TAUNTON'S

Fine WoodWorking

CELEBRATING 30 YEARS

April 2006

No. 183

3 ways to keep tables flat

TOOL TESTS:
Dust collectors, dovetail saws

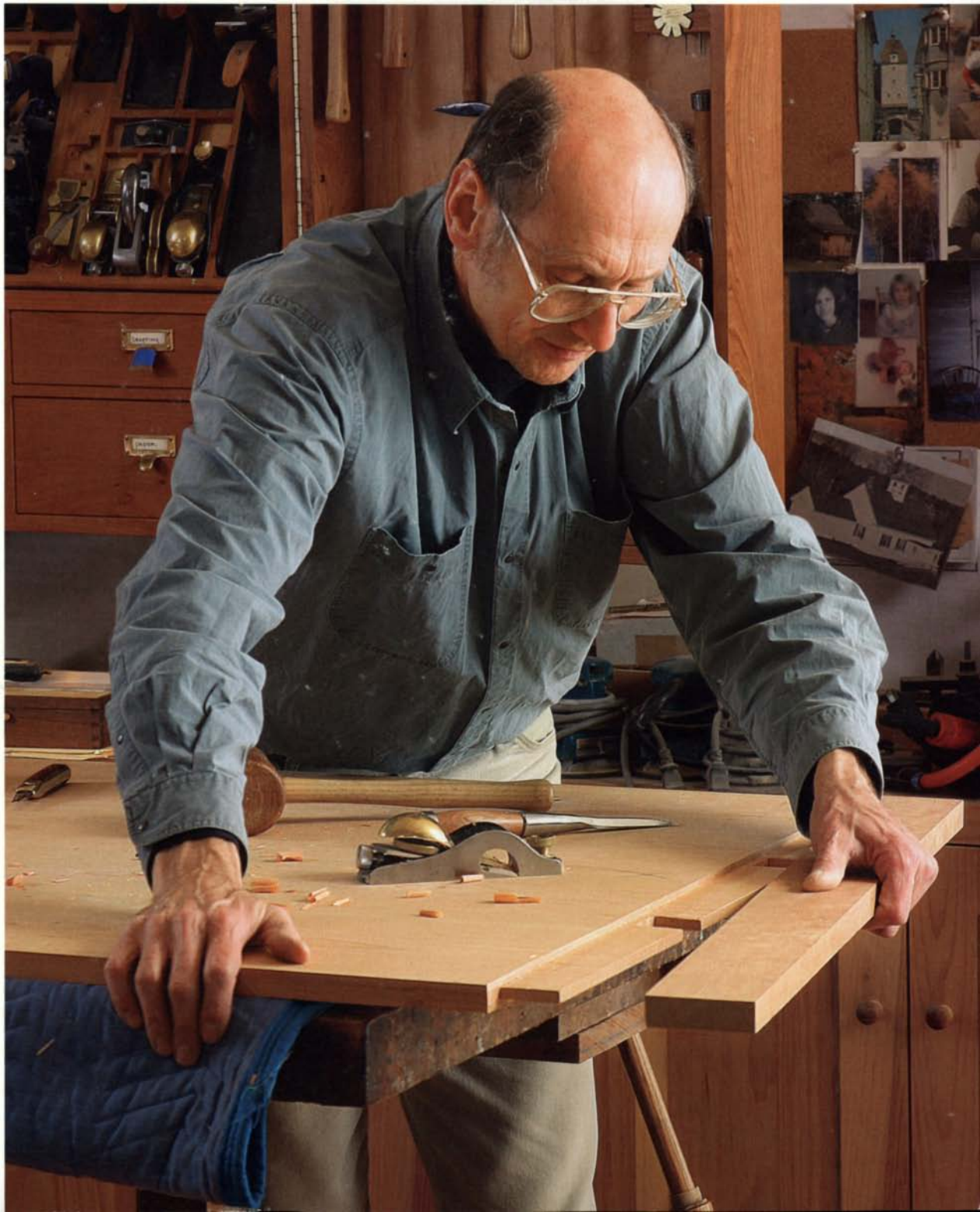
Furniture to fit high-tech TVs

Maintaining a fine finish

Outdoor table

Add a bead to a drawer

Fundamentals: Managing wood moisture



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Fine WoodWorking

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The Taunton Press
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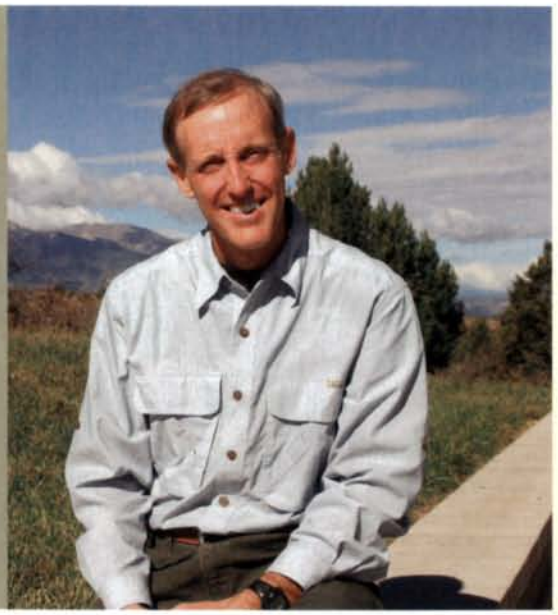
contributors

Andy Beasley (*"Shopmade Planer Table"*) developed an interest in woodshops as a child, when his family lived in the ongoing remodel of a 19th-century house. He served as an Air Force pilot for 20 years, mostly flying in supersonic jets as an instructor/examiner. Coming full circle, he and his wife, Peg, now live amidst the scattered tools they are using to complete their home in rural Colorado. Beasley also has written for *Fine Gardening* and *Fine Homebuilding*, and the couple has been in several television episodes for the DIY Network.
www.FineWoodworking.com/andybeasley



David Bedrosian *("Durable Outdoor Table")* designs and builds woodworking projects for family and friends in his basement shop. He has built items as small as turned Christmas ornaments and as large as a 7-ft.-dia. dining table. An electrical engineer involved in software development, he lives in Waterloo, Ont., Canada, with his wife and two teenage children. Bedrosian enjoys mountain biking with his son and competing in triathlons with his daughter. www.FineWoodworking.com/davidbedrosian

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letters

Spotlight

ISSUE NO. 181
Tools & Shops 2005/2006
p. 46

MYSTERY SOLVED AFTER A HALF-CENTURY

About 50 years ago, while wandering around Radio Row in New York City, I purchased a new Witherby 13-in.-long by 0.650-in.-wide socket chisel for a few cents. Radio Row was a section in lower Manhattan that had dozens of shops selling surplus electronics, used tools, old machinery, P-51 seat belts—the miscellany of early post-World War II industrial society. It was a great place for a young engineering student to explore for free the actual intricacies of the mechanical and electrical worlds.

The chisel traveled around the country with me as I built a career, abandoned it, and started a new one. Although I used the tool only once or twice during the 30 years after I bought it, I never could bring myself to sell it.

About 20 years ago I began to pursue woodworking seriously, and ground about 1/16 in. off the chisel learning how to sharpen. But I was unable to figure out how to classify the tool. It was too long to be a bench chisel, too thin to be a mortise chisel, too thick to be a paring chisel, and of an odd width. No catalog or woodworking book showed one like it.

Then I read Bob Smalser's article on chisels in *Tools & Shops*. I was happy to learn it is probably a sash chisel.

For the last few years, though, every time I pick it up I feel a bit of sadness and think of 9/11. Radio Row was razed to build the World Trade Center.

—Marshall Brodsky, via email

More advice on shop security

Regarding the "Cutoffs" (*FWW* #181, pp. 117-118) about tool and shop security, the writer had very helpful ideas. But as a locksmith of 16 years, I thought the author glanced over the physical security of the shop. For one, I suggest using (UL) Grade 1 deadbolts on the shop door. Also, reinforce the door and frame with metal. It is better to keep the crooks out than to make noise and call the cops once they get in.

The saying, "If they really want to get in, they are going to get in," shows a defeatist attitude. I have found very effective ways to stop break-ins in a large variety of buildings. It all depends on how far the owner is willing to go.

—CHRIS MICHELS, via email

What's with the squeaky-clean shops?

I love your magazine, and look forward to each issue. I have one question, though: How long does it take to "polish" the environment of the shops featured in your articles? It's amusing to notice that most of those shops do not evidence one speck

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of dust anywhere! Come on, we all know what sawdust looks like; so why go to all that effort to make a working woodshop look like an operating room?

—PAUL LANDERS, via email

Router table vs. shaper

As is often the case, your review of router tables (*FWW* #181, pp. 36-41) came just as I was considering buying one. After reading what one gets for several hundred dollars, I was left wondering: Why go that route? For the price of the top-rated table and the router, I can buy a 3-hp shaper with reversing motor, precise height adjustment, cast-iron top, and collet spindle to use ¼-in. or ½-in. router bits. With a router table, I wouldn't be happy without a router lift that would add another couple hundred bucks. In the end, it would cost me the same or more to put together a router/table/accessories combination than it would to buy a dedicated shaper *and* a second router. I must be missing something.

—JIM ANDERSON, via email

Editor replies: A shaper is a perfectly good option for some. However, if you plan to use mostly router bits in a shaper, most of these tools top out at 10,000 rpm, not the optimal speed for many router bits.

Consider a pellet stove for shop heating

I am doing research on heating my shop and I think pellet stoves deserve a look. Your article in Tools & Shops (*FWW* #181, pp. 74-79) calls them a "costlier option." This may not be true in the long run.

The initial cost is somewhat higher ($1,000 to $3,000), but figuring in fuel costs it might not be. Pellets are only $150 to $200 per ton versus rising gas, electrical, and oil costs. Pellet stoves have a few advantages over woodstoves. They are closed-combustion, and you can choose one that uses outside air (better for dusty environments). They have safe clearances down to 3 in., the hopper can hold over 100 lb., and the heated air is fan circulated. They also can be thermostatically controlled with automatic start.

—SCOTT VELIE, via email

Woodstoves and insurance may not be compatible

I had thought heating my new shop with a woodstove taken from my last home would be a great idea. So I moved the stove 1,900 miles across the country to our new hobby farm. It turns out my insurance provider wouldn't cover the shop and contents for fire due to wood shavings and airborne dust. I was told the woodstove had to be in a separate room. I asked other woodworkers in my area, and it seemed they had experienced the same problems. Check with your insurance provider to see which types of heating systems comply with your policy before you purchase. Now I need to build a guest cabin to get some use out of my much-loved woodstove.

—EZEKIEL N. HAGAR, Lunenburg, Ont., Canada

> "How long does it take to 'polish' the environment of the shops featured in your articles?" —PAUL LANDERS

Toolmakers wanted

Do you make your own woodworking tools? We want to showcase these shopmade wares in our annual Tools & Shops issue. We'd also like to include photos of restored vintage hand tools and machinery. Send entry forms (available at www.FineWoodworking.com) and photos (unaltered digital images, prints with negatives, or slides) to Readers Gallery, Fine Woodworking, 63 S. Main St., Newtown, CT 06470, or email fwgallery@taunton.com.

Woodstoves and greenhouse gas

Your article on shop heating (*FWW* #181) states that woodstoves don't release greenhouse gas. Of course they do. Wood is a hydrocarbon. Burn hydrocarbons and you get carbon dioxide (and maybe carbon monoxide), the most common greenhouse gas resulting from combustion.

Furthermore, burning wood releases lots of particulates, as the author notes. This also has a "greenhouse-gas" effect. In sum, burning wood is probably the worst means of heating if one wants to minimize greenhouse-gas types of emissions.

—GEORGE COULBOURN, Black Diamond, Wash.

Author Andy Engel replies: Of course Mr. Coulbourn is right: Woodstoves emit carbon dioxide. But they don't increase the *net* amount of greenhouse gases in the atmosphere in a manner that exceeds the normal, ongoing carbon cycle. Carbon is in constant flux—sometimes in the form of carbon dioxide, as a by-product of combustion, respiration, or decay, and sometimes in the form of a thing that will soon combust, respire, or decay.

Any biofuel—wood, corn, buffalo chips—is part of this closed cycle. While growing, the source plant takes up carbon dioxide from the air. When the plant is burned, or left to rot on the ground for that matter, the same amount of carbon is released back into the atmosphere, to be taken up by new plants. The greenhouse gases we fret over come from fossil fuels, carbon sources that have been out of the loop, so to speak, for millions of years, and are released by combustion to change the atmospheric balance that we've come to think of as normal.

Corrections

A photo published in "Heating Your Shop" (*FWW* #181, p. 78) misidentified a heating device. The heater featured under the headline "Electric Heaters" is a gas-powered, vent-free unit made by Empire.

The drawing in "Tool Cabinet for a Workbench" (*FWW* #181, p. 81) gave the wrong dimension for the width of the drawer front (and back). The correct width is 19½ in.

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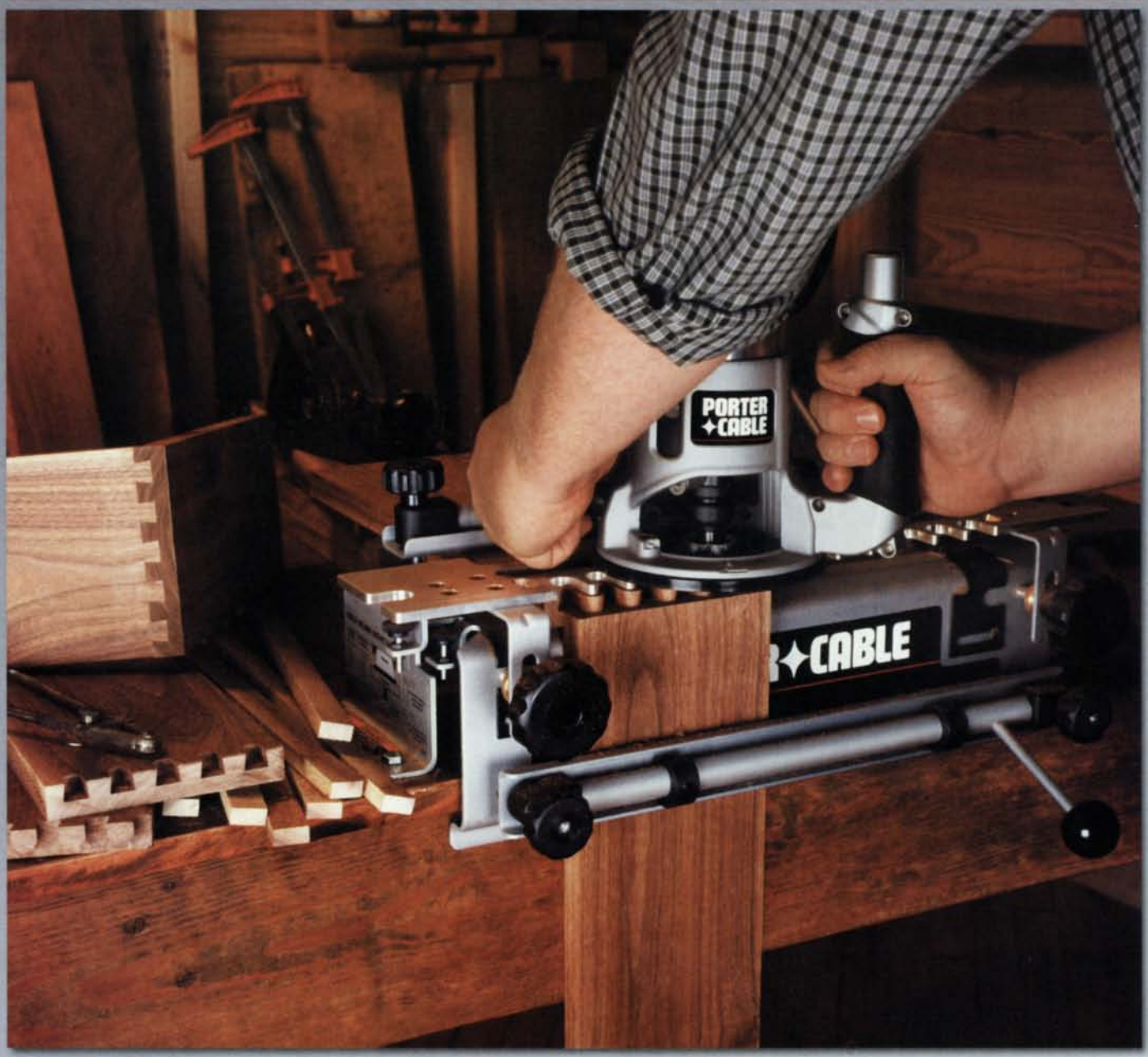

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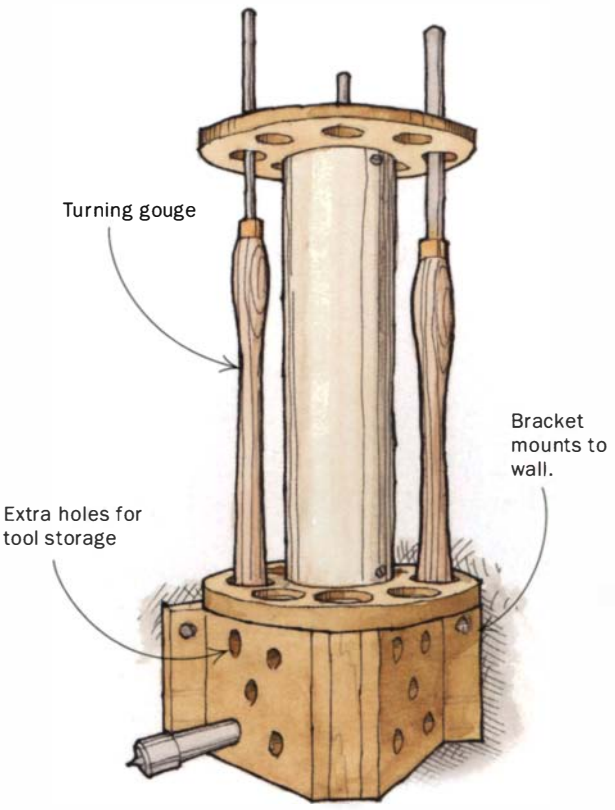

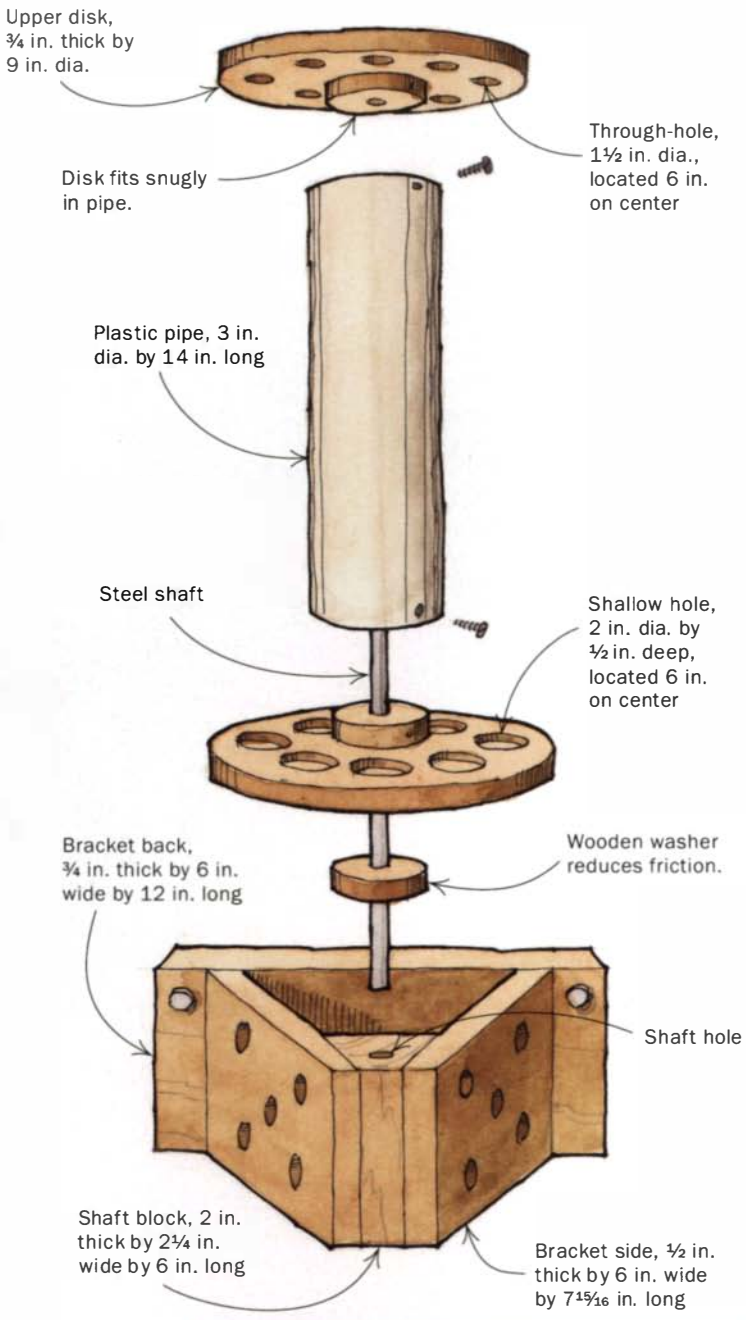

Best Tip

Carousel holds lathe tools

Jim Bowler retired from General Motors Corp. after 36 years as a manufacturing engineer. His woodworking almost always includes a few jigs and fixtures, evidence that engineering instincts don't vaporize on retirement day.

Mounted on the wall near my lathe, this holder keeps my tools secure and within easy reach. To add a gouge, I just slip the cutting edge of the tool into a hole in the upper disk, then set the handle into the shallow hole in the lower disk. Holes drilled in the bracket provide a handy spot to store miscellaneous lathe tools.

It's important for the shaft hole to be vertical. To that end, it's best to drill the hole after the bracket is assembled.

Once all the rotating parts of the carousel have been cut and assembled, the steel shaft simply slips into the shaft hole.

—JAMES W. BOWLER, Lockport, N.Y.

