the batteries simply ran out, I decided that I could get comparable results by boring holes repeatedly with a 1½-in. spade bit, which consumes a lot of power. With each drill-driver, I bored as many holes as I could into 1-in.-thick red oak before the battery power was drawn down far enough that the spade bit would no longer cut. I identified a wide variation between the shortest and longest run times, especially between the tools in the two price categories.

Of the higher-priced drill-drivers I looked at, the best performer was the Makita, which bored 22.75 holes. The Sears Craftsman cashed out at 14.5 holes—the lowest performer in its category—with the others falling somewhere in between. Of the less-expensive drill-drivers, the Ryobi model performed the best, boring 10.25 holes, compared with the Skil, which stopped cutting after just more than 4.6 holes.

This test proved that you get what you pay for: The best performer among the pricier drill-drivers bored more than twice

Better balance. *The Milwaukee is one of several drill-drivers with a battery that slides on and off. The battery on the Milwaukee is unique in that it can be mounted in two directions (bottom) to change the center of balance for different operations.*

Charge it. *Nearly all of the drill-drivers tested come with a single, one-hour battery charger. The Ridgid is an exception; it recharges two batteries at a time and takes only a half-hour for each.*

Are bells and whistles just noise?

There really are only a few useful features that manufacturers have added to cordless drill-drivers. Blinking lights and belt clips don't enhance the power or performance of a drill-driver, so don't let those features influence your buying decision.

Some features, however, are valuable. There's nothing worse than reaching for your cordless drill-driver only to find that it's missing bits. One convenient feature that manufacturers have incorporated into drill-drivers is built-in bit storage. All of the drill-drivers tested, except the Milwaukee and Sears Craftsman, have storage on the handle or motor casing for driver bits. The Ryobi also has a magnetic plate on its base that holds drill bits and screws.

Bubble levels integrated on the top or back side of the motor housing also are useful when you must drill plumb in the vertical or horizontal position. However, built-in levels don't guarantee accuracy, perhaps because while the drill might be level, the workpiece might not.

Auxiliary handles, which come with the Milwaukee and Ridgid, also can be advantageous. They are especially convenient when trying to control the power of these tough tools while boring large holes or driving large screws.

Bells and whistles. *Skil wins the prize for the most doodads on its drill-driver, including a removable stud finder, which also lights up when the drill is in use.*

Check for level. *The Ryobi drill-driver features two bubble levels, including a bull's-eye level on the back end that helps align the tool 90° for vertical drilling.*

Get a handle on your drill. *The Ridgid, as well as the Milwaukee and Bosch, comes with a removable auxiliary handle that provides extra leverage when boring large holes or driving large screws.*

as many holes as the best performer among the less-costly tools.

Torque, power are measures of toughness

Torque, the amount of force applied to the driver or bit, is one of the most important characteristics of a drill-driver. Another important characteristic is power. To measure these, we consulted technicians at the test facilities at Consumers Union (for more on the tests, see the story on p. 45).

Each drill-driver was tested on multiple runs, each time with a fresh battery. The results of the tests were combined into a single rating. Again, there was a difference between the two categories of tools. All of the low-cost drill-drivers received a good rating, while the higher-priced tools received a very good or excellent rating.

The Ridgid and Bosch took the two top spots in both of the tests, and the Hitachi finished last in both tests. The Milwaukee rated third in power but was middle of the road in torque, while the Craftsman rated third in torque but scored a middle-of-the-road rating in power.

Adjustable speed adds control

All of the drill-drivers have two speed settings, with the exception of the DeWalt, which has three. Generally, the low-speed setting produces high torque at a slow speed. (This can be compared to putting a car in low gear to climb a steep hill.) The low speed is best for driving screws and boring large holes. The high-speed setting produces less torque and is useful for drilling small holes, especially in metal. All of the drill-drivers also have pressure-sensitive triggers; the harder you squeeze the trigger, the faster the chuck spins.

Each drill-driver has an adjustable clutch, which stops driving a screw when a certain amount of torque has been reached. This function can be used to prevent stripping a

screw head or driving a screw too deep. All of the drill-drivers have in excess of 16 different torque stops.

Chucks should grip tightly with little runout

All of the power in the world is useless if it can't be applied to the cutting edge. A chuck that can't grip a bit tightly not only wastes the power of the drill-driver, but it also wreaks havoc with the bit's shank.

In the days of keyed chucks, it was essential to tighten the chuck at all three positions for heavy drilling. The advent of keyless chucks—a feature found on all of the drill-drivers tested—has eliminated the need for a key. However, some of the keyless chucks were not so easy to tighten.

Most of the keyless chucks in this review accept ½-in.-dia. shanks, but the Black & Decker, Delta, Hitachi, Ryobi, and Skil are limited to ⅜-in.-dia. shanks. The drill-drivers also feature one of two different styles of keyless chucks: a ratchet-style, single-sleeve chuck with an automatic shaft lock, or a double-sleeve chuck.

Single-sleeve chucks are designed to be tightened with one hand. I was able to crank these chucks real tight without too much stress on my hand, something the arthritis in my thumb joints appreciated. I especially liked the knurled-metal single-sleeve chucks on the Milwaukee, Porter-Cable, and Ridgid. They were easier to grip than the plastic kind.

Drill-drivers with a double-sleeve chuck were difficult to tighten, requiring me to hold one of the sleeves with one hand and crank the second sleeve with the other. If either sleeve was too small, it was difficult to get a good enough grip to tighten it thoroughly. That was the case with the Hitachi and Ryobi. The Hitachi was particularly hard to tighten with its short, tapered front sleeve. The double-sleeve chucks on the Delta and Black & Decker were large enough to get both my hands around.

Testing the gripping power—To measure the grip of the various chucks, I installed a 1½-in. Freud Diablo Forstner bit into each of the drill-drivers and bored into 3-in.-thick pine and red oak. I colored the shank of the Forstner bit with a marker; if the bit turned in the chuck jaws, a visible streak was left on the shaft. Some of the chucks could be tightened enough to actually leave indentations in the bit shank from the hard edges of the chuck jaws.

Each of the single-sleeve chucks gripped the bit shank hard enough to keep it from slipping under the most severe wood-boring conditions. But some of the double-sleeve chucks showed signs of slippage. The Black & Decker and Hitachi slipped while boring into both the hardwood and softwood samples. The Ryobi and Makita held firmly in softwood but showed signs of slippage in hardwood.

Measuring chuck runout—While not as critical with a handheld drill-driver as with a drill press, chuck runout still is a concern. Too much runout can make accurately placing a spinning bit nearly impossible, and a wobbling bit can rob

More power from 15.6v drills

Three manufacturers—Metabo, Panasonic, and Hilti—don't make 14.4v drill-drivers and instead have equipped their midsize tools with 15.6v batteries. These tools are a little more expensive than the 14.4v models tested (except for the $425 Hilti, which is aimed at professionals), but they performed slightly better overall.

A Metabo representative said that the company produces a higher-voltage midsize drill-driver because it was able to "provide a more powerful drill, while remaining price-competitive." Its drill-driver is roughly $10 more than the highest-priced 14.4v tool, similar to the Panasonic.

The three 15.6v drill-drivers had more stamina in the 1½-in. hole-boring test, compared with the 14.4v models. Each one outlasted the 14.4v drill-drivers in the number of holes bored, with the Hilti taking the top spot at 27.75. The Metabo and Panasonic were not far behind. However, they didn't stand out on the torque and power tests. The Metabo got an excellent score, trailing only the two top 14.4v performers, while the Panasonic and Hilti received very good ratings.

Weight also isn't much of a concern with the 15.6v drill-drivers. The Panasonic and Hilti weighed in at just under 5 lb., consistent with the high-priced 14.4v models. The Metabo was about 6½ lb. but still not any heavier than the biggest 14.4v model.

Better but not necessarily bigger. *The 15.6v drill-drivers from Metabo, Panasonic, and Hilti are powerful and have more stamina than the 14.4v models, without being much bigger or heavier.*

power while creating less than perfectly round holes. Any excessive out-of-round motion will cause larger bits to jam easily; spade bits are especially prone to jamming.

Most of these drill-drivers had commendably low runout. The best was the Makita, with 0.002 in. of runout. The worst was the Black & Decker, which has a quick-release chuck that was removed easily to facilitate hex-shaft bit use; but the chuck fit poorly on the drill shaft, resulting in 0.022 in. of runout.

My choices

After I spent a few weeks in the shop getting to know the drill-drivers, the Milwaukee stood out. Its power was controlled easily with a sensitive trigger, and its fairly slim handle fit my hand nicely. The ½-in. chuck was one of the best and most pleasant to use. The Milwaukee has no gimmicks; it's just a smooth-running, powerful tool.

With a great drill chuck and smooth power, the Porter-Cable is a close runner-up. But I had trouble changing the battery, and this tool didn't score as high on the stamina test.

Among the lower-priced drill-drivers, Best Value goes to the Ryobi. It bored the most holes on a single charge and performed the best in the torque and power tests among the tools in its price category. The magnetic pad on the base of the handle for holding loose bolts and screws was one of a few useful extra features.

A close second for Best Value is the Hitachi. While it trailed the competitors in both the torque and power tests and had problems with slippage, it excelled as a workbench tool. Its light weight and compact size made it great for running small screws and boring small holes; and it won't wear you out by the end of the day. □

Roland Johnson is a contributing editor.

Independent lab tests torque and power

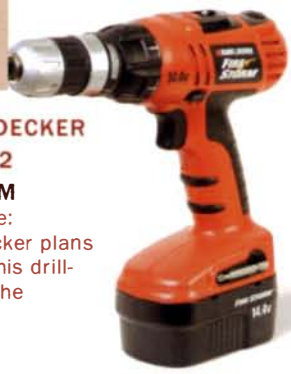
To find out just how tough these tools were, the test lab at Consumers Union, publisher of *Consumer Reports*, put each drill-driver through a series of rigorous and methodical tests to measure their overall power.

The first test measured torque, using a similar method as employed by manufacturers: The drill-driver was mounted in a vise and chucked up to a static digital-reaction torque meter. It measured the amount of torque in inch-pounds (in.-lb.), by recording the twisting force of each drill-driver. With the exception of the Makita and Ridgid, the test results came in lower than what manufacturers stated in their product literature. The DeWalt and Milwaukee scored more than 100 in.-lb. lower than their advertised numbers.

Next, the drill-drivers were mounted in a dynamometer to test maximum power output: The drill-driver was brought up to full speed, and then a load was put on the tool until it nearly stalled. The test results, measured in watt-seconds, recorded the energy created at peak output. In practical terms, this test measured the amount of power the drill-driver could deliver when twisting a bit through a workpiece.

Testing torque. *Peter Sawchuck, an engineer with Consumers Union, measured torque at a lab in Yonkers, N.Y. (left). Each drill was mounted in a dynamometer (above) to measure power.*

Drills under $100



BLACK & DECKER FSD142K-2 FIRESTORM
Editor's note: Black & Decker plans to replace this drill-driver with the FS1402D.

DELTA SHOPMASTER CL144

HITACHI DS14DVF
Editor's note: Hitachi plans to replace this drill-driver with the DS14DMR.

RYOBI SA14402

SKIL 2587-05

Drills over $100

BOSCH 33614

DEWALT DW983 XRP

MAKITA 6337DWDE

MANUFACTURER/ MODEL	CONTACT	PRICE	WEIGHT	TRANSMISSION ASSEMBLY*
DRILLS FOR LESS THAN $100				
Black & Decker FSD142K-2 FireStorm	www.blackanddecker.com 800-544-6986	$90	4.2 lb.	Plastic and metal
Delta ShopMaster CL144	www.deltawoodworking.com 800-223-7278	$60	4.5 lb.	Metal
Hitachi DS14DVF	www.hitachi.us/hpt 800-829-4752	$89	3.7 lb.	Plastic and metal
BEST VALUE Ryobi SA14402	www.ryobitools.com 800-323-4615	$90	4.4 lb.	Metal with plastic ring gear
Skil 2587-05	www.skil.com 877-754-5999	$80	4.2 lb.	Metal
DRILLS FOR MORE THAN $100				
Bosch 33614	www.boschtools.com 877-267-2499	$180	5.3 lb.	Metal
DeWalt DW983 XRP	www.dewalt.com 800-433-9258	$189	5.3 lb.	Metal
Makita 6337DWDE	www.makita.com 800-462-5482	$199	5 lb.	Metal
BEST OVERALL Milwaukee 0616-20	www.milwaukeetool.com 800-729-3878	$140	5.8 lb.	Metal, except for shift from first to second gear
Porter-Cable 9978	www.porter-cable.com 800-321-9443	$170	5.7 lb.	Metal
Ridgid R83015 X2	www.ridgid.com 800-474-3443	$189	6.3 lb.	Metal
Sears Craftsman 26927	www.craftsman.com 800-349-4358	$170	4.7 lb.	Metal

*According to manufacturers.
**Spade-bit test measured how many 1½-in.-dia. holes each drill-driver could bore in 1-in.-thick red oak on a single battery charge.
***Torque/power rating combines the results of two tests performed four times (see p. 45).

MILWAUKEE
0616-20

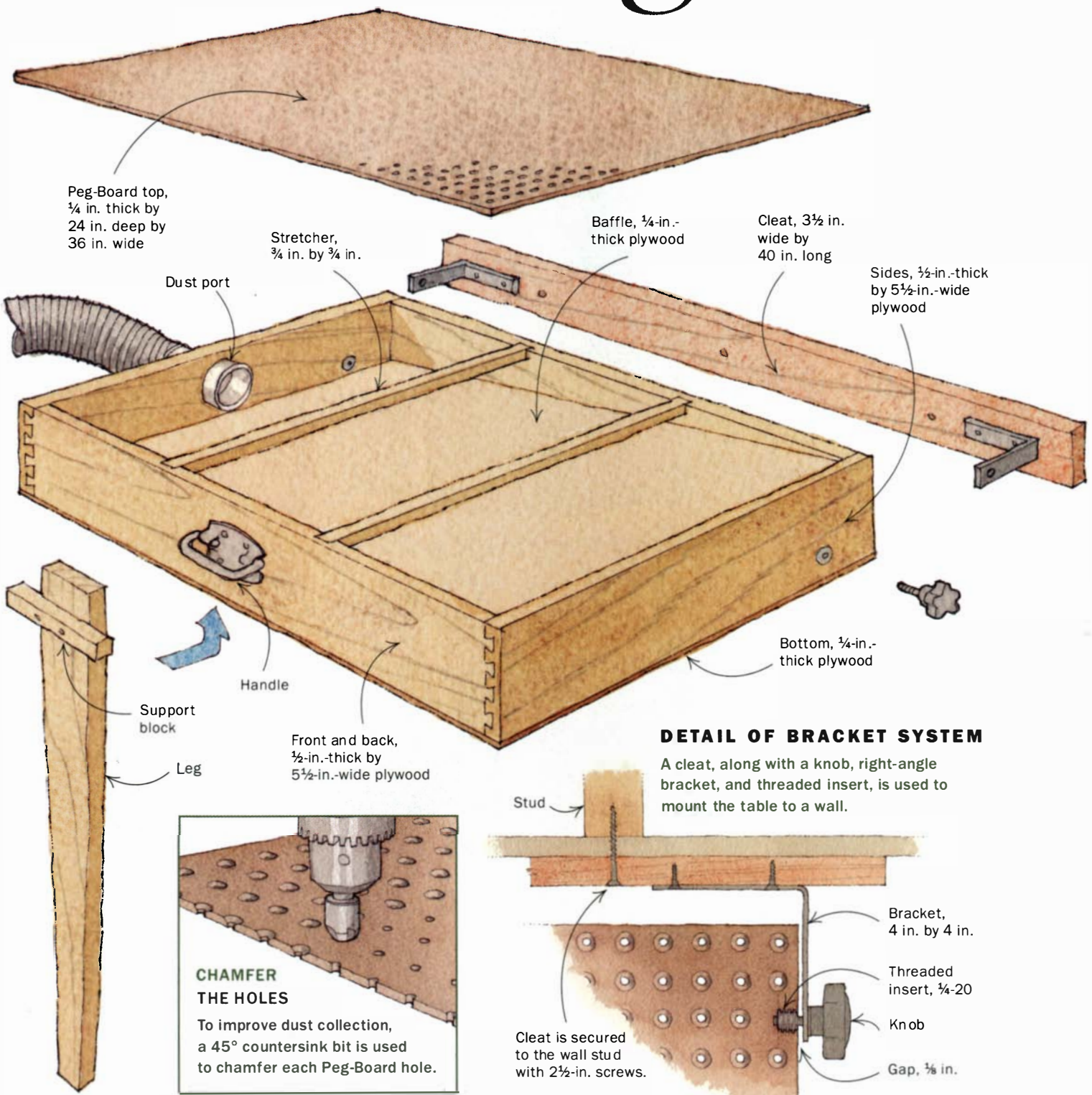
PORTER-CABLE
9978

RIDGID
R83015 X2

SEARS
CRAFTSMAN
26927

CHUCK STYLE/ PERFORMANCE	RUNOUT	DRILLING TEST**	TORQUE/ POWER RATING***	BALANCE	GRIP	RECHARGE TIME	COMMENTS
Two-piece sleeve, metal and plastic/Good	0.022 in.	4.75 holes	Good	Good	Good	Three hours	The manufacturer promises upgrades with its replacement; Quick Connect bit system created problems with runout.
Two-piece sleeve, metal and plastic/Good	0.003 in.	4.75 holes	Good	Fair	Good	One hour	A no-frills drill-driver with good power for the low-buck category; small chuck; difficult-to-release battery.
Two-piece sleeve, metal and plastic/Fair	0.005 in.	6.25 holes	Good	Good	Good	One hour	Compact size and light weight make this a nice drill, but tapered chuck was difficult to tighten.
Two-piece sleeve, metal and plastic/Fair	0.008 in.	10.25 holes	Good	Good	Good	One hour	The most powerful of the low-buck tools with features such as a magnetic pad for holding screws; small chuck.
Single sleeve, plastic/ Excellent	0.005 in.	4.63 holes	Good	Good	Excellent	One hour	The only low-cost drill-driver with a single-sleeve chuck; stud finder and other gizmos aren't very useful in the shop.
Single sleeve, plastic/ Excellent	0.006 in.	18.5 holes	Excellent	Fair	Fair	One hour	Plenty of power and high-quality build; but overly large handle.
Single sleeve, metal and plastic/Excellent	0.008 in.	17 holes	Very good	Good	Good	One hour	The only drill-driver tested with three speed settings; solid tool; the chuck held bits tightly.
Double sleeve, metal, with shaft lock/Fair	0.002 in.	22.75 holes	Very good	Fair	Good	One hour	Easy-to-change battery; tons of power; textured chuck has automatic shaft lock but requires two-handed tightening.
Single sleeve, knurled metal/ Excellent	0.003 in.	21.75 holes	Excellent	Excellent	Excellent	One hour	Bidirectional battery mount provided good balance; tons of power; lacks bit storage.
Single sleeve, knurled metal/ Excellent	0.004 in.	20.25 holes	Very good	Good	Excellent	One hour	Solid, well-built tool; great chuck; good power; battery changing was awkward.
Single sleeve, knurled metal/ Excellent	0.005 in.	18.13 holes	Excellent	Good	Good	30 minutes	Great chuck; dual battery charger; lots of muscle; but the drill-driver is too heavy for delicate woodworking tasks.
Single sleeve, metal and plastic/Excellent	0.005 in.	14.5 holes	Very good (plus)	Good	Fair	One hour	A reasonably powerful drill-driver and a solid performer, but it has a fat grip and lacks bit storage.

Fold-Down Sanding Table



CHAMFER THE HOLES

To improve dust collection, a 45° countersink bit is used to chamfer each Peg-Board hole.

DETAIL OF BRACKET SYSTEM

A cleat, along with a knob, right-angle bracket, and threaded insert, is used to mount the table to a wall.

Drawings: Jim Richey

Shopmade tool saves space and collects dust at the source

BY DAVID DiRANNA

In December 2002, a U.S. Department of Health and Human Services report officially designated wood dust as a human carcinogen. According to the report, "unprotected workers have a higher risk of cancers to the nasal cavities and sinuses."

Such blunt facts make it clear that it's important to control wood dust in the shop. As part of that effort, I built a fold-down sanding table that allows me to collect dust at the source as I sand.

The design is pretty basic. The table itself essentially is a shallow rectangular box with a Peg-Board top. A port in the side connects to the hose from my dust-collection system. When fired up, the dust collector draws air from above the table down through the holes in the top, taking along a good deal of the dust generated while I sand. Inside the box, a plywood baffle extending from one corner to the other helps improve the dust-collection effectiveness. The table mounts to the wall via a simple bracket system (see the detail on the facing page).

Construction is straightforward

I own a dovetail jig, so it was easy to join the front, back, and sides of the table with dovetails. But you don't have to use dovetail joinery. You can create strong-enough joints simply by butting the parts and screwing them together.

By the way, before assembling any of these joints, use a drill press and a circle cutter to cut a hole in one of the sides, with the hole diameter just big enough to create a snug fit for the dust port. I used a 3-in. PVC pipe coupling here. The 4-in. outside diameter of the coupling was a perfect fit for the dust collector's 4-in. hose. This also is a good time to drill a hole at the back end of each side and install the threaded inserts.

Attach the bottom of the table with glue and finish nails. Then secure the baffle with a bead of silicone caulk along the full length of all four edges.

To mount the port, first add a generous coat of epoxy glue to both the edge of the hole and the end of the PVC pipe. Slip the pipe into the hole and allow the glue to dry.

To help support the Peg-Board, add a pair of ¾-in. square stretchers between the front and back of the box. The stretchers are glued into notches cut in the front and back pieces.

I wanted the Peg-Board top to be removable, just in case I needed to open the table for cleaning or repair. So the top is secured using only flat-head wood screws. By the way, before attaching the top, chuck a 45° countersink bit into the drill press and chamfer each of the Peg-Board holes to help improve dust collection.

When attaching the cleat to the wall for mounting the table, be sure to drive the screws into wall studs for maximum holding strength. Also, mount the cleat so that the table is at a height you find comfortable for sanding.

Next, screw the two right-angle brackets to the cleat (you can find these brackets at most hardware stores). To allow the table to pivot, you need to space the brackets so there's about ⅛ in. between the side of the table and the inside face of each bracket.

Rip the leg to a width that allows it to just fit inside the handle and then cut it to length. Screw a short block near the top of the leg. The block fits under the handle, supporting the table. A couple of coats of polyurethane complete the project. □

David DiRanna builds furniture in his home shop in Fountain Valley, Calif.

READY TO SAND IN AN INSTANT

This sanding table not only makes sanding in the shop safer, but it also folds flat against the wall when not in use, saving space. Best of all, setting up or folding away the table takes just seconds. In use (right), the dust collector draws air and dust down through the holes in the top.

Down and out of the way. *Simply removing the leg allows the table to fold flat against a wall.*

Handle doubles as leg connector. *The handle not only is used to lift and lower the table, but it also connects the leg to the table.*

Photos: Tom Begnal

Shop Flooring Solutions

Quick, effective coverings for a cold concrete slab

BY ANATOLE BURKIN

Concrete is a perfect shop floor for machines. But it's not so kind to the body or to the occasional dropped hand tool. Concrete is especially nasty in the winter if your shop is in a detached building. And no matter how high the indoor-air temperature gets, the floor is always cold, even in warmer months.