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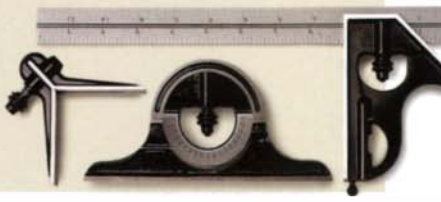
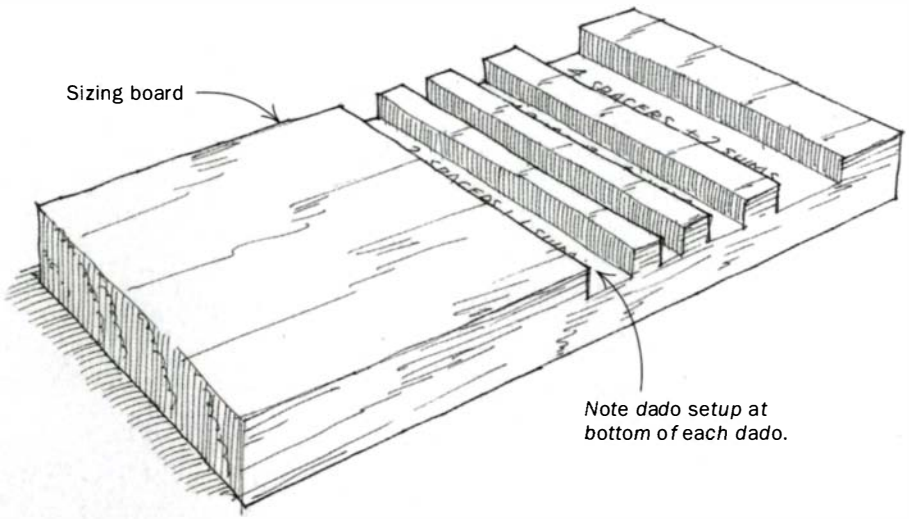
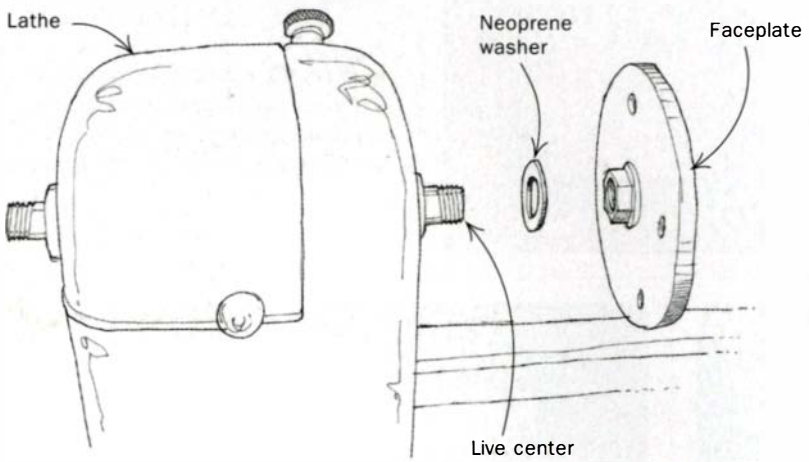


Dado-sizing board

A "sizing board" makes it easy to remember my stacked-dado setup for a given cut. Every time I cut a dado that has a width I've not used before, I take a minute to cut the same dado in my sizing board. Then, at the bottom of the dado, I note the arrangement of cutters and spacers. The next time I need to cut the same width, all of the pertinent information is there for the taking.

—WILL BRAUN, Lacombe, Alta., Canada





Preventing an overtightened faceplate

When using a faceplate on a wood lathe, I found that while turning, the faceplate would invariably tighten and freeze onto the shoulder and threads of the live center. To prevent this, I now use a neoprene washer between the faceplate and the drive thread shoulder. Problem solved.

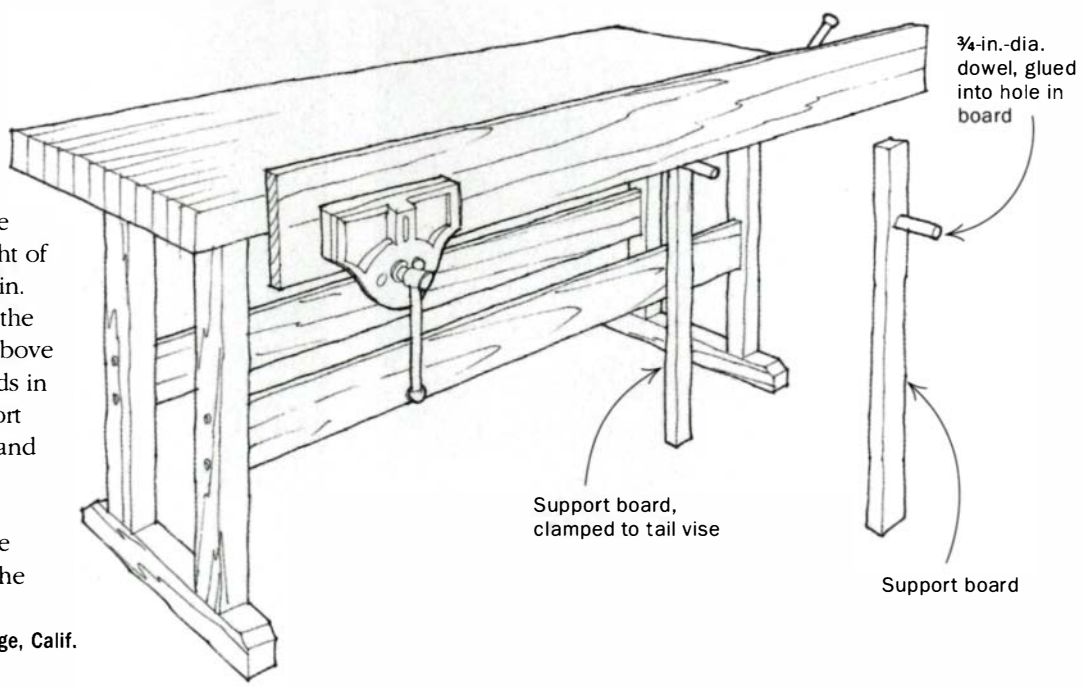
—JASON NASH, San Anselmo, Calif.

Long-board support

A while back when I was wrestling with a large board on my workbench, it occurred to me that the tail vise might come to my rescue. First, I cut a 1½-in.-wide board to a length equal to the height of the workbench. Then I drilled a ¾-in. hole in the edge of the board with the top of the hole the same distance above the floor as the top of the guide rods in the front vise. Next, I inserted a short piece of ¾-in. dowel into the hole and clamped the board in the tail vise.

I clamp the long workpiece in the front vise with the bottom edge resting on the guide rods and on the top of the peg.

—LEN URBAN, Rancho Mirage, Calif.



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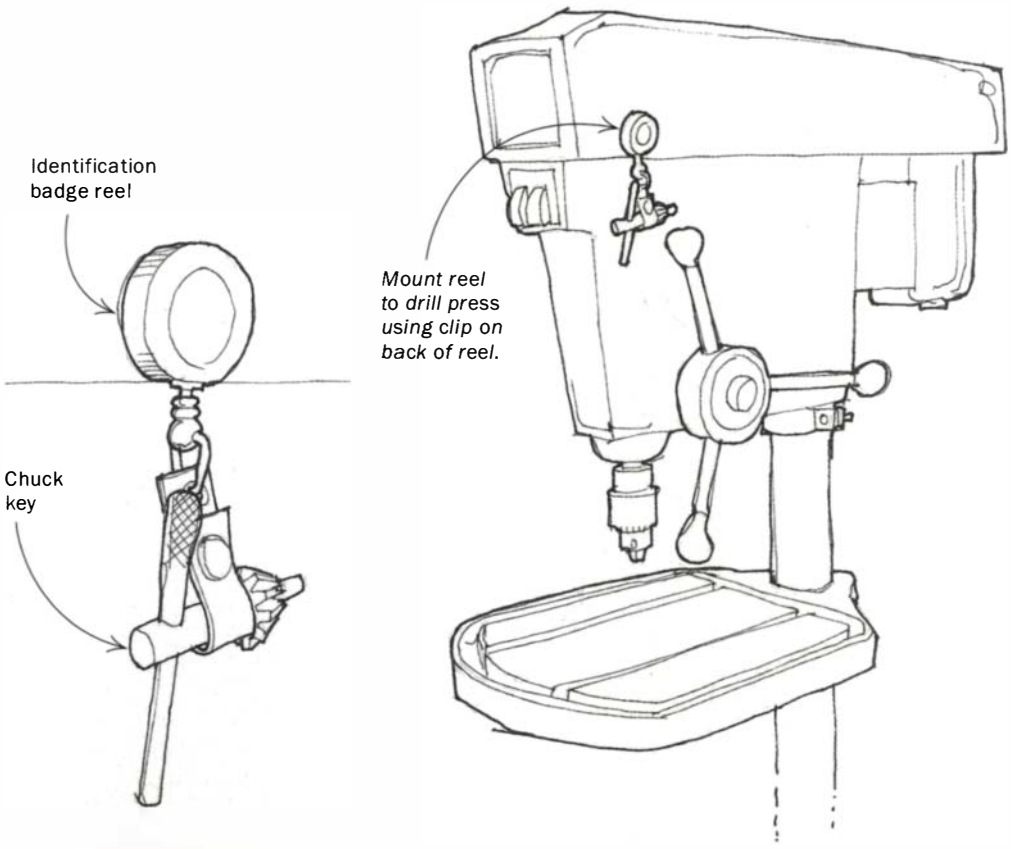
Badge reel holds a drill-press key

If you have a drill press, you've probably had to find a way to keep track of the chuck key. Some people tie a string around the key or hang it on a nearby peg. This solution is better.

Many workplaces require ID cards and often provide badge reels to clip the ID to your waist. These reels are perfect for fastening the key to the drill press. The reels have a clip on the back that fastens handily to the top of the drill press. The loop at the other end snaps around the chuck key.

With this simple device you always will know where the key is; you can pull it down to use it and then it will retract conveniently out of the way. If you can't get a badge reel from work or at a trade show, you can buy one online for about $2.50.

—KURT SCHAEFER, La Honda, Calif.



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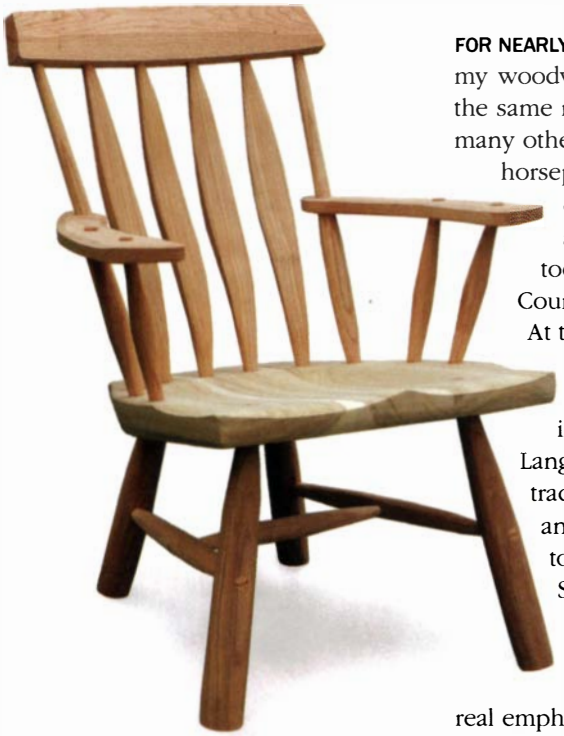
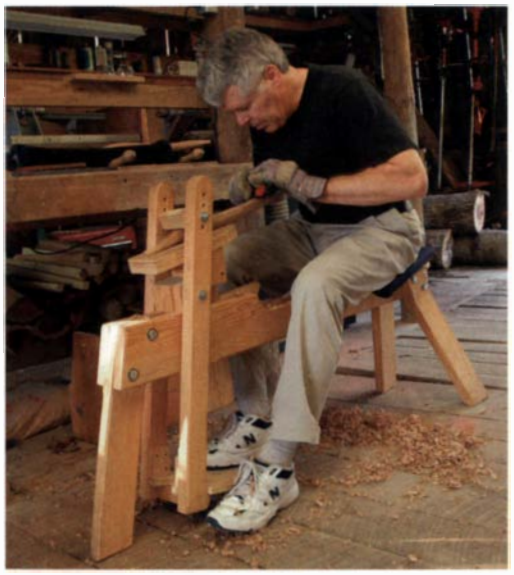
Students take home a love for hand tools



Fruit of their labors. *Each student at Country Workshops takes home a chair.*



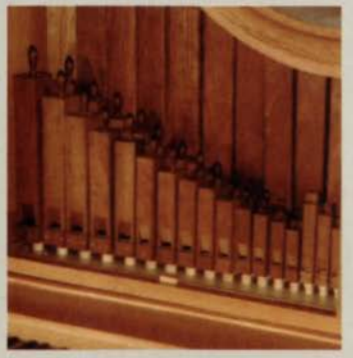
Traditional skills with time-tested tools. *Students hold their work on a shaving horse while shaping it with drawknives, spokeshaves, planes, and other hand tools.*

FOR NEARLY 25 YEARS, my woodworking took the same route as that of many others—toward more horsepower, more carbide, and more sandpaper. Then I took my first class at Country Workshops. At the school near Asheville, N.C., green woodworking expert Drew Langsner teaches traditional chair making and other classes to small groups. Students use a few power tools to keep the course on schedule, but the real emphasis is on hand tools and how much they can do.

Students learn to use tools of old such as drawknives, adzes, and froes. I learned that using sharp, high-quality hand tools doesn't take much more time and effort than using power tools, and you get a nicer finish. Since the class, I have made traditional hand tools my mode of operation and have all but banished sandpaper from my shop. My work has improved and the way I perceive craftsmanship has changed.

Tuition for most of the one-week chair-making classes is $775 in summer, $950 in winter. For that you get a cabin room in the foothills of the Smoky Mountains, home-cooked meals, a week's use of a fully equipped woodshop, and instruction by a master. Materials are included and you go home with a chair. For more information, see the school's Web site at www.countryworkshops.org.

—Bill Rohrs, a woodworker and firefighter in suburban Round Lake, Ill.



No ebony or ivory. *The organ's 49 pipes are made of cherry. The case is quartersawn fir and the keys are bird's-eye maple and ipé.*

A symphony in cherry, fir, and ipé

AN ALL-WOOD PIPE ORGAN MIGHT SEEM A DAUNTING PROJECT for a woodworker with no instrument-building experience and no workshop. But Henry Pietkiewicz likes challenges.

Pietkiewicz, a classical-music lover, built the organ for a musician friend using the tools at a local Woodcraft store in Charleston, S.C. He finished the piece in a friend's garage.

He said the biggest challenge was in fine-tuning the delicate mechanics of the keyboard. The organ draws air via a small blower salvaged from an old vacuum cleaner.

"It was a modest first attempt as pipe organs go," he said. "If I were to do another one, I think I'd do it bigger, maybe a second row of pipes."

—Katherine Winick

Photos, this page: Bill Rohrs (top); Henry Pietkiewicz (bottom)

Variations on a theme. *William Turner's sleigh bed appeared in* FWW *#91. Woodworkers Jeff Burstein of New York (right), Gunnar Wickman of Hawaii (below), and Bruce Pritchard of Ontario (bottom) added their own distinctive touches in reproducing the piece.*

Challenge of sleigh bed project holds lasting allure

WILLIAM TURNER'S SLEIGH BED, featured in *FWW* #91, was a complex project. It had carved feet, giant turned crest rails, rosewood tambours, and carved rosettes. The queen-size bed took more than 1,200 hours to design and build.

Yet since the bed appeared in *FWW* in 1991, readers at all experience levels have tried it. Several have contacted Turner. "They all wanted plans, and to various degrees, a little coaching," he said. "It's not the easiest thing to tackle."

Gunnar Wickman, a furniture maker in Kapaa, Hawaii, built the bed for a client in the mid 1990s using curly koa and other indigenous woods. The piece took a year to complete and now resides on the 21st floor of a Honolulu high-rise. "If I had to do it again, I would charge quite a bit more," Wickman joked.

Dr. Bruce Pritchard, an experienced guitar maker, essentially built the bed twice. After ruining the headboard on a nearly completed bed during a glue-up, he salvaged what he could and "rebuilt it, piece by piece." After two years of work, the Woodstock, Ontario, dentist presented the bed to his daughter as a wedding gift in 1998.

Jeff Burstein, of Cold Spring, N.Y., took on the bed in 1994 as a present for his daughter. Burstein, a tax attorney, took furniture-building classes at night after buying the plans from Turner. He modified the design, hand-shaping the crest rails where Turner had used a large lathe, and using sheets of curly maple cut to look like tambours. The 10-year task was "so far beyond anything (else) I've ever done," he said. "I look at it now and I still don't think I can do it."

For Turner, one sleigh bed apparently was enough. He says simply, "I haven't built another one, and I probably won't again."

—K.W.

Furniture Society portfolio goes online with 122 makers

FOR A HANDY SAMPLER OF THE COUNTRY'S BEST studio-furniture makers, it's hard to beat The Furniture Society's annual "Makers Portfolio." Until now, the publication has been available to the public only in back copies of the society's annual source book. Now, the portfolio can be viewed online, with photos and contact information for 122 furniture makers. The site is a great way to see innovative studio furniture or to find a studio-furniture maker in your area. The portfolio can be seen at www.furnituresociety.org.

—Steve Scott, associate editor

Photos of beds, this page: Jeff Burstein (top), Gunnar Wickman (center), Bruce Pritchard (bottom)

Head to Head

GREX P635 Price: $190
Pin lengths: ⅜ in. to 1⅜ in.
Source: www.grexusa.com

BOSTITCH TU-216-2330 Price: $106
Pin lengths: ½ in. to 1 3/16 in.
Source: www.bostitch.com

New pin nailers easier to use

A DECADE AGO I BOUGHT MY FIRST PIN NAILER, which proved to be a great tool for fastening glazing stops and other delicate moldings and for performing numerous glue-clamping chores. A 23-ga. pin nailer leaves such a small hole that it's seldom even necessary to fill it. But many of the early models lacked a trigger safety and required that the nail carriage be adjusted each time you wanted to load it with a different length of nail.

Bostitch and Grex have introduced pin nailers with magazines that adjust automatically for nail lengths, with Grex offering a slightly wider range of choices. Both tools have noses with narrow profiles for easy pin placement in tight places; the Grex includes a soft nose cover to help prevent marring.

Both nail guns have trigger safety mechanisms to help prevent accidental firing. The Bostitch safety trigger is large and located in front of the tool trigger, so I found myself depressing it unintentionally when I grabbed the tool by its barrel grip.

Rear air exhaust is a feature on both tools, and the Grex includes a built-in silencer for slightly quieter operation. Nail jams on both guns can be cleared easily by loosening a couple of hex-socket screws; Grex includes a wrench and holder on its tool. Using both guns, I drove lots of the longest nails into hard maple without a single misfire or a nail left proud of the surface—a nice feat indeed. The Bostitch also offers a high/low power control for a precise pin-depth setting without the need to adjust incoming air pressure.

—Roland Johnson is a contributing editor.

CORDLESS TOOLS

A PALM-SIZE SCREWDRIVER WITH POWER

WHEN I WANT TO TAP IN A FEW 18-ga. brads, I don't reach for my 24-oz. framing hammer. Driving screws is no different. When I first saw this new screwdriver from Skil, I figured it was designed for small jobs like driving three dozen #6 screws into a length of piano hinge. It does much more.

In keeping with the current industry rage of developing new lithium-ion cordless tools, this one is driven at a single-speed rate of 200 rpm by a 3.6v rechargeable battery, which packs a surprising punch. To test its limits, I drove half a dozen #10 by 3-in. deep-thread screws into a block of white oak, without pilot holes, and the battery held up fine. Lithium-ion batteries are engineered to hold a charge much longer than other types.

This tool is incredibly comfortable in hand, with a rubberized handle and a two-finger trigger. Green and red lights indicate when the switch is set to forward and reverse. The tool comes in a sturdy metal can with a charger and a 34-piece set of driver bits, and sells for about $40. For more information, go to www.skil.com.

—William Duckworth is a contributing editor.

Photos: Rodney Diaz

■ HAND TOOLS

Spokeshaves a solid value

VERITAS TOOLS HAS INTRODUCED a trio of adjustable spokeshaves—flat, round, and concave—that take a large step forward from the Record and Stanley adjustable spokeshaves of past decades. With nicely machined ductile-iron bodies and caps, African rosewood handles, thick A-2 tool-steel irons, and a superior thumbwheel blade-adjustment system, the Veritas shaves make my old metal spokeshaves seem ordinary and have all but banished them to the relic drawer.

All three are comfortable to use. The blades are fairly easy to flatten and hone, the soles of the tools are shaped accurately, and the blade-adjustment wheels allow you to dial in any cutting depth in a flash. Plastic blade shims are included with each tool, and are used to raise the blade off the bed to create a narrower mouth opening for finer cuts if needed. I get great results even in figured woods without the shims, so I don't bother with them.

At $75 per tool (or $209 for all three; www.leevalley.com), the Veritas spokeshaves are priced squarely between the mass-produced Stanley-type adjustable shaves and the more refined Lie-Nielsen Boggs shaves. As such, they are a solid value and as good a set of spokeshaves as I will ever need.

—William Tandy Young is a woodworker in Stow, Mass.

Positive adjustment. *The two thumbwheels allow precise adjustment of the blade's extension and alignment.*

■ ACCESSORIES

FIRST-CLASS FILTRATION MADE AFFORDABLE

WHILE OLD-STYLE WOVEN-POLYESTER BAGS will handle the chips and shavings drawn in by a dust collector, you can't rely on them to control the hazardous ultrafine dust.

For reasons explained in my article on p. 38, I'm a big fan of the cartridge filter. Cartridge canisters (with pleated filters) provide superior dust separation and require far less time to clean than felted-polyester bags, which also filter fine dust. At least half a dozen manufacturers now offer cartridge filtration for their 1.5-hp and 2-hp collectors for around $200. Felted bags are about $75.