Determined to get off the slab and to do it with a minimum of fuss, I surveyed what floor coverings were available. My primary goal was to find products that would be easy to install and would keep my feet from freezing in winter. Of secondary importance was to find products that acted as a moisture barrier, could protect a dropped tool, and were easy to keep moderately clean.

I found five types of flooring products that seemed to meet all of those criteria. One is a wood composite; the others are PVC based.

Wood composite vs. PVC

The wood-composite product, called DRIcore, is a subflooring material made of random waferboard bonded to a high-density polyethylene base. This

WOOD-COMPOSITE TILES

Although they're designed to be a subflooring material, on shop floors these large tiles can be used as is. Easy to install with tongue-and-groove joinery, the tiles help insulate you from a cold floor.

DRICORE

AVAILABLE AT THE HOME DEPOT
866-976-6374
WWW.DRICORE.COM

The ⅞-in.-thick DRIcore panels are about 2 ft. square and fit together with tongue-and-groove joints. The fit between adjoining tiles was good, but not as neat and tight as with PVC tiles (see pp. 52-53). This is the only flooring product that has a leveling system; special spacers can be purchased to correct for minor pitch changes in your floor. No fasteners are needed. Although sold primarily as a subflooring system for basements, the panels may be used as is. The clear acrylic finish is not meant as a wear surface but as a sealant; however, the manufacturer says it can be topcoated with a non-water-based paint or a polyurethane floor finish.

The insulation factor. *After the concrete floor and the acclimatized DRIcore tile are checked with an infrared thermometer, the readings show a 4.5°F difference. The polyethylene underside elevates the tile, providing a moisture barrier and adding to the insulation factor.*

INSTALLING WOOD-COMPOSITE TILES

Block, mallet, shims, and a jigsaw for installation. *Protect the tongue-and-groove edge with a block when knocking the tiles into place with a mallet (left). Leveling spacers are easy to position and compensate for any unevenness in the concrete floor (above). With the tiles on a stable support, cut them to size with a jigsaw.*

Photos, except where noted: Marcia Ryan; facing page: Matthew Gardner; this page: Robin Burkin (bottom left); Matthew Gardner (top right)

tongue-and-groove product was created as a base for carpet, vinyl tile, or engineered hardwood flooring, but it may be used as is. The color of DRIcore is a natural-wood tone, and the surface can be painted. A mallet and a jigsaw are all the tools required for installation.

Most of the PVC products are available in the form of interlocking tiles (Century, Lock-tile, and Resilia) and come in a variety of colors. All of the tiles can be installed with a rubber mallet and trimmed with a utility knife.

PVC flooring also comes in the form of large sheets (Better Life Technology) that unroll like a carpet and can be trimmed with a utility knife. Adjoining sheets may be laid side by side or attached to the floor at the seam with carpet tape. PVC rolls are available in numerous colors.

Costs for both composite and PVC flooring products range from about $1.25 per square foot to more than $4 per square foot.

Performance underfoot

I assembled samples of each flooring type, and they fit together easily. The PVC products were best assembled at room temperature, between 60°F and 70°F, which made them pliable and easy to connect.

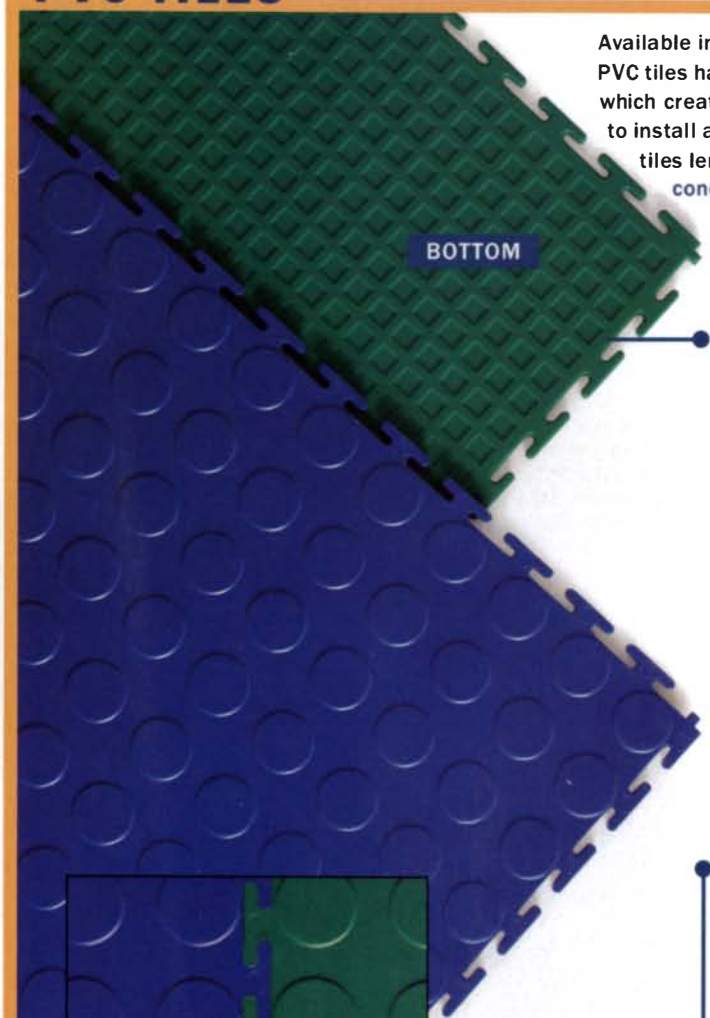
All of these flooring products provided some insulation from the concrete slab, which can reduce the rate of body-heat loss.

Covering concrete with flooring also resulted in a warmer floor temperature, although only slightly. Using an infrared thermometer, I found that the floor temperature increased by 2°F with the PVC products. With the wood composite, though, the floor temperature increased by 4.5°F, a noticeable amount. All of these products also act as vapor barriers, which, depending on how the concrete slab is constructed, may reduce the humidity in your shop.

To see how well these floor-

PVC TILES

Available in a variety of colors and sizes, PVC tiles have interlocking tabs, some of which create almost invisible seams. Quick to install and ready for immediate use, these tiles lend a bright and modern look to a concrete floor.



LOCK-TILE

EVERTILE FLOORING CO.
888-562-5845
WWW.LOCKTILE-USA.COM

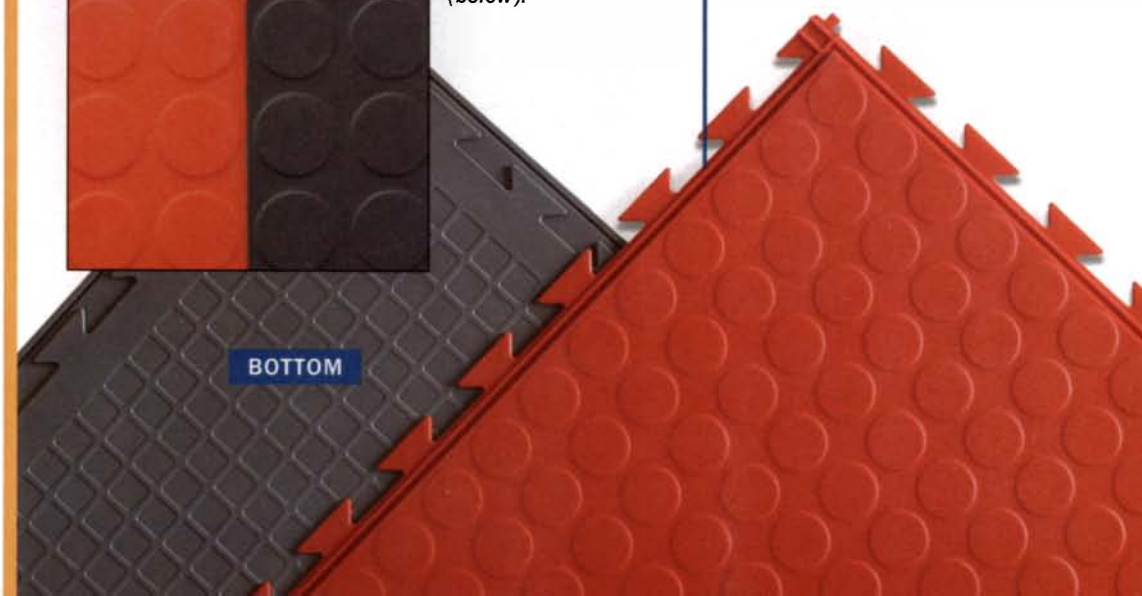
Lock-tile pieces are ¼ in. thick and 19⅝ in. square. They come in nine colors (custom colors may be ordered but only in large quantities). Like other PVC-tile products, these can be installed with a rubber mallet and a utility knife. The interlocking tabs create a snug but exposed joint.
Approximate cost: $3.20 per sq. ft.

Locking tabs vary in style. *Lock-tile tabs leave a visible seam (above), while Century tiles have tabs that join in a tight, clean, and hidden seam (below).*

CENTURY

FLOORING ADVENTURES
877-779-2454
WWW.FLOORING ADVENTURES.COM

Century PVC tiles are ¼ in. thick and 18 in. square and come in seven colors. The hidden interlocking dovetail-shaped tabs seemed to be the best-designed joint of all the samples; the connection is secure and nearly invisible, leaving only a hairline gap between adjoining tiles.
Approximate cost: $4.39 per sq. ft.



RESILIA

FLOORSURFACES INC.
805-963-4250
WWW.FLOORSURFACES.COM

Resilia interlocking tiles come in a choice of 20 colors, and for a surcharge, custom colors may be ordered. These ¼-in.-thick tiles are 12 in. square and have a hidden interlocking joint, which leaves only a hairline seam between tiles.
Approximate cost: $3.45 per sq. ft.

A clean look. *When locked together, the Resilia tiles have a tight seam.*

LAYING PVC FLOORING

The tight interlocking tabs are joined easily with a mallet. *Knock the interlocking edges into place with a rubber mallet for a snug, flush seam.*

Trim the tiles with a utility knife and a straightedge. *PVC tiles are thin enough to be cut to size with a standard utility knife.*

A clean finish. *Some manufacturers offer edge strips, which are snapped on or glued into place.*

Large photos of PVC tiles: Matthew Gardner (facing page, top and bottom; this page, top)

PVC ROLLS

This material covers a concrete floor in no time, lending a clean and uniform covering. Although durable, it is thinner and more flexible than the PVC tiles.

BLT (BETTER LIFE TECHNOLOGY)

877-810-6444
WWW.BLTLLC.COM

BLT's PVC floor covering comes in a roll. The material is about ⅛ in. thick and is available in various widths and lengths and in six colors. BLT's covering is the easiest product to install: Simply unroll it. Adjoining sheets can be butted together, but for a better joint, tape mating edges to the concrete with indoor/outdoor double-faced tape.
Approximate cost: $1.10 per sq. ft.

ROLLING OUT PVC FLOORING

Cover a large surface area in no time. *The large, heavy rolls are easy to install once in position. Wait for warm weather, as the PVC material is more pliable and easier to unroll above 60°F.*

Trim with a utility knife. *Before trimming the excess material, allow it to relax at the base of the wall.*

Hold down edges with tape. *When taping the edges, use indoor/outdoor double-faced tape.*

ing products could protect a tool from mishap, I dropped a sharp 1-in. chisel from waist height onto each sample. In all cases, the flooring prevented the edge of the chisel from chipping. All of the flooring samples suffered only minor damage, except for the Better Life Technology PVC sheet, which was partially punctured. Such a fine slit, however, is unlikely to degrade the product.

I dabbed each type of flooring product with typical shop chemicals such as naphtha, alcohol, and oil stain, and did not see any damage (the PVC products are rated against damage from a host of chemicals). Except for the DRIcore tiles, which absorbed some stain, all of the flooring samples cleaned up easily.

What to choose for your shop

It seems you couldn't go wrong with any of these flooring products, based on the ease of installation and the insulation improvement. Budget, however, may be a factor in your decision (prices are noted in the comments about the individual products), as may be aesthetic considerations. For instance, the PVC flooring comes in numerous colors. You could even make a checkerboard pattern if you go with the PVC tiles. PVC also is a durable substance, and it might wear better than wood composite.

There's another point worth mentioning: During the course of my review, a number of people asked me which of the flooring products was more comfortable to stand on. I can't say any of them is a substitute for antifatigue mats, which have a lot more give. But I did appreciate the insulating qualities that the DRIcore tiles provided during cold weather. □

Anatole Burkin is the editor of Fine Woodworking.

Photo, this page (top): Matthew Gardner

Fire Safety in the Shop

How to prevent, detect, and put out fires

BY BRUCE RYDEN

It could have been worse. *Ellis Walentine, host of Webcentral.com, lost his entire shop in rural Pennsylvania in May 1999 to a fire; but no one was hurt in the conflagration. He suspects the fire was caused when arcing in a loose connection in the electrical panel ignited some accumulated sawdust.*

No matter the size of your shop, fire hazards are present day in and day out. Wood is a combustible material, but when it's in the form of a solid mass, such as a plank of lumber, it is difficult to ignite and to keep burning. Try holding a match to a large piece of wood and see which gets burned first, the wood or your fingers. If you took that same piece of wood, put it through a thickness planer, and held a match to the pile of shavings, you'd be amazed by how quickly it would ignite.

The best way to prevent a fire in your shop is to practice good housekeeping. Sawdust and wood shavings are the two most commonly dangerous products in a woodshop. They are ignited easily, and the fire can spread with unbelievable speed and intensity. The careless use, storage, and disposal of finishing supplies

PREVENTING A FIRE IN THE SHOP

DISPOSE OF OILY RAGS

Rags soaked with flammable finishes can ignite spontaneously, so they must be disposed of properly. With its spring-loaded, self-closing lid, this red bucket prevents spontaneous combustion. A plastic bucket half-filled with water also will work.

STORE FLAMMABLE LIQUIDS

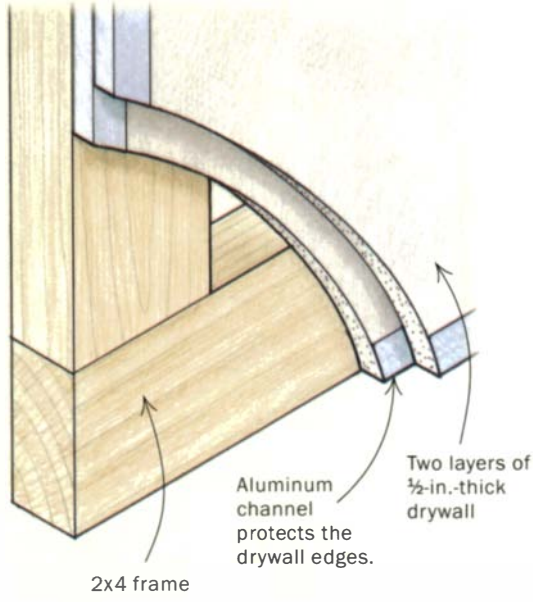
A storage cabinet for flammable liquids is meant to keep a fire from getting much worse very quickly. Whether you buy one or build your own (below), it should have a self-closing door and a lip on the shelves to keep spilled liquids from escaping. The metal cabinet at right costs about $850.

A SHOP-BUILT SOLUTION TO STORING FLAMMABLE LIQUIDS

Ryden built a basic storage cabinet for flammables in the garage adjacent to his shop. He used 2x4s for the frame, and covered that with two layers of drywall. He encased the edges of the drywall with aluminum channel to keep the gypsum from crumbling. By hinging the door at the top, it self-closes when he removes the strut that holds the door open so he can access the shelf inside.

CONSTRUCTION DETAIL

The 2x4 frame serves as a spillproof lip on the front of the shelf. The two layers of drywall greatly increase the time that it would take a fire to ignite the liquids in the cabinet.



Photos, this page (top left, top right): Rodney Diaz; p. 55: Ellis Wallentine; drawing: Vince Babak

also are frequently encountered fire hazards. Many woodworkers store cans of varnish, containers of solvents and thinners, and organic-based finishes, such as linseed oil and tung oil, on open shelves in the shop, where they can provide the fuel to greatly accelerate the spread of a fire.

Prevention is mostly common sense

Three elements are required to cause a fire: fuel, oxygen, and a source of heat. Take away any one of them, and you cannot have combustion.

We need the oxygen to breathe, so we can't remove that. We often can remove the heat to prevent a fire (by not smoking or not using torches or welding equipment in a woodshop). But the easiest item to remove is the fuel. It may seem like a real chore to sweep up a pile of wood chips or shavings after a long day working in the shop, but by cleaning up, you can remove the most manageable portion of the three elements needed to start a fire.

Electricity, another hazard in most shops, often is blamed as the cause of a fire, but seldom is that borne out by a competent fire investigation. In a clean shop, this heat source rarely is the cause of a fire. If an electrical short circuit does occur, it must have a fuel to feed upon. Without contact with piles of sawdust or wood shavings, the likelihood of a short circuit starting a shop fire is improbable (but possible—see p. 55). Still, any tool or piece of machinery that has a cord that is frayed, cracked, or otherwise not in great condition should be replaced, and all electrical connections should be secured tightly.

One of the frequently forgotten and least understood causes of fire in the shop is spontaneous combustion of rags and waste. When an organic oil, such as linseed oil or tung oil, is applied to rags used for finishing, a heating process takes place. This heating takes place only in the presence of oxygen, and when the heat given off by the process is not allowed to dissipate, it will continue until the rags reach a temperature that is high enough to ignite them.

By placing used rags in a steel container with water and a cover on it, this process will not occur. An acceptable alternative is to hang the rags in a single layer on a clothesline or a fence, which allows the rags to dry without the heat buildup.

The application of a flammable finish by hand is not without hazards, but if there is good air exchange with fresh outside air, the vapors given off by the finish can be diluted to a safe level. Most of these vapors are heavier than air and will sink to the floor. Be especially careful about any possible source of ignition (such as water heaters, furnaces, portable heaters, and electric fans) down near the floor close to where you are working.

The proper storage of flammable and combustible materials used in finishing projects is one of the most neglected safety issues in many workshops. Cans and sometimes even glass bottles stored on open shelves can fall off and release large quantities of hazardous materials. Spray cans containing any flammable or combustible materials are extremely dangerous items to have sitting on open shelves. These cans are considered by the National Fire Protection Association as the most hazardous of all flammable or combustible materials. Once ignited, finish supplies quickly can turn a small fire into a dangerous, raging inferno.

Three elements are required to cause a fire: fuel, oxygen, and a source of heat. Take away any one of them, and you cannot have combustion.

Commercially available storage cabinets for finishes can be expensive. But for small home shops, you can make your own inexpensive version by surrounding the contents on all sides with two layers of ½-in.-thick drywall, which will greatly slow the speed with which a fire will spread to the finishes inside the cabinet (see the photos and drawing on the facing page). The door should be self-closing, and the shelves should be lipped to contain any spilled liquid.

Equip the shop with heat detectors

The most sensitive detection device is the human nose, which can smell smoke long before any electronic gadget can detect it. But when you're not in the shop, you must rely on other detection devices. Electronic detectors fall into three major categories: heat, smoke, and flames. Of these, heat detectors are best for a woodworking shop. Smoke-detection devices—both the ionization type and the photoelectric type—are susceptible to false alarms caused by the dust generated in a woodshop. Flame detectors are not as susceptible to dust contamination, but they are much more expensive than heat detectors.

There are three types of heat detectors: fixed temperature, rate of rise, and a combination of both types. The fixed-temperature devices usually are set in the 135°F to 165°F range. When the temperature of the room reaches the preset level, the alarm sounds. The rate-of-rise detectors measure how quickly the room temperature increases. When it rises more than a certain number of degrees in a preset time period, the alarm sounds. The combination-type detector is the best for woodworking shops because it will sound the alarm as soon as it detects either a slow, smoldering fire or a quickly spreading fire. This alarm can be either a local alarm (sounding just inside or outside of the shop), or you can connect it to a monitored service (such as ADT or Brinks).

Putting out a fire once it starts

While detection devices are good to have in the shop, they do nothing to slow or stop the spread of a fire. This is best done by an automatic sprinkler system that utilizes water to be discharged only in the vicinity of the fire, most often extinguishing the fire before it can spread. Most of us would rather come into the shop and find some water damage than find that the entire shop has been destroyed. There are systems that can be installed to detect water flowing through the sprinkler piping and sound an alarm, thereby reducing the water damage.

Sprinkler heads are readily available and inexpensive. (I paid a sprinkler contractor about $5 each for the ones I installed in my shop.) The total cost to plumb my 900-sq.-ft. shop with sprinklers was less than $100,

Photos, except where noted: William Duckworth

COMBATING A FIRE IN THE SHOP

If a fire occurs, damage will be minimized if a sprinkler system has been installed (below). Heat detectors (top, far right) provide an early warning and don't commonly suffer malfunctions in dusty environments. A fire extinguisher (bottom, far right) can prevent a small fire from getting worse, but you should always call the fire department first.

AUTOMATIC SPRINKLER SYSTEM

A typical sprinkler head will spray an area about 10 ft. by 10 ft. You can connect sprinklers to copper, galvanized, or PVC plastic pipes. PVC is the least expensive to install. Prime the pieces first with a cleaner, then daub on the cement.

and it took me eight hours to accomplish—a small price for a lot of peace of mind.

The most common sprinkler heads are the pendant style, which hang below the piping, and the upright style, which stand above the piping. They must be installed in the correct position or they will not function properly. In most shop situations the pendant head is appropriate. These heads are available from local fire-sprinkler contractors, but you also can find some online suppliers by doing a Web search for "fire sprinklers." The only application where water-sprinkler heads are not appropriate is in an unheated shop in a cold climate.

Place extinguishers near an exit

Every shop should have at least one well-maintained, easily accessible, portable fire extinguisher. Fire extinguishers are first-aid appliances. You must know when to use them and when to back off and let a professional handle the situation. The first thing you should do when a fire is detected is to call the fire department. They can always go home if they're not needed.

Fires are classified into four different categories: A, B, C, and D. The easiest way I know to remember them is as follows: Category A involves anything that leaves ash when it burns (paper, wood, cloth); B involves burning liquid (gasoline, paint, paint thinners, oil-based products); C includes circuit fires (live electrical fires in wiring, wiring devices, motors, electrical appliances); and category D fires involve combustible metals, which usually are not found in woodworking shops.

The most effective fire extinguisher for a shop is at least a 10-lb. multipurpose dry-chemical fire extinguisher, rated ABC on the label. This type of extinguisher can be applied to any kind of fire in a shop, has sufficient agent to extinguish almost any fire in its early stage, and can be used with minimal training.

Another consideration with fire extinguishers is where to place them. You should always have to go toward an exit door to access the extinguisher. That way, if the fire suddenly builds, you have a way out of the shop without having to go past the fire. Always keep a door at your back when using a fire extinguisher. Never allow a fire to come between you and a safe way out. □

Bruce Ryden is a retired fire-safety inspector.

Photo, this page (middle): Rodney Diaz

HEAT DETECTOR

Smoke detectors can malfunction because of the dust found in the air of most woodshops. Heat detectors are a better choice in dusty environments. They are activated when the room temperature reaches a preset level, usually 135°F to 165°F. The heat detector in Ryden's shop is powered by a circuit from the electrical service panel, and it is connected to a commercial alarm service through a telephone line.

FIRE EXTINGUISHER

Use an extinguisher rated ABC to fight woodshop fires fueled by wood, finishing supplies, or bad electrical connections. Extinguishers should always be placed near an exit so you won't get trapped by a fire while trying to access the extinguisher.

SOURCES OF SUPPLY

SPRINKLERS

Sprinkler heads can be purchased from either a sprinkler-installation contractor or a plumbing-supply store.

HEAT DETECTORS

Heat detectors are offered at most electrical-supply stores and at many online suppliers.

FIRE EXTINGUISHERS

Fire extinguishers are available at most hardware stores and home centers.

Photos, this page (top and bottom right): Rodney Diaz

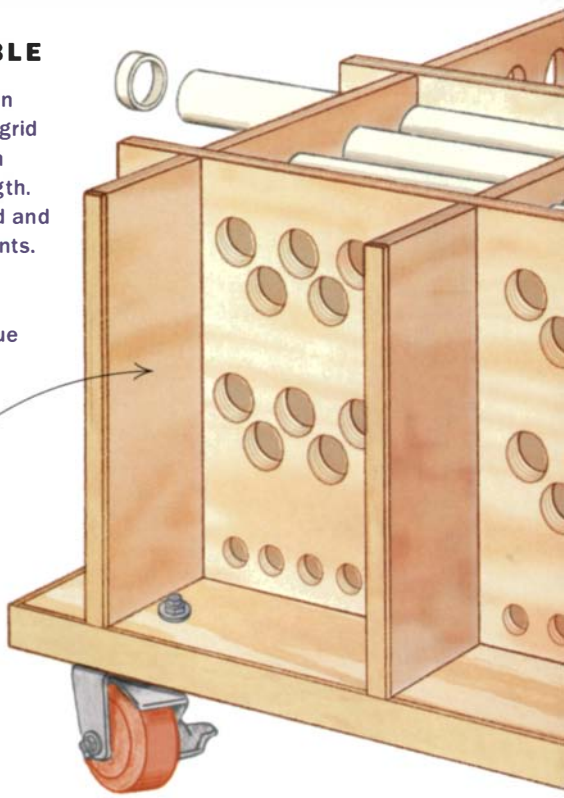
Convertible Clamping Workstation

Assembly table keeps clamps close at hand, adjusts to different heights and tasks

BY GARY B. FOSTER

LOWER SECTION: MOBILE ASSEMBLY TABLE

The lower portion of the workstation is a tall torsion box consisting of a grid with five panels spanning the width and three panels spanning the length. The ¾-in.-thick panels stand on end and cross one another with crosslap joints. The grid is sandwiched between a top and a base made of ¾-in.-thick plywood, which is attached with glue and 2½-in.-long drywall screws.



After working for months on my knees building a large bookcase, I decided I needed a low table in my shop for assembling large projects. Although my newly built shop is spacious at 1,040 sq. ft., I didn't want to take up room with a low table that would find only part-time use. It needed to do more. So I designed a workstation that also fulfilled a number of other shop needs, including a place to store my clamps, and a level surface to support long clamps when gluing up cumbersome furniture parts such as tabletops and frame-and-panel doors. The workstation is built in two sections and can be reconfigured to accommodate its various uses.

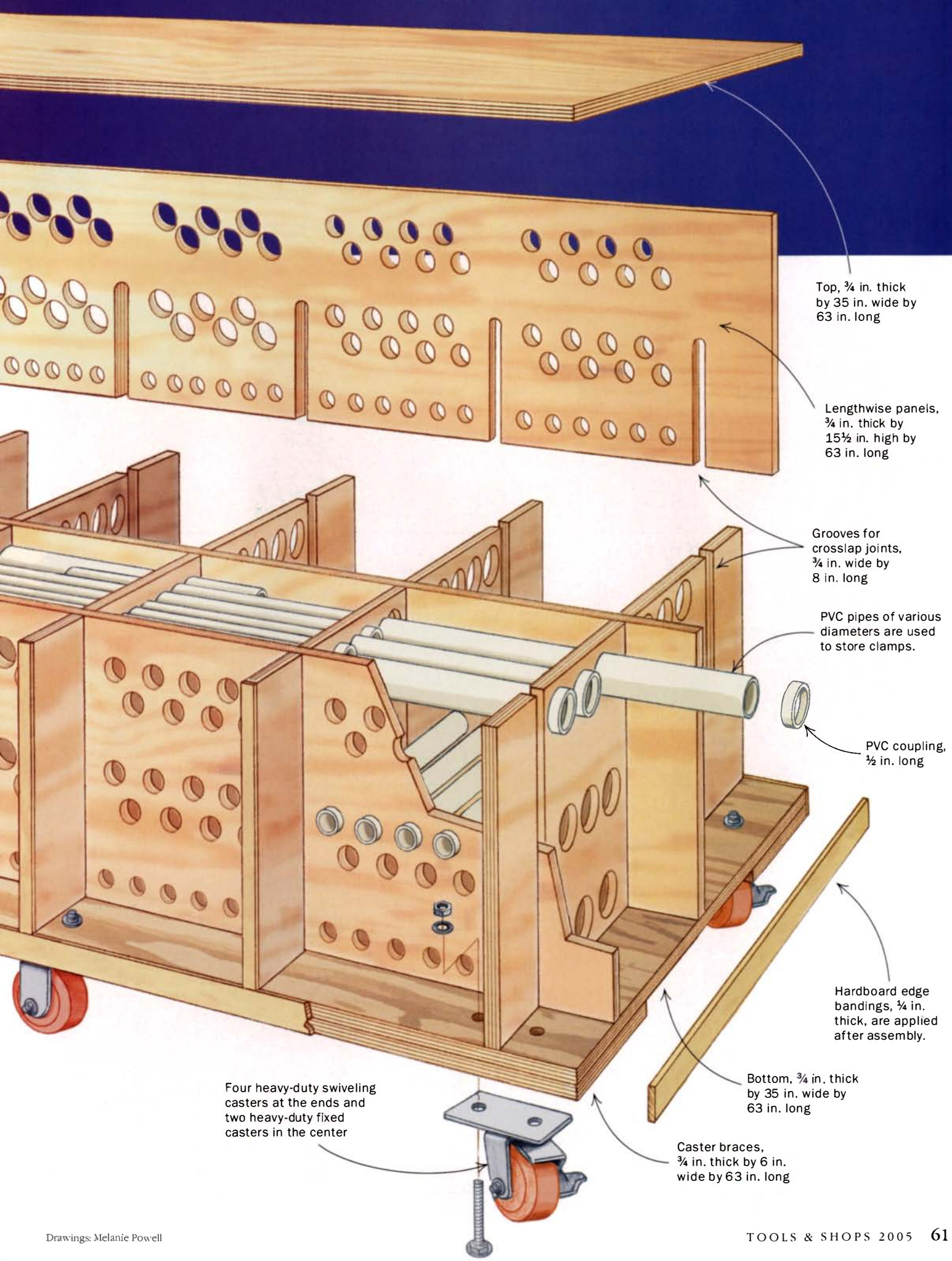
A twist on the torsion box

The lower portion of the workstation consists of five plywood panels running widthwise and three panels running lengthwise (see the drawing at right). The panels are sandwiched between a top and base of ¾-in.-thick plywood. Built into the lower torsion box is a web of PVC pipes that hold clamps up to 6 ft. long.

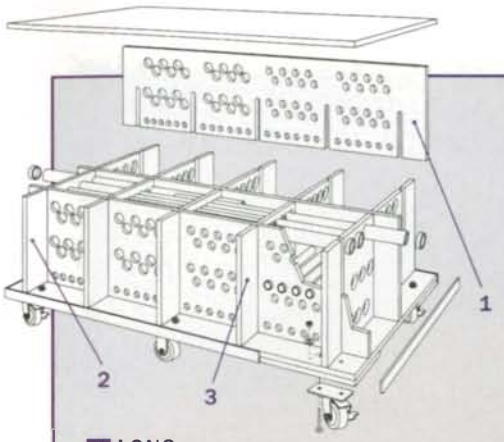
Build it from the bottom up—Begin by cutting the crosslap joints in the plywood panels with a ¾-in. plywood router bit. This specialty bit, available from most home centers or catalog retailers, is slightly undersize to account for the actual thickness of plywood. Using this bit will make the crosslap joints fit tightly.

Next, plan and lay out the PVC pipes. I chose to use several different-diameter pipes to hold the assortment of clamps I own. Those spanning the width can be accessed from either side of the table, while

Photos: Matt Berger

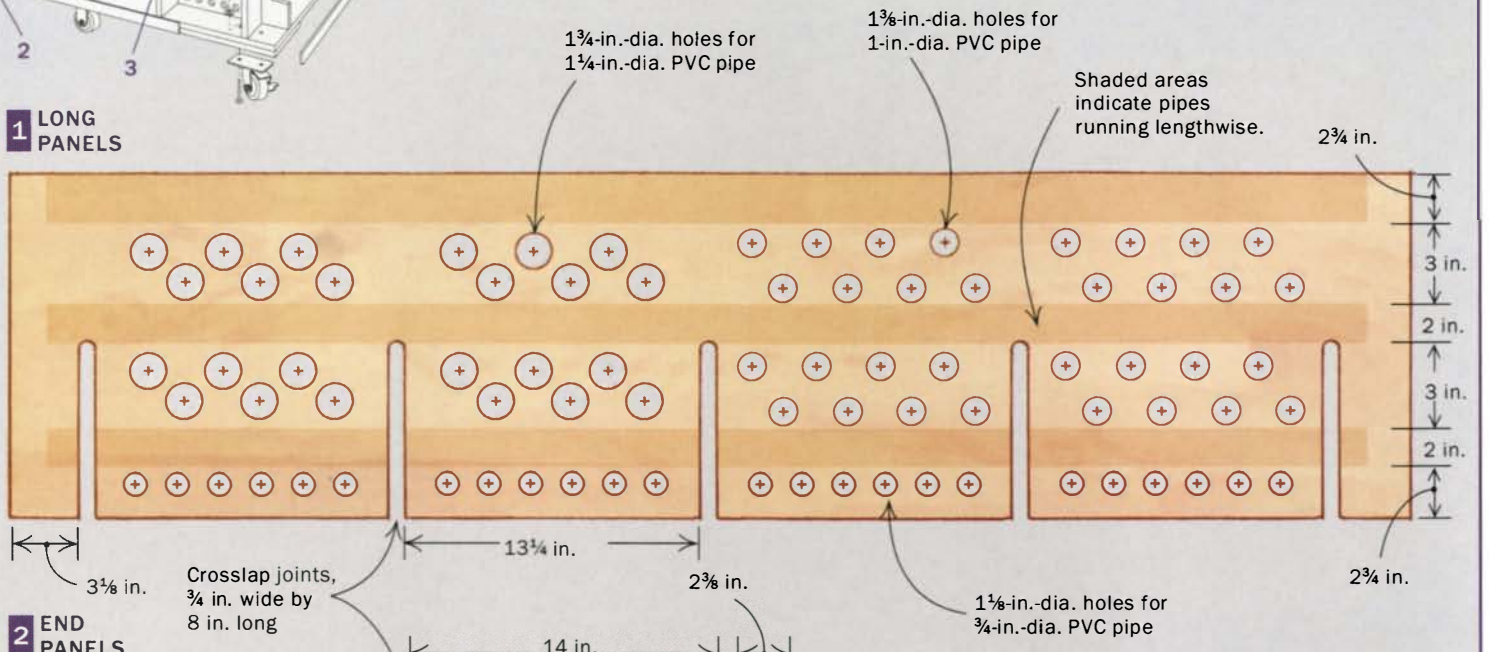


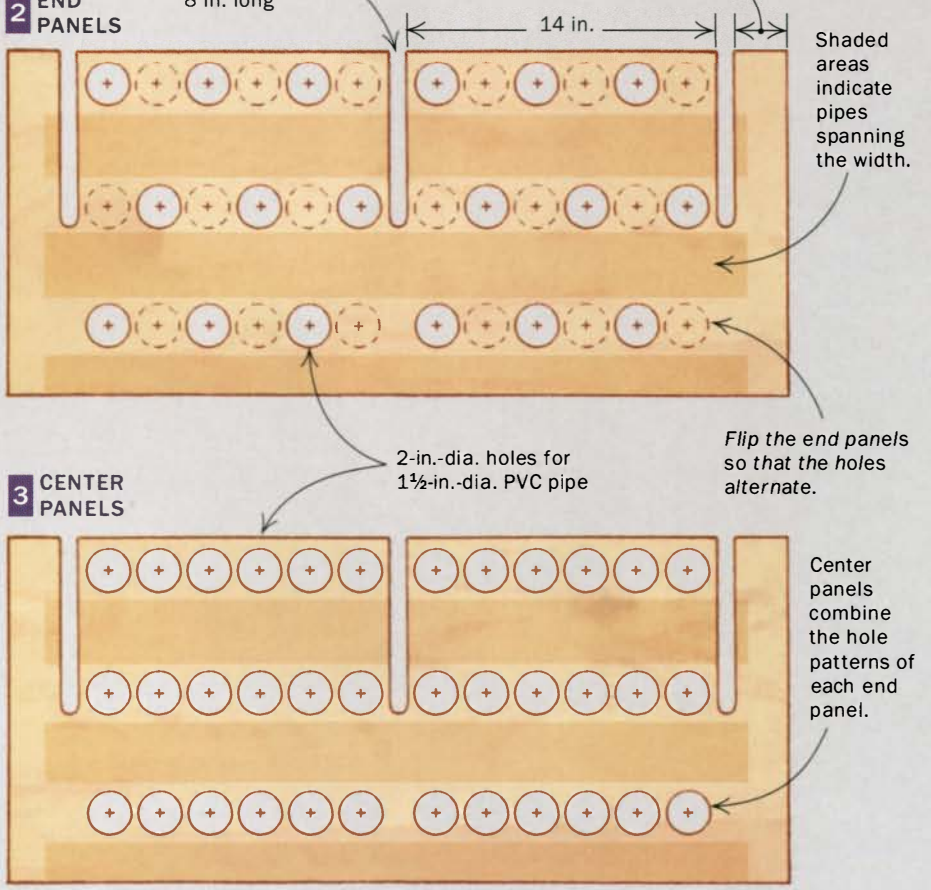
Drawings: Melanie Powell



HOLE LAYOUT FOR PLYWOOD PANELS

PVC pipes, with diameters based on the size of the clamps they will hold, are fed through holes drilled in the plywood panels. Lay out the pipes so that those spanning the width of the table don't interfere with those running lengthwise. Prepare templates to cut matching hole patterns on each plywood panel. The end panels are mirror images of each other and are laid out with the same template. The center panels combine the layouts of the two end panels.





Prepare templates for matching holes. *Transfer the center points from a paper template to a ¼-in.-thick plywood template. Use the template to lay out each section on the final panels.*

those running the length can by accessed only from one end. This setup maximized the number of long clamps I could store.

The pipes extend through the torsion box's interior grid, and holes must be drilled in each plywood panel in the same location so that the pipes can feed through properly. I created a template to locate and drill pilot holes in each of the interior panels, and then bored each hole with an appropriately sized hole saw.

After the plywood panels have been prepared, begin assembling the torsion box. It must be constructed on a flat surface and upside down. Fit together the plywood grid and attach the bottom with glue and 2½-in.-long drywall screws.

While the box is upside down, attach six heavy-duty casters with carriage bolts. I added a plywood brace between the bottom panel and the casters to provide extra strength for carrying the weight of the table as it's rolled around the shop. I used 6-in. casters rated at 700 lb., purchased from an industrial-supply store. The four corner casters swivel, and the two center casters are fixed, making the workstation easy to move around the shop.

Plumb the table for clamp storage— Flip over the torsion box to install the piping and the top. The lowest row of piping comes first as you work your way up the table. To prevent the pipes from slipping out of the holes in the grid, use ½-in.-long rings cut from PVC couplings. The couplings are sold in plumbing-supply stores and are easily cut. I used a bandsaw, holding the couplings with locking pliers to keep them straight.

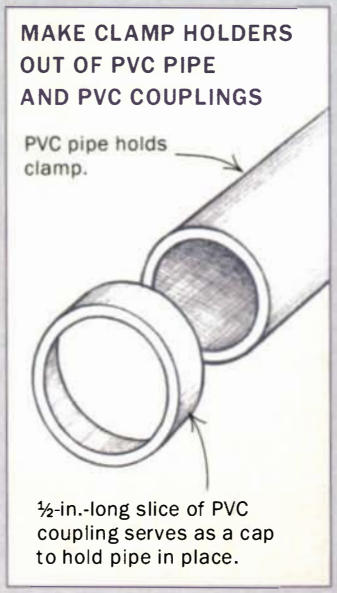
Cut the pipes that span the width of the table 1 in. longer than the width of the torsion box. Glue a ring over one end of the PVC pipe and feed it through the plywood grid. The pipe should extend ½ in. from the other side of the table. Place a ring over that end.

The pipes running lengthwise should be cut roughly 12 in. short of the opposite end panel. Feed one end of the pipe through the table, cap it with a ring, then cap off the other end.

Clamp table makes glue-up easy

The upper section of the table stacks on top of the lower section and is designed to support clamps when assembling furniture parts. Like the lower section, the upper

PVC-PIPE GRID KEEPS CLAMPS FROM GETTING TANGLED

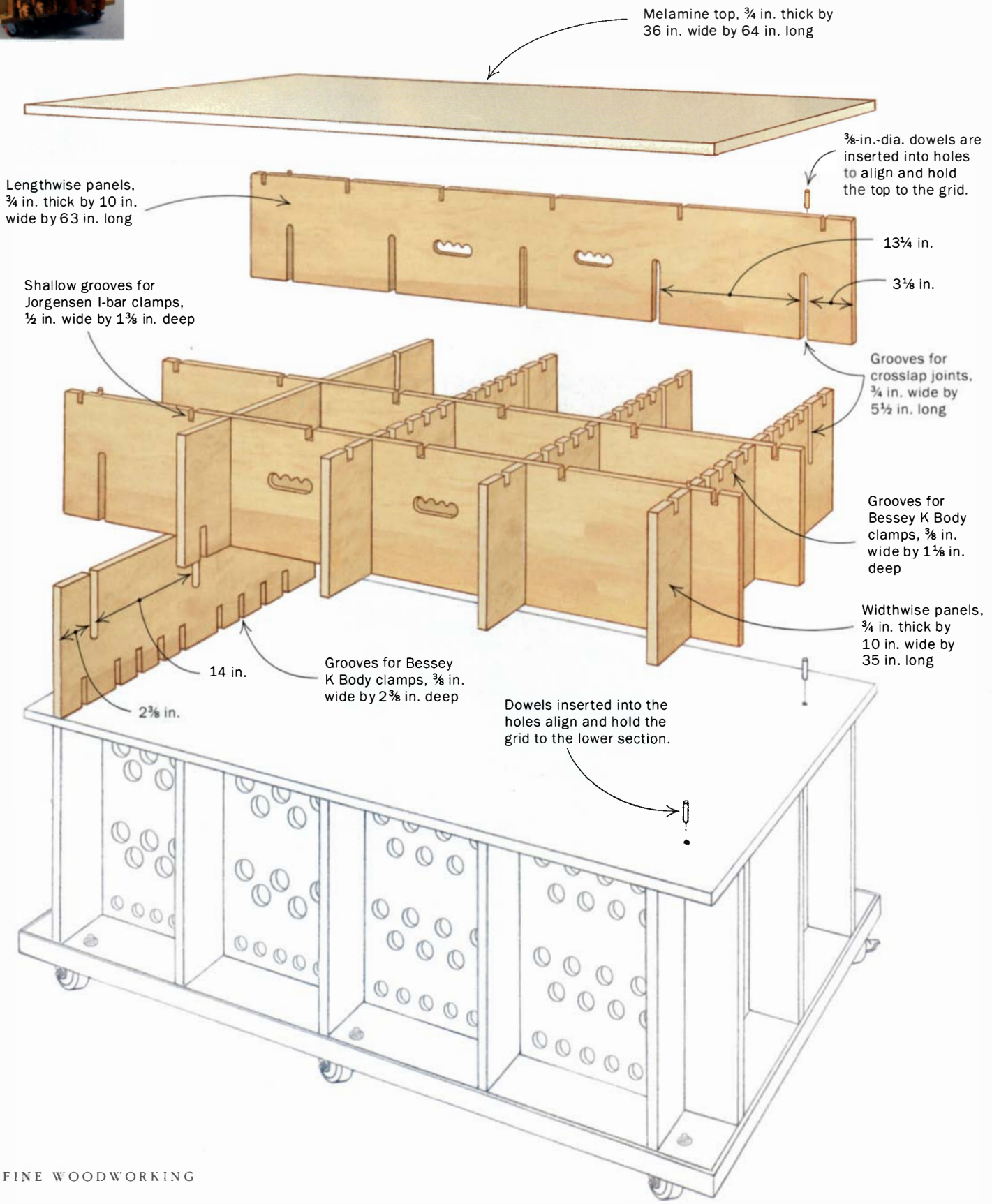


Install the pipes. *Use PVC glue to attach the rings to the pipes. Work from the lowest row to the top.*

Space-saving clamp storage. *Offset the holes for the PVC pipes to maximize storage space. If clamps interfere with each other, you can insert some from the other side.*

UPPER SECTION: KNOCKDOWN TABLE DOUBLES AS CLAMPING GRID

The upper section of the workstation is a torsion box consisting of tall plywood panels connected by crosslap joints. The panels are not glued together, so they can be reconfigured for different clamping arrangements. Grooves in the top edges of the panels support clamps during glue-up. In one configuration, grooves in the lengthwise panels are twice as deep as those in the widthwise panels. This allows clamps to be arranged front to back and side to side without interference. With the top panel in place, the workstation can be used as a large worksurface.



one is constructed as a tall torsion box with panels that lock together with crosslap joints. However, this torsion box is not glued, so it can be reconfigured to hold clamps in different arrangements. Use a standard ¾-in. straight router bit when cutting the crosslap joints so that the plywood panels have wiggle room for assembly and disassembly. While most of the table is finished with oil-based polyurethane, these boards should be finished with a water-based polyurethane and waxed regularly to keep them from sticking.

To secure the upper section to the bottom, install ⅜-in. wood dowels in each corner of the upper torsion box and drill matching holes in the top surface of the lower table assembly (see the drawing on the facing page).

Grooves hold clamps level—On the top edge of the plywood panels, grooves cut at regular intervals are sized to hold clamps. My table holds Bessey K Body clamps and Jorgensen I-bar clamps. However, grooves can be cut for clamps from any manufacturer. Size them so that the width of the groove is equal to the width of the clamp, and the height of the groove is ⅛-in. shallower than the height of the clamp. As a result, the clamp will sit proud by ⅛ in. and keep a workpiece out of contact with the table during glue-up.

Gluing up some furniture parts, such as frame-and-panel doors, requires clamping in two directions to apply pressure on four edges. To accommodate two-directional clamping, cut grooves in the widthwise panels twice as deep as those in the lengthwise panels. This way, the clamps won't contact each other when they cross.

Top off the table with melamine

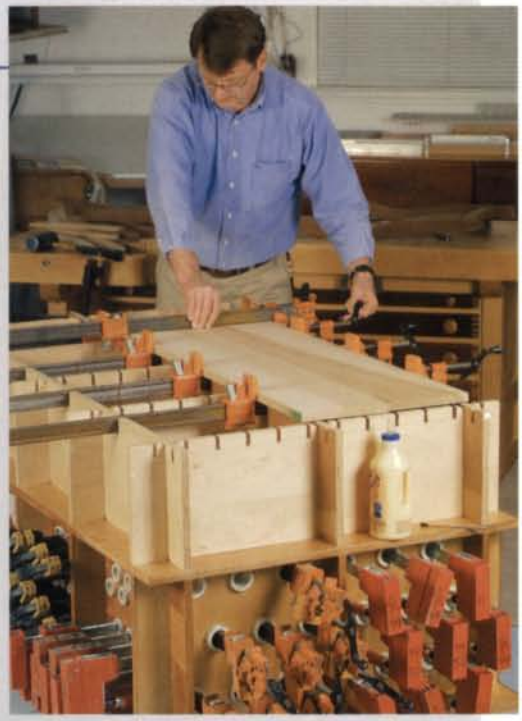
The upper section also can be used as a worksurface by laying a sheet of ¾-in.-thick melamine on top of the plywood grid. With the top on, the table is level with my workbench and tablesaw, so it is useful as an infeed or outfeed support.