On the other hand, if you don't mind spending an hour or two on the conversion, you can have the benefits of a cartridge for the price of a bag. At about $70, Wynn Environmental's 9E300BL requires a simple shopmade plate to adapt it to any collector. You'll also need to replace the bottom bag with a plastic one. For a few dollars more, the very latest Wynn filters are made to fit popular collectors directly.

For information, including installation guidance, go to www.wynnenv.com.

—Michael Standish is a woodworker in West Roxbury, Mass.

A pleated cartridge filter for less. *These sturdy filters capture 99.7% of the most dangerous particles and have seven times more surface area than the largest aftermarket bags.*

■ SHARPENING

Wolverine jig sharpens flat blades

THIS JIG IS THE LATEST ADDITION to Wolverine's line of fine sharpening products. The original system is used to produce consistent grinds on curved-edge tools such as turning gouges. This jig is designed to hold a plane iron or chisel for both grinding and honing without the need to remove or reposition the blade. It can be purchased as an accessory ($80) if you own the Wolverine grinding system, or as a complete package ($100).

The jig works on electric grinders that have 6-in. and 8-in. wheels. To use it for grinding, you mount the blade on the jig and slide the assembly onto a pivoting arm. The pivoting motion allows the blade to be lowered onto the grinding wheel, to slide back and forth across the wheel, and to be lifted from the stone for inspection, all without altering its setting. The jig was easy to set up and adjust. Once set, it was easy to grind a consistent bevel. But it was not as easy to secure the blade to the jig, where Allen screws require a separate wrench.

I was not impressed with the honing-guide feature. The jig hones okay but felt heavy and awkward. It was cumbersome to move the blade over the stones and turn it for burr removal. Because the guide wheels travel on a different surface from the stone, the jig must be adjusted to maintain a consistent honing angle for stones of different thicknesses.

The tool is available from Woodcraft (www.woodcraft.com) and Rockler (www.rockler.com).

—Chris Gochnour is a woodworker and teacher in Salt Lake City, Utah.

A jig for grinding and honing. *The manufacturer designed this jig for grinding and honing flat plane blades and chisels. It slides side-to-side on a steel bar mounted in front of the grinder (top) and then slips off for honing on a benchtop stone (bottom).*

Forrest Blades

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For almost 60 years, experienced woodworkers have relied on Forrest for the very finest in precision-engineered saw blades.

Kitchen and bath remodelers especially appreciate the smooth, quiet cuts that Forrest blades deliver–without splintering, scratching, or tearouts. In fact, independent tests rate Forrest blades as #1 for rip cuts and crosscuts. So they are perfect for cabinets, countertops, and flooring.

Forrest blades and dados owe their superior performance to a proprietary manufacturing process, hand straightening, and a unique grade of C-4 micrograin carbide. Nobody beats these American-made blades for quality or value.

"Your blades are without question the best by miles, and I have tried them all."
Bob Jensen–Fridley, MN

"From the first cut on, I realized that this blade was a bargain at any price! Nothing else I have cuts comparably."
Calvin Brodie–Spanaway, WA

Forrest has over 12 blades designed for serious woodworkers. **These blades are especially useful for high-end remodeling:**

Duraline – Available in several tooth count/style combinations for flawless cutting of laminates, acrylics, wood, and more.

Duraline Hi-AT – Best for cutting two-sided veneers and low pressure laminates without chip-outs or splintering.

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Woodworker II – *The* best-rated all-purpose blade for excellent rips and crosscuts on all hard and softwoods.

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Dado King – The finest multi-tooth set for making flat-bottom grooves without splintering across *and* with the grain.

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- **Call us toll free at 1-800-733-7111.** (In NJ, 973-473-5236) Ask about special discounts, free shipping on orders over $275, and discounts for blade sharpening.
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Keeping Tabletops Flat

Three ways to keep a top from cupping while letting it move with the seasons

BY CHRISTIAN BECKSVOORT

Any well-made solid-wood table has a dead-flat top when new. And you expect that top to stay flat for years to come. But unless the maker follows some basic rules, the top is likely to warp down the road, courtesy of the humidity in the air. That said, if you understand how to assemble, finish, and restrain these wide panels, they will be flat when the next millennium arrives.

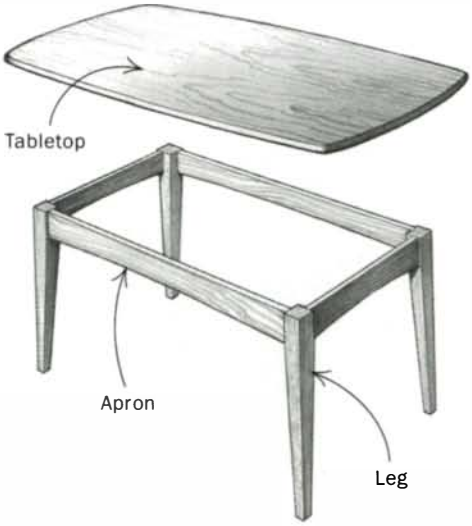
Understanding tabletop warp

Moisture entering the cell walls of wood causes the cells to expand, while moisture leaving the cells makes the walls contract. Warp results when different areas of the wood expand and contract at different rates. One common form of warp, called cup, occurs when one side of a board expands and contracts at a different rate from the other. All else being equal, cup tends to become more pronounced as boards get wider.

Quartersawn vs. flatsawn—When viewed from the end of a board, the growth rings can tell you a lot about whether the board is likely to cup. If the rings meet the face at between 45° and 90°, the wood is considered quartersawn. The rings on flatsawn wood meet the face at less than 45°.

Quartersawn wood moves only about half as much as flatsawn and is much less likely to cup. So quartersawn wood often is a good choice for tabletops that cannot accept a mechanical support to help keep them flat.

When edge-gluing several flatsawn boards to create a tabletop, some



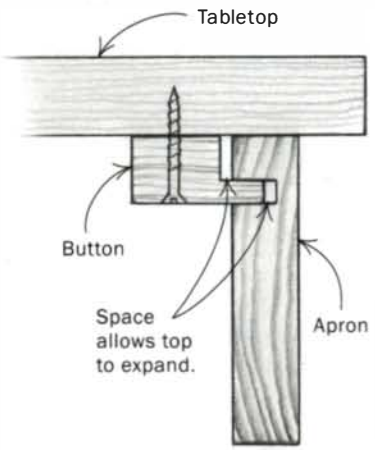
1. Take advantage of aprons

Aprons provide a built-in means to keep a tabletop flat. When secured to the flat, straight aprons, the tabletop stays flat and straight, too. On wide tabletops (generally 24 in. and wider for oak or hard maple, 30 in. and wider for cherry), Becksvoort uses wood buttons that slip into grooves cut into the inside face of the aprons. On narrower tabletops, he simplifies the process by screwing through pocket holes in the aprons.

TWO OPTIONS FOR ATTACHING THE TABLETOP

SHOPMADE BUTTONS

Buttons fit into grooves in the apron and are screwed to the tabletop.

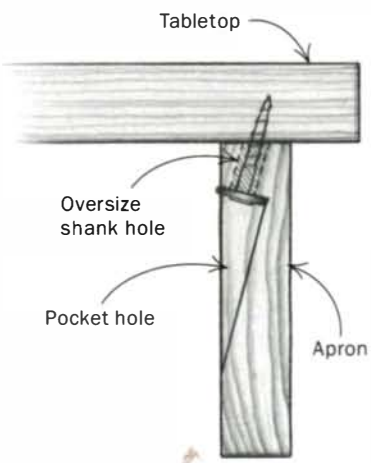


Make the buttons. *After rabbeting the end of a board to create a lip, Becksvoort uses a tablesaw and a miter gauge to crosscut the stock into individual buttons.*

Add the buttons. *The lip of each button slips into a groove in the apron. It takes just a single screw to secure the button to the underside of the top.*

POCKET HOLES

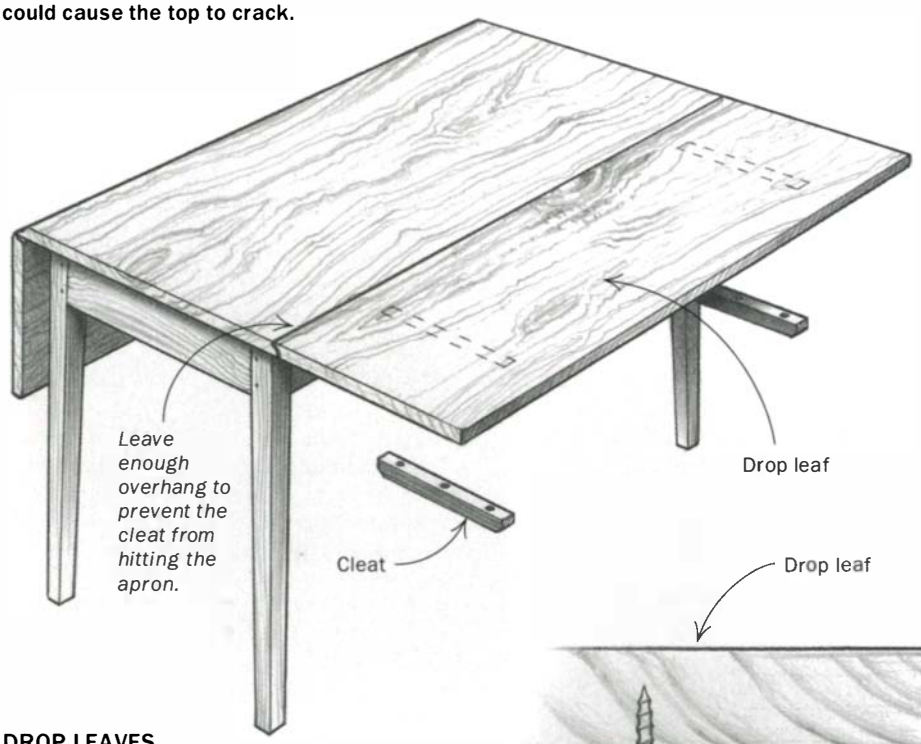
Angled holes are drilled into the aprons before assembly. The oversize shank holes allow for seasonal movement.



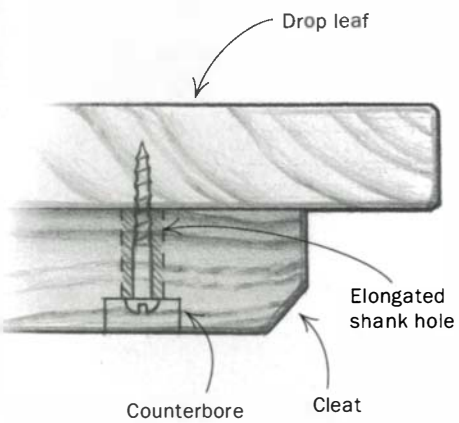
Jig simplifies pocket-hole drilling. *A shop-made drill-press jig holds the apron at a suitable angle for drilling the pocket holes with a Forstner bit (above). A screw driven through an oversize shank hole in the pocket joins the top to the apron (right) while allowing the top to expand and contract.*

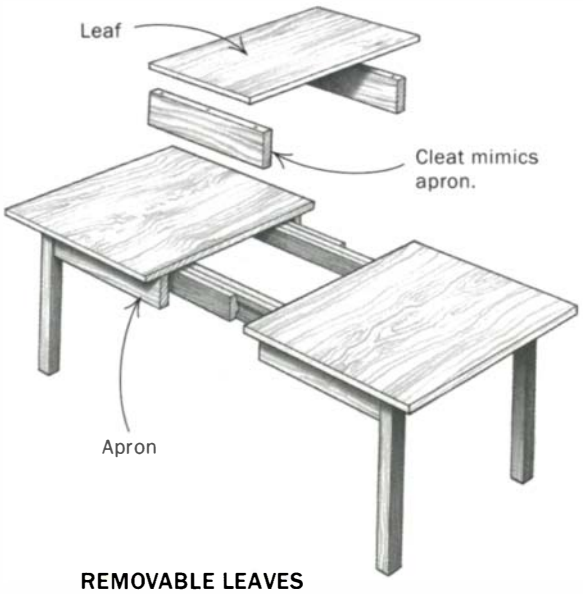
2. Screw cleats to the bottom

A straight cleat, screwed to the underside of a drop-leaf table, an extension table, or a pedestal table, is a simple and effective way to keep a top flat. Don't use glue here, however, or the top won't be free to expand and contract with changes in humidity, and that could cause the top to crack.



DROP LEAVES
Cup generally doesn't become a problem until a drop leaf is wider than 12 in. or so. With a wider leaf, two or three cleats screwed to the underside should keep the leaf flat.





REMOVABLE LEAVES
An extension-table leaf might cup without some sort of support. A cleat mimicking the apron provides a perfect solution.

PEDESTAL TABLES
The wide, mostly unsupported top of a pedestal table is a prime candidate for cup. In addition to the center cleat, a couple of outside cleats provide extra support.

Elongate the end holes. *A typical cleat has three holes, with the two nearest the ends elongated to allow the top to expand. The author uses a round rasp for the job.*

woodworkers prefer to alternate the growth rings (concave toward the top, then concave toward the bottom, and so on), while others prefer to run them in the same direction. But after 40 years of gluing up hundreds of tabletops and thousands of panels, I find that grain orientation really makes little difference. My priority is to position sapwood and blemishes on the underside of the table, which usually means that the growth rings are concave toward the top.

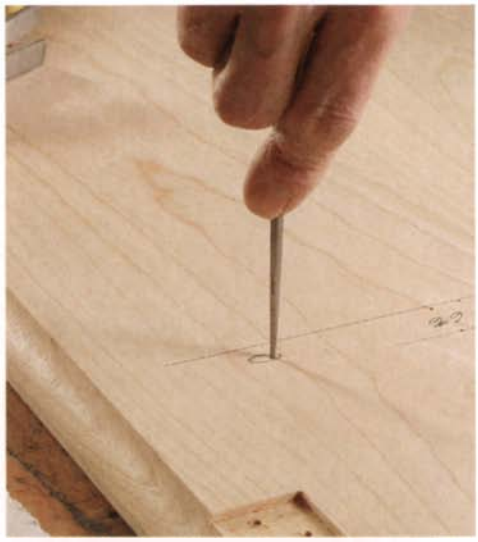
Wood species can make a difference—Some wood species tend to cup less than others. If you aren't tied to a specific type of wood, consider one of these cup-resistant species: Ash, cherry, yellow birch, black walnut, and white pine are good choices.

An even finish can help—For a finish to reduce cup effectively, all of the surfaces of a tabletop (top, bottom, and all four edges) must be finished equally. If not, one surface will gain or lose moisture faster than the other, and that's a formula for cup. The ends require particular attention. They absorb and expel moisture faster than face grain, and should be sealed with a few extra coats.

Furthermore, tables should always be finished with the top removed. When a table is finished after assembly, it ends up

Photos: Michael Pekovich; drawings: Michael Gellatly

Mark the hole locations. *Position the cleat on the underside of the top and mark the center of the middle hole. Make a series of points with a scratch awl to mark the elongated holes.*



Outline the elongated holes and locate the position of the outside screws. *With the points made by the scratch awl as a guide, use a pencil to scribe the elongated shape. If you anticipate the top is likely to expand, locate the pilot hole near the inside end of the elongated hole. If the top is expected to shrink, put the pilot hole near the outside end.*

with unfinished areas under places like cleats, stretchers, aprons, and bases.

Mechanical support ensures flatness

Ultimately, no finish will exclude moisture completely. Many furniture pieces need mechanical support to keep their tops from cupping.

Take advantage of aprons—Most table designs incorporate four aprons that support the legs and provide a means to attach the tabletop to the base parts. But aprons can do more. They are perfect for serving double duty as cleats to hold a tabletop flat, given enough attachment points.

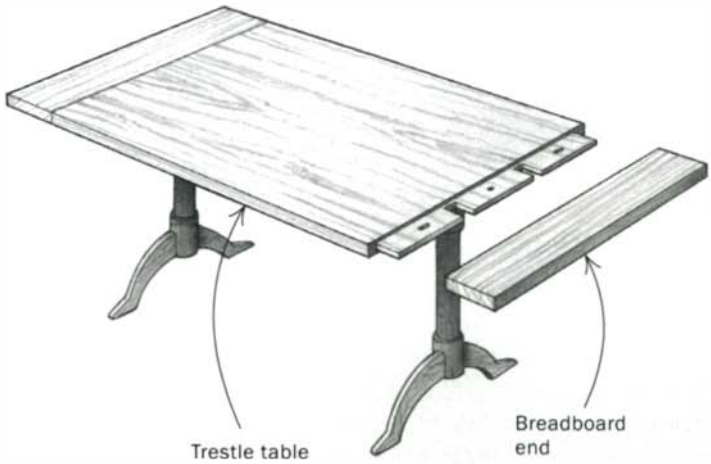
Tabletops can be secured to aprons in several ways. For a wide top, I use wood buttons, as they allow for a lot of expansion and contraction. On a narrow table, I mount the top through pocket holes in the aprons, a faster and simpler method. Although it allows only limited wood movement, this method is more than enough for most narrow tables.

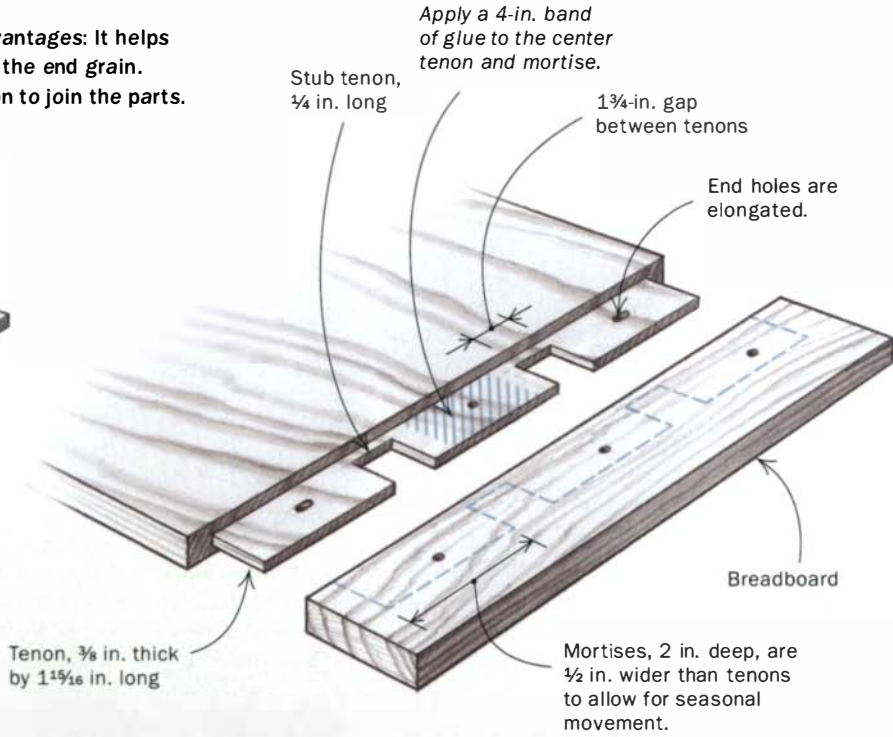
Cleats work effectively—A cleat is simply a flat, straight piece of relatively narrow wood that is attached, typically with screws, to the underside of an otherwise unsupported tabletop. It is found most often on drop leaves, extension-table leaves, and pedestal tables. To prevent the tabletop from cupping, attach the cleat at

Drive the screws. *After drilling pilot holes, drive the screws through the cleat until it's snug against the underside of the top. Don't use glue.*

3. Add breadboards to the ends

Mounting a cleat to the ends of a tabletop has a couple of advantages: It helps keep the top flat while allowing the top to move, and it covers the end grain. Becksvoort uses an elongated version of the mortise-and-tenon to join the parts.





Cut the tenons. *Use a router with a straight bit guided by a straightedge to cut the shoulders and cheeks (top). Cut the notches between each tenon using a dovetail saw (bottom) parallel to the grain followed by a coping saw across the grain.*

Assemble the breadboard ends. *Check the tenon fit in the breadboard mortise, and trim the tenons as needed. When the fit is right, use pipe clamps to snug the breadboard ends to the tenon shoulders, then drill holes all the way through for the pins.*

a right angle to the grain. Don't use glue; the top has to be free to expand and contract. Generally, a screw at the midpoint of the cleat anchors the parts at the center. Screws on either side of the anchoring screw go into slotted holes in the cleat.

Drop-leaf tables may or may not require cleats, depending on the size of the leaf. For relatively narrow leaves, say, 12 in. or less, I tend to avoid cleats when working with stable woods such as cherry or pine. On wider leaves, or when using less well-behaved woods such as oak or hard maple, a few cross-grain cleats on the underside are in order. They must be relatively small so that they won't bump into the apron when in the down position or interfere with any slide or spinner supports.

Extension-table leaves, when used on a leg-and-apron table, can be kept flat by continuing the aprons below the leaf. Again, use an anchoring screw at the center and slotted holes on either side. Also, make the extension apron a bit shorter than the leaf. That way, when the leaf shrinks in the dry winter season, it won't become narrower than the length of the aprons and create a gap between the leaf and the tabletop halves.

A cleat also can be a welcome addition to a pedestal table. Make the cleat as long as possible, but not so long that it can be seen easily. Again, use an anchoring screw at the midpoint with slotted holes on either side of the anchor.