Again, install four wood dowels on the underside of the top sheet. Matching holes are drilled into the top edge of the upper torsion box and keep the worksurface locked in position. □

Gary B. Foster works wood at his home in Folsom, Calif.

RECONFIGURE THE GRID FOR DIFFERENT GLUING TASKS

SETUP FOR LARGE PANELS



Crosslap joints make for easy assembly and disassembly of plywood grid. *Bar clamps rest in grooves cut into the top edges of the plywood grid. The bars extend ⅛ in. above the plywood edge to provide clearance during glue-up.*

SETUP FOR PANEL DOORS

Reconfigure the grid for two-directional clamping. *Grooves of various depths, cut into the five short plywood panels, allow the grid to be arranged so that clamps situated front to back can sit below those running side to side.*

A Safer Tablesaw Finally Arrives

But will blade-stopping technology revolutionize the woodworking-tool industry?

BY KELLY MEHLER

SAWSTOP CABINET SAW	
Motor	3 hp or 5 hp, single or three phase
Blade size	10 in.
Blade tilt	Left
Rip capacity	36 in. or 52 in.
Dust collection	Blade shroud
Price	$2,499 plus fence
Contact	503-638-6201 www.sawstop.com

A blade guard that works. *This blade guard, which is thinner than most, lifts easily out of the way. It's mounted on an integral riving knife fitted with antikickback pawls.*

For years I've advocated improvements in the safety design of tablesaws sold in the United States. After testing one of the first SawStop machines shipped from the Geetech factory in Taiwan, I'm happy to report that with this saw, the industry has made a major leap forward. (For a description of the features on this saw, see *FWW* #171, p. 34.)

This machine offers three valuable safety features: a brake that stops the blade instantly when it comes in contact with the operator; a riving knife that prevents kickback; and a user-friendly blade cover. The blade brake is activated by an electronic sensor in a replaceable cartridge. When it senses contact with human flesh, the cartridge fires into the blade as it drops down below the level of the tabletop. The blade is ruined in the process, and the cartridge will need to be replaced. A cartridge for a 10-in. blade is $59, and one for 8-in. dado sets is $69. I tested this saw twice with hot dogs, once with a chicken leg, and once with sopping-wet pressure-treated lumber. (If there's any chance that you might activate the brake by mistake, as when cutting pressure-treated lumber, you can override the sensor with a keyed lock.) Each time I tested the device, it worked.

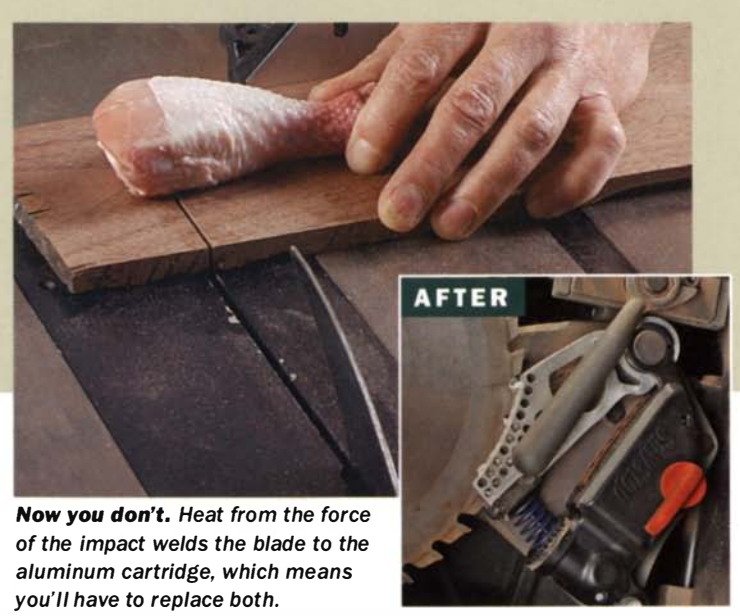
The first test was in front of one of my classes. I stuck a hot dog on the end of a stick and swung it into the moving blade as fast as I could. The result was a 1/16-in.-deep by 1/8-in.-wide by 3/16-in.-long cut. One of the students, a medical doctor, said such a wound would require two or three stitches at most. When I tested the device using a chicken leg pushed into the blade at normal speed, the cut was almost imperceptible.

I'm really pleased to see a riving knife on this saw. Unlike a splitter that stays in one position, a riving knife travels with the blade for height and angle adjustments, and it can be set to within 1/8 in. of the back of the blade. It not only prevents kickback but also keeps hands away from the back of

FASTER THAN THE EYE CAN SEE

When Mehler moved the chicken leg into the path of the blade, the SawStop brake worked flawlessly, leaving no discernible damage on the piece of chicken. The braking mechanism springs an aluminum cartridge into the path of the blade as the whole blade assembly drops below the surface of the tabletop, out of harm's way.

Now you see it. *The replaceable cartridge on the bottom right of this photo (inset) is the device that fires into the blade to stop it instantly.*



Now you don't. *Heat from the force of the impact welds the blade to the aluminum cartridge, which means you'll have to replace both.*

the blade. This saw comes with a choice of two riving knives—one single-piece unit and one with antikickback pawls that is part of the blade-cover assembly, which is the best of any other designs that I've seen.

I did run into an electrical problem with the test machine: Twice it turned off inadvertently, without my having hit the switch. The quality-control staff at SawStop will have to solve this problem. □

Kelly Mehler recently opened a woodworking school in Berea, Ky. (www.kellymehler.com).

Riving knife eliminates kickback. *This technology, common on European saws, does not exist on any other 10-in. cabinet saw sold in the United States.*

Will SawStop be standard on all saws?

When Stephen Gass first invented a device to detect contact between an operator and a moving sawblade and then stop that blade instantly (meaning within five-thousandths of a second), he figured that all he had to do was offer it to saw manufacturers, and they'd be tripping over each other to buy it. It didn't work out that way. After the SawStop technology won the prestigious Challenger's Award at the IWF show in Atlanta in 2000, progress seemed to grind to a halt. Why?

The answer to that question, like most stories, depends on whom you ask. I spent more than an hour on the phone with Gass, and he gave me a truncated version of the events from his perspective. Gass and his partners showed prototypes of the device to more than a dozen tablesaw manufacturers and got as far as a signed license agreement with one of them before the deal fell apart. In April 2003 they (along with several hundred signatures in agreement) petitioned the U.S. Consumer Product Safety Commission (CPSC) to initiate a ruling that would declare the technology a performance standard, the net effect of which would require manufacturers to put it on their saws. The CPSC has yet to make a formal ruling on that petition.

None of the manufacturer representatives that I contacted would agree to let me use their names or go on the record with a response. But one of them told me the reluctance to adopt the technology is twofold: They don't believe the mechanism has been tested thoroughly enough, and the retooling costs would be enormous because they can't retrofit it to existing saws. He added that they also don't believe tablesaws are inherently unsafe, as long as consumers utilize the guards and splitters that come with the machines.

According to statistics put out by the CPSC, there were 33,114 injuries on tablesaws in the United States in 2002. Of those, 3,503 were amputations and 22,105 were lacerations, and none of them were fatal. (The chart I saw didn't explain the missing 7,506 injuries, but presumably, that would represent blunt traumas from kickbacks.) The owners of SawStop believe their product will reduce those figures.

***—William Duckworth,* associate editor**

Photos: Rodney Diaz

A Shop on Top

Raising the garage roof creates space for a second-story shop

BY PAUL H. BRESKIN

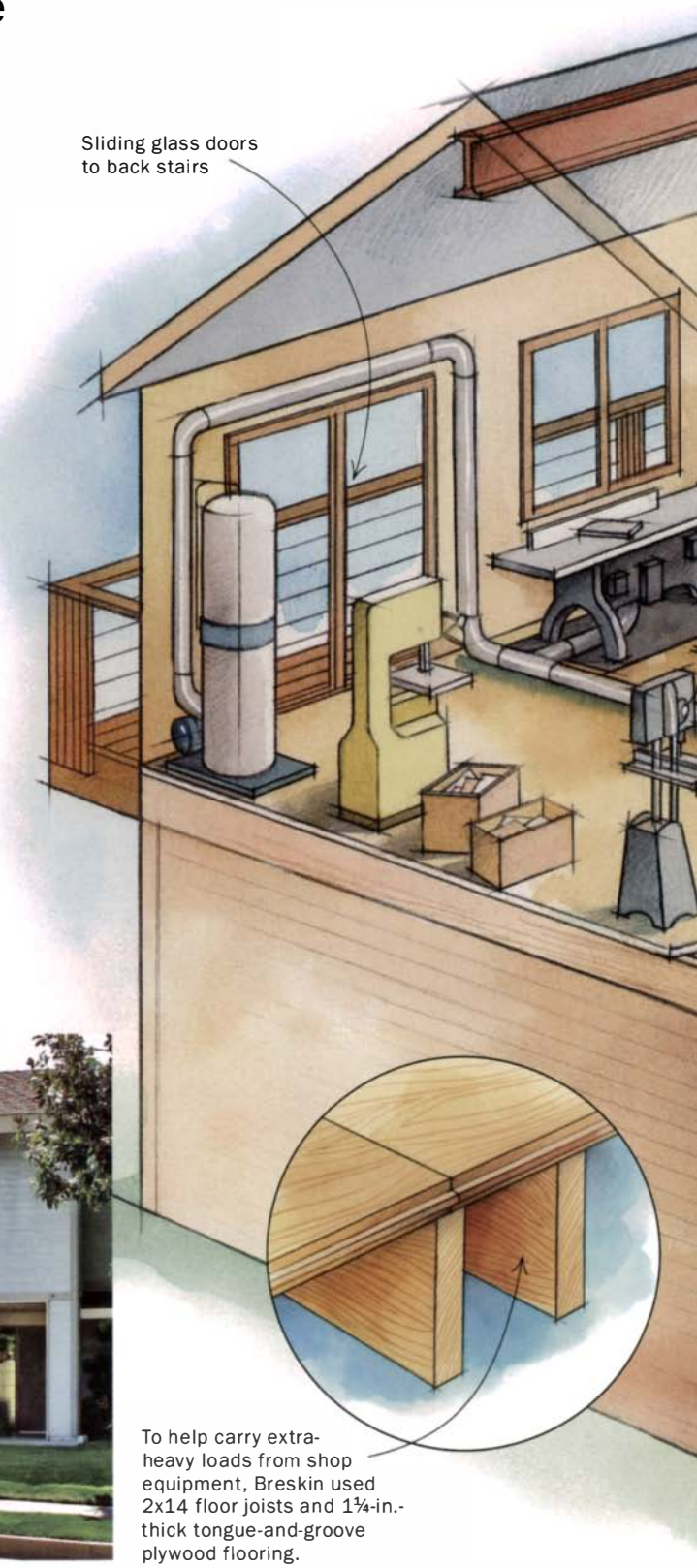
For a good many years, I was able to get by with my three-car garage doubling as a workshop. And while all the shuffling of cars and woodworking machines made that shop far from a perfect arrangement, it provided enough space to satisfy most of my woodworking needs.

Eventually, though, as I spent more time in the less-than-ideal confines of a garage, I began to recognize the many advantages of a stand-alone shop. But there was a problem: I didn't have room on the property to expand outward. That's when I realized my dedicated shop could be had by adding a second story to the garage. Although some might consider the solution unorthodox, it provided me with an additional 800 sq. ft. of open space to devote entirely to my shop.

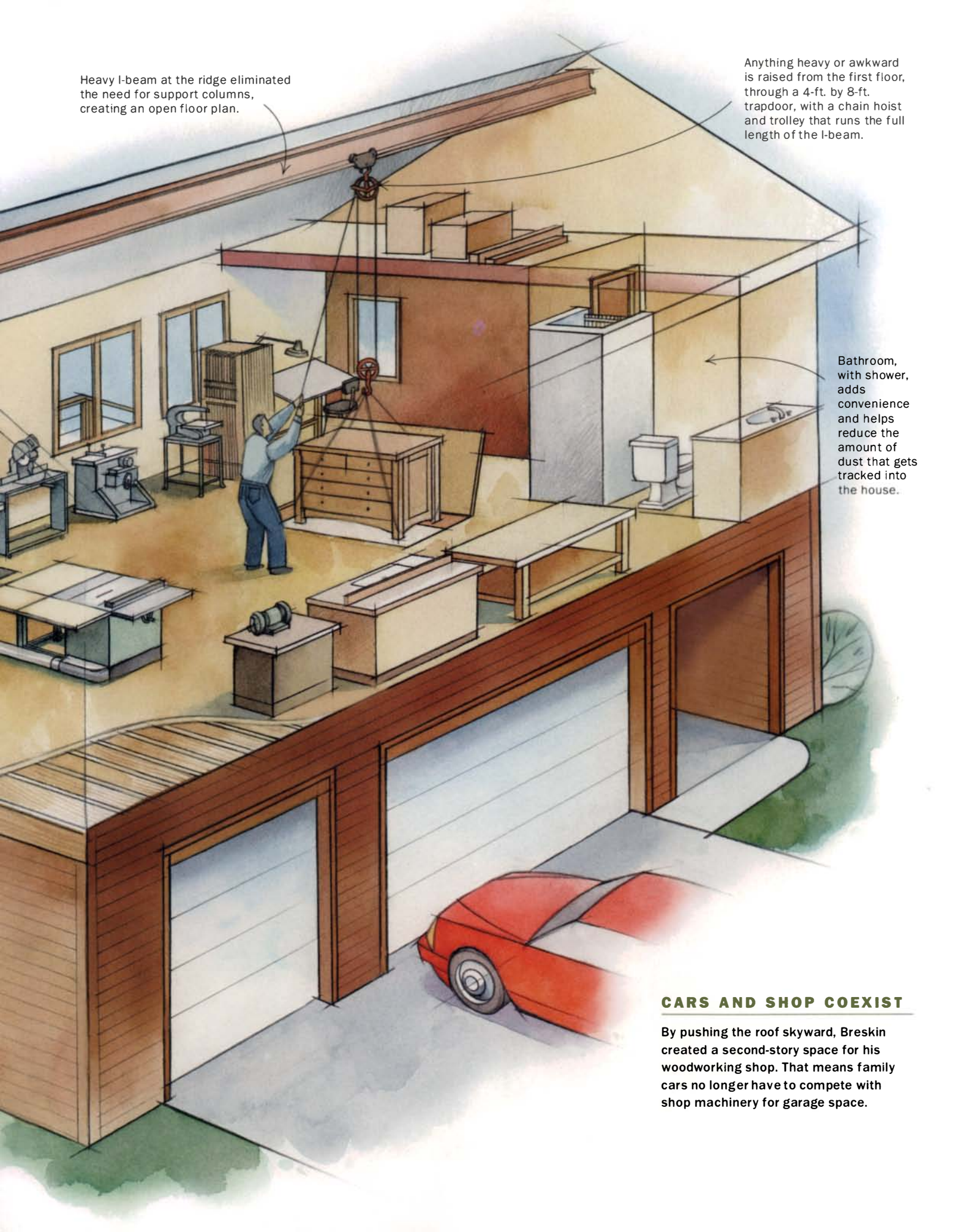
Like any major building project, this one came with an assortment of challenges. For starters, the foundation needed major modifications to meet building-code requirements related to the added weight of a second story. Also, because the second floor had to support a 16-in. jointer that weighs more than 1,800 lb., the floor joists had to be 2x14 lumber placed 12 in. on center, instead of

A WELL-DISGUISED WORKSHOP

In need of room for a shop but lacking space on his property to build one, Breskin looked up rather than out. His single-story, three-bay garage (above) was expanded skyward (right), producing space for an 800-sq.-ft. shop that blends comfortably with the design of his home.



Drawings: Brian Jensen



CARS AND SHOP COEXIST

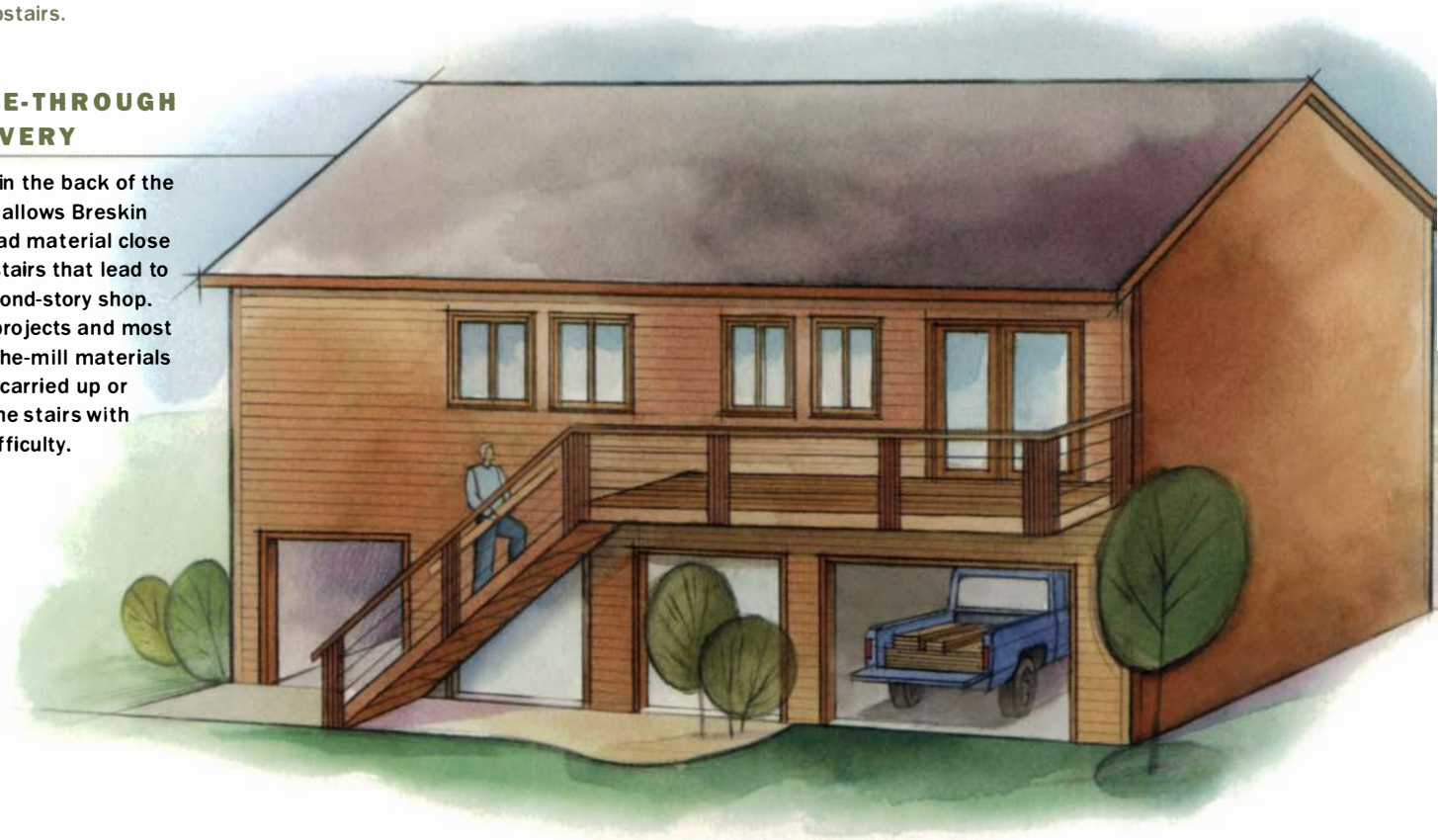
By pushing the roof skyward, Breskin created a second-story space for his woodworking shop. That means family cars no longer have to compete with shop machinery for garage space.

ACCESSING A SECOND-STORY SHOP

Gravity is not your friend in a second-floor shop, as the biggest challenge is getting tools and materials topside. But thanks to some clever planning, Breskin has two good ways to get heavy stuff upstairs.

DRIVE-THROUGH DELIVERY

A door in the back of the garage allows Breskin to unload material close to the stairs that lead to the second-story shop. Small projects and most run-of-the-mill materials can be carried up or down the stairs with little difficulty.



A DOOR IN THE FLOOR

When heavy or awkward items can't be moved easily up or down the outside stairs, a trapdoor in the shop floor provides the best way in or out. The trapdoor is located directly under the I-beam, and with the aid of the hoist, all sorts of heavy items can be hauled up or down through the opening.

Watch it on the Web To see the author's winch system in use, go to www.finewoodworking.com.

Photos: Tom Begnal

the more common requirement of 2x12 lumber placed 24 in. on center. I also had to use 1¼-in.-thick tongue-and-groove plywood for the floor, instead of the normal ¾-in.-thick plywood.

Support posts always seem to get in the way in a woodworking shop. To avoid having any, I substituted an 8-in. by 16-in. steel I-beam for the typical wood ridge beam. The I-beam also served as a place to mount a chain hoist with a trolley. The trolley lets me run the hoist along nearly the full length of the shop.

To help contain shop noise, I insulated the floor, ceiling, and walls. Now, as long as the windows are closed, I can work in the shop any time of the day or night without bothering my neighbors.

Compressors are noisy, and mine is no exception. To give my ears some relief, I installed the compressor below the shop, in the garage. I use the same area for lumber storage.

The exterior of the shop, including the windows, was designed to complement the look of the house. A lot of natural light bathes the shop, thanks to a generous number of windows, plus a sliding glass door and three skylights. To help minimize noise, all of the windows, doors, and skylights are double-paned.

Thanks to all of the glass, I rarely need to have lights turned on during the day. Keep in mind, though, that windows have one drawback: They reduce wall space. And walls are great places to hang tools or mount storage cabinets. In my shop, the walls are constructed of pine boards installed horizontally. Not only does the pine give the shop an appropriate look, but it's also a surface that readily accepts screws, nails, and pegs to hang tools.

A 6-ft. by 8-ft. bathroom, complete with a toilet, sink, and shower, occupies the northwest corner of the shop. The shower lets me clean up quickly at the end of the day before heading back to the house. The sink is more than just a place to wash my hands; it's also a brush-cleaning station and an area to sharpen edge tools with my waterstones.

My Southern California location means I don't have to worry about heating the shop, but I do have to keep it cool. Toward that end, I mounted a 16-in. by 16-in. squirrel-cage fan high on the east wall to exhaust warm air to the outside. However, because the fan pushes such a large volume of air when it runs, I need to keep one of the windows open a crack; otherwise, the airflow would be reduced considerably. Thanks to a built-in thermostat, the fan goes on and off as needed to keep the temperature under control.

At the end of the day, for safety's sake, I want to be able to shut off power to all of the electrical outlets with one switch. A separate subpanel makes that possible.

I've been in my upstairs shop for a few years now. Any doubts I might have had about the sense of building up have long since disappeared. The shop is bright, spacious, and comfortable. And the distant views of Malibu and Catalina Island I gained from my second-story vantage point aren't hard to take, either. □

Paul H. Breskin, an amateur woodworker for 50 years, has studied with such notable furniture makers as Ian Kirby, James Krenov, Sam Maloof, and John Nyquist. He lives in Southern California.

A shop with elbow room. *Much of the appeal of the shop can be traced to the more than 800 sq. ft. of floor space, plus lots of natural light and ventilation.*

Tool Rests for Bench Grinders

Aftermarket tool rests and tool guides make grinding easier, but which of these products works best?

BY CHRIS GOCHNOUR

Virtually all bench grinders come from the factory with a built-in tool rest. As the name suggests, the tool rest serves as a supporting surface when grinding cutting tools such as plane irons, bench chisels, and turning or carving gouges. A tool rest improves control, which results in a better grind. Plus, the added control helps make the procedure safer.

Although a few factory-made tool rests are designed better than others, I've yet to find one that didn't look to be much more than a casual afterthought by the manufacturer. In particular, tool rests tend to be small, so tool support is minimal. As a result, when it comes time to grind, the process isn't as easy as most woodworkers would

FASTTRAK

888-536-1870
www.prairieriverwoodworking.com
Grinding and honing guides: $89.99

Ideal for plane irons. *Although the FasTTrak system can be used for grinding carving tools and bench chisels, it's best suited for grinding and honing (below) plane irons. The blade is clamped in the tool guide, which slides on the tool rest.*

The FasTTrak sharpening system is unique in that it considers the entire sharpening process—from dressing the grinding wheel to grinding the tool to honing the ground edge. It has four main components: a track, a tool rest, a tool guide, and a blade-setting jig.

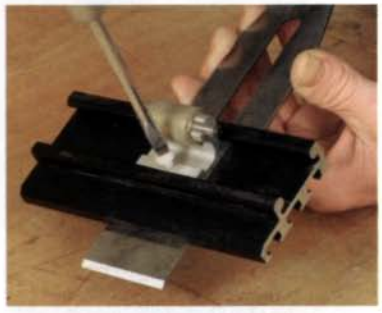
The sliding track is secured to the worksurface just below the grinding wheel. The tool rest, a 7½-in.-long piece of rigid L-shaped stock, slides in and out on the track. The 2⅜-in.-wide by 6-in.-long tool guide slides along the top of the tool rest when in use. When grinding, the bevel angle is established by adjusting both the amount the blade projects from the tool guide and the distance between the guide and the grinding wheel. The blade-setting jig proved handy for adjusting the blade projection.

Blades are mounted to the tool guide using the included clamps. With the FasTTrak set to make the lightest of cuts, it's just a matter of sliding the guide back and forth along the tool rest to grind the edge. Once grinding is complete, the tool guide morphs into a honing guide simply by adding an included roller.

Although it's easy to mount a slotted plane iron to the tool guide, I found it a bit cumbersome to mount bench chisels and other cutting tools.

The tool guide also can be used for freehand grinding of carving tools and turning gouges. It worked effectively, but with one caveat: Because the tool guide is free to pivot forward, it took some extra concentration to avoid tipping the tool too aggressively into the grinding wheel.

All things considered, though, the FasTTrak system proved to be a versatile sharpening package that did a good job grinding and honing plane irons.



Roller adds honing option. *Mounting the roller (top) to the tool guide converts the FasTTrak into a honing guide (bottom) to be used on benchstones.*

like. Aware of those shortcomings, several companies now offer aftermarket tool rests that are designed to make the grinding process easier, mainly by adding a greater measure of control. Before using any of these products, the factory-made rest is removed and retired.

I recently looked at the four most common models on the market: FasTTrak, Veritas, VersaRest, and Wolverine. Each one can be used with either a 6-in.- or an 8-in.-dia. grinding wheel.

Three of these companies—FasTTrak, Veritas, and VersaRest—offer an optional tool guide designed to be used with the tool rest. In use, the cutting tool first is secured in the tool guide, and then the guide is placed on the tool rest. This setup allows the tool guide to slide back and forth, with the edge of the cutting tool always maintaining the same position relative to the grinding wheel. As a result, the user gets both added control and a consistent grind. Because the tool rest and tool guide commonly are teamed up to create a grinding system, my review is based on how well they performed together.

Wolverine doesn't include (or offer as an option) a tool guide to use with its tool rest. Instead, Wolverine's tool rest has a long arm with a stop on one end that is especially suitable when grinding either turning or carving gouges.

By the way, on all but the

Photos, except where noted: Tom Begnal; facing page: Michael Pekovich

VERITAS

800-871-8158; www.leevalley.com
Tool rest, tool guide, and bevel-setting gauge: $52

BEST OVERALL — AUTHOR'S CHOICE

BEST VALUE — AUTHOR'S CHOICE

Gauge sets bevel angle. *Setting the bevel angle on the Veritas is easy, thanks to a gauge (left) that comes with the tool rest.*

The Veritas tool rest has a platform, a pair of slotted arms, and a base, all made of anodized aluminum. The base is bolted to the worksurface. The slotted attachment holes allow some side-to-side alignment.

Adjustable handles made it relatively easy to lock the 2⅝-in. by 4-in. platform in place. Once the handles were tightened, the entire tool rest was solid and secure. Its size and sturdiness make the Veritas more than suitable for freehand grinding.

The tool rest comes with a molded-plastic gauge that can be used to set the platform to any of the four common grinding angles: 20°, 25°, 30°, and 35°. Using the gauge was just a matter of placing it on the platform, then pivoting the platform until the edge of the gauge was tangent to the grinding wheel.

Unlike any of the other tool rests, the Veritas platform has a notch in front that allows it to wrap around the grinding wheel. The notch allows access to a portion of the side of the wheel while using the rest, a useful feature when sharpening a scratch awl or creating a conical shape.

The platform also includes a lengthwise groove designed to accept the Veritas tool guide, also called a grinding jig. Any cutting tool can be held between the clamping bar and the deck of the tool guide for sharpening. A pair of knurled brass knobs provides all the clamping force needed. A brass alignment pin made it easy to register the blade of the tool at 90° (for most applications) or at 30° (for grinding skew chisels).

In use, the Veritas proved to be easy to set up and adjust. It excelled when grinding plane blades and chisels. On the downside, because the tool rest is bolted to the worksurface, it first must be unbolted and then remounted before it can be moved from one wheel to another.

Wolverine, I noticed that loose grit from the grinding wheel built up on some of the parts, adversely affecting the performance of the jig. Fortunately, I was able to remove the grit using an old, stiff toothbrush. A blast of compressed air also worked well to clean the particles off the parts.

One more point: To use any of these tool rests, the bench grinder must be mounted to a flat, solid worksurface. The tool rest also must mount to that surface. Rather than mount directly to the worksurface, though, all of these aftermarket models, except for the Veritas, connect to an intermediate track that attaches to the worksurface. The track allows quick front-to-back adjustment and makes it easy to remove the tool rest from the worksurface.

By installing an additional track in front of the second grinding wheel, you can switch from one wheel to another in just seconds. With such a setup, you can start with, say, an 80-grit wheel, then quickly move the tool rest over to a finer-grit wheel for a smoother grind, all the while maintaining the same bevel angle.

Which tool would I buy?

All four of these aftermarket tool-rest systems proved to be an improvement over the typical factory-supplied rests. But after using these systems, I discovered some differences among them.

VERSA-REST

800-345-2396
www.hartvilletool.com
Tool rest and
tool guide: $44.99
Extra sliding track: $8.99

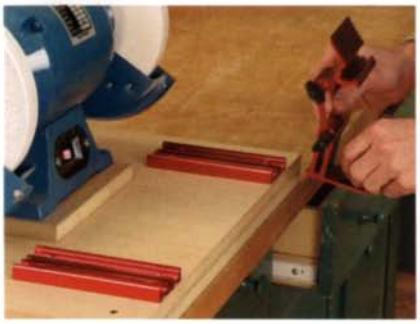
Like the Veritas, the Versa-Rest tool rest is made of anodized aluminum, and it has a similar-size (2½-in. by 4-in.) platform. The platform can be tilted to various angles, moved up and down, or adjusted in and out. Initially, the platform wasn't perpendicular to the track. But with some judicious bending of the arms, I was able to correct the misalignment.

Plastic wing nuts lock things in place after adjustments have been made. Compared with the handles on the Veritas model, however, the wing nuts were less comfortable to use, mainly because they had to be turned with a good measure of force to lock the platform securely. Even then, it was not quite as secure as the one on the Veritas model.

The base of the Versa-Rest is secured in a sliding track, making it easy to adjust the base either in or out. Another advantage of the sliding track is that it allows the base to be removed quickly and easily when extra room is needed for freehand grinding. You can buy a second track and mount it in front of the second wheel on the grinder.

The tool guide that comes with the Versa-Rest, called the Multi-Jig, secures the cutting tool between the clamping bar and the deck. A pair of slots in the bar allows the knobs to slide back and forth, a small feature but one that made it easy to adjust for blades of various widths.

The guide holds the tool steady to the grinding wheel at 90°, or 45° for a skew grind. Two holes in the deck accept an alignment pin that's supposed to help position the blade at those two angles. But with only one fixed registration point on the deck, the pin is of little value. Plus, the pin lacks a shoulder, so it regularly fell though the hole and onto the floor. A rubber shoe under the clamping bar did prove useful, though, helping to hold the tools more securely and to dampen vibration.



Two tracks allow a quick switch. *Mounting a second sliding track allows you to switch the tool rest from a coarse-grit wheel to a fine-grit one without losing the bevel-angle setting.*

For example, the Versa-Rest (above) wasn't as easy to adjust as the others, mainly because of its wing nuts, which were difficult to tighten fully. Even when tightened, the parts didn't lock as securely as I would have liked. Also, the alignment pin proved to be more of a nuisance than a help.

The blade-setting jig provided by FasTTrak ensured that a bevel angle could be set quickly and conveniently. Plus, the honing guide is a handy feature you won't find on the other jigs.

If you grind a lot of turning or carving gouges, you should strongly consider the Wolverine. Its V-arm design puts this model head and shoulders above any of the other tool rests I tested. Unfortunately, though, the Wolverine system doesn't come with a tool guide, so all grinding must be done freehand.

The Veritas tool rest comes with a gauge that makes it especially easy to set the bevel angle. Also, the tool rest was easy to adjust and lock into place, and it was sturdy. When grinding plane irons and chisels, the tools I most often sharpen, the Veritas system was the easiest to use. If I had to buy only one of these systems, it would be the Veritas. For these reasons, I awarded it Best Overall. And because it's the lowest priced, I named it Best Value, too.

Chris Gochnour is a frequent contributor to Fine Woodworking.

WOLVERINE

800-565-7288; www.oneway.ca
Platform, V-arm, and two bases: $76.50

The Wolverine comes with two sliding bases, or tracks, a tool rest, and an arm attachment. The tool rest and arm simply slide in and out of the bases.

Each sliding base mounts to the worksurface with three wood screws. Because of the height of the bases, the grinder I used had to be elevated on a ¾-in.-thick plywood pad and moved to the front edge of the worksurface. By the way, moving either the arm or the tool rest from one base to another was quick and easy. Locking either one in place was a relatively comfortable process, thanks to a jumbo-size adjustable handle.

The tool rest, which measures 3 in. by 5 in., is bigger than any of the others in the review. Made from a ¼-in.-thick steel plate, the platform is plenty beefy.

When slipped into the base, the pivot point of the platform is 5½ in. above the worksurface, and the platform can slide in or out a total of about 5¾ in. Like the other tool rests in the review, the Wolverine can be used to grind any bevel angle simply by pivoting the platform. But because Wolverine doesn't offer a tool guide, all blades not suitable for the arm must be done freehand. If you want a system with a tool guide, you'll need to improvise.

Freehand is the only option. *Without a tool guide in its arsenal, plane irons must be ground freehand on the Wolverine tool rest.*

Great for gouge grinding. *The long, adjustable arm on the Wolverine jig is perfect for grinding turning and carving gouges.*

The arm is designed for grinding turning and carving gouges, but it also can work with narrow bench chisels. It can't, however, be used to grind a plane or spokeshave blade.

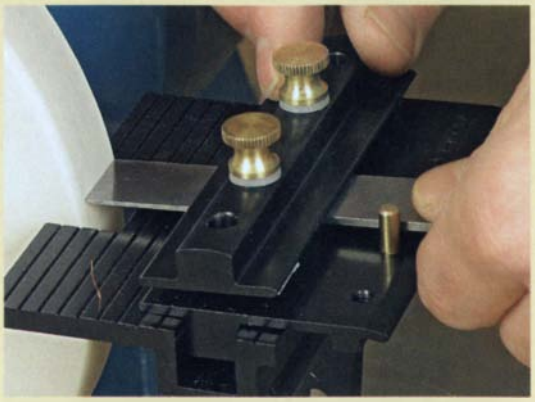
In use, the end of a gouge is set into a V-shaped pocket located on one end of the arm. The bevel angle is established by sliding the V-arm either in or out of the base. Once the handle of a gouge is in the V-arm, the tool can be easily and consistently ground. The rest can slide up to about 25 in.

Among all of the tool rests I tested, the Wolverine model was the quickest and easiest to adjust. The large, smooth platform was great for freehand grinding. The arm excelled at grinding turning and carving gouges, and it did a good job grinding chisels that measured 1 in. wide or less. Overall, the Wolverine had an exceptionally stout design and a rock-solid feel.

Tips for better grinding

Use a light touch. *Too much pressure while grinding will cause the steel to heat up and lose hardness.*

Keep the wheels dressed. *Use a dressing stone to periodically resurface the grinding wheels. In addition, Gochnour finds it helpful to bevel the edges.*



Start with a flat nose. *Gochnour grinds a square nose at the cutting edge; then the edge is used as a visual reference while grinding the bevel.*

I've learned a few good grinding tips over the years. Even though most of them fall into the category of common sense, they all prove helpful when I'm at the grinding wheel.

• Dedicate an area in your shop to grinding. It doesn't have to be big, but always keep it clean and ready to use. By making the grinding process as convenient as possible, you'll be more likely to take the time needed to keep tools sharp.

• Grind tools when you're in the proper frame of mind. I generally grind and sharpen my tools first thing in the morning; that's when I'm fresh and not yet too distracted by the various concerns of the day. Unless absolutely necessary, I prefer not to sharpen in the middle of a work session.

• Use aluminum-oxide grinding wheels. They are more efficient for grinding because the individual grits of aluminum oxide tend to fracture easily, revealing new, sharp edges. For a faster but coarser grind, I use a 60-grit wheel. For a slower but smoother grind, I sometimes follow with a 120-grit wheel.

• Dress the wheel periodically to expose a fresh grinding surface and to keep it running straight and true. One option is to use a dressing stone freehand or mounted in a tool guide. But I prefer to use an industrial diamond set in the end of a steel rod, with the rod mounted in a tool guide. With the tool rest angled 5° below the axis to the wheel, I move the diamond point back and forth across the wheel to expose fresh, sharp abrasive particles quickly. Another good idea, which I picked up from the FasTTrak owner's manual, is to bevel the edges of the grinding wheels. This helps minimize the chance of overheating a tool as you engage the grinding wheel from the side.

Keep water within reach. *For quenching a blade that gets too hot while grinding, it's a good idea to keep a water bath close at hand.*

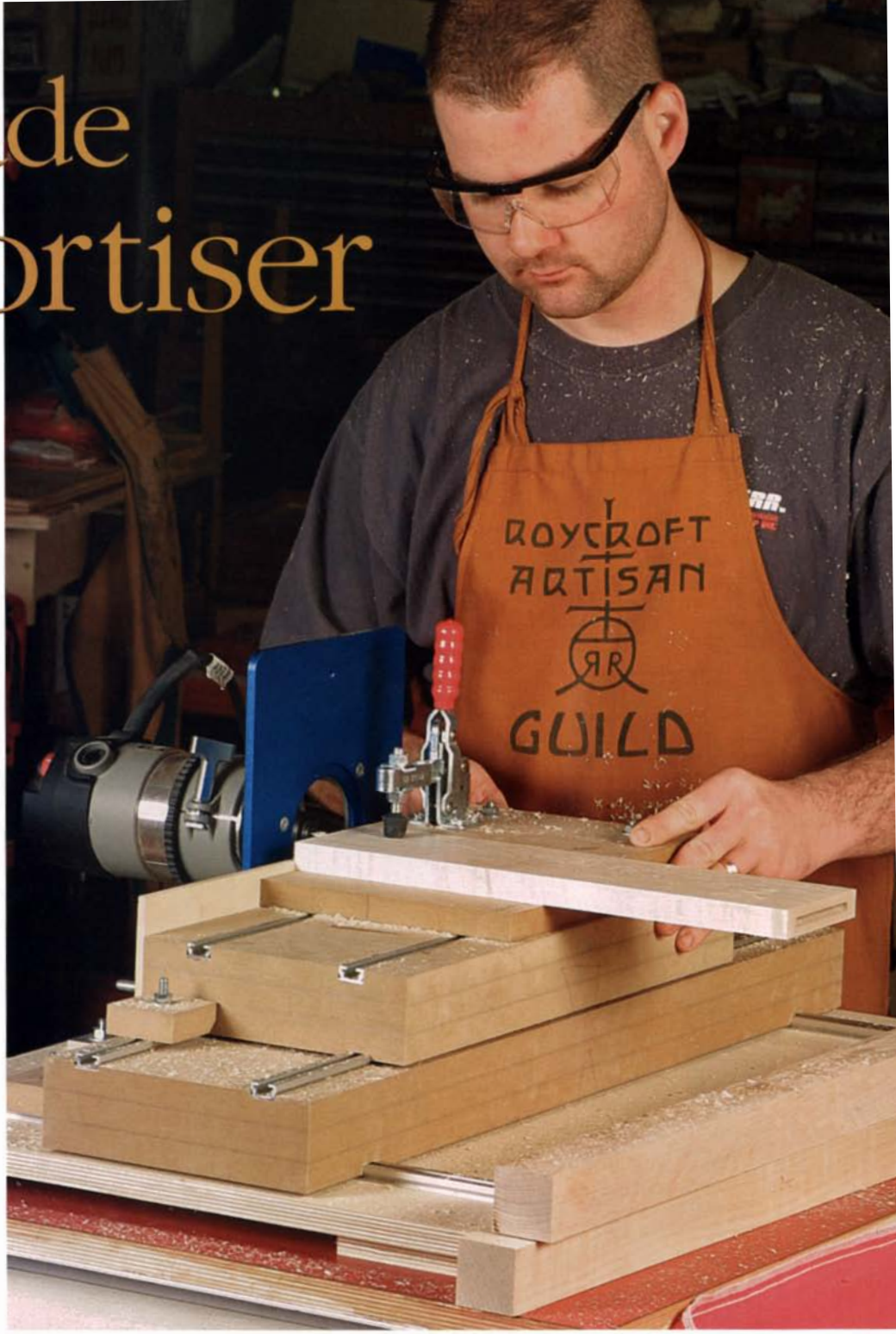
• Use a light touch to keep things cool. An aluminum-oxide wheel also can help. By applying too much force to the tool in an effort to speed up the grinding process, the tool steel may overheat and cause the cutting edge to lose hardness. When using the proper grinding technique, you should be able to grind a tool without having to cool its cutting edge in a water bath. That said, I always keep water close at hand when I'm grinding, for those occasions when I sense the edge just might be getting too hot.

• Define the shape of the cutting edge before starting to grind. Regardless of whether the tool has a straight, skewed, or crowned edge, I first create a small, flat, blunt nose on the edge using an abrasive sander, a coarse benchstone, or the grinder. I use the flat as a reference while grinding, working until the flat almost disappears uniformly across the cutting edge. I don't grind all the way to a feather edge because the blade is more prone to overheating, plus the reference flat is lost. The thin flat area that remains after grinding is eliminated easily during the honing phase of the sharpening process.

Shopmade Slot Mortiser

Use your router to cut mortises with speed and accuracy

BY GREGORY PAOLINI



As a member of a professional guild, I make a lot of Arts and Crafts style furniture, and I cut countless mortise-and-tenon joints. I used to cut the joints with a combination of hand and power tools, but I quickly realized that I had to find a more efficient way if I was going to keep the price of my furniture out of the stratosphere. I tried many different methods, but when I saw furniture maker and teacher Gary Rogowski using a slot mortiser, I was sold on the idea.

A slot mortiser basically is a table with a horizontally mounted router equipped with a spiral bit. The mortise is cut by plunging the workpiece into the bit while moving the workpiece from side to side to bore its width. Slot mortisers are the choice of production shops because they are very fast, accurate, and work well with integral or loose tenons.

I went shopping for a slot mortiser and found some machines that could do everything I needed—except fit into my budget. Prices for joint-making machines and commercial slot mortisers ranged from about $450 to $2,600, and in some cases I still had to supply my own router. Talk about sticker shock. I figured, for that much money, why not try to make my own.

Like the commercial machines, mine had to be reliable and accurate. It needed to incorporate a horizontally mounted router, a table that could move on both X and Y axes, stops to control mortise width and depth, and a system to index and secure my work.

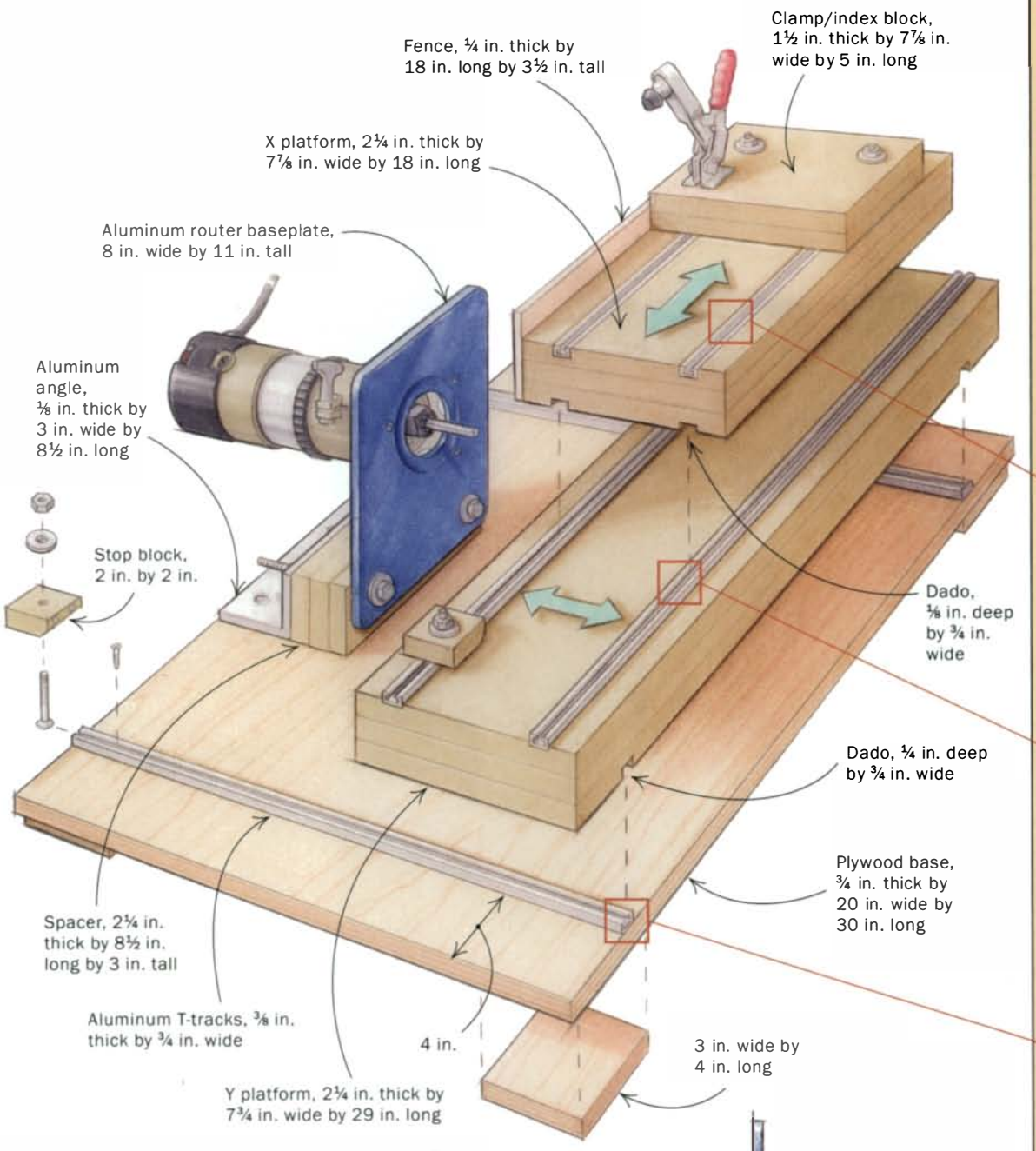
Build heavy sliding tables from MDF

Building the movable table was the tricky part. I needed a system that would provide movement independently along two axes. I achieved the X-Y movement I was after by making two platforms, each of which moves along a different axis, with alu-

Photos: Matt Berger

Simple-to-make mortiser

Don't let the simple design fool you. This shopmade device, constructed primarily of MDF, makes it easy to cut countless mortises quickly and accurately.