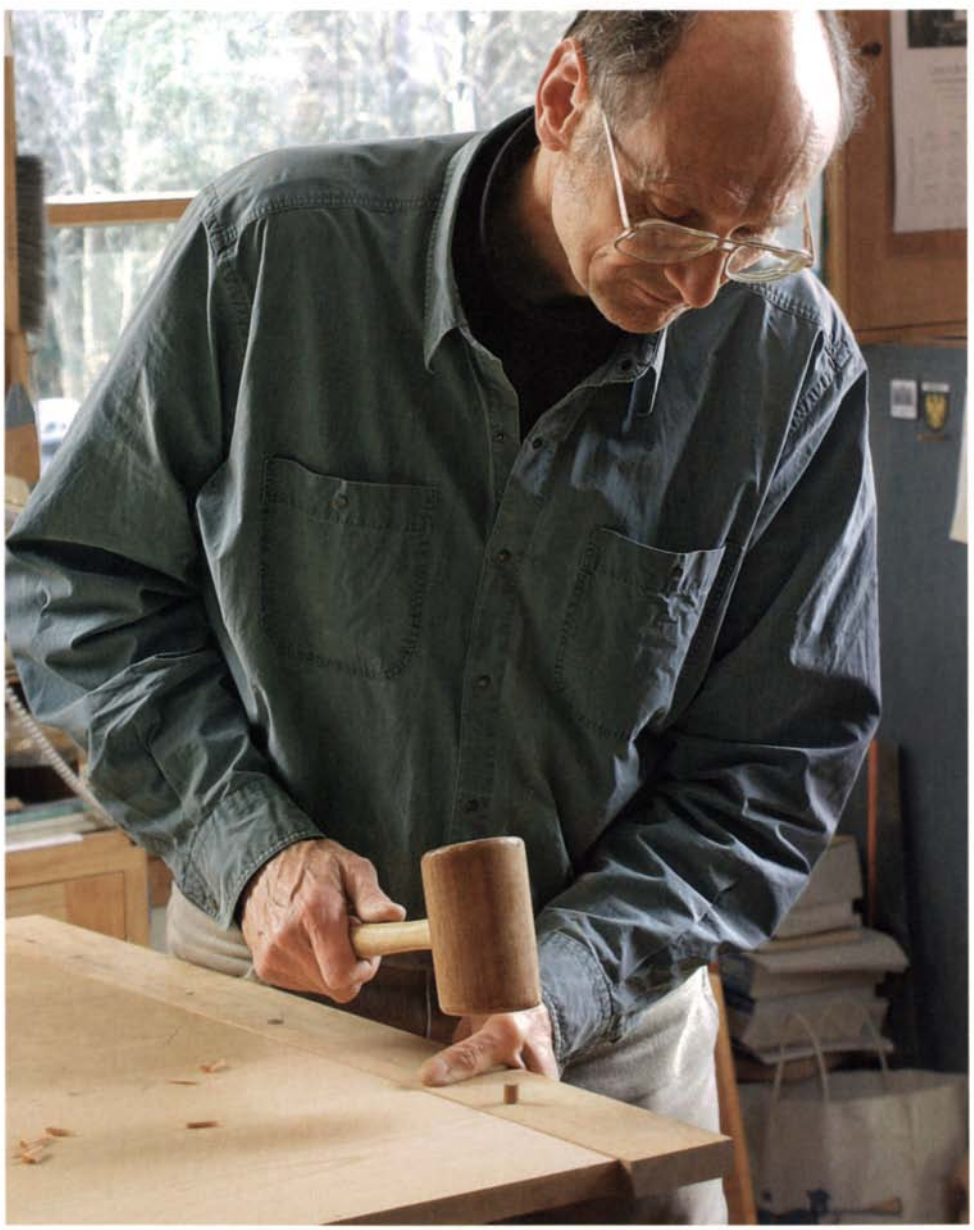
Breadboard ends are another good option—Because of their large overhangs on either end, trestle tables traditionally have breadboard ends to keep the tops flat. Essentially, a breadboard end is a cleat attached to the end of a tabletop with a mortise-and-tenon joint. Each end of the tabletop is tenoned, while a mortise is cut into the breadboard ends.

For overhangs of 14 in. or less, I tend to avoid breadboard ends because the cross brace at the top of the leg is close enough to keep the table flat. But they are a good option for overhangs of 18 in. or more.

The downside to a breadboard end is that its ends are flush with the table edges for about half the year. The rest of the time, either the top is a bit wider than the breadboard, or the breadboard is a bit wider than the top. □

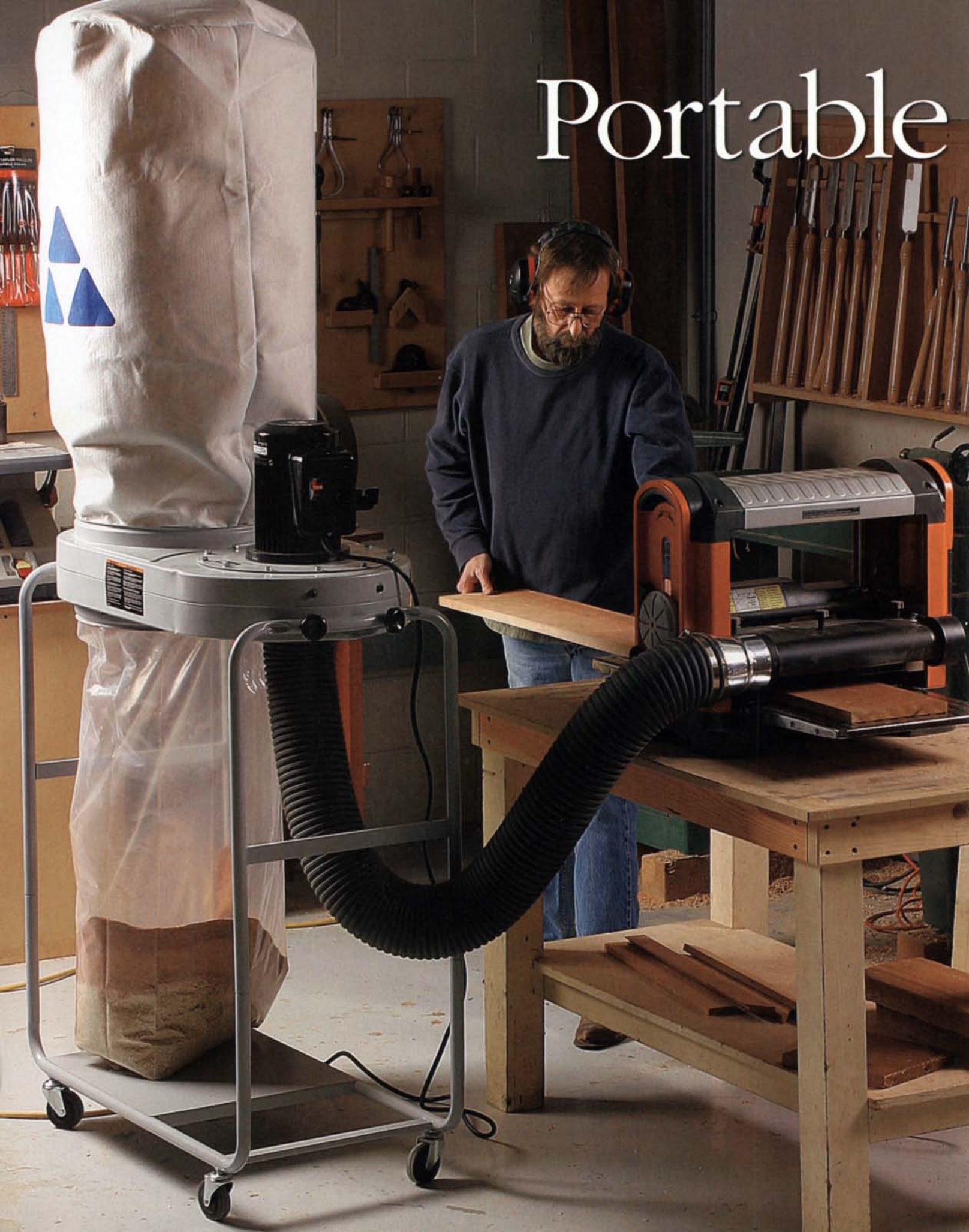
Christian Becksvoort is a contributing editor. His shop is in New Gloucester, Maine.

Elongate the holes. *With the breadboard ends removed, use a marking gauge to scribe a pair of lines tangent to the end holes. A round file or rasp is ideal for elongating the end holes, but stay just inside the lines.*



Drive the pins. *Reassemble the breadboard ends after adding glue to the center tenon and mortise. Then add a thin coat of glue to each pin and drive them home. Trim the ends flush with the table.*

Portable



Dust Collectors

Affordable and mobile, 1½-hp machines can do the job if you follow two simple rules

BY MICHAEL STANDISH

With enough money and electricity, it's easy to get a dust collector strong enough to move mountains of chips through ducts connected to every machine in the shop. But even a modest dust collector, such as those tested for this article, can be a tremendous help provided you follow two rules: One, fit it with an effective filter; and two, don't treat it like a true central dust-collection system with long runs of ductwork.

To be effective, portable dust collectors must do three things: move air fast enough to transport big chips, shavings, and dust; move enough air to capture all the waste that woodworking machinery generates; and trap even the finest dust particles.

Without a first-class filter, a dust collector becomes a dust-recirculating pump, spewing contaminated air throughout the shop. The most pernicious dust particles measure only 1 micron—a millionth of a meter—or less. When inhaled, they contribute to afflictions ranging from chronic respiratory problems to various cancers. Some of the units we tested come with a 1-micron filter as standard equipment, but others offer it only as an extra-cost accessory. There are also 1-micron aftermarket filters you can buy (see sidebar, p. 41).

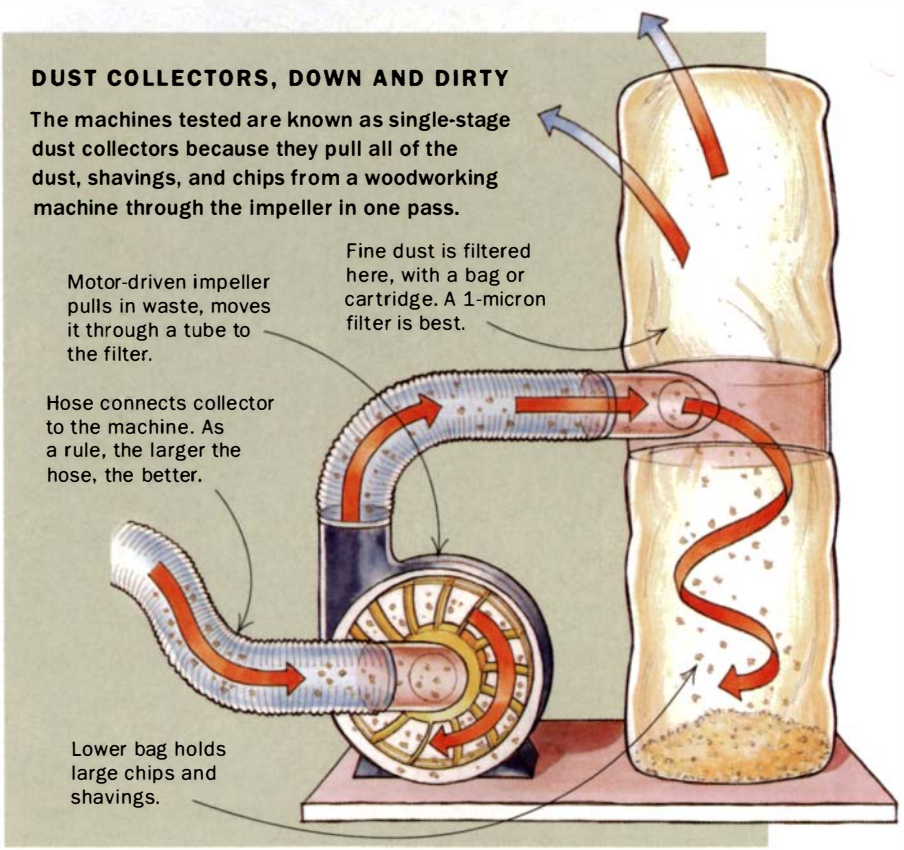
The 10 collectors tested are about the most powerful type available that run on normal 120v household current. They have a 1.5-hp motor driving an impeller to suck dust into the filter and the collection bags (see drawing, right). They're designed to handle the waste from a typical shop machine, but not from two machines at once. Some have a 6-in.-dia. intake port; others, a 5-in.-dia. port. These dust collectors look so much alike that you might think they came from the same factory. However, testing turned up some important differences. To fully appreciate those differences, you first need to understand the basics about moving air.

Dust Collection 101: A primer

Forcing air through a dust collector generates both static pressure and velocity pressure. Velocity pressure is produced by the moving air. Once you know the velocity pressure, you can calculate the speed of the moving air (in feet per minute, or fpm) and its volume (in cubic feet per minute, or cfm). Those are the two critical factors that determine whether the dust collector will do an adequate job in your shop.

Static pressure is essentially another term for resistance. Friction in ducts and hoses, turbulence in elbows and other bends, and congestion in the filter all contribute to static pressure.

Static pressure, velocity pressure, and other airflow factors are interrelated. Change one and you change them all, because dust collection is a zero-sum game. Most important, if you increase velocity—which



How the dust collectors were tested

Season the filter. *To simulate real conditions in a repeatable way, the cartridge filter used with all the dust collectors was purposely loaded with about 10 lb. of diatomaceous earth, a fine mineral powder.*

Read the numbers. *Instruments inserted into the duct leading to the dust collector registered the airspeed and the volume of air being moved.*

happens when you reduce the diameter of the duct—you decrease air volume. You'll move air faster, but you will move less of it. Worse, reducing the duct size exponentially increases the friction in the system. If you double the air's speed, you quadruple the friction. As friction continues to increase, the volume of air will continue to drop until the dust collector ceases to be effective. That's why you want as powerful a collector as possible. Every hose, elbow, and reducer that gets added to it reduces volume, velocity, or both.

Experts generally agree that a dust collector should deliver at least 3,500 fpm of velocity to effectively move the dust away from a single machine. A velocity of 4,000 fpm is optimum. You also want the machine to provide 800 cfm of air volume to collect the dust effectively. That's enough to accommodate a tablesaw or planer, machines that make very heavy demands on a dust-collection system.

Your dust collector might not be able to achieve that level of performance, however. You'll have to make compromises in the shop that will mean sacrificing some aspect of performance. The trick is to avoid making the system worse than it needs to be, so that it maintains an airflow strong enough to keep big chips moving and also enough air volume to draw in the finest dust.

The most common problem you're likely to face is how to mate a dust collector, which has a 5-in. or 6-in.

Constrict the airflow. *Restrictor plates with progressively smaller openings were placed on the open end of the duct to mimic the friction and turbulance of typical ducting.*

Photos, except where noted: Rodney Diaz; this page: Andy Engel; p. 38: Kelly J. Dunton; drawing: Stephen Hutchings

intake port, with a machine that has a 4-in. exhaust port. The collectors reviewed here come with a Y-fitting that attaches over the intake and provides a pair of 4-in. ports, so at first the solution seems obvious: Run a length of 4-in. hose from the machine to the collector.

However, that simple approach will reduce volume and increase friction and turbulence, possibly to levels at which the dust collector wouldn't be effective. I recommend a better approach:

First, move the dust collector as close to the machine as you can, to keep hose lengths as short as possible. Second, don't use the Y-fitting. Instead, use a hose that matches the dust collector's intake diameter (6-in. hose for a 6-in. inlet, for example). Fit the machine end with a tapered adapter, which minimizes turbulence (see photos, right). A short run of larger-diameter hose will keep air volume high while minimizing inefficiencies caused by friction.

Let your shop's size and layout guide decisions about how to connect the collector. Some people may find it handier to leave lengths of hose clamped to each machine, hooking each one to the collector as needed. Others may have an easier time with just one hose clamped to the collector and hooked to machines as they are used.

Testing the collectors

Dust-collector manufacturers don't do a very good job of defining performance. For example, some manufacturers rate their hardware according to maximum developed static pressure, which is measured when the intake duct is completely closed off and the air is at a standstill. Designers and engineers might find that useful, but the rest of us probably would find it difficult to predict how much air a dust collector can move based on how much air it can stop. Other manufacturers test their hardware without filters or ductwork, producing a high but meaningless figure for air volume.

My tests put the best face on real-life performance. They show how each machine performs with a modest buildup of dust on the filter and a minimal amount of ductwork.

I used a high-efficiency cartridge filter from Wynn Environmental for all the testing, first seasoning it with a measured amount of fine mineral powder to mimic a full load of dust (see top photo, facing page). After I had finished testing one dust collector, I moved the cartridge to the next machine.

To measure air velocity and volume, I fitted a pitot tube and a digital manometer (devices for sampling and measuring air pressure) into short lengths of smooth-wall metal

Hoses, reducers, filters: What well-dressed collectors wear

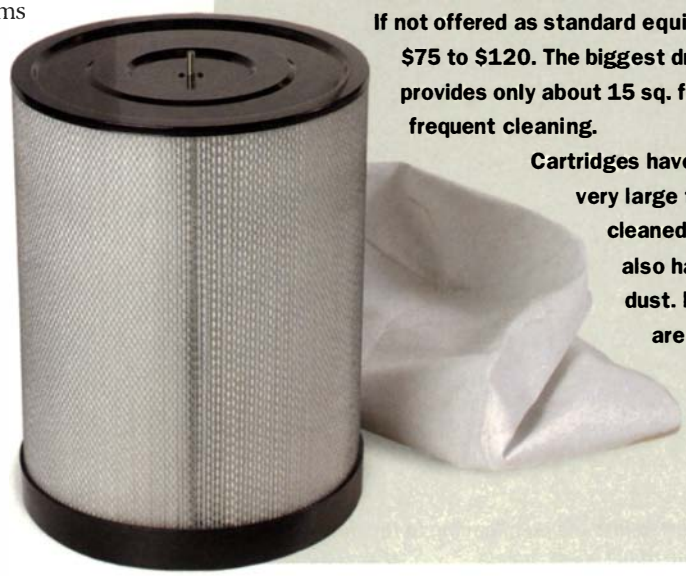
SMART DUCTING MAXIMIZES POWER

As a rule, larger-diameter hose or duct is better. A 6-in. hose (top right) handles a larger volume of air than 5-in. or 4-in. hose. The smaller sizes speed up the air but move less of it. Every time you reduce the size of the hose, you increase friction; added friction eventually will outweigh gains from faster air movement.

The fittings you use to connect the dust collector with machines in your shop also make a difference. The Y-fitting supplied with the dust collectors I tested (above right) reduces hose diameter at the wrong end of the line. It's better to run larger hose with a tapered reducer (right) connecting it to the shop machine.

FILTERS: BAG VS. CARTRIDGE

Filter bags are not created equal. Some are made of loosely woven cloth and are effective only with relatively large particles—30 microns and larger. They allow the smallest, most hazardous particles to spew out into the shop at head level. You'll treat your lungs best if you outfit the dust collector with a 1-micron filter, either a bag or a cartridge. (I found the choice of bag or cartridge to have a negligible effect on air flow.)



A felted fabric bag has small pores to capture fine particles. If not offered as standard equipment, felt bags cost from $75 to $120. The biggest drawback is that the bag provides only about 15 sq. ft. of filter area, and needs frequent cleaning.

Cartridges have a pleated filter and thus a very large filter area, so they need to be cleaned much less frequently. Many also have a flapper inside to dislodge dust. However, some cartridge filters are costly; don't be surprised by prices of $200 or so. The Wynn filter I used was a relative bargain at $118.

—M.S.

Bridgewood BW-105A
www.wilkemachinery.com
717-764-5000

Craftsman 21337
www.sears.com/craftsman
800-377-7414

Delta 50-760
www.deltamachinery.com
800-438-2486

Delta 50-850
www.deltamachinery.com
800-438-2486

General 10-105
www.general.ca
819-472-1161

duct sized to allow intake turbulence to sort itself out while avoiding undue amounts of friction.

I then took a series of airflow readings on each machine, fitting the open end of the duct with progressively smaller restrictor plates, which steadily raised static pressure and reduced velocity. The graph at right shows how each dust collector's air-volume figures dropped as the openings in the restrictors became smaller.

Finally, I measured the noise each machine makes, taking readings 5 ft. from the motor and 5 ft. from the floor. All are very loud, from 79 to 85 decibels. With a dust collector in the shop, good hearing protection is a must.

So, what should you buy?

The Delta 50-760, the Grizzly, and the Jet delivered significantly better volume than the others, without sacrificing air velocity. I've designated them as the best overall machines.

Of those three, I think the Delta also offers the best value. It's the only one that comes with a standard 1-micron filter bag. You could outfit the Grizzly and the Jet with comparable bags, but that would add about $75 to the cost. Penn State Industries (which also sells its own dust collector) and Woodworker's Supply are two sources for 1-micron bags. Penn State also has a 1-micron cartridge compatible with the Jet; it won't fit the Grizzly collector, however.

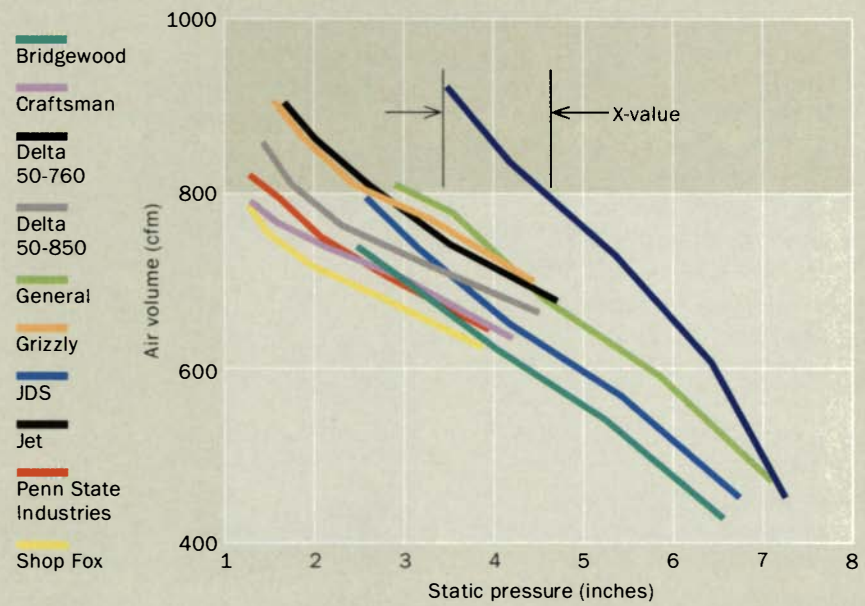
The other machines fall too quickly below the 800-cfm threshold for effective dust pickup, or they never achieve that volume in the first place. □

Michael Standish is a writer and woodworker in West Roxbury, Mass.

How the dust collectors performed

Each line in the graph describes the performance of one dust collector in my tests. The highest cfm readings for each collector are with a wide-open duct. The air-handling capability dropped as I gradually restricted the opening leading to the collector's intake port, increasing the static pressure. As a practical matter, a dust collector needs to provide 800 cfm or more in order to move all the dust, chips, and shavings that machines like tablesaws, jointers, and planers produce. The best collectors start above that baseline and stay above it the longest. The X-value illustrated below on one of the most powerful machines represents how much resistance (static pressure) can be added before a machine's performance falls below 800 cfm. The author's picks have the largest X-values.

In general, air volume on a machine with a 6-in. intake port drops at a slower rate than on a 5-in. model. In the shop, that inherent difference means that a 6-in. machine has the capacity to handle slightly longer hose.



Grizzly G1028Z
www.grizzly.com
800-523-4777

JDS Dust-Force
www.jdstools.com
800-480-7269

Jet DC-1100A
www.jettools.com
800-274-6848

Penn State Industries DC2V2
www.pennstateind.com
800-377-7297

Shop Fox W1685
www.woodstock international.com
800-840-8420

MODEL	PRICE	INLET DIA.	NOISE	PERFORMANCE	STANDARD FILTER	OPTIONAL FILTER	ADDED FEATURES
Bridgewood BW-105A	$250	5 in.	80 db.	Fair	1-micron bag	Kit with 1-micron cartridge, disposal bags, $250	None
Craftsman 21337	$300	6 in.	85 db.	Fair	30-micron bag	None	None
Delta 50-760	$290	5 in.	83 db.	Excellent	1-micron bag	None	Intake ports can be oriented to face up or down.
Delta 50-850	$280	6 in.	85 db.	Good	5-micron bag	1-micron bag, $90. Model 50-850A, $460, comes with 2-micron cartridge.	None
General 10-105	$350	5 in.	79 db.	Good	30-micron bag	2-micron bag, $55. 1-micron cartridge filter, $280.	Remote on-off switch, $100
Grizzly G1028Z	$270	6 in.	84 db.	Excellent	30-micron bag	2.5-micron bag, $25	Remote on-off switch, $45
JDS Dust-Force	$300	5 in.	80 db.	Fair	1-micron bag	5-micron bag, $60. 1-micron cartridge, $199.	Low-voltage blast gates for multiple hookups. Starter kit, $60
Jet DC-1100A	$350	6 in.	83 db.	Excellent	30-micron bag	5-micron bag, $80. Model DC-1100CK, $470, supplied with 2-micron cartridge.	Versions available with remote on-off switches.
Penn State Industries DC2V2	$300	6 in.	82 db.	Good	1-micron bag	1-micron cartridge, $169. Collector with 1-micron cartridge, $415.	Remote on-off switch, $50. muffler, $80.
Shop Fox W1685	$240	6 in.	86 db.	Fair	30-micron bag	2.5-micron bag, $50	Remote on-off switch, $40

Beading a Drawer

Applied molding disguises gaps, adds a sophisticated look

BY STEVE LATTA

Cock beading is a prime example of the design philosophy, "If you can't hide it, accentuate it."

As all woodworkers know, wood moves, and with components like drawers there is no real method to hold that movement in check. A nice flush and even gap probably won't stay that way, especially on inset drawers. Cock beading distracts the eye from the gap, and by helping to break up large, dormant surfaces, adds visual distraction and consequently a little life. It can be used on many different styles of furniture, requires no special tools, and is a technique well worth acquiring.

I won't cover beading that is incorporated into the case, but rather the method where the bead is applied directly to the drawer itself. If the front of the drawer happens to be veneered, as in this table, the beading does double duty by helping to protect the edge of the veneer.

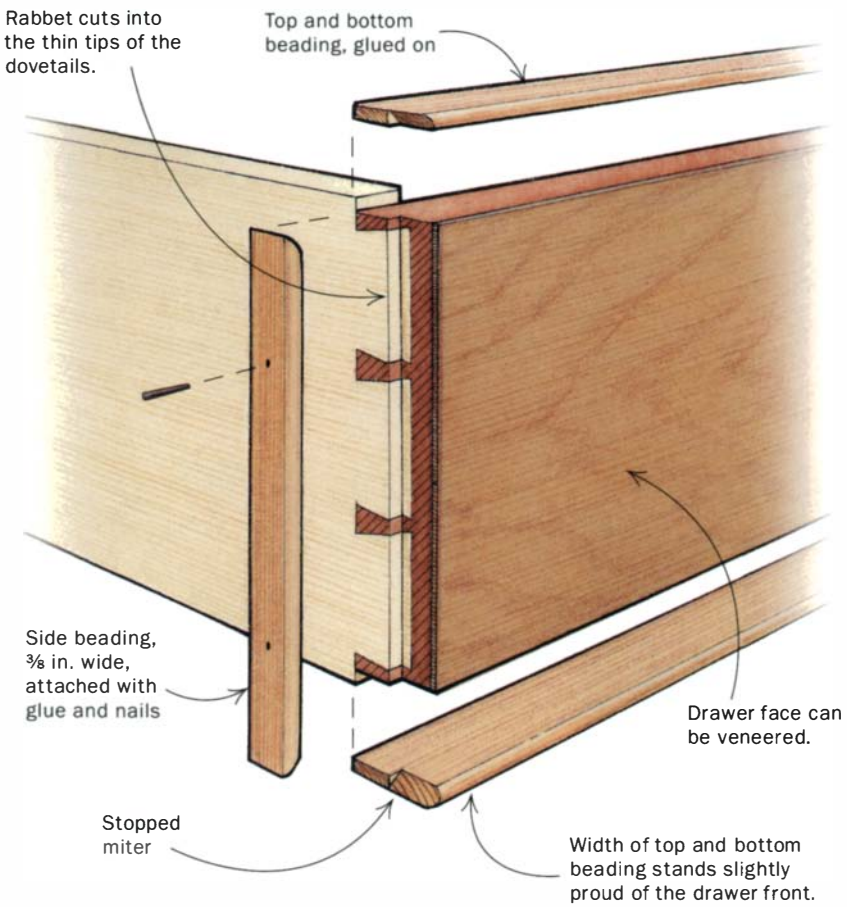
Steve Latta is an instructor at Thaddeus Stevens College of Technology in Lancaster, Pa., and a frequent contributor.

FineWoodworking.com

Visit our Web site to see the author demonstrate how to apply cock beading.

HOW COCK BEADING WRAPS AROUND A DRAWER FRONT

After the drawer has been fit to its opening, the edges of the drawer front are cut away so that the thin beading can be added. The bead completely covers the top and bottom edges of the drawer front but fits over the sides by only about ⅜ in., enough to cover the tips of the dovetails.



Photos: Mark Schofield; drawings: Heather Lambert

1. Make the beading

I always apply cock beading to a drawer after the drawer has been glued up and fitted to the opening. Sometimes the drawer dividers have a little twist or bow and the drawer front must be planed to fit the opening. If the bead was already on, it would lose a bit of its profile.

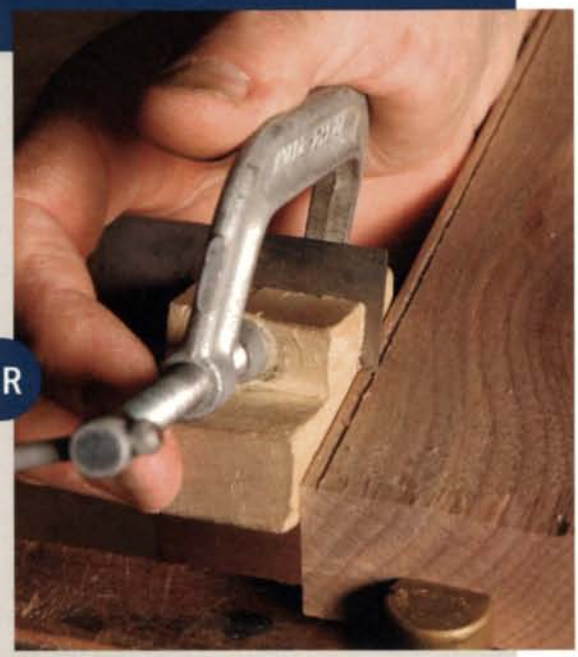
It's a good idea to make the beading before you trim down the drawer front to receive it. This way, you'll know the exact thickness.

There are a couple of ways to make the beading. If you need beading for several large drawers, take the time to set up a bullnose bit (Amana part No. 51540) in a router table. For just a couple of drawers, a scratch stock makes quick work of the job and can produce thinner, more delicate beading than a router bit. The wooden body of the scratch stock is shaped like an inverted "T" with a handsaw kerf across the top to hold the cutter. I made mine from a piece of an old scraper and shaped the profile with a small, round, needle file. A 2-in. C-clamp holds the cutter in place and doubles as a handle.

I bead opposite edges of a 1-in.-thick board (with jointed edges) and then rip away the bead on the tablesaw fitted with a combination blade, a zero-clearance insert, and a stub splitter. I use a long push stick and run it right through the blade. The low splitter stays out of the way and keeps the stock from twisting into the blade and getting unsightly burn marks.

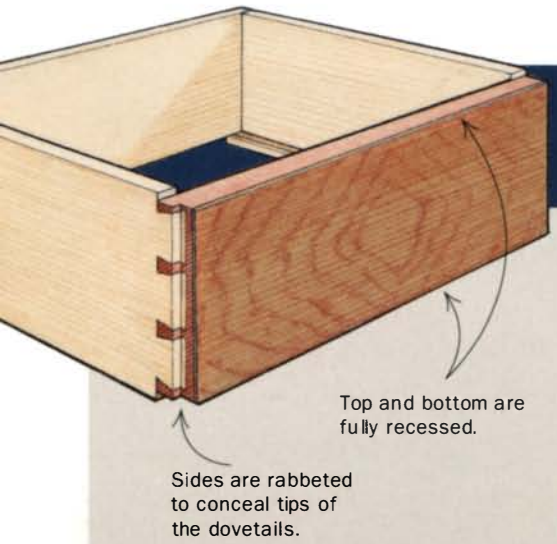
Router-cut beading. *The fastest way to cut large amounts of beading is with a bullnose bit in a router table. Set the bit within a sacrificial fence.*

OR



A low-tech method. *A scratch stock made from a block of wood and a piece of scraper blade is an efficient way to create small amounts of beading.*

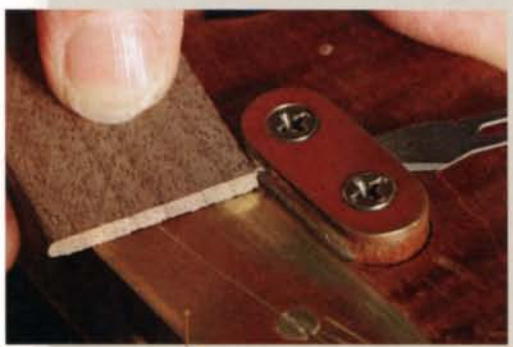
Rip the beading. *After the bullnose profile has been routed or scratched, rip the beading to width on the tablesaw. A splitter prevents saw-burn marks on the sides of the beading.*



2. Prepare the drawer front

MARK THE FACE, BACK, AND SIDES

With the drawer bottom removed, mark the drawer front: Set a slicing gauge to the thickness of the beading (about ⅛ in.) and score a line along all four edges of the face. Since the bead stock will completely cover the top and bottom edges of the drawer front, I also score a fairly deep line along those edges on the inside of the drawer front. Here an old plane iron serves as the perfect tool for extending the lines into the corner where the slicing gauge can't reach. Reset the gauge to about ⅜ in. and, referencing off the front, score a line across the sides of the drawer, making sure the ends of the dovetails are included in what will become the rabbet for the bead.



1 ***Set your gauge.*** *The slicing gauge should be set to match the thickness of the beading. Unlike a marking gauge, which uses a pin to scratch a line, the blade of a slicing gauge cuts a clean line.*

2 ***Mark the drawer front.*** *Use the slicing gauge to mark all four edges of the drawer face.*

3 ***Mark the back, too.*** *Because the beading will extend the whole thickness of the top and bottom of the drawer front, don't forget to mark the inside edges, too.*

4 ***Cutting corners.*** *Because the slicing gauge can't reach into the corners, extend the line with a plane iron tapped by a hammer.*

5 ***Mark the drawer sides.*** *Reset the gauge to about ⅜ in. and scribe a line on both drawer sides.*

CUT AWAY THE WASTE

Fitting the drawer to the opening sometimes leaves edges that aren't perfectly straight, and the recess for the bead must match this profile. A handheld router with a short fence works well. Because I tend to use small routers that can't take a lot of load, I remove much of the waste on the tablesaw first. This extra step takes just a minute but greatly adds to personal safety and radically reduces the possibility that the router will grab the stock and chew up the front. Having gone to the trouble of building the drawer, it would be a shame to wreck it at this point.

The sawblade must be partly buried in an auxiliary fence and set so that the cut is just a hair away from the scribe lines in both width and height. Rabbet both sides using a miter gauge to guide the drawer. Reset the blade height and groove the top and bottom edges of the drawer front, leaving only about ⅛ in. of stock for the router fence to ride along.

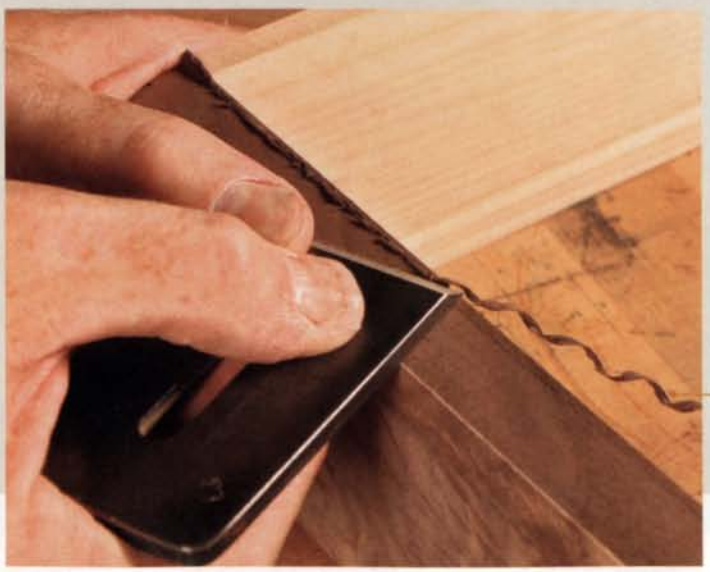
Set a straight bit to the width and depth of the side rabbet and bury it into an auxiliary fence clamped to the router base. After rabbeting both drawer sides, reset the depth of the bit so that it matches the depth of the sawcut, and with the router fence riding against the lip you left when sawing, rabbet the top and bottom edges. Place the drawer on its face, and with a couple of hammer blows on a plane iron, make short work of the lip.

1 ***Saw away most of the waste.*** *Use a tablesaw to cut the sides of the drawer front and then the top and bottom. Leave a ⅛-in. lip on the latter two edges for the router fence to ride against during the next step.*

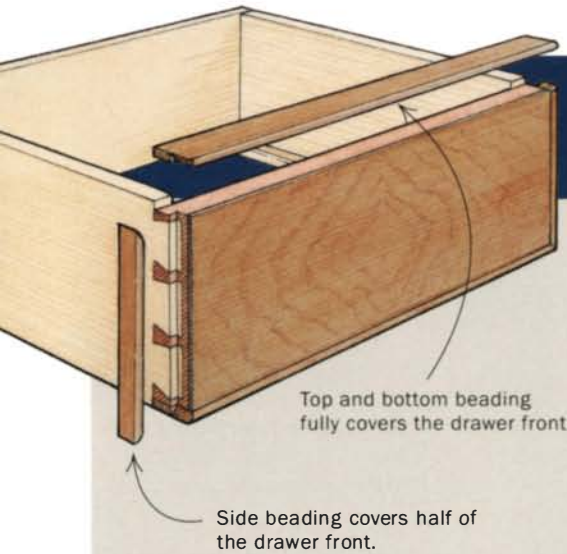
2 ***Cut almost to the line.*** *Removing the bulk of the waste on the tablesaw makes the final cut with the router easier and cleaner.*

3 ***Finish cut with a router.*** *Use a straight bit buried in an auxiliary fence to cut the sides. Then rout the top and bottom rabbets to their final depth, leaving the small lip at the bottom.*

4 ***Remove the lip.*** *Use a plane iron or wide chisel to remove the lip on the top and bottom rear edges.*



5 ***Clean up the lip.*** *Use the same iron or chisel to pare away any remnants of the lip.*



3. Miter and apply the beading

DRY-FIT ALL THE PIECES

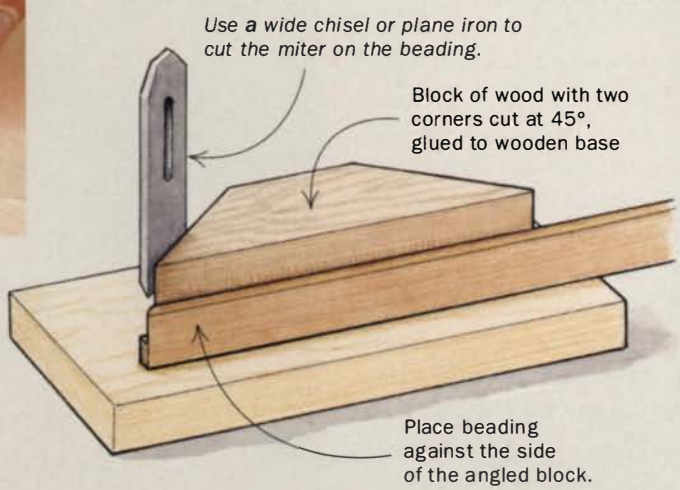
Square an end of the top bead stock and line it up with the end of the drawer. Referencing off the side rabbet, mark where the stopped miter needs to end by slicing in carefully with a plane iron or a chisel. Cut the miters on both adjoining pieces using a guide block with 45° corners. Repeat this process at the diagonal corner of the drawer front. With these two mitered corners properly fitted, cut the top and bottom pieces to length and miter the other two corners, fitting the side pieces last.

To keep the bead from sliding around during final fitting and gluing, tack three or four brads into the top and bottom edges of the drawer front, and clip the heads off close to the surface with the jaws of

1 ***Mark the miters' depth.*** *Use a plane iron resting on the bottom of the side rabbets to mark where the miters stop.*

2 ***Slice the miters.*** *Use an angled cutting block (see drawing, right) to guide the plane iron or chisel when cutting the stopped miters.*

ANGLED CUTTING BLOCK FOR MITERING THE BEADING



4 ***Clipped brads prevent sliding during fitting.*** *Tap three brads into the top and bottom of the drawer front, and then remove the heads close to the surface.*

5 ***Fit the top and bottom beading.*** *Press the beading onto the headless brads, starting in the middle and then at either end.*

6 ***Fit the sides.*** *With the top and bottom beads dry-fitted and clamped with cauls, fit the side beading.*

the cutter parallel to the edge. Positioning the jaws this way gives you a little sideways movement when fitting the bead.

Press the beading into the brads and test-fit it. Then fit the side beading, and secure its location by attaching the pieces to the drawer sides with clear tape.

3 *A perfect fit.* *The miters on the top and bottom beading should stop where the rabbets on the drawer sides end.*

7 *Secure the location of the ends.* *To keep the final location of the side beading, attach the pieces with clear tape, then proceed to gluing.*

ATTACH WITH GLUE AND BRADS

Apply a thin film of glue and then press on the top and bottom beading, working from front to back. Apply pressure using two pieces of ¾-in.-thick stock trimmed about ⅛ in. shorter than the length of the beading. Run the clamps under the drawer front so that the side beads can be clamped across the face.

Apply a thin coat of glue to all the end grain. This will prevent the end grain from absorbing the main application of glue and starving the joint. Then glue on the taped side beading. As cauls I use two blocks, each cut with a small groove to straddle the joint. The groove helps provide even pressure, even if the bead stands a little proud of, or shy from, the drawer side. Let any squeeze-out dry about 20 minutes and then carefully peel it away with a chisel. After everything is dry, unclamped, and cleaned up with sandpaper, I use a few small Tremont brads (www.tremontnail.com) to secure the side beads in case the glue lets go due to seasonal movement.

1 *Minimize squeeze-out.* *To reduce squeeze-out on the front face of the drawer, roll on the top and bottom beading from front to back.*

2 *Glue the sides.* *Pre-glue the end grain on the miters, glue the whole surface, and then flip up the taped side beading.*

3 *Clamp the beading.* *Place the clamps for the top and bottom beading around the back of the drawer front and place the clamp for the side beads across the top. A block of wood supports the clamp while it is being fitted.*

4 *Nail the side beads.* *To reinforce the cross-grain glue joint, use a couple of brads to secure the side beads. Predrill the holes to avoid splitting the thin stock.*

Maintaining

Despite the wide range of products, a simple waxing is best

a Finish

BY TERI MASASCHI

The number of furniture-care products on the market is staggering: There are liquid waxes and polishes, spray polishes, oils with color in them, dust removers with scents in them, and dozens of paste waxes. Everyone has seen, read, or heard the advertisements for these products: The wood in your house must be fed; it is drying out, and it must be rehydrated or oiled! Or, conversely, too much polishing will lead to the dreaded "wax buildup."

Most of this is pure hype, but the products sell because most homeowners want to keep their furniture looking its best. Woodworkers are even more motivated to take care of their creations and thus are extra vulnerable to the sales pitch. The good news is that you can ignore most of these products; I'll show you which ones have value and how best to use them.

Why sprays and oils have limited use

The biggest-selling furniture-care products are aerosol sprays and liquids because they are so easy to apply. They fall into three main categories: emulsion polishes, oils, and silicone polishes.