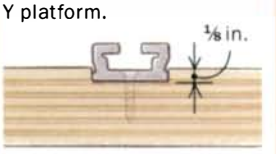


T-TRACKS ARE THE KEY TO SMOOTH OPERATION

The movable platforms don't make contact with one another; instead, they slide solely on the aluminum T-tracks. The tracks also secure the clamping blocks. Wax the tracks regularly to ensure smooth movement.

T-tracks that secure the clamping blocks are fully recessed into the X platform.

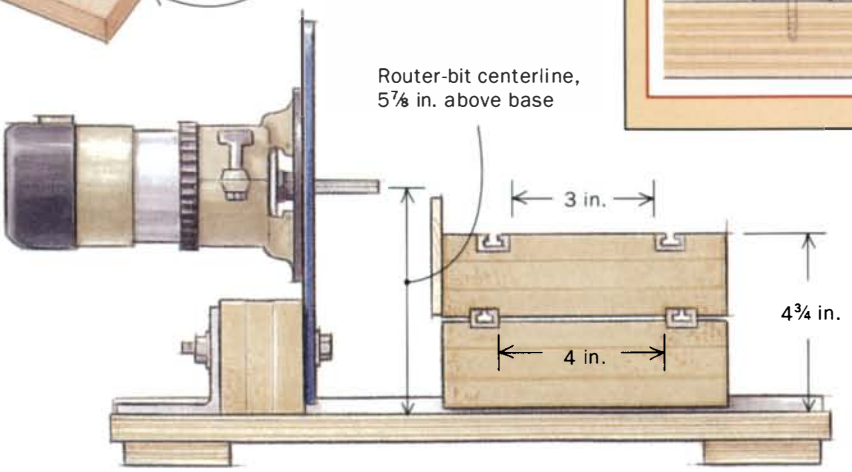
T-tracks that support the X platform are partially recessed into the Y platform.



T-tracks that support the Y platform are surface-mounted to the plywood base.

minum T-tracks riding in dadoes. The table also had to be stable and strong, as well as a little weighty, to resist jumping or jerking when cutting. Three stacked layers of ¾-in.-thick medium-density fiberboard (MDF) provided both the weight and the stability I needed.

T-tracks make great runners for jigs. They fit into a dado that is ¾ in. wide. They don't swell and shrink like hardwood runners. And you can bolt things onto them—in this



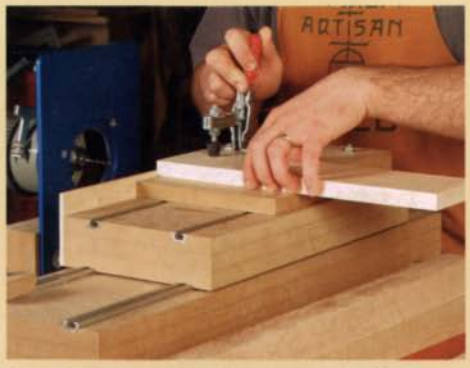
Drawings: Bob La Pointe

Cutting mortises for a leg-to-apron joint

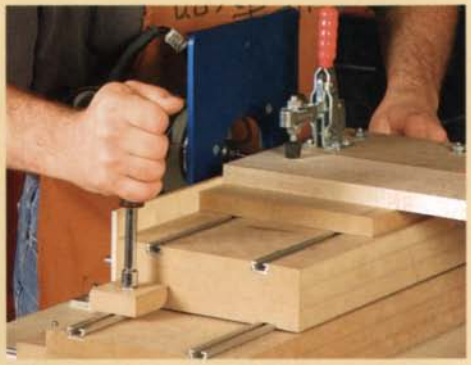
The slot mortiser works well for cutting mortises into two mating pieces to be joined with a loose tenon. And the mortiser can be adjusted quickly to cut a multitude of mortises.

SET UP THE APRON MORTISE FIRST

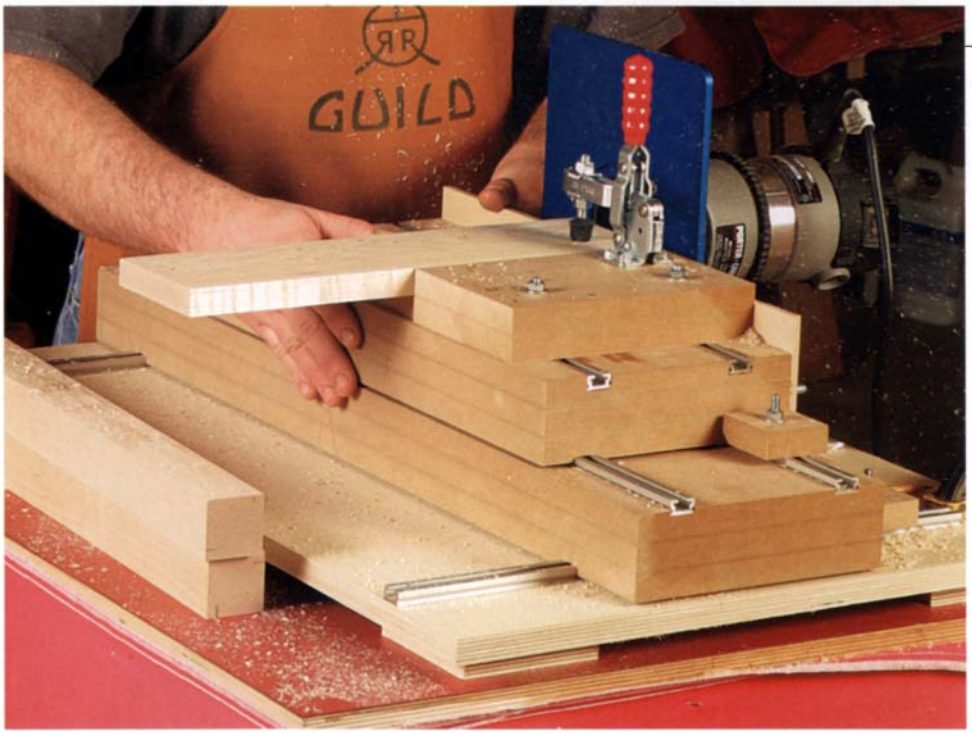
Adjust mortise depth on the router. *The distance from the fence to the end of the router bit determines the depth of the mortise.*



Clamp the apron to the sliding platforms. *Set the mortise height with a spacer. Then butt the workpiece against the fence and index block, and clamp it in place.*

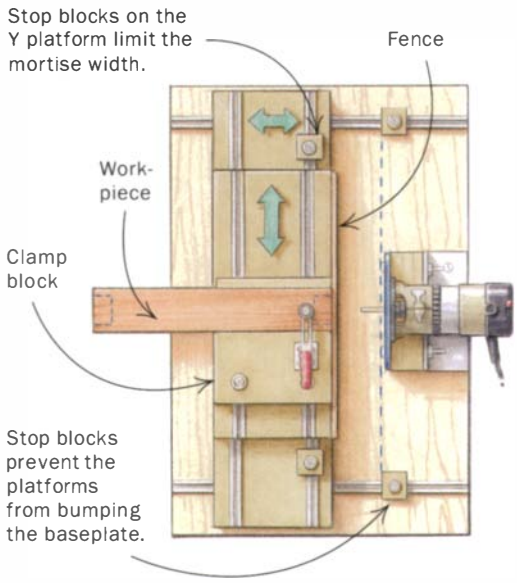


Adjust the stop blocks to the correct mortise width. *Align the router bit with one end of the mortise, butt the stop block against the sliding platform, and secure it in place.*



MORTISE THE APRONS

Apply light pressure against the bit and move the workpiece side to side, cutting deeper with each pass.



case, I bolted a couple of MDF blocks that act as stops to limit platform travel in each direction. Additionally, the T-track I used can accept standard ¼-in. by 20-tpi bolts, which keeps hardware and fastener costs to a minimum. Some brands of T-tracks require you to buy specialty hardware.

Keep T-tracks aligned

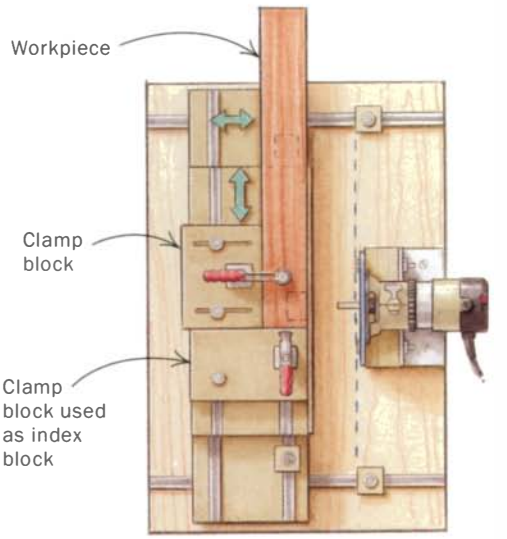
It is important that the upper (X) and lower (Y) sliding platforms move perpendicular and parallel, respectively, to the cutting bit. To ensure this, I cut all of the matching T-track dadoes at the same time with the same settings on the tablesaw. For instance, two ⅛-in.-deep dadoes in the underside of the X platform along its length were cut at the same time as the matching dadoes in the top side of the Y platform below. As a result, T-tracks mounted in the dadoes on the Y platform are aligned perfectly with the dadoes above.

The T-tracks on the base of the slot mortiser are screwed to the surface, so no dadoes are required. However, those T-tracks fit into dadoes cut in the underside of the Y platform along its width. Once the T-tracks are installed, applying a little furniture wax cuts down on wear to the MDF platforms and helps the mortiser work smoothly.

To finish the X platform, I cut a series of dadoes in the top surface for two more T-tracks, on which I can mount index

MORTISE THE LEGS

The clamp block is used as an index block to register the end of the leg. A second clamp block is added to secure the leg.



blocks that act as a fence to butt a workpiece against.

Mount the router on a baseplate

Keeping the router from deflecting while in use is critical, and I didn't think that a plastic router base was up to the task. Instead, I attached the router to a standard aluminum router baseplate and made a spacer from MDF and a piece of ⅛-in.-thick by 3-in. by 3-in. aluminum angle to secure the baseplate to the table base. When securing the router plate to the aluminum angle, make sure the router-bit centerline is 5⅞ in. above the base. This is an ideal height for cutting mortises into most furniture parts.

Also, it's important to reference the router baseplate against the X and Y platforms with a square while securing it to the base. This will ensure that the mortises are cut at a perfect 90°.

Use spacers to adjust the height of a mortise—Unlike commercial machines, the bit on this slot mortiser can't be adjusted for the height of a mortise. Instead, I raise or lower the workpiece with spacers of various thicknesses. For example, to cut a ¼-in. mortise in the center of a ¾-in.-thick workpiece, I use a ¾-in. spacer.

It takes some fooling around to determine spacer thickness, but once you have made a few spacers for various projects, label and save them for future use. I also have angled spacers that allow me to cut angled mortises, expanding the versatility of the tool. You can fine-tune the height with plastic laminate or cardstock shims.

Using the slot mortiser

Lay out the first mortise in a series with a marking gauge, and then set up the slot mortiser. Verify that the mortise height is correct and that the stop blocks are set accurately (see the photos on the facing page).

Once you've cut the first mortise, you can use most of the settings to cut the mating mortise. The only adjustment you might have to make is to the height, which involves swapping or removing the spacer. Finally, the two pieces can be joined with a loose tenon, cut from the same material and planed to fit the mortises. □

Gregory Paolini makes Arts and Crafts style furniture at his home in Depew, N.Y.

SOURCES OF SUPPLY

T-TRACKS
Brunner Enterprises
877-299-2622; www.brunnerent.com

ROUTER BASEPLATE
Rockler
800-279-4441; www.rockler.com

Jimmy Carter on Woodworking

"A sense of belonging to a dedicated fellowship"

Four-poster bed. *Carter built this bed out of cherry, with tapered, faceted posts.*

Since I was a child, woodworking has played an important role in my life. It has given me a sense of belonging and a connection to a wide-ranging and dedicated fellowship. The feelings of continuity and timelessness that the craft has brought to me are most gratifying. I know that some of my pieces will be used for many generations in the future, and yet there is also a strong connection with the past. For instance, my most recent project was a large cabinet made of old pine boards from the first home built, in 1833, on our family farm. Each 1¼-in.-dia. doorknob contains 75 annual growth rings, so the trees were growing when Europeans were settling in this part of the country.

The workshop as a refuge

There was a real breakthrough in my life as a cabinetmaker when I was involuntarily retired from political life after the 1980 election. As we prepared to leave Washington, cabinet officers and White House staff had taken up a collection for my going-away present: enough to purchase a Jeep. I really didn't need or want this gift, so I dropped a gentle hint that was eventually honored. With the already collected funds, they gave me a gift certificate for woodworking tools. It has been the most enjoyable gift I've ever received.

I spent most of 1981 at home in Plains, Ga., writing a memoir of my years in the White House. I put in several solid hours of writing before and after breakfast, and each day I walked the 20 steps to my woodshop for a restful vacation, studying my back issues of *Fine Woodworking* and Tage Frid's instruction books. In those

Finishing touches. *Carter puts a final coat of oil on a walnut-crotch table he recently completed.*

quiet moments, I practiced dovetail and finger joints, learned ornamental carving, and became more skilled with the router, lathe, and other power tools. Over the course of that year, we acquired a log cabin in the North Georgia mountains, and I built all of its furnishings—beds, chairs, tables, benches, cabinets, stools, and even the smaller items needed in the bathrooms.

Woodworking out of necessity

I grew up on a relatively isolated farm, long before we had electricity and when all the labor was by hand or with livestock. My father did the building and repairs, made many of our hand tools, and was a good cobbler and an expert blacksmith. As soon as I was physically able, he expected me to do my share of the work, and I was an eager student. I expanded my skills as a Future Farmer of America, and was required to make a few pieces of furniture, usually as gifts for my mother.

Later, when I was a young naval officer with a base pay of $300 a month, it was important for my wife, Rosalynn, and me to live as inexpensively as possible, so we chose unfurnished apartments. There were fully equipped hobby shops at the large submarine

Photos: Anatole Burkin

bases, staffed by qualified personnel who helped in the design of furniture and provided good advice on the types of wood, proper joints, gluing techniques, and the use of power tools. I made the necessary beds, tables, and other furniture, but the only piece we brought home from the Navy was a white oak cabinet for high-fidelity sound equipment.

When Rosalynn and I moved back to Plains, we lived in a government housing project, and I was struggling just to earn a living for our family. I can't say that I improved my woodworking skills during those years as a farmer and struggling businessman, since my only tools were a handsaw, hammer, drawknife, and an auger and bits, but I made some couches, lounge chairs, and tables that we still use every day. During this time, I became more familiar with the local woods and accumulated a good supply of lumber.

I had very little time for woodworking while we lived in the governor's mansion in Atlanta, which had no shop facilities, or immediately thereafter when I was a campaigning full-time for president.

Making pieces for pure enjoyment

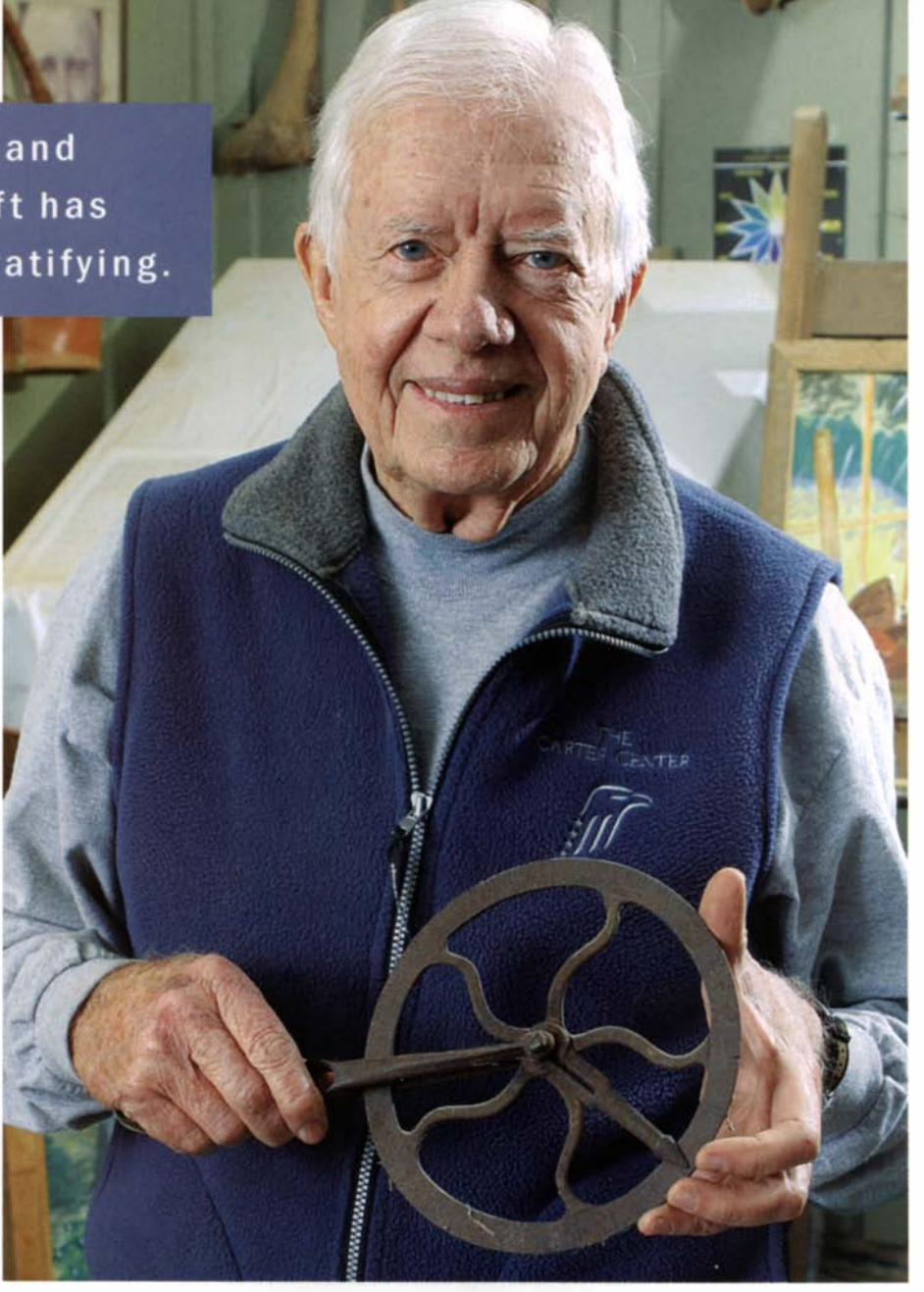
As president, I used the woodshop at Camp David on weekends but had no need for furniture, so I confined my efforts to making small items as gifts, including some lathe turnings and tippet holders and reels for fly-fishing lines for family members and close friends.

Although I have built more than 100 pieces of furniture, I wish I had more time to spend in the shop. Some of the projects have been quite challenging, such as a cradle with woven straw side panels that took 120 hours to complete.

I know that some of my pieces will be used for many generations, and yet there is also a strong connection with the past.

Fun and functional. *Carter built the chess table (above) and turned and carved the pieces. The cedar chest (right) features hand-cut dovetails.*

The feelings of continuity and timelessness that the craft has brought to me are most gratifying.



I've made several other cradles, and they have helped bribe my children into producing more grandchildren.

One of my most enjoyable projects was making a set of greenwood chairs, stools, rakes, and pitchforks from a hickory tree that I cut down near our home. I limited myself to using just tools that were available during colonial times. There is something satisfying about working on a shaving horse using the most basic equipment such as a knife, froes, adzes, hatchets, drawknives, spokeshaves, and a stovepipe for steaming and bending.

Building furniture to help others

I occasionally build items to be auctioned at annual fund raisers for The Carter Center, the human-rights organization founded by Rosalynn and me in 1982. I've contributed about a dozen pieces for this effort, including cedar chests, four-poster beds, greenwood chairs and tools, and cabinets of various designs. One year I carved a chess set, with the individual pieces housed in a maple box that Rosalynn lined with velvet. An album of self-taken photographs has accompanied each item, with my handwritten notes describing the step-by-step process, from wood selection to a final burned signature.

Because a former president made them and the provenance is indisputable, bidding is always brisk and the final prices very high, ranging from $51,000 to more than $200,000. The money is used to eradicate diseases in Africa and Latin America, and to help finance our efforts to improve health, increase food production, monitor elections, and negotiate peace agreements in about 65 of the poorest nations. In 2004, I contributed an oil painting of Menachim Begin, Anwar Sadat, and me at the Camp David peace ceremony. Its bid price was in the midrange of those for my furniture, so now I have two options for contributions as a craftsman.

Tools from home and abroad. *Carter's collection of antique tools includes a tracing wheel (above) used for measuring the circumference of wagon wheels. This scraper plane (left) was a gift to Carter when he visited a Chinese furniture factory.*

Inspired by Sam Maloof

Rosalynn and I have been to more than 120 countries through our Carter Center work, and I've had a chance to visit a number of the most famous craftsmen in Europe, Africa, Asia, and Latin America. I consider myself fortunate to have a personal friendship with Sam Maloof, whom I consider to be the world's finest woodworker. His integrity and personal philosophy are demonstrated vividly in the design and beauty of his furniture, and my visits with him have always been inspirational. I've never attempted to emulate the flowing artistry of his work but am satisfied knowing how to build pieces with square corners and simple joints. I own one of his black-walnut rocking chairs and two pedestal tables, a double rocker of bird's-eye maple, and a remarkable zircote straight chair that he gave to Rosalynn and me when we were honored recently.