Emulsion polishes are best kept for cleaning— These are emulsified blends of water and oil packaged in cans and sprays. They are recognizable by their milky appearance when first applied. Because emulsion polishes contain both water and petroleum distillates, they are good for removing grease and dirt. They are also suitable for a quick dust pickup and leave a non-greasy surface, but a very limited shine. A cloth dampened in warm, soapy water cleans just as well.

Oils leave a slick surface that attracts dust and dirt—There is a large range of furniture oils, but the main ingredients usually are petroleum-based mineral oil and mineral spirits. Sometimes the latter is replaced with or augmented by a citrus-based solvent that gives a pleasant smell. Other options include added color to help hide scratches.

When applied, these products leave a very temporary shiny, slick surface. They are a favorite of antiques dealers because that glorious shine will last long enough to get the piece out of the shop. However, the oil left on the surface is a magnet for dust and dirt, so it's better to avoid this type of polish.

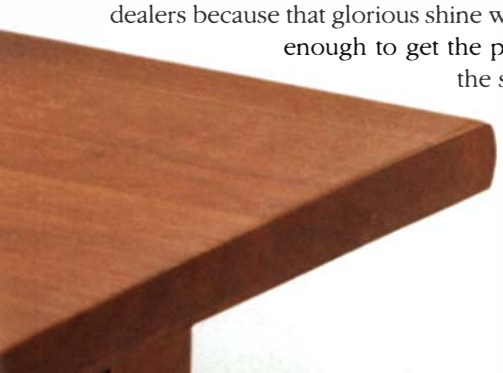
Silicone gives a high shine and refinishing nightmares—Many popular emulsion and oil polishes such as Pledge, Old English, and Orange Glo contain silicone. This gives the wood a temporary slippery, polished surface, but silicone is a dirty word for refinishers. If you try to refinish a piece of furniture that has been polished with a silicone spray, the residue will play havoc with getting the new finish to stick.

Paste wax protects and enhances furniture

A regular application of paste wax is the best maintenance you can give your furniture, but it is important to know what paste waxes can and cannot do. When applied thinly and buffed out, paste wax will give a longer-lasting shine than any of the sprays and oils I described. It will conceal minor scratches and other surface blemishes, and by raising the surface sheen, it will give the wood a deeper look. Also, by making the surface slick, paste wax reduces friction, letting

Emulsion polishes

Emulsion polishes clean well. *Recognizable by their milky appearance, emulsion polishes are a blend of oil and water. They are good for cleaning dirt and grease but leave only a temporary shine.*



Oil polishes

Oils attract dirt. *Oiling furniture gives the piece a high shine in the short term but attracts dirt and dust.*

objects slide over the surface without scratching it.

Paste wax should not be used to clean furniture: Dirt and grime are removed best with a damp, soapy cloth, and dusting should be done with a microfiber cloth (see photo, facing page) before applying wax. Wax will not fix a severely damaged surface; in that case, you'll have to sand or strip the old finish before applying a new one.

A different wax for each task— Most paste waxes are combinations of different waxes blended for specific jobs. Popular components include hard carnauba or candelilla derived from plants, medium-density beeswax, and soft paraffin wax. A paste wax designed for floors, such as Butcher's Bowling Alley Wax, is not a good choice for furniture. Its large percentage of carnauba wax is designed to be buffed out with a machine. On the other hand, a product that contains too much soft paraffin wax is likely to remain smeary on the wood. Good choices for furniture include Staples, Liberon's Black Bison, Briwax, and Antiquax.

All waxes contain solvents to keep them smooth and workable. Many of these, such as toluene, are fairly strong and toxic. People who are sensitive should wear gloves and use good ventilation when waxing. Also, never wax a brand-new finish because the solvents will erode the finish. Wait a week for most finishes to cure and at least a month for lacquer.

Paste waxes also are available in many colors. A dark wax can give dark furniture a richer look, and is important particularly if the surface is grainy or carved. A clear wax that gets lodged in cracks and crannies will appear white when it dries. A dark brown wax won't show up after it is dry.

If you have an antique to care for, you'll need to use a man-made wax to avoid the acids in natural waxes. Known as a micro-crystalline wax, the brand used by most curators is Renaissance wax.

How to apply paste wax—This is one finishing technique that is easy to master and requires no special tools. An old, well-washed cotton T-shirt is ideal for both applying and buffing out paste wax. You either can wrap your fingers in the cloth and scoop out a small amount of wax, or for more control over the rate of application, especially on intricate surfaces, spread some wax inside the cloth. Then fold the cloth into a pad and squeeze it until the wax just starts to ooze through. In both cases, apply the wax thinly over the surface. Some manufacturers suggest working

Rejuvenating an oil finish

If your furniture was originally finished with pure oil or a few coats of Danish oil but has been allowed to dry out, the best way to restore it is to remove any wax residue with a cloth dampened with mineral spirits (1), and then apply another couple of coats of the original finish (2).

Photos, except where noted: Mark Schofield; this page (bottom left) and product shots: Michael Pekovich

Wax is easy to apply

with the grain, but I prefer a circular motion. Most manufacturers suggest waiting 15 to 30 minutes before buffing. A shorter dry time is not fatal, but don't wait too long—these are not car waxes that need to haze up before buffing. Choose a single surface that can be worked comfortably before moving on—don't apply wax to an entire hutch before starting to buff. You are finished buffing as soon as the surface isn't smeary and the cloth slips without catching.

What about wax buildup? If you apply paste wax correctly, buildup should never occur; each new application will dissolve the previous layer. Buildup occurs only if the last layer has been left on thick and not buffed out.

What to do between waxings

Dust magnet. *With their millions of fibers and electrostatic charge, microfiber cloths are the best way to dust furniture with no need for sprays or oils.*

For regular dusting, a new product virtually eliminates the need for aerosols or oils. Microfiber cloths made from polyester and polyamide are non-abrasive and lint-free. Their strand count of 200,000 per square inch can absorb large amounts of dust. They also generate a charge of static electricity to aid dust pickup. Best of all, they can be washed and used over and over again. The easiest place to buy them is at car-care centers. Avoid those popular dust-pickup products that can't be washed; they contain a chemical coating.

Regular waxing and dusting will not make your furniture bulletproof: A finish cannot tolerate standing water, heat, or brutal sunlight. Protect each piece with coasters, hot plates, and window blinds or curtains. □

Teri Masaschi owns a furniture repair and restoration business near Albuquerque, N.M.

The wax goes inside. *By putting the wax inside the cloth, the rate of application can be controlled much more closely.*

Apply the wax thinly. *Rub the pad in a circular motion to apply a thin coat of wax to one area at a time.*

Buff the surface. *After letting the wax dry for 15 to 30 minutes, rub the surface with a cotton cloth, turning the cloth frequently to reveal a clean section.*

Durable Outdoor Table

Ipé table will seat six and weather many seasons

BY DAVID BEDROSIAN

Last summer brought a new pool to our backyard. With it came more company and the need for a better outdoor table. Rather than purchasing something mass-produced, I designed a table to match the wooden deck that completes our backyard landscaping. Both the deck and the table are built from ipé (pronounced ee-pay), a dense South American hardwood. I like ipé for outdoor furniture because of its rich color, dimensional stability, and natural resistance to decay. But you could substitute white oak, cedar, or any other wood that will withstand the elements.

Ipé may not be available at the local hardwood dealer. You may have to visit a lumberyard that sells high-end deck material, or you can order the ipé online. It comes in a limited number of standard dimensional lumber sizes. Although the stock sizes may be limited, ipé comes planed and ready for sanding.

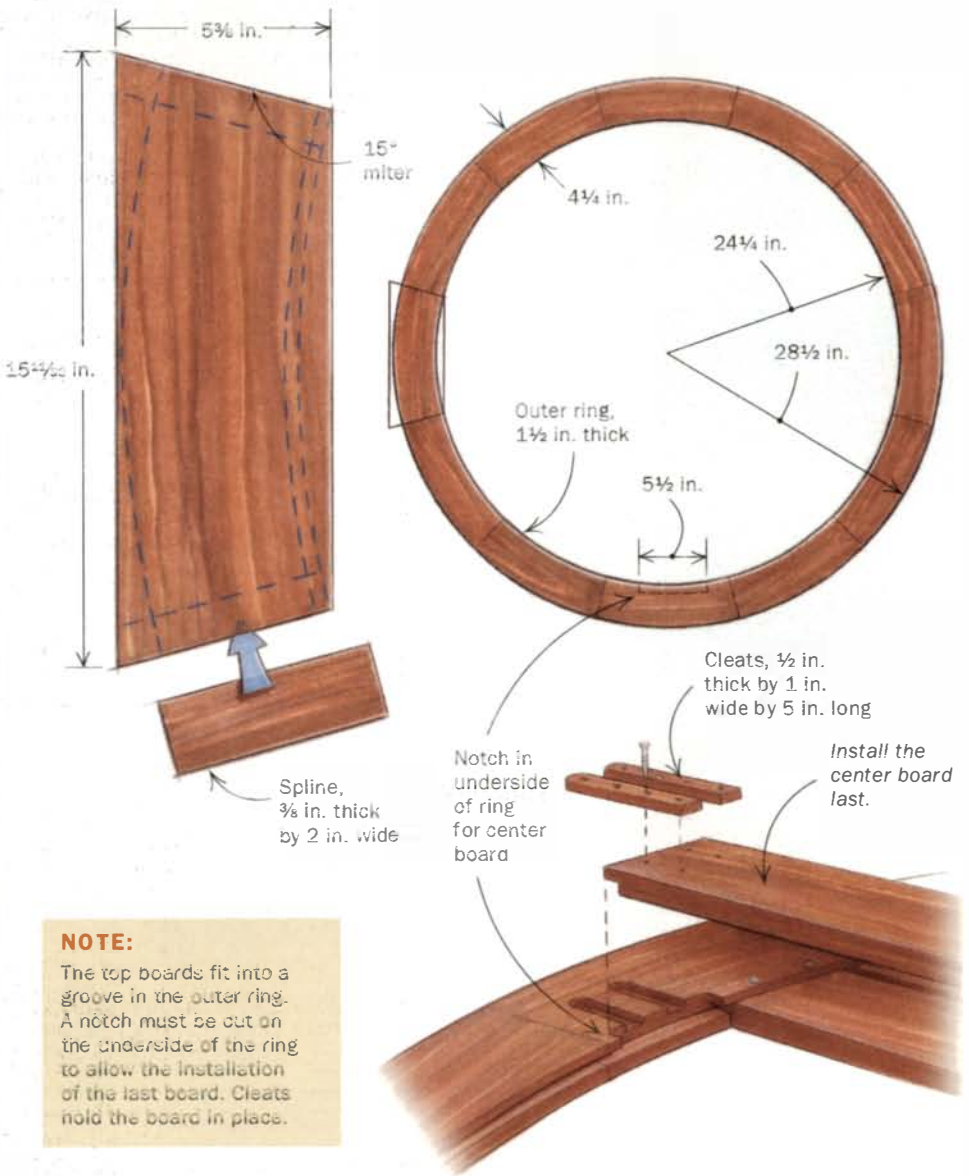
The table is about 5 ft. dia. and seats six comfortably. The top is made of 5/4 by 6-in. boards surrounded by an outer ring built from 12 segments of 8/4 by 6-in. stock joined with splines (see drawing, p. 56). Each inner board is glued and screwed into a groove in the outer ring. Gaps between the boards lighten the look of the top and allow water to drain. The gently curved legs attach to the base with mortise-and-tenon joints. An oil finish highlights the ipé's rich color.

When you lift the first board, you'll notice that ipé is much denser than other woods. Although it can be jointed and planed with steel knives and light cuts, ipé is tough on tools. You must use sharp carbide blades and bits in your saws and routers. Even so, you'll need to rout in shallow passes. The wood is difficult to handplane, but it sands to a very smooth finish. Drilling was required for the stainless-steel screws I used throughout (to prevent staining). Also, it's important

A sled guides cutting the segments to length. Wedges cut to the 15° miter angle position the stock for crosscutting. The last two pieces won't be cut until the others are glued up, to allow for tweaking the final fit.

Tenoning jig and a dado blade slot the segments. Splines sawn from ipé scraps fit in the slots to secure the joints.

Can you have too many clamps? Blocks held to the segments with the red clamps provide purchase for small bar clamps to pull the segments together.



NOTE:
The top boards fit into a groove in the outer ring. A notch must be cut on the underside of the ring to allow the installation of the last board. Cleats hold the board in place.

to seal all end grain or ipé will check. Take extra caution with ipé sawdust, a respiratory irritant. The oil in the wood makes the sawdust stick to walls, clothes, even the inside of dust-collector pipes. It also may stain other unfinished wood.

Because of ipé's oily nature, both the makers of Gorilla Glue and of Titebond III, two waterproof glues that I use for outdoor pieces, recommend gluing it soon after machining or lightly sanding the surfaces of joints if there is a delay before glue-up. I glued all of the joints within a few days of machining and have not had any joint failures. I used Gorilla Glue for the joints where the squeeze-out could be removed easily and Titebond III for the others.

Start with a full-scale drawing

Make a full-size drawing of the tabletop on a 5-ft. by 5-ft. sheet of plywood. This will show the exact size of the outer ring and later will serve as a support board for machining the top. To determine the inside diameter of the ring, measure the combined width of the nine inner boards including the ¼-in. space between them, and then subtract ¾ in. This will allow the inner boards to fit in a ⅜-in.-deep groove in the ring. Mark the centerpoint on the plywood and draw an inner circle of this diameter. Draw the outer circle's radius 4¼ in. larger.

Using dividers, lay out 12 equal segments representing the 12 boards that will make

Photos: Andy Engel; drawings: Bob La Pointe

Router on a trammel cuts the circle. *Blocks screwed to the plywood template secure the ring. After cutting a shallow groove, the author removes the ring and jigsaws the waste away. He finishes the cut by replacing the ring on the template and trimming with a router.*

up the ring. Then you'll know the exact length of each segment. The angle at the end of each segment is 15°. I cut 10 of the segments on my tablesaw using a sliding crosscut sled with a 15° wedge (see photo, facing page). Even a slight inaccuracy in the angle will lead to a gap between the last two boards in the ring, so I left those long and custom-cut them for a precise fit.

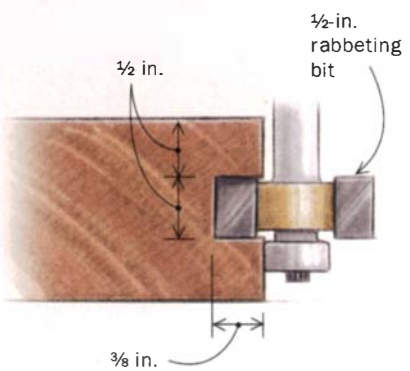
The joints between the segments are strengthened with ⅜-in. by 2-in. ipé splines that fit into grooves cut in the end of each segment. I glued the segments together one joint at a time using angled clamping blocks.

Rout the outer ring round

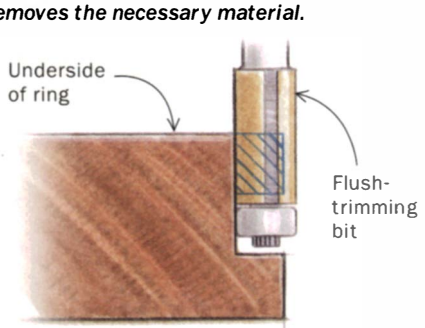
With the glue dried on the outer ring, the next step is to make it circular using a router and a trammel jig. Secure the ring to the plywood by screwing blocks around the inside edge of the ring. Be sure the ring is aligned with your full-scale drawing so that you can pivot the router trammel on the centerpoint drawn on the plywood.

I used a ½-in. solid carbide spiral bit to rout a shallow groove for the outside curve. I then lifted off the outer ring and used a jigsaw to cut away most of the waste. Then I reset the ring on the template

Groove the ring for the top boards. *A ½-in. bearing-guided rabbeting bit makes the cut. To control the depth on multiple passes, successively smaller guide bearings are used until the groove reaches ⅜ in. deep.*



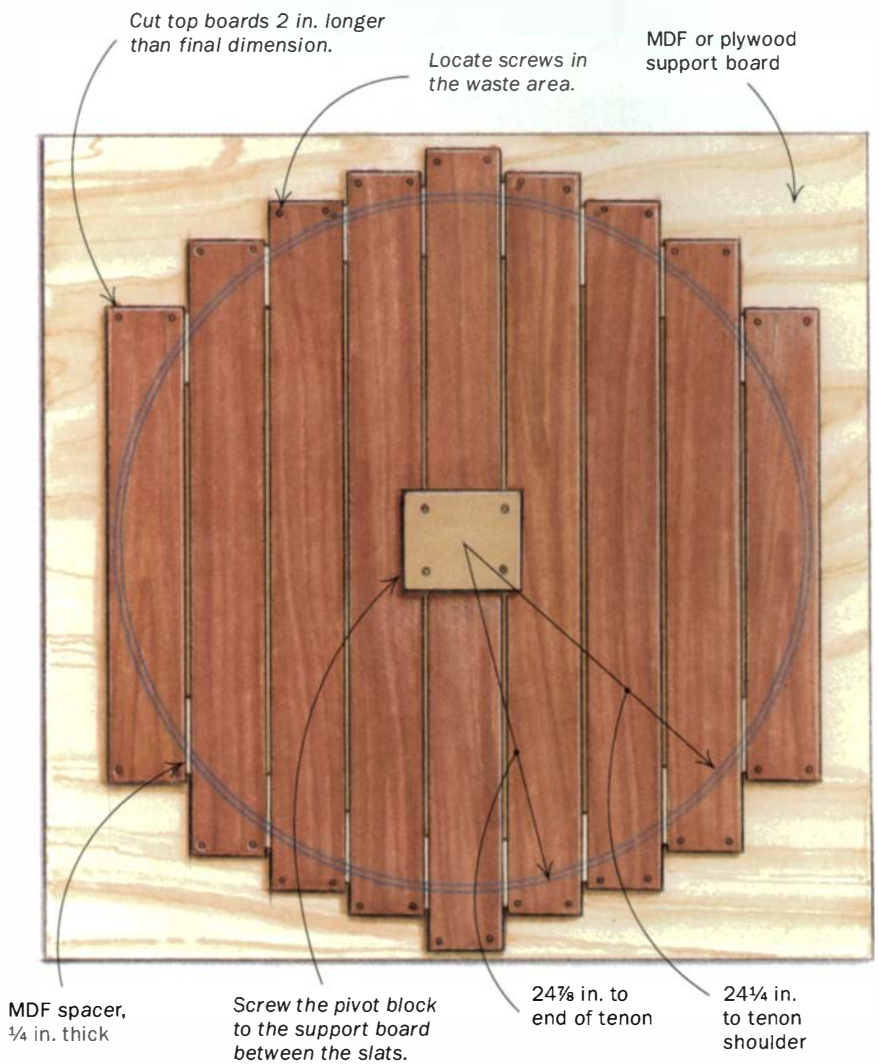
Clearance for the last board. *The shorter boards slide into the groove, but the last one must be dropped into place. Working on the bottom of the ring, a flush-trimming bit removes the necessary material.*



RADIUS AND TENON THE TOP BOARDS

Pivot block prevents marring the top boards. *Drive screws between the top boards to hold the block in place. A pivot pin in the trammel engages the center hole in the block.*

Rout the tenons first. *To minimize tearout, the author uses a ½-in. spiral up-cutting bit and ¼-in. MDF spacers between the boards where the router will pass. Take shallow passes until the tenon thickness matches the groove in the ring.*



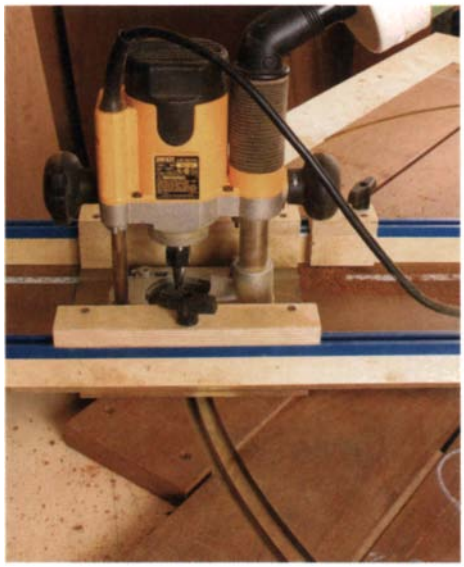
and cleaned up the edge with the same router setup. After routing the outside of the ring, I fastened blocks around it to hold the ring in place and removed the inner blocks. I used the same procedure to rout the inner circle. A belt sander cleaned up the outside edges.

I routed a ½-in.-wide groove ⅜ in. into the inside edge of the ring to hold the inner boards (see photo, p. 57). To ensure that the ring and the inner boards are flush, the distance from the top of the ring to the bottom edge of the groove should equal the thickness of the inner boards. I used a ½-in. rabbeting bit and took several passes with guide bearings of diminishing size to get to the full ⅜-in. depth of the bit. If you are going to apply a finish to the table, apply it to the inside edge of the ring before routing the groove. This will prevent any problems gluing the inner boards.

A small section of the bottom of the inner ring must be removed so that the longest inner board can be inserted in the groove. Mark the width of an inner board on the ring and use a flush-trimming router bit to make this cut.

Lay out the top on the template

I chose grain- and color-matched boards for the top and cut them about 6 in. longer than needed. Use two screws at each end to



Adjust the trammel and rout the tenons to length. *Cut a deep groove ⅜ in. out from the tenon shoulder, stopping short of routing all the way through the boards. Unscrew the boards and finish the cut on the bandsaw.*

secure the boards to the plywood, good side up, placing the screws in the waste area. I used ¼-in. MDF spacers between the boards at the cut line to ensure consistent spacing and to minimize splintering. To prevent finish from getting on the glue surfaces of the inner boards, I applied finish to the sides of the boards before screwing them down.

The end of each board gets a curved tenon with a shoulder radius that precisely matches the inside of the outer ring. I used my router trammel and a scrap of MDF to fine-tune the radius for a snug fit.

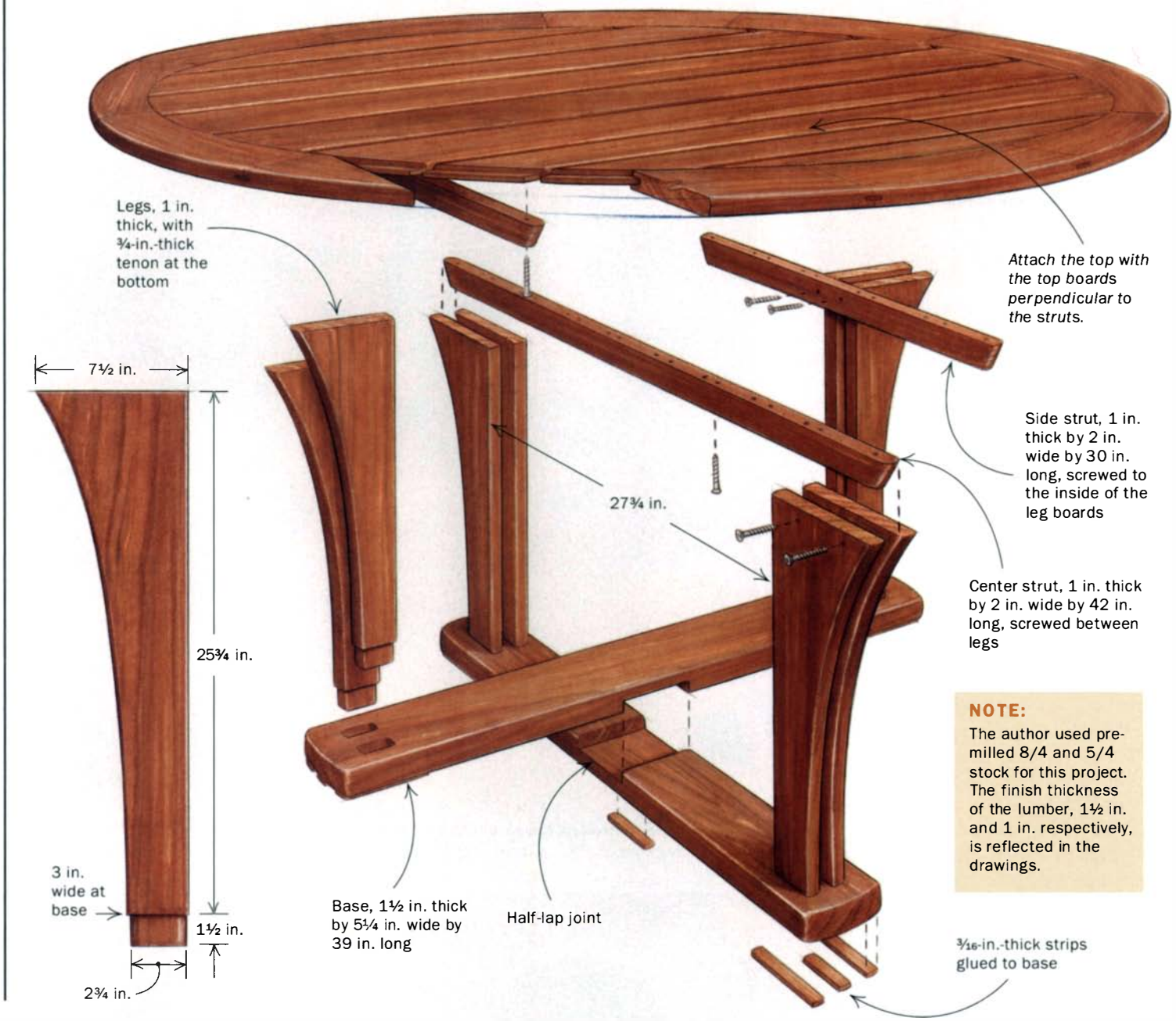
Rather than drilling a hole in the ipé for the centerpoint of the trammel, I fastened a scrap of ¼-in. MDF to the top with screws placed between the boards. A similar piece of MDF fastened to the trammel below the router ensured a 90° cut. I cut the tenons in several passes, increasing the depth of cut by about ⅛ in. until the tenon thickness matched the groove in the outer ring.

The tenons are cut to length by increasing the radius of the trammel by just less than ⅜ in., the depth of the groove in the outer ring. Make several passes until the bit almost cuts through to the plywood. Don't rout through the boards, as doing so would separate them from the screws holding them in place. I left about 1/32 in., which was cut easily on the bandsaw and then sanded flush to the tenon with my

Rabbeted top boards fit the ring. *Working from below, the boards are spaced with ¼-in. shims. A deadblow hammer adjusts them so that the final, center board aligns with the clearance slot.*

Cleats support the last board. *Fitting into channels routed in the ring, two cleats made from ipé scraps are screwed home.*

MAKE AND ASSEMBLE THE BASE



belt sander. Be sure to number each board to keep them in order for final assembly.

Dry-fit the top, starting with the small boards. The middle board is last and should fit into the groove at one end and the cutout at the other end. Position the boards and then drill holes for two screws at the end of each. Clearance holes in the ring and pilot holes in the boards will prevent splitting. Locate these screw holes as close as possible to the inside edge of the ring to minimize the chance of splitting the tenons. With the holes drilled, remove all of the boards, apply glue, and screw the boards in place. Two support strips glued and screwed into grooves routed on the bottom of the inner ring secure the end of the middle board in the cutout. Round over the outside edge of the top and bottom of the outer ring and sand the top flush.

Shape legs with a router and template

The eight curved legs that support the tabletop are machined from 5/4 ipé. The top portion of the leg is wider than the 5/4 by 6-in. ipé boards that I had, so I glued each leg from two pieces. To ensure that the pieces matched in color and grain, I bandsawed the initial curve into the lower leg, then glued the cutoff to the wider, upper section.

After the glue set, I bandsawed away most of the scrap and machined the legs to final size using the template with a router and a flush-trimming bit. A ½-in. roundover softens the front edges of each leg. A ¼-in. roundover softens the back edges. The final step in making the legs

Tenoning the legs. *A pair of dado blades spaced with a scrap of ¾-in. plywood tenon the 1-in.-thick leg in one pass.*

Clamping jig positions the legs during glue-up. *The jig's shoulders are square, and the center is the width of the space between the legs. The legs' tenons fit into mortises routed into the base. Prefinishing the pieces prevents glue squeeze-out from staining the wood.*

is to machine the tenons that will fit into mortises in the base.

This table needs a solid base to support its weight and to prevent it from tipping over. For strength, I made the base from two pieces of 8/4 ipé joined with a glued and screwed half-lap joint. To elevate the base above any rain puddles, I glued 3⁄16-in.-thick strips of ipé under the legs.

The table legs fit into mortises machined in the base using a plunge router, bushing guides, and an MDF jig with cutouts for both mortises. Be sure the spacing between the mortises and tenons allows a 5/4 piece of ipé to fit snugly between the legs.

Three ipé struts screwed to the underside of the tabletop keep the table boards aligned and secure the top to the legs. One long strut runs below the center of the table and is sandwiched between opposite pairs of legs. Two shorter struts run parallel to the long strut and are screwed on the inside edges of the other legs. Because the struts aren't glued to the legs, the top can be removed for winter storage.

To keep the table looking like new, I brushed on two coats of Penofin penetrating oil, following the manufacturer's directions. Ipé also can be left outdoors without finish. Over time, it will weather to a gray color. □

David Bedrosian is an electrical engineer and woodworker in Waterloo, Ont., Canada.

TOOL TEST

Dovetail Saws

To cut dovetails by hand, you need a fast-cutting saw that's easy to control

BY CHRIS GOCHNOUR

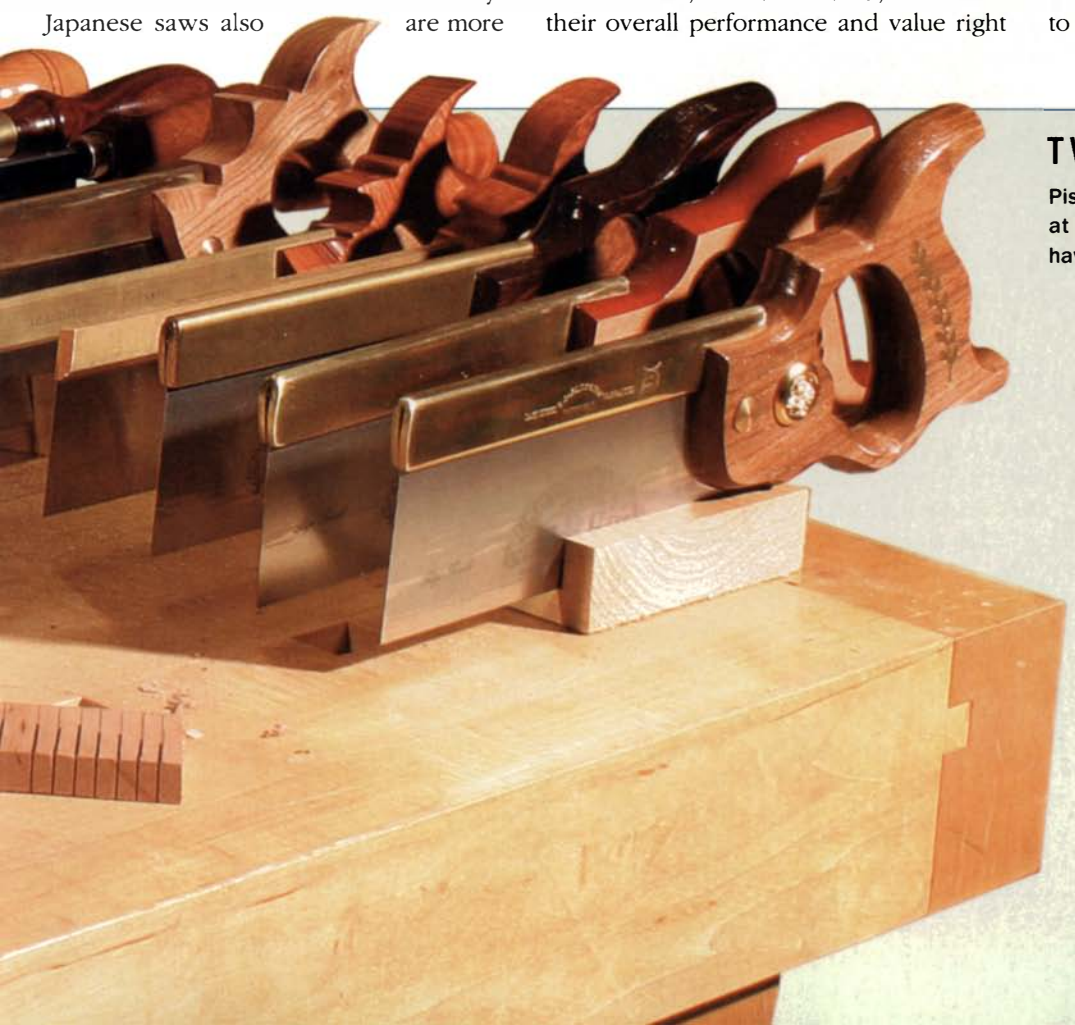
Hand-cut dovetails are a hallmark of craftsmanship, adding unmatched beauty, detail, and strength to a project. I often tell students that dovetailing by hand isn't difficult. But mastering the dovetail saw requires perseverance, and having the best tool for the job can make all the difference in the world.

Some woodworkers like to use Japanese dovetail saws, which cut on the pull stroke. These saws tend to be razor sharp out of the box, but the steel is often very thin and the teeth are bent and broken easily. Japanese saws also are more challenging to sharpen. The high-end saws frequently are returned to Japan for sharpening, and the moderately priced saws often are discarded once they become dull. Both Japanese and Western-style saws have their advocates; I prefer the Western style because of their sturdy construction and thicker steel. I also like that they cut on the push stroke and are sharpened easily. (To learn how to sharpen a dovetail saw, see Master Class, p. 94.)

For this review, I tried 11 Western-style dovetail saws, from $10 to $125, to evaluate their overall performance and value right out of the box. I used each one extensively in cherry, oak, and maple, making cuts with the grain and across it. I observed how fast each saw cut, the ease with which it started a cut, how smooth the saw was throughout the cut, and how well it tracked a line. I also checked the saw's quality of construction and ergonomics.

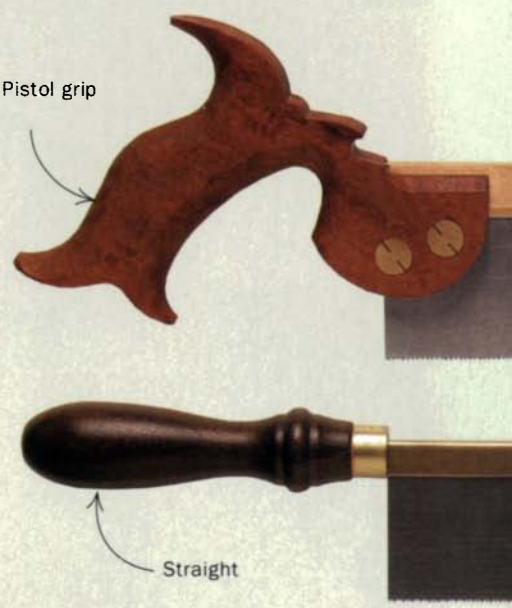
What to look for in a dovetail saw

To make fine dovetails, you need a saw that cuts fast, tracks a straight line, and leaves a smooth, narrow kerf. It should be easy to control and comfortable to hold. Other



TWO HANDLE STYLES

Pistol-grip saws have open or closed handles at an angle to the blade, while gent's saws have straight handles.

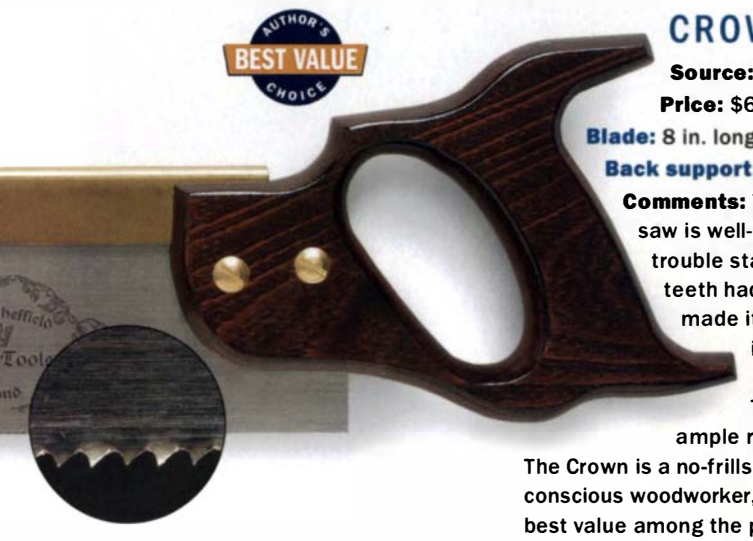


PISTOL-GRIP SAWS

Pistol-grip saws, whether open-handled or closed, provide a solid connection between hand and saw, ensuring optimum power to cut material of any thickness.

ADRIA

Source: www.adriatools.com
Price: $115
Blade: 8 in. long, 15 tpi
Back support: Slotted brass
Comments: Although it took me a while to get used to the hang of the Adria saw, once I did, the tool was impressive. The factory sharpening job is superior, making it the fastest-cutting saw of those tested, in spite of its short length. It left a thin, clean kerf and tracked a dead-straight line. The tradeoff with its speed is that the saw was slightly more difficult to start. The Adria is my choice for best overall in the pistol-grip category.



CROWN

Source: www.highlandhardware.com
Price: $62
Blade: 8 in. long, 20 tpi
Back support: Folded brass
Comments: The thin blade on the Crown saw is well-supported, and I had no trouble starting a cut. Although the teeth had more set than I like, which made it a bit more difficult to track in the kerf than the Adria, the saw cut fast and smooth. The closed handle provides ample room for a large hand. The Crown is a no-frills tool, but for the cost-conscious woodworker, I recommend it as the best value among the pistol-grip saws.

LIE-NIELSEN

Source: www.lie-nielsen.com
Price: $125 (add $25 for rosewood handle)
Blade: 9 in. long, 15 tpi
Back support: Slotted brass
Comments: The Lie-Nielsen saw was easy to start and made smooth cuts. Although the saw cut a bit slower than others, its 9-in. length allowed for a longer, more efficient stroke. As with the Adria, it took a bit of time to get used to the hang of the saw, but the saw fit my hand comfortably. Overall, the Lie-Nielsen is a great saw, with a classic aesthetic, and the company offers factory resharpening services.

important considerations are the tooth pattern (how the blade was sharpened), the blade length, how the blade is attached to the back, and the handle style.

The right number of teeth, sharpened correctly—A saw's performance out of the box will depend on how the blade was sharpened at the factory. The type and number of teeth and the set of the teeth all come into play.

Because most dovetail cuts are made with the grain, a saw that is sharpened for a ripcut is ideal. Rip teeth have chisel-shaped points that tend to cut faster than crosscut teeth.

The number of teeth per inch (tpi) can boost or hinder performance. A saw with more teeth per inch will make fine cuts with little tearout, while a saw with fewer teeth will make a rougher but faster cut. Saws that performed well in this review generally have blades with 15 tpi to 20 tpi —fine enough to handle precise cuts but aggressive enough to cut quickly and take on the occasional cut across the grain.

When cutting dovetails, I favor a saw that leaves a narrow kerf because the saw encounters less resistance and cuts with less effort. The kerf width depends on the thickness of the saw plate (blade) and the amount of set in its teeth.

TWO WAYS TO MOUNT A BLADE

Because a dovetail saw has such a thin blade, it needs strong back support to prevent it from deflecting during the cut. Some blades are mounted in a slotted back (top); others are pressed into a folded back (bottom), the traditional method.

Photos: Thomas McKenna

THE HANDLE ANGLE MATTERS

When considering a pistol-grip saw, be sure the angle between the handle and the sawblade (called the hang) is comfortable. Ultimately, the mounting angle will dictate how you hold the saw.

The set is simply a measurement of how far the sawteeth, which are bent, protrude from the sides of the blade. The purpose of the set is to provide clearance so that the blade doesn't bind in the sawkerf. The blade should be set evenly on both sides; if not, the saw will drift toward the side with more set.

Longer blades cut faster—Dovetail saws range in length from 8 in. to 10 in. Saws with longer blades tend to cut faster and more efficiently because they allow longer strokes. Shorter saws, on the other hand, cut slower but their short strokes may give you more control over the tool for precise cuts. I generally prefer the longer saws because of the efficiency of the stroke and, consequently, the speed at which they cut.

A thin blade needs a strong back—Most dovetail saws have a thin blade (around 0.020 in. thick), so it's important that the blade be well supported at the back to prevent it from deflecting or

LYNX

Source: www.traditionalwoodworker.com
Price: $100
Blade: 8 in. long, 20 tpi
Back support: Folded brass
Comments: The Lynx dovetail saw was grabby at the start and rough through the cut. The closed handle, though spacious, felt a bit blocky in my hands. The handle also encroaches on the blade, which means cuts deeper than ¾ in. are limited to 6½ in. of usable blade length. However, in spite of the rough feel and ergonomic shortcomings, the saw cut relatively fast and tracked well.

PAX NO. 1

Source: www.leevalley.com
Price: $76
Blade: 8 in. long, 20 tpi
Back support: Folded brass
Comments: Pax saws are made by Thomas Flinn, the same company that produces the Lynx saw. The Pax No. 1 came with a quality sharpening job and cut quite smoothly. It was easy to start, but the kerf was wider than needed, making it wander a bit more in the cut. As with the Lynx saw, the large handle encroaches on the blade, reducing the stroke length for cuts deeper than ¾ in.

PAX 1776

Source: www.toolsforworkingwood.com
Price: $120
Blade: 10 in. long, 15 tpi
Back support: Folded brass
Comments: The handle on the Pax 1776 saw, made of English elm, was the most comfortable of the pistol-grip saws I tested, and its hang was the most to my liking. Its back is hefty and holds the long blade rigidly and in tension. The saw cut aggressively and fast, but it was a bit difficult to start and made for a rougher cut. However, the extra blade length allows for a long, efficient stroke, and the saw became a favorite of mine.

GENT'S SAWS

A gent's saw is easy to control for precise work in thin material, but the straight handle can make it difficult to exert enough force to cut thick material.

CROWN

Source: www.highlandhardware.com
Price: $19
Blade: 10 in. long, 16 tpi
Back support: Folded brass
Comments: The turned handle on this saw feels good in the hand, and its rigid back makes the saw feel solid. Given its low price, I was pleasantly surprised with how much I liked this saw. The palm grip was comfortable and made the saw easy to align with the cut and to track while in the cut. The saw started well and cut fast. It is my choice for best overall and best value among the gent's saws.

DEER

Source: www.toolsforworkingwood.com
Price: $10 (product No. PZ-30210)
Blade: 10 in. long, 20 tpi
Back support: Thin steel
Comments: The Deer saw is an economy saw, and its detailing reflects as much. The beech handle, though reasonably comfortable, is far from graceful, and a thin steel back, riveted to the blade, provides minimal rigidity. The biggest downside to this saw, however, was its poor performance caused by a subpar sharpening job. It's shaped with a peg tooth (the same angle on the tooth's front and back) and has excessive set, which produced a slow cut that was prone to wander in the kerf, making it difficult to control.

LIE-NIELSEN

Source: www.lie-nielsen.com
Price: $75 (add $15 for rosewood handle)
Blade: 10 in. long, 15 tpi
Back support: Slotted brass
Comments: The Lie-Nielsen saw is impeccably detailed. Its long handle is designed to be grasped through the hand, similar to how you would hold a Japanese pullsaw. The saw's thin blade sliced effortlessly through wood, but the long handle was more difficult to grasp, drive, and control than the shorter handle styles.

HOW TO GRIP A DOVETAIL SAW

For comfort, use a three-fingered grasp on a pistol-grip saw, with the index finger pointing forward.

The turned handle of a gent's saw is designed to be grasped in the palm of the hand, with the index finger providing control.

buckling during the cut. The saw back can be made from brass or steel, but a brass back looks good and adds heft, and a heavier saw requires less muscle to use.