I'll continue to be an eager learner and expect woodworking to become even more important as advancing age forces me into a more sedentary life. Someday I may do a photograph album of the furniture I've built. □

Current Work

Current Work provides design inspiration by showcasing the work of our readers. For more details and an entry form, visit our Web site at www.finewoodworking.com. Send photos and entry forms to Current Work, *Fine Woodworking*, 63 S. Main St., Newtown, CT 06470.

Bill Durow Mountain Home, Ark.

Inspired by a piece in *The Toolbox Book* (The Taunton Press, 1998) by Jim Tolpin, Durow built this chest (25½ in. deep by 37½ in. wide by 24 in. tall) to house his antique tool collection. It has three sliding drawers, a saw till, and a smaller chest inside. He used 16 different woods in its construction: lacewood, padauk, Osage orange, cocobolo, rosewood, bubinga, birch, tulipwood, imbuia, amaranth, boxwood, walnut, cherry, oak, red cedar, and maple. Walnut-burl panels line the lid's interior, and the drawer fronts and covers are curly maple that is 200 to 500 years old. The carcase has a milk-paint finish; the trim, interior, and drawers are finished with four coats of tung oil.

Jim Moon Concord, N.C.

Moon, a physician, based this Brazilian-rosewood plow plane on the highly collectible Sandusky centerwheel plow plane featured in *Art of Fine Tools* (The Taunton Press, 1998). The knobs, adjusters, and centerwheel are turned brass, and the wheel adjusts the fence on a threaded rosewood bolt. The skate is steel. The remaining details are made of woolly-mammoth ivory, a material that still is unearthed in Alaska and Siberia. The plane (7 in. wide by 12 in. long by 9½ in. tall) accommodates interchangeable cutters from ⅛ in. wide to ¾ in. wide. It has a shellac finish.

Andrew L. Rivard Edina, Minn.

During his second year in medical school, Rivard enrolled in a woodworking class and made this stout 11½-in.-long mallet with a 4¼-in.-dia. head, based on one featured in a book by Chris Pye. "The size and weight of the mallet were chosen for carving the hardest of woods," Rivard said. The handle is bulletwood, a straight and sturdy species historically used for ship masts. An ebony wedge secures the lignum vitae head to the handle. The mallet has a linseed-oil finish.

Kathy Somerville and Larry Diegel
Calgary, Alta., Canada

Somerville, a woodworker, and Diegel, a machinist, teamed up to craft these "chair devils," used in chair making and paddlemaking to scrape round spindles after they've been shaped with a drawknife or spokeshave. Diegel made the blades from high-speed steel and secured them with brass screws. The cherry version (top) measures 12¼ in. long with a 1⅛-in.-dia. cutting surface; the African-blackwood model (bottom) is 11 in. long and has a ⅞-in.-dia. cutting surface. They're both finished with tung oil and wax.

Theodore Ewalt Bonita, Calif.

Borrowing some features from a bench in *Fine Woodworking* (#167) that he liked, Ewalt designed and crafted this workbench (32 in. deep by 77 in. wide by 35½ in. tall). It features a rolling vise with auxiliary support for a large panel, as well as a Veritas twin-screw vise with a double row of dog holes along the benchtop. The top is maple, and the legs and stretchers are poplar. Ewalt finished the bench with three coats of polyurethane.

Garrett Hack Thetford Center, Vt.

Frequently on the road due to his busy teaching schedule, Hack built these small molding planes for his traveling demonstrations. On the left is a bead plane (1⅛ in. thick by 7½ in. long) crafted from curly maple with a rosewood wedge and a snakewood skate. The roundover plane (1⅛ in. thick by 8¼ in. long) on the right is constructed entirely of rosewood. Hack heat-treated and shaped the blades using steel from an old plane blade.

Robert Ratts Bedford, Texas

A hobbyist woodworker for 60 years, Ratts designed this set of chisels and a matching marking knife because he wasn't satisfied with store-bought chisels. He purchased steel blades from a hunting-knife supply company and sent them out to be heat-treated. After polishing the blades, Ratts assembled the chisels with stainless-steel ferrules. The handles are turned from Osage orange and finished with polyurethane. Each chisel is 9 in. long, and their blade widths increase by ⅛-in. increments. According to Ratts, "These chisels do the job."

Chris Black Canton, Ga.

Black designed this round-tipped marking knife (¼ in. thick by ¾ in. wide by 5½ in. long) to slice wood rather than scratch it. The blade is beveled on one side and flat on the other so that it registers tightly against a square. Black purchased steel as bar stock, heat-treated it, and shaped the blade. The handle is bird's-eye maple finished with oil.

Robert Inserillo Stanfordville, N.Y.

Inserillo, a period-furniture maker who specializes in reproductions, built this tool chest on a rolling stand to hold his hand tools. The removable upper chest (14 in. deep by 31⅝ in. long by 14 in. tall) is walnut with cherry and ebony inlay and curved cherry drawer fronts. The stand (31 in. tall) is maple with walnut drawer fronts. For the drawer handles and knobs, Inserillo salvaged ebony from an old upright piano that had belonged to his grandmother. He said he had saved the ⅜-in.-thick by 3½-in.-long ebony keys because "I knew I could put them to use someday." The chest also has handmade cherry hinges and a maple lid stay.

Adam Cherubini Cinnaminson, N.J.

Cherubini, a master joyner at Pennsbury Manor Joyner's Shop in Morrisville, Pa., built this tool chest (18 in. wide by 48 in. long by 21 in. tall) after researching 18th-century examples. It includes a number of period elements such as a single till, iron strap hinges, a crab lock, and rope handles. The chest is constructed of tulip poplar with a pine bottom. The till is made of mahogany, and the box handles are maple. The tool chest is finished with milk paint and beeswax.

Scott Grandstaff Happy Camp, Calif.

Grandstaff has a passion for making handplanes that are influenced by historical examples but deviate from the traditional. Grandstaff's infill scraping plane (2 in. wide by 8½ in. long by 6 in. tall) borrows its shape from the Stanley No. 87, but the details are his own. Grandstaff machined the sole and sides from a piece of 3-in.-wide heavy channel iron, and he sand-cast the brass lever cap and frog using a mold he carved out of applewood. The plane has a Bolivian-rosewood square knob and tote. The tote tilts for planing in tight corners.

Garry Smith Engadine, Mich.

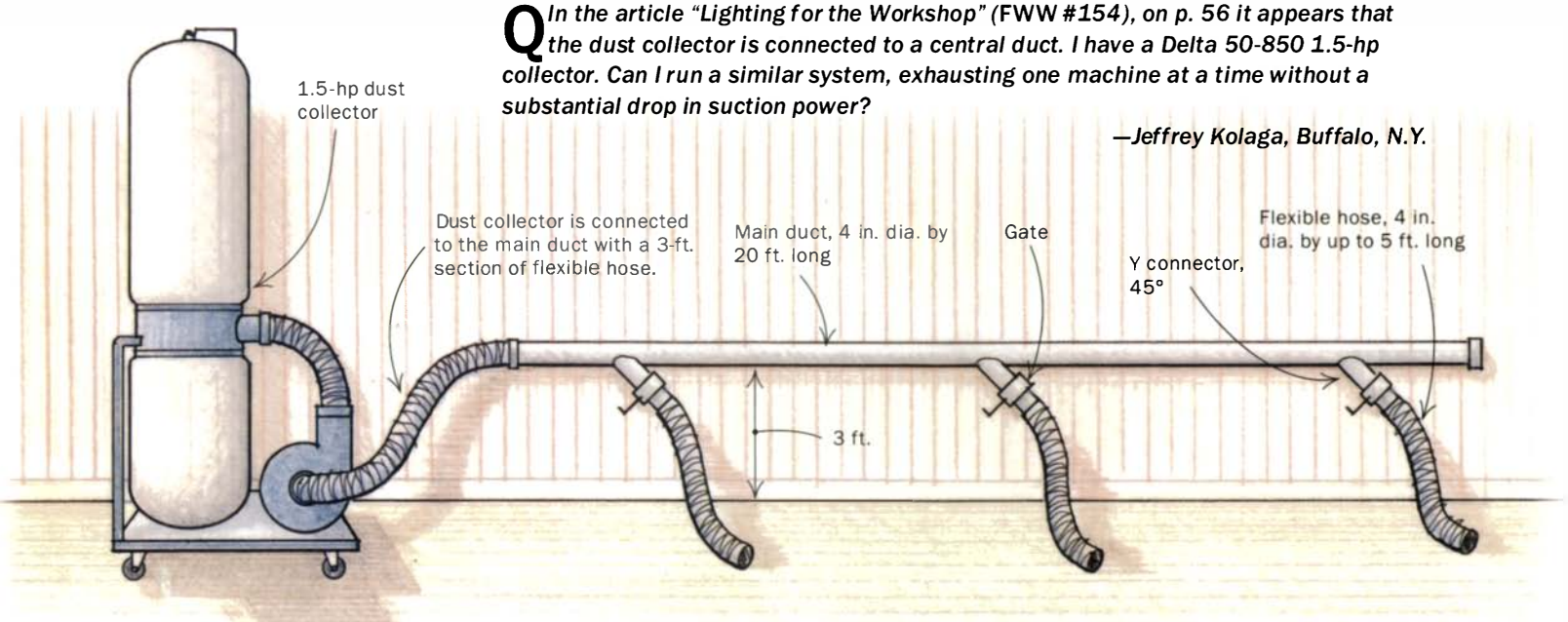
One of the first appliances in Smith's new shop was this downdraft sanding bench (27¼ in. deep by 74 in. long by 34 in. tall) made of cherry, maple, and yellow-birch hardwoods, and lauan plywood. He uses it regularly when sanding furniture parts and moldings. The table's dust-collection system is a fan housed in a ventilated chamber that draws dust into another chamber through holes in the grooved plywood top. A standard furnace filter keeps dust from reaching the fan.

Lee Spradlin Bedford, Texas

Spradlin used a leftover bubinga table leg to turn the handle for this 11-in.-long hammer, which he uses to strike chisels and tap furniture parts into place. At its thickest, the handle is 1¼ in. It has an oil finish. He turned and tapped the hammerhead pieces on a wood lathe using 1¼-in.-dia. brass stock and wood-turning tools. The brass parts can be unscrewed and replaced with heavier pieces to adjust the hammer's striking force.

Q&A

Making the most of a 1.5-hp dust collector



Q *In the article "Lighting for the Workshop" (FWW #154), on p. 56 it appears that the dust collector is connected to a central duct. I have a Delta 50-850 1.5-hp collector. Can I run a similar system, exhausting one machine at a time without a substantial drop in suction power?*

—Jeffrey Kolaga, Buffalo, N.Y.

A **Curt Corum replies:** Portable dust collectors generally lack the power for a central duct system. They are designed to provide optimum air volume at the end of a 5-ft. length of flexible hose, not a 25-ft. duct run. Woodworkers who have tried to use a 1.5-hp collector in an overhead system have not been all that successful (too much duct). However, they have been successful with running a 20-ft. main duct along a wall, about 3 ft. off the floor, with several gated tap locations on the duct. The collector stays in one place, and the stationary power tools are connected with short lengths of 4-in.-dia. flexible hose.

[Curt Corum is sales manager at Air Handling Systems Manufacturers Service.]

Tablesaw-blade tightening technique

Q *It's hard to get a lot of leverage on the blade of my cabinet saw when I'm tightening it to the arbor. What technique should I use to tighten the blade enough so that it won't fly off while it's spinning?*

—Aaron Graham, Jamaica Plain, Mass.

Steady the blade with slight hand pressure. *Then a few quick raps on the free end of the wrench with a piece of hardwood are all that is needed to tighten the nut solidly (left). Loosen the blade the same way, but protect the tabletop from the loosened wrench (right).*

A **John White replies:** Jamming a block of wood against the blade's rim or clamping the blade can permanently distort a precisely made blade. The method I use doesn't put any stress on the blade. After you get the nut finger-tight against the blade, place the wrench on the nut, hold the blade with one hand, and strike the wrench with a block of hardwood, taking two or three moderate blows. This method simulates the action of an impact wrench, using the inertia of the saw's drive system to keep the arbor still while the nut is tightened with a series of blows.

Because of the way a saw is designed, you don't have to worry about the nut coming loose and the blade flying off. The direction of the threads on the arbor run in the opposite direction of the arbor's rotation; so even if the nut were loose, it wouldn't spin off the shaft while the saw was running.

To remove the nut, reverse the procedure. Place a shop rag on the edge of the table-insert opening to prevent the wrench handle from dinging the edge of the opening when the nut comes loose.

[John White is *Fine Woodworking*'s shop manager.]

Photos, except where noted: Marcia Ryan; drawings: Vince Babak

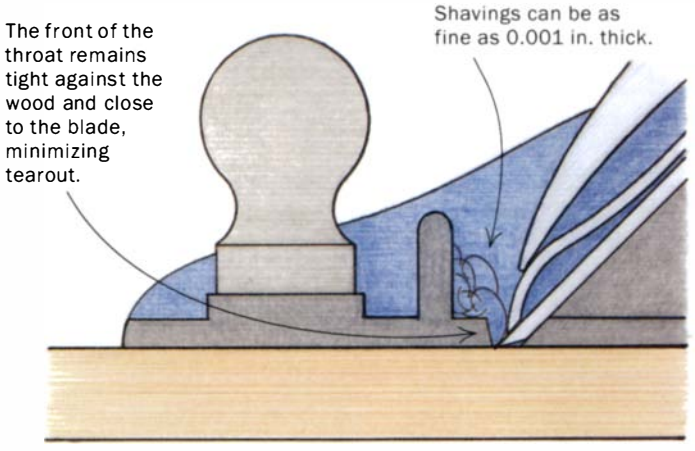
Why not make handplanes like jointers?

Q *Why is the bed of a handplane not set up the same way as the split bed on a jointer, with the leading edge recessed a little and adjustable?* —*Dan Floyd, Chicago, Ill.*

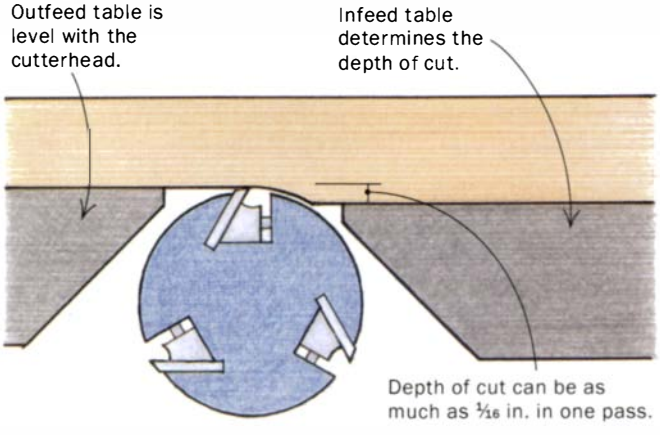
A **Garrett Hack replies:** To create thin shavings with minimal tearout, a handplane does not need a split sole. I regularly use a plane to cut shavings that are 0.001 in. to 0.002 in. thick or less. To cut smoothly, the plane sole ahead of the cut must be close to the blade and must press the wood fibers down firmly so that they can't lift up and tear out ahead of the cut.

Compared to the shavings made with a plane, those made with a power jointer are considerably thicker, up to 15 times or more. To achieve this, the jointer's tables must be set far enough apart to accommodate the rotation of the cutterhead. They also must be offset to keep the board from rocking. The lack of pressure on the wood fibers right at the cut results in some tearout. [Garrett Hack is a contributing editor.]

HANDPLANES FOR FINE CUTS, JOINTERS FOR HEAVY CUTS



Handplanes are designed for fine cuts, so a split sole is not necessary.



Jointers are designed to take heavy cuts, so the tables need to be offset to guide the workpiece through the milling process.

What is a helical cutterhead?

Q *I have noticed that some planers can be purchased (or retrofitted) with a helical cutterhead. What is a helical cutterhead, and how does it work?*
—*Peter Saale, Pasadena, Calif.*

A **Roland Johnson replies:** Helical cutterheads, made by Bridgewood, Delta, Powermatic, International, and other manufacturers, have rows of small knives that spiral around the drum. Each knife takes a small cut, and the knives are aligned to create a shearing action. This results in a smoother finish with less tearout than when planing with a cutterhead that has long, straight knives. Also, knife changes on a helical cutterhead are easier than you may think. Insert knives have four sharp faces and are easy to rotate or replace when damaged or dull.

For more information about helical cutterheads, visit www.byrdtool.com/journals.html. [Roland Johnson is a contributing editor.]

Angled knives shear the wood. *Retrofit helical cutterheads are available for 6-in. to 16-in. jointers and 8-in. to 30-in. planers.*

A lathe on casters

Q *I am a retiree just trying my hand at wood turning. I have a heavy, 50-year-old Craftsman lathe that I need to move around my small shop. Can I put heavy casters under the lathe stand, or would that predispose it to vibrations?*
—*Charles J. Brooks, Saratoga, Calif.*

A **Andy Barnum replies:** I think your idea is just fine. Heavy-duty casters (available at www.woodcraft.com) shouldn't contribute to vibration. Look for casters that have a dual mechanism that brakes the wheel and locks the swivel simultaneously. Also, all of the wheels should touch the floor firmly so the lathe can't rock.

Remember that the spindle center height should be the same as your elbow height when your arm is hung at your side. If you need to adjust the spindle height, you'll have to modify the stand, but make sure it remains rigid and stable. As an added (and inexpensive) stabilizer, place sandbags on the stand. [Andy Barnum teaches wood turning at Purchase (N.Y.) College.]

Heavy-duty caster. *For maximum steadiness, use casters that brake the wheel and lock the swivel simultaneously.*

Photo, this page (top right): Courtesy of Byrd Tool Corp.

Pros and cons of ipé for a benchtop

Q *I'm considering using a heavy, hard, exotic wood such as ipé for a benchtop. My goal is to have a shockproof top that seldom requires resurfacing and that has dimensional stability. Aside from cost, will there be other problems, such as damage to the cutting edges of tools?*

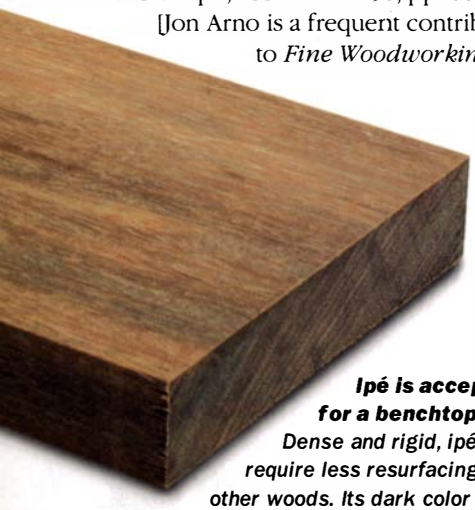
—John Blackwell, Denver, Colo.

A **Jon Arno replies:** Ipé is an acceptable choice for a benchtop. It is extremely dense, strong, and rigid. It also has exceptionally good wear characteristics, so it requires resurfacing less often than other woods. When the time comes, you should use a cabinet scraper or a handplane with a high blade angle and a fine set for resurfacing, as opposed to using a belt sander. The hand tools will give you better control over creating a perfectly flat surface.

Ipé is at least as stable as hard maple or beech, which traditionally are used for benchtops in the United States and Europe. Because of its density, ipé tends to develop fine surface checks when exposed to the elements, but this shouldn't be a problem in a workshop. Also, while ipé is extremely dense, it isn't as dense as the high-carbon steel used in tools, so don't be overly concerned about damage to cutting edges.

One drawback, though, is ipé's moderately dark color. Try to pick stock in the lightest shade you can find so that your benchtop will reflect light better. (For more on ipé, see *FWW* #156, pp. 66-67.)

[Jon Arno is a frequent contributor to *Fine Woodworking*.]



Ipé is acceptable for a benchtop. *Dense and rigid, ipé will require less resurfacing than other woods. Its dark color is variable, so select the lightest-colored wood to increase light reflection.*

A propane heater in a dusty environment

Q *It's below 50°F in my garage workshop, and glue doesn't set well. I've tried an electric space heater, but it isn't enough to heat the garage. Would a propane heater be safe to use?*

—Lu Silverstein, Duvall, Wash.

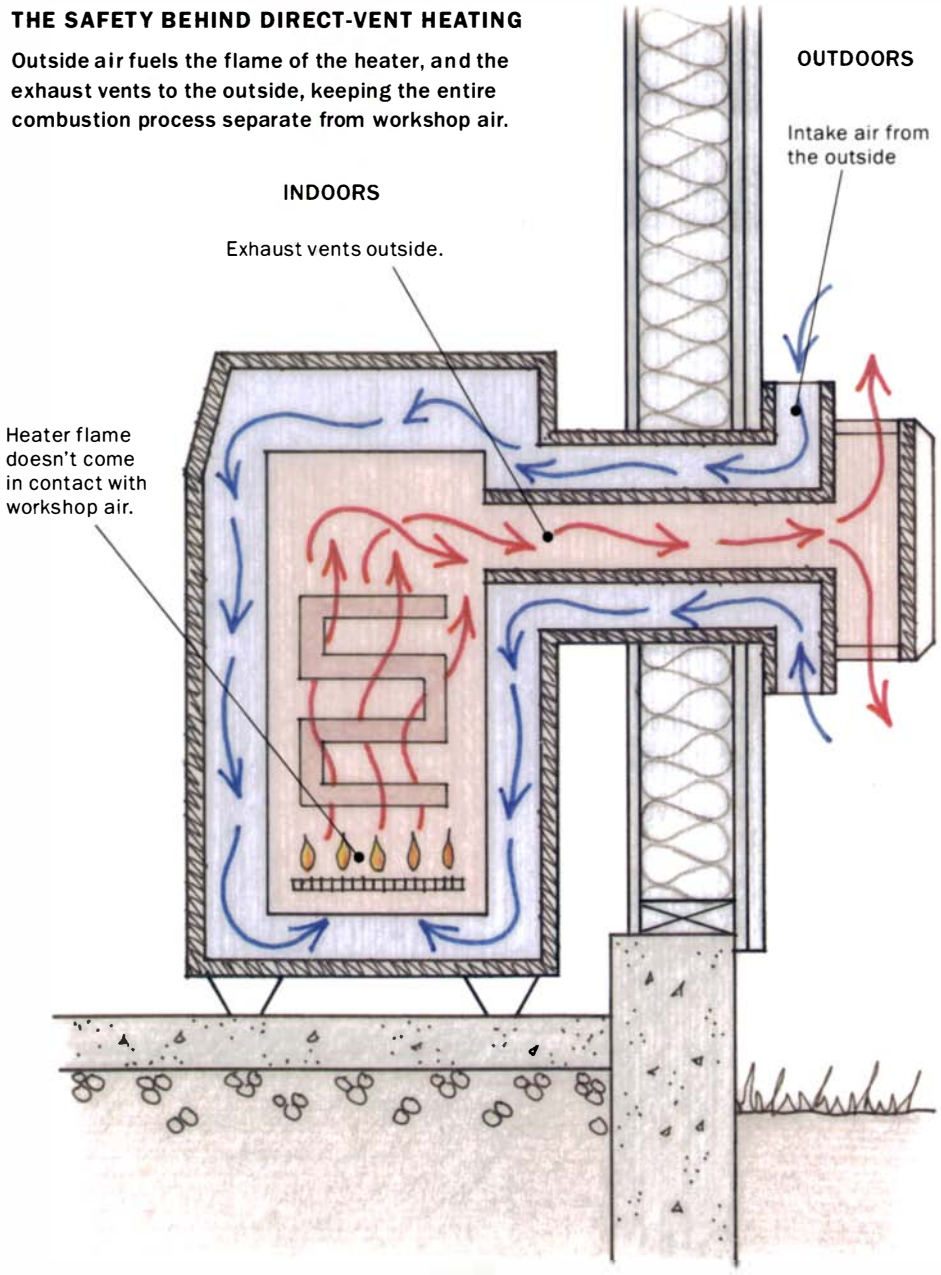
A **Roland Johnson replies:** Yes, propane heaters are safe to use in a workshop if they are direct-vent heaters. These heaters draw combustible air from the outside and then vent the exhaust to the outside. This keeps workshop air that may be contaminated with inflammable particles out of the combustion process. *Fine Woodworking* has published an article on heaters (see *FWW* #133, pp. 89-91); the author's choice for his workshop was Empire Comfort Systems (www.empirecomfort.com).

A propane heater that has an exposed, intermittent flame isn't safe in a woodworking shop. The flame or burner could set off a high-density, ambient-air dust explosion or a fire from dust accumulation on the burner.

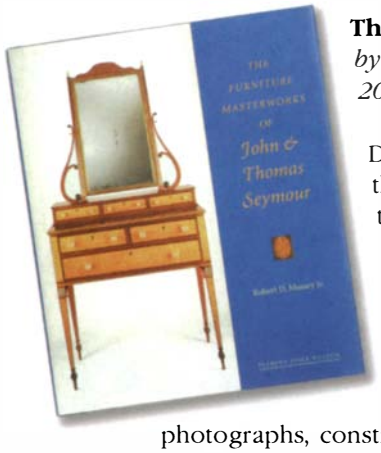
Keep warm, keep safe, and enjoy winter woodworking.

THE SAFETY BEHIND DIRECT-VENT HEATING

Outside air fuels the flame of the heater, and the exhaust vents to the outside, keeping the entire combustion process separate from workshop air.



Reviews



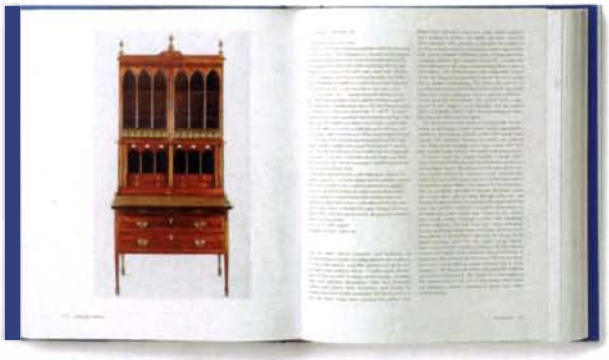
The Furniture Masterworks of John & Thomas Seymour
by Robert D. Mussey Jr. Peabody Essex Museum, Salem, Mass.; 2004. $60 hardcover; 480 pp.

Devotees of Federal furniture can receive no better gift than this book. It tells the story of John Seymour, a country furniture maker in England who immigrated to Portland, Maine, in 1784 and eventually took up residence in Boston. Together, he and his son Thomas built some of the finest Federal furniture ever made. Never content to follow trends, they were endlessly innovative in their use of veneers, inlays, carvings, and hardware.

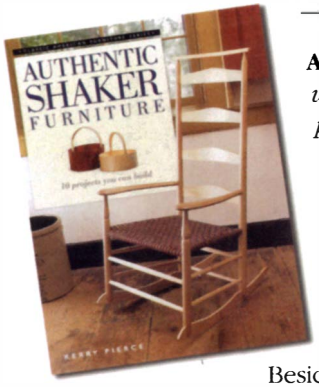
Detailed descriptions of 155 pieces include full-page color photographs, construction techniques, and hidden markings. Many of these pieces remain high-water marks of furniture craftsmanship and the ultimate challenge for today's top woodworkers.

The book also shares the few known details about the Seymours' lives and their struggling business. John spent his last two years in an almshouse and lies in an unknown grave, while Thomas had to give up his own business and spent his last 20 years in relative obscurity supported by his in-laws. A sobering thought for today's professional furniture makers.

—Mark Schofield, associate editor



A pair of standard-bearers. *Mussey's book examines the lives of the father-and-son team of craftsmen. The book also offers a study of Federal furniture making at its peak.*

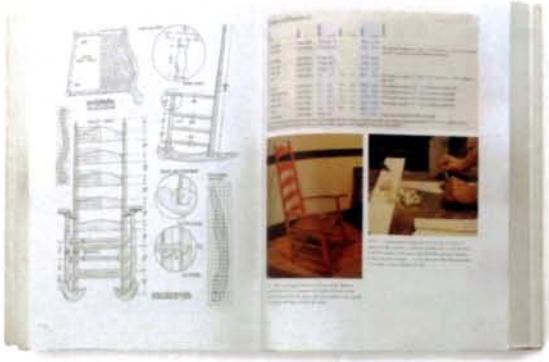


Authentic Shaker Furniture *by Kerry Pierce. Popular Woodworking Books, www.popularwoodworking.com, 2004. $24.99 paperback; 128 pp.*

Kerry Pierce, a veteran chair maker, shares his methods for building the three chairs at the heart of this book—a side chair and two rockers—including how to use the various bending and mortising jigs required. It is apparent that his methods result from years of experience, and the reader is the lucky beneficiary of that knowledge.

Besides chairs, readers can learn how to build a sewing desk, hanging cabinet, and candle stand. But the book's 10 projects aren't limited to furniture. Pierce also provides step-by-step instruction on making Shaker bentwood boxes in a variety of sizes and styles. A wall clock, wooden hangers, and pegboards are among the other pieces covered. Each project is accompanied by a series of color photos, scale drawings, and attractive illustrations.

—Michael Pekovich, art director



Thoroughly illustrated. *Measured drawings and detailed photos highlight Pierce's book of projects.*

His latest turn. *Like his first video on the skew chisel, Lacer's latest unlocks the mysteries of this indispensable tool.*

The Son of Skew *with Alan Lacer. Woodturning Learn, www.woodturninglearn.net, 2004. $29.95 (VHS); $34.95 (DVD); two hours.*

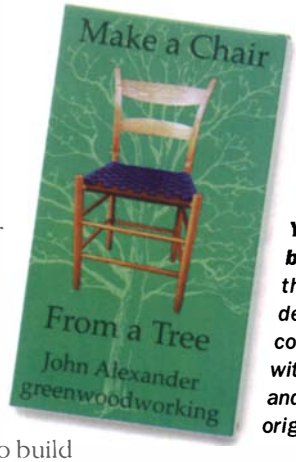
I've always had trouble learning to use a wood-turning tool by reading a book. Without seeing the tools in action, it's hard to picture the hand positions, cutting angles, and swift movements needed to cut clean, curly shavings.

After watching Alan Lacer's first video, *The Skew Chisel*, I got the confidence to pick up the versatile tool and take it for a spin. Now he has released his second video about the tool. In *The Son of Skew*, Lacer, a wood-turning instructor and former president of the American Association of Woodturners, devotes less time to the fundamentals, but he still has created a valuable learning aid.

The Son of Skew starts with a quick primer on sharpening, then goes right into instruction on 11 projects made entirely with a skew, from a tool handle to an egg to reproduction furniture parts. While I didn't have any immediate interest in some of the projects, I found it helpful just to see Lacer wield his skew to rough out a turning billet or turn beads and coves. While he worked, the tool's sweet spots were revealed.

—Matt Berger, associate editor

Make a Chair From a Tree *with John Alexander.*
www.greenwoodworking.com, 1999. $25 (VHS); two hours.



You've read the book. *Now see the movie. Alexander's classic text comes to video with all the charm and wisdom of the original.*

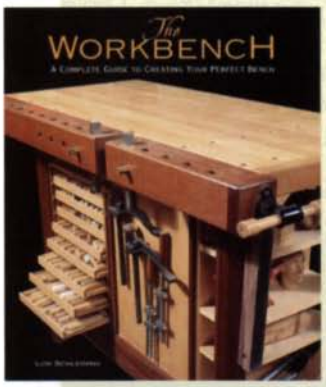
In his revered book, *Make a Chair From a Tree* (The Taunton Press, 1978), and in his video of the same name, John Alexander has proven that traditional ways often are the best ways. You'd be hard-pressed to find a maker of ladder-back chairs who doesn't owe something to Alexander's instruction. Brian Boggs, the noted chair maker in Kentucky, built his first post-and-rung chair using Alexander's book and a screwdriver sharpened into a chisel. Although this video was released five years ago, it's one that shouldn't fall off the radar screen.

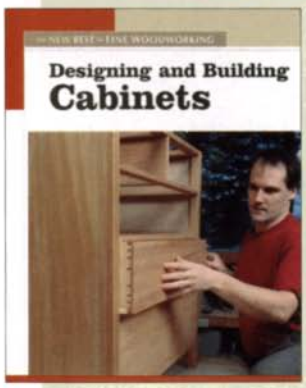
To understand the charm of the video (or the book, which is out of print), you first must understand the charm of Alexander's methods. He chops down a white oak and then splits, rives, bends, shapes, and shaves the parts until he's built a delicate post-and-rung chair using only hand tools. Comfortable and sturdy, it's a chair that will outlast you—and it doesn't contain a drop of glue or a single nail.

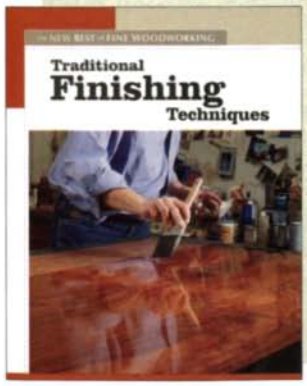
Whether you decide to build a chair using Alexander's methods, want to understand the philosophy behind green woodworking and wet-dry joinery, or simply are looking for two hours of woodworking entertainment, this video (even with its occasionally shaky camera work) won't disappoint.

—Matthew Teague

NEW FROM THE TAUNTON PRESS







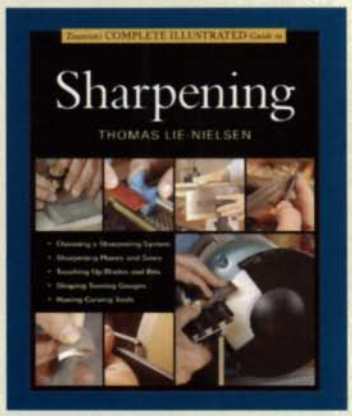
The Taunton Press has introduced an assortment of woodworking books that cover a wide variety of topics. The following are among the highlights. For more titles and information, go to www.taunton.com.

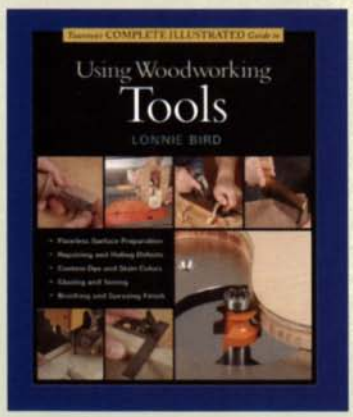
The Workbench *by Lon Schleining.*
$34.95 hardcover; 208 pp.
Should you buy or build? Schleining offers guidance on answering that question and finding the right bench and accessories to suit your woodworking needs.

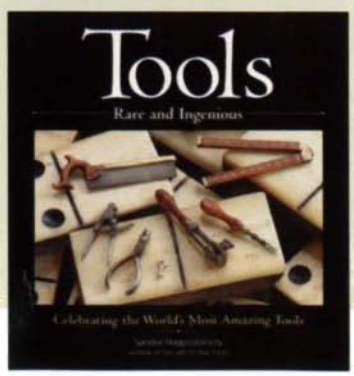
NEW BEST OF *FINE WOODWORKING* SERIES, FROM THE EDITORS OF *FINE WOODWORKING*
This series collects articles from the last 10 years of the magazine to create concise references on key woodworking topics.

Designing and Building Cabinets
$17.95 paperback; 160 pp.
The book includes sections on designing and managing projects. Materials, including plywood, are covered, too.

Traditional Finishing Techniques
$17.95 paperback; 160 pp.
Readers will learn about surface preparation, oil finishes, varnishes, wood coloring, and finish restoration.







TAUNTON'S COMPLETE ILLUSTRATED GUIDES

Sharpening
by Thomas Lie-Nielsen.
$39.95 hardcover; 224 pp.
Lie-Nielsen covers the equipment available for sharpening and the methods for getting sharp edges on all types of hand tools, from basic chisels to molding planes to carving tools.

Using Woodworking Tools
by Lonnie Bird.
$39.95 hardcover; 288 pp.
A general reference on shop practice, Bird's book is aimed at all woodworkers, regardless of skill level. The author shares expert advice on the correct setup and use of power tools, as well as key hand-tool techniques.

Tools: Rare and Ingenious
by Sandor Nagyszalanczy.
$37 hardcover; 216 pp.
A showcase of tools, this book goes beyond woodworking to include implements for blacksmithing, leatherwork, and other crafts.

WOODWORKER'S MART

See ad index on page **115** for reader service number.

WOODWORKER'S MART

See ad index on page **115** for reader service number.

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1. Paid and/or requested outside-county mail subscriptions	201,773	201,463
2. Paid and/or requested in-county mail subscriptions	0	0
3. Sales through dealers and carriers, street vendors, and courier sales	100,255	99,093
4. Other classes mailed through the USPS	0	0
C. Total paid and/or requested circulation	302,028	300,556
D. Free distribution by mail		
1. Outside-county as stated on form 3541	5,149	5,066
2. In-county as stated on form 3541	0	0
3. Other classes mailed through the USPS	0	0
E. Free distribution outside the mail	3,525	6,652
F. Total free distribution	8,674	11,718
G. Total distribution	310,702	312,274
H. Copies not distributed	176,812	182,702
I. Total	487,514	494,976
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BY CHRIS GOCHNOUR

Expand your workbench with versatile bench hooks

Even in a contemporary workshop filled with power tools and timesaving devices, it often is more practical and convenient to perform some woodworking tasks, such as final fitting of joinery and detail work, at the workbench using hand tools.

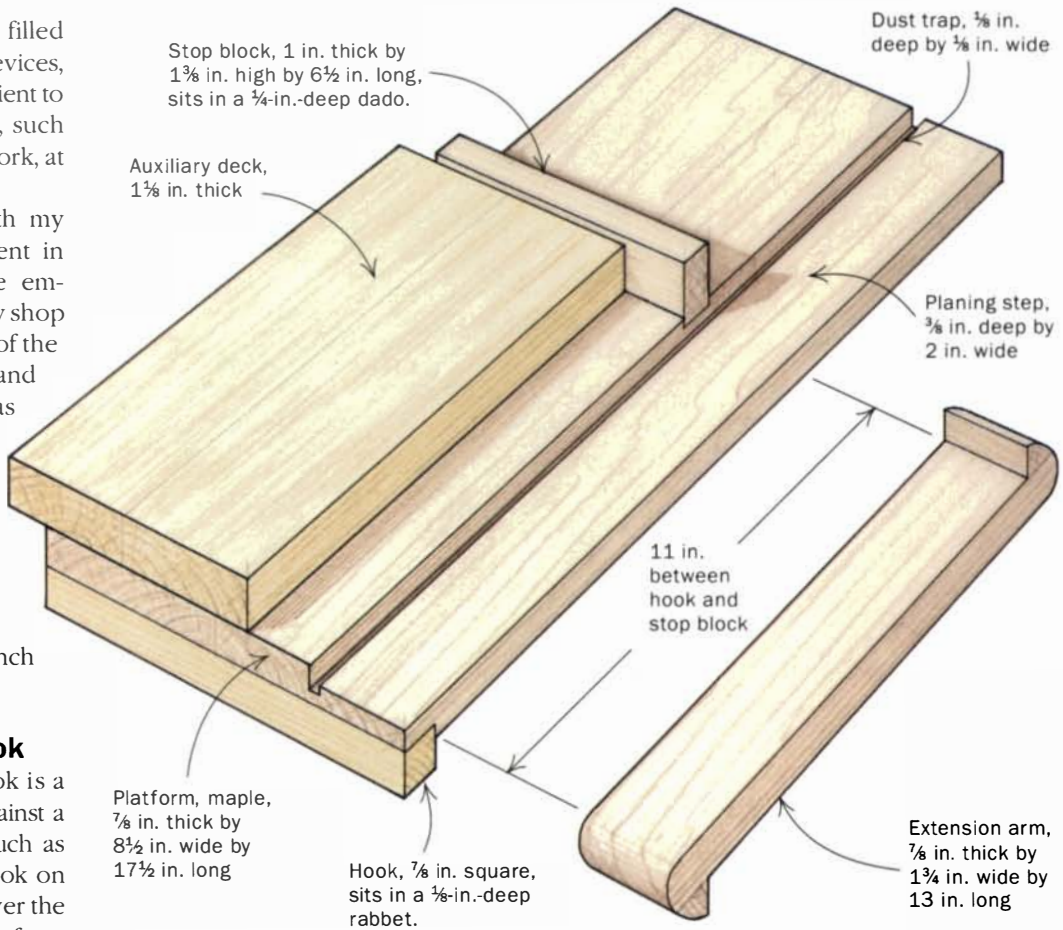
Since temporarily relocating with my family to a two-bedroom apartment in downtown Washington, D.C., I've embraced this notion to the extreme. My shop here, tucked into the corner of one of the bedrooms, consists of my bench and my most essential hand tools. Just as important is a collection of bench hooks that I draw on regularly, which are capable of performing a range of tasks, including cutting square and mitered ends as well as fine-tuning miters and ends to perfection. Even in less extreme shop conditions than mine, these bench hooks are indispensable tools.

Beyond the basic bench hook

In its simplest form, the bench hook is a platform that can be held steady against a workbench for performing tasks such as crosscutting and handplaning. A hook on the underside of the platform fits over the edge of the bench and keeps the platform

STANDARD BENCH HOOK

This bench hook excels at holding stock when crosscutting as well as handplaning. An extension arm adds support for long stock, and an auxiliary deck can be used for planing thin stock.



TASKS FOR THE STANDARD BENCH HOOK

Hook one end over the workbench. *The bench hook makes easy work of cutting the shoulder on a tenon (above). The step on the edge of the bench hook provides a true and square surface to guide a bench plane for trimming the end of a board (right).*

An auxiliary deck raises thin stock. *A solid-maple shim reduces the height of the stop block to accommodate thin stock.*

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Rough-cut miters. *The miter-block bench hook is convenient for cutting small pieces of trim or molding.*

MITER BLOCK

Designed for rough-cutting miters, the miter block is a combination of a bench hook and a miter box. Forward pressure keeps it steady on the bench while the workpiece is held tight against the stop block, and the sawkerfs guide the sawblade.

steady as forward pressure is applied. A stop block on top of the platform, perpendicular to the edge of the bench hook, supports the work while it's being cut or planed.

The bench hook I favor expands on this basic design. On the right side of the platform I cut a wide rabbet that serves two functions: First, it protects my workbench from being damaged when I use the jig to crosscut material with a backsaw. Second, it guides a handplane when the bench hook is used as a shooting board. I use this feature often to square and true up end grain after crosscutting.

The bench hook is handy for working tenon shoulders and cheeks, but I get further use from it with a thick auxiliary platform, which raises the worksurface to about ⅛ in. below the planing stop. In this configuration I can plane small, thin pieces such as loose tenons or splines.

I also have a second, narrow hook, which I use with the standard bench hook to steady long stock. Both hooks are the same thickness, and the stop on the narrow hook is set the same distance from the leading edge as it is on the standard hook.

Use solid, stable materials—Because I use the bench hook so often in my day-to-day work, I made it from ⅞-in.-thick hard maple, which is relatively stable. For larger bench hooks you might consider using thicker stock. Quartersawn lumber is ideal, if available, because it's more stable than plainsawn stock.

I also cut dadoes in the platform where the hook and the stop block attach, to ensure that they hold steady and remain perpendicular to the edge of the platform.

I find one other detail about my bench hook useful. I cut a small groove in the interior corner of the planing step to collect sawdust that accumulates when trimming with a plane. The groove eliminates potential inaccuracies that could be caused by a buildup of sawdust between the jig and the plane.

Two bench hooks for miters

I prefer to cut and fit small bits of molding right at the bench. The precision this method affords is hard to beat: It cuts down on trips across the shop floor to the miter saw or tablesaw; and I've found it to be the safest way to handle small and fragile pieces of molding. To make perfect miters consistently, I use a pair of bench hooks: a miter block for rough-cutting, and a miter shooting board for fine-tuning.

A miter block is a version of the bench hook designed to guide a sawcut at a 45° angle in two directions. It serves as a simple version of a miter box. I made mine of solid alder. On the miter block, the hook and stop block are attached to the platform with a dado, similar to the standard bench hook.

There's only one secret to the miter block, and that's setting the 45° kerfs in the

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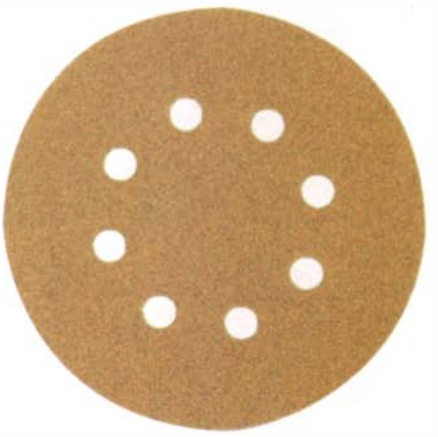
1810

Tabitha Babbitt introduces the circular saw.



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MITER SHOOTING BOARD

Sawn miters often require fine-tuning. That's where the miter shooting board comes in handy. Two 45° fences made of hardwood support the workpiece as it is trimmed with a jack plane.

How much should you cut? *Any material that extends beyond the stop block will be trimmed away. Use your layout lines as a guide.*

fence to guide a backsaw. Lay out the kerfs with pencil lines and cut them by hand with a backsaw. Just make sure that the kerfs aren't any wider than the blade on the handsaw you plan to use with the jig, or sloppy miters will result.

Miter shooting board finishes the job—Cuts made at the miter block generally are rough. So I use a second bench hook—a miter shooting board—to tune miters to a perfect 45°. I made mine from two stacked pieces of ⅝-in.-thick Baltic-birch plywood, which is relatively stable. I glued a strip of hardwood in the location of the planing step, which allows me to true up the jig after construction without having to use a handplane on plywood.

Like my other workbench accessories, the shooting board is designed to hook the edge of the bench during use. However, it requires a hook on both ends because the jig is designed to be reversed for trimming miters in opposite directions. My shooting board sits on the bench at a tilt, which isn't a problem; however, you can make it long enough to straddle the bench.

Two fences set at 45° (together forming a 90° angle) are secured to the platform with glue and screws. Care should be taken to ensure that the fences are accurate, because they serve as a reference for all subsequent cuts made at the shooting board.

A step rabbeted into the edge of the shooting board, as on my standard bench hook, is used to guide a handplane. It also has a small groove for dust accumulation.

When using the miter shooting board, I generally align the layout line of the miter with the end of the fence on the shooting board. Any material that extends into the path of the plane will be trimmed off. Hold the stock snug against the fence, and pass the plane over the stock with repeated strokes until it stops cutting.

Other tips for using a shooting board—To keep a plane cutting smoothly on a shooting board, apply wax to all of the working surfaces of the plane and bench hook. It also is important that the plane's side be perpendicular to the sole and that you tune up the plane correctly for the task. Align the plane blade parallel with its sole, and adjust it for a light cut. Always make sure the side of the plane is firmly registered on the planing step.

When trimming harsh end grain, which tends to dull the blade rapidly, dampen the end grain with water prior to planing. □

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