Some saw backs are made from solid bar stock, with a slot milled in it to receive the blade. Other saws incorporate a folded or bent back, made from a plate 1/16 in. to 1/8 in. thick. Both solid and folded backs support the blade well, but I favor the folded back not only because of its traditional nature, but also because a damaged blade can be removed for straightening or retensioning.

Pick a comfortable handle—Because dovetail saws often are used for extended periods, a comfortable handle is key. But ergonomics is a subjective matter, so before purchasing a saw, you should try it out to ensure that it feels right for you. There are two styles: pistol grip and gent's (also called a straight-handle saw).

How the saws measure up

A dovetail saw is a simple tool, made of a piece of thin steel with filed teeth, a metal back, and a handle. It is amazing how these simple parts combine to produce such a significant variation in results.

Some woodworkers prefer pistol-grip saws, while others like to use gent's saws. To satisfy both groups, I've awarded best overall and best value for each category of saw.

I've always preferred pistol-grip saws because they can handle any dovetailing task in materials of any thickness. Although it would be hard to go wrong with the Lie-Nielsen, Pax 1776, or Adria saws, I chose the Adria as best overall. The saw came with the best sharpening job, which made for fast cuts and crisp kerfs, was comfortable to hold, and has beautiful aesthetics and craftsmanship. For best value among the pistol grips, I chose the Crown because of its affordability and solid performance.

Gent's saws are best for making rapid, precise dovetail cuts in thin material (¼ in. to ⅝ in. thick). But I find them harder to control in thicker material. In this category, I chose the Crown as best overall and best value because it is affordable and easy to start, tracks a line well, and cuts fast. I also liked the way its rosewood handle fit in my hand. □

Chris Gochnour is a woodworking instructor and furniture maker near Salt Lake City.

PAX NO. 1

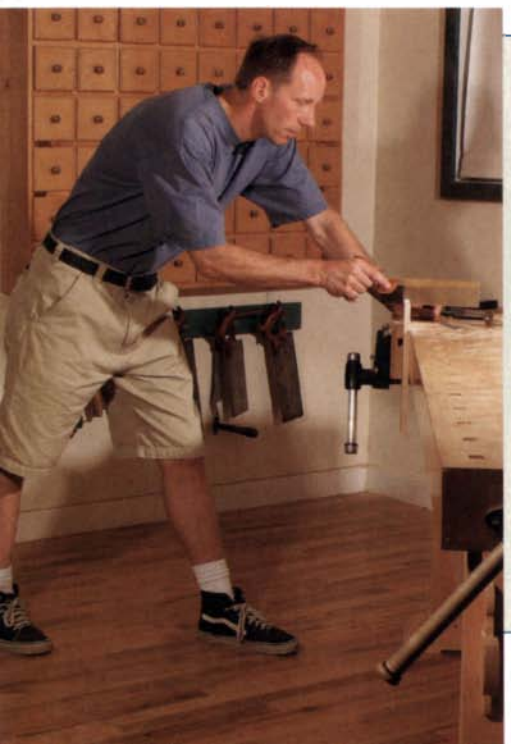
Source: www.toolsforworkingwood.com
Price: $25
Blade: 10 in. long, 20 tpi
Back support: Folded brass

Comments: I really like the Pax saw, which is identical to the Crown gent's saw in all respects except that it has more teeth per inch. Due to the number of teeth, the Pax cut a little slower and just a bit smoother than the Crown.

THOMAS FLINN & CO.

Source: www.woodcraft.com
Price: $10 (product No. 15Q01)
Blade: 9¾ in. long, 15½ tpi
Back support: Folded steel

Comments: This inexpensive saw has a short, stubby handle that was the least comfortable of all the gent's saws I reviewed. At one point the handle pulled off the saw. The saw has a folded steel back that held the blade tight and rigid, and it cut fast. However, the blade had much more set on its right side, causing it to pull dramatically to the right.



HOW TO CUT WITH A DOVETAIL SAW

Cutting dovetails by hand requires precision. By employing the proper stance and cutting technique, you'll get good results every time.

Mount the board low in a vise to minimize deflection and vibration. Stand relaxed with your weight evenly distributed and your arm aligned with the saw. If you use your right hand, put your left foot forward (lefties, put your right foot forward). This wide stance will bring you closer to the work and will help you avoid fatigue.

Starting a cut in end grain can be tricky. A real light touch is the key. Use your thumb to guide the saw (see photo, right), and slowly apply more force as you cut.

Once the cut is established, angle the saw slightly upward. Check your progress frequently to be sure you are following the layout lines. As you reach the baseline, level the saw horizontally, ensuring that you don't cut too deep on either side.

Smart, Stylish Cutting Boards

Consider the cargo when orienting the grain and shaping the board

BY TIM ALBERS

A cutting board is a good destination for short or narrow offcuts of attractive wood. Nicely designed cutting boards also add a touch of custom woodwork to your kitchen. And if you use templates to make your boards, as I do, you can churn out a stack of gifts.

While any slab of wood can be used as a cutting board, there is more to this topic than first meets the eye. You want a safe surface for food preparation, and one that will stand up to sharp blades and lots of moisture. There are also issues of form and function: The goal is a board that is both beautiful and suited to its specific purpose, whether for slicing meat, bread and cheese, or fruits and vegetables, or just for serving.

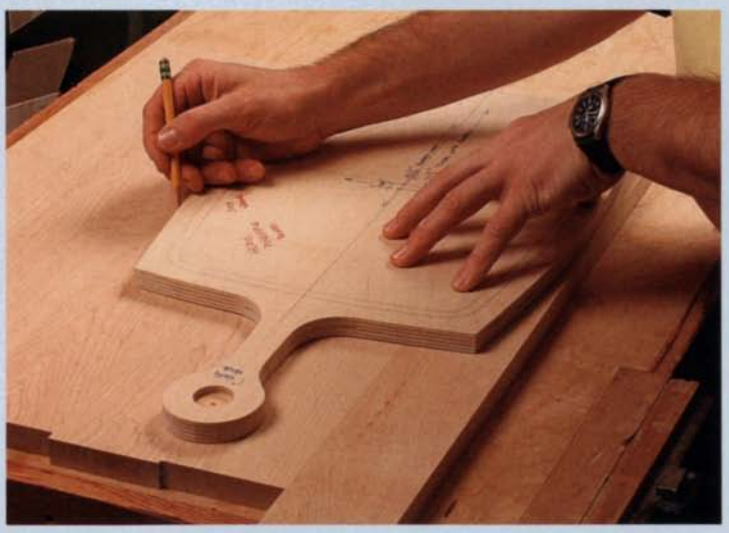
Avoid soft or oily species

The first step is selecting the wood. Cutting boards are pretty simple as woodworking projects go, so more emphasis is placed on the wood's appearance as one of the primary design factors. Durability is another concern. Hard maple is the traditional choice for making a cutting board, but nearly any hardwood will stand up well in the home kitchen.

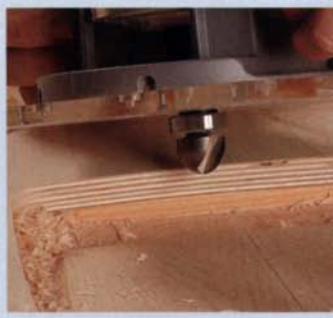
Most woods are safe for kitchen use, though there are a few to avoid. Stay away from the rosewoods, such as cocobolo, and don't use olivewood, yew, or sassafras. Basically, avoid any wood that is known to cause allergic reactions or that has a high oil content, making gluing more difficult. It may seem obvious, but avoid softer woods like poplar, pine, and fir that will not hold up well to chopping and slicing. Deep cuts and cracks are potential homes for bacteria.

If you want to err as far as possible on the side of caution, stick with hard maple. It's a little tougher to work with, but it creates a smooth, durable cutting board, and it's available with a wide range of figure, such as quilted, curly, and bird's eye.

An easy router project

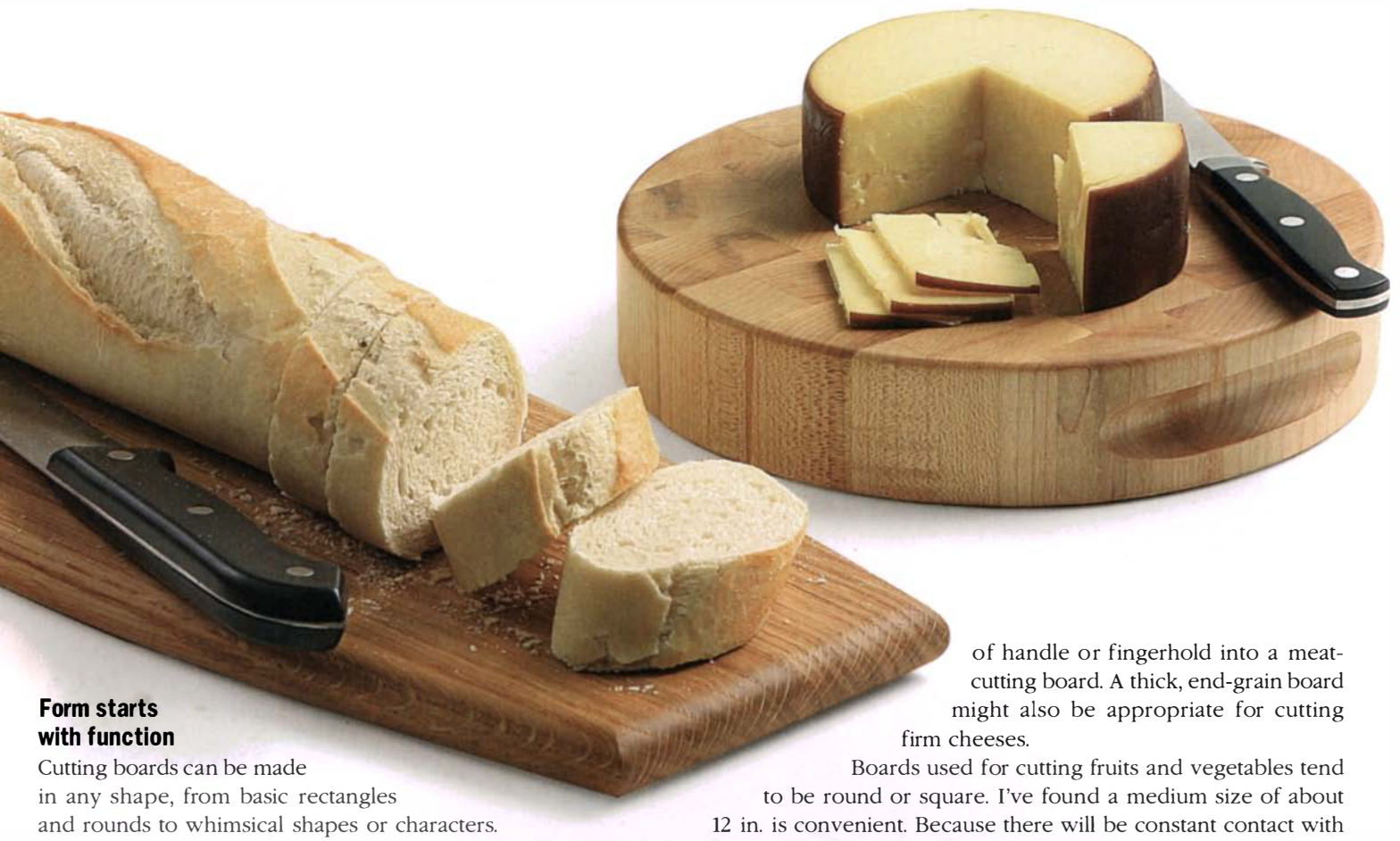


Start with a template. *This lets you fine-tune the shape before cutting into your good wood. Trace the shape onto the stock.*



If you need one, rout the juice groove next. *Use the first template to make an outside template, which will guide a top-bearing, roundnose router bit (top) or a router outfitted with a template guide.*

Photos, except where noted: Asa Christiana; facing page (top) Kelly J. Dunton



Form starts with function

Cutting boards can be made in any shape, from basic rectangles and rounds to whimsical shapes or characters. There are no hard-and-fast rules. Traditionally, however, cutting boards are designed around their intended uses.

Boards designed for cutting meats can be round or rectangular, but should be designed to take a pounding. End-grain boards work well: Their durability and thickness are suited to the abuses of heavy chopping and cutting, while the extra mass keeps the board from sliding around the counter. End grain also has less of a dulling effect on knife blades than edge or face grain. Because of the extra weight, it's a good idea to incorporate some form of handle or fingerhold into a meat-cutting board. A thick, end-grain board might also be appropriate for cutting firm cheeses.

Boards used for cutting fruits and vegetables tend to be round or square. I've found a medium size of about 12 in. is convenient. Because there will be constant contact with liquids, edge-grain boards work well. Quartersawn lumber will allow for a thin but stable board with plenty of durability. Quartersawn stock often is narrow, which opens the door to using striped patterns of alternating woods.

A juice groove should be part of any board intended for cutting meats or fruits and vegetables. A juice groove is simply a recess cut or routed into the board's surface to collect liquids and prevent them from running onto the counter or floor.

For breads and cheeses I often make rectangular boards that

Saw and rout the perimeter. *Saw close to the line before routing with a bearing-guided, flush-cutting bit.*

Shape the edges. *A bearing-guided bit makes a partial roundover on this board. Flip the board to complete the profile.*

Many shapes and sizes

Cutting boards are best shaped to fit their cargo—long boards for bread, rounds and squares for cheese or meat, wide boards for fruits and vegetables. End grain and edge grain will stand up to a lot of abuse, while face grain is an attractive option for serving boards and bread boards, which don't encounter as much moisture or heavy cutting.

Photos and drawing, this page and facing page: Kelly J. Dunton

resemble a loaf of bread or block of cheese, with a lighter profile and an elegant handle. Bread and cheese boards don't take as much abuse as meat boards, and therefore don't have to be quite as tied down by their purpose. Figured woods and highly sculptured profiles and handles are common. Without constant water contact, face grain will hold up just fine.

If you have room, it's nice to have some boards dedicated to serving. These can be made from figured wood or can incorporate elegant design features that you wouldn't necessarily use in a basic cutting board. These boards are great for serving breads, cheeses, or even appetizers. In creating some of these designs, I was particularly inspired by the cutting boards of Edward Wohl, a Wisconsin woodworker (www.edwardwohl.com).

Lighter boards can have hanging holes incorporated into their designs, either in the handle or in the body. Holes make storage easier and safer, and they can turn a stylish board into a wall decoration.

Glues: food-safe and waterproof

Through trial and error I have found the best results with high-grade polyvinyl acetate (PVA) glues, such as Titebond II and III, which contain a catalyst and are considered cross-linking glues. The catalyst creates a stronger bond than standard PVA glues. And Titebond II and III glues (when dry) are approved by the FDA for indirect food contact.

However, with any PVA, if you routinely submerge your cutting boards in water, you risk the glue joints failing eventually. Generally, a wooden cutting board should not be submerged in water or put in the dishwasher. It should be cleaned with warm water and soap, toweled dry, and left to air-dry further, preferably not lying on a flat surface.

Sand finely for a blotch-free oil finish

Since many of the boards are made with figured woods, I like to do most of my heavy sanding or scraping while the board still is a wide slab, before it is shaped. If you try to do a lot of sanding afterward, it will be harder to hold onto the workpiece and you'll likely create a low spot somewhere or round over crisp edges.

After the board is sanded to P150-grit paper, cut and shape the profile. Then sand the board to P400-grit for a blotch-free oil finish. For a really smooth finish on end grain, go to P600 grit.

Two food-safe finishes

Like construction, finishing is straightforward. Flood the board with oil and let dry, wiping off the excess after 20 minutes. Mineral oil is the traditional choice. Look for mineral oil that meets the standard set by the United States Pharmacopeia (USP) organization, labeled "USP grade" or "meets USP standards." Mineral oil comes in different viscosities, typically light, medium, and heavy. A lighter grade will provide slightly better penetration as an initial coat. A word of caution: Mineral oil can weep from the board for days, so let the board sit on paper or an old towel to catch the excess.

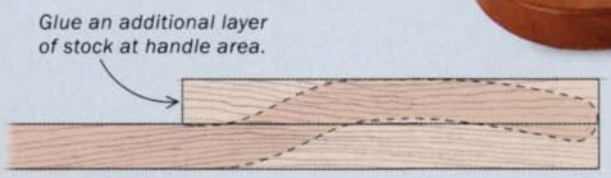
An alternative finish is walnut oil, which is applied in the same manner as mineral oil. The advantage of walnut oil is that it actually dries after a day or two, whereas mineral oil never completely dries. Both finishes are easily renewable. □

Tim Albers is a part-time woodworker in Ventura, Calif., and loves to eat.

Get a grip

RAISE THE HANDLE

Raised handles require an extra layer of stock when gluing up, and some hand-shaping.



PAN HANDLE

ROUT A FINGERHOLD

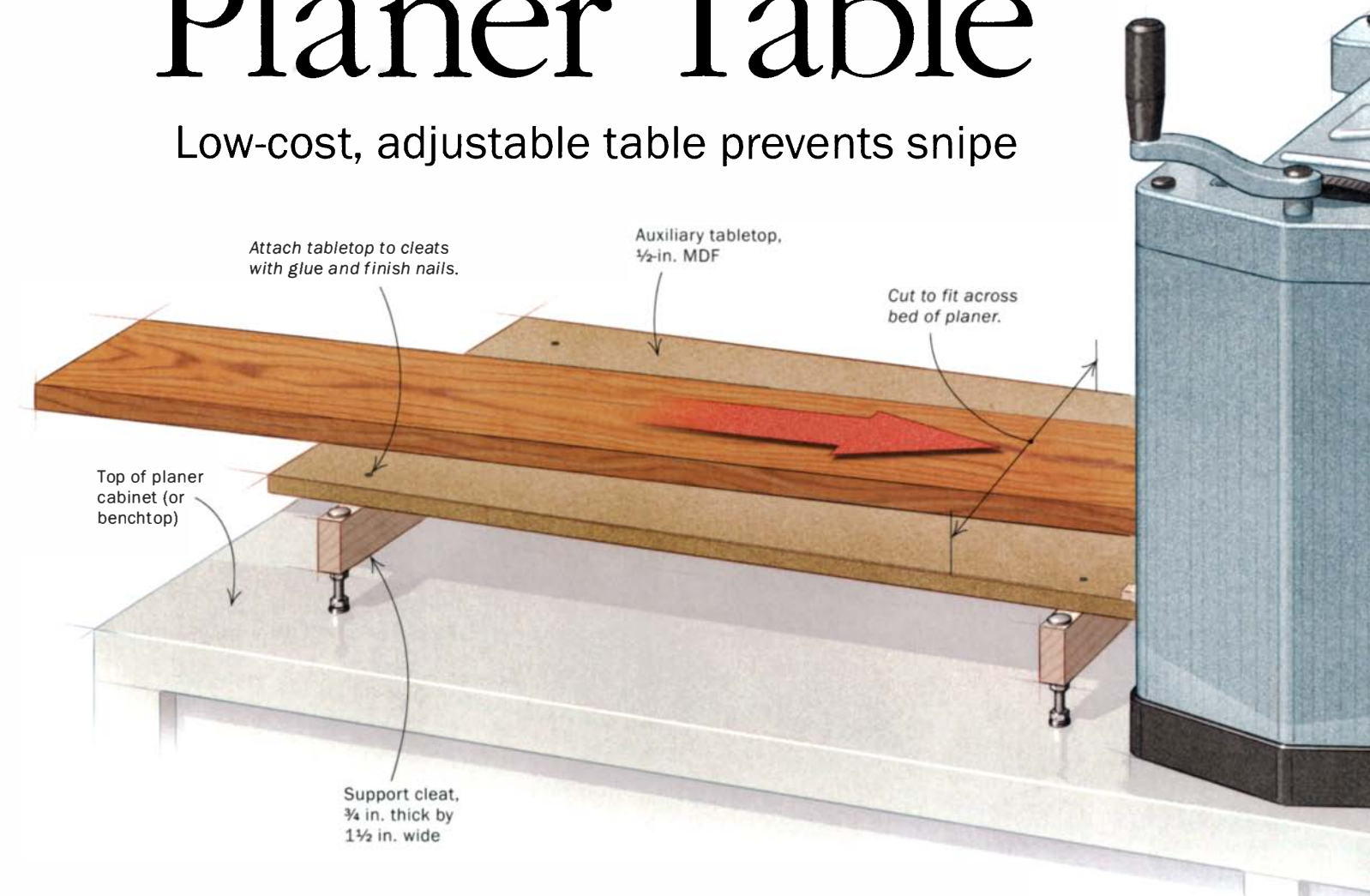
Fingerholds make nice handles in a thick board. This maple board features edge grain for stability and durability, and a juice groove to collect liquids.

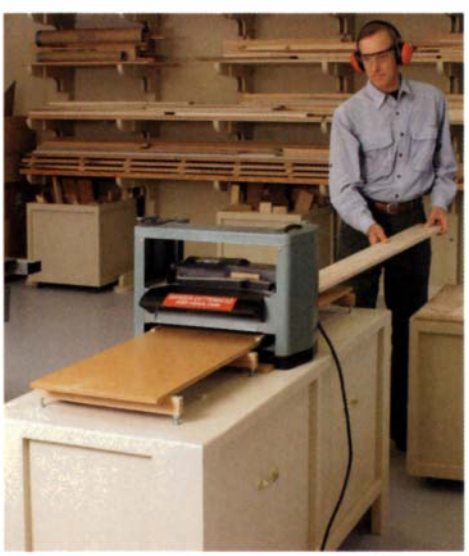
ADD FEET

A raised cutting board allows better airflow, and a dry board is inhospitable to bacteria.

Shopmade Planer Table

Low-cost, adjustable table prevents snipe





BY ANDY BEASLEY

Benchtop thickness planers are compact workhorses that produce remarkably smooth wood surfaces. But, like any thickness planer, they often create snipe—that's the 2-in.-long (or so), slightly deeper cut at each end of a board. Granted, some newer models have made good strides at reducing the problem, but like the common cold, snipe defies eradication. Indeed, it's rare to find a thickness-planed board that's snipe-free.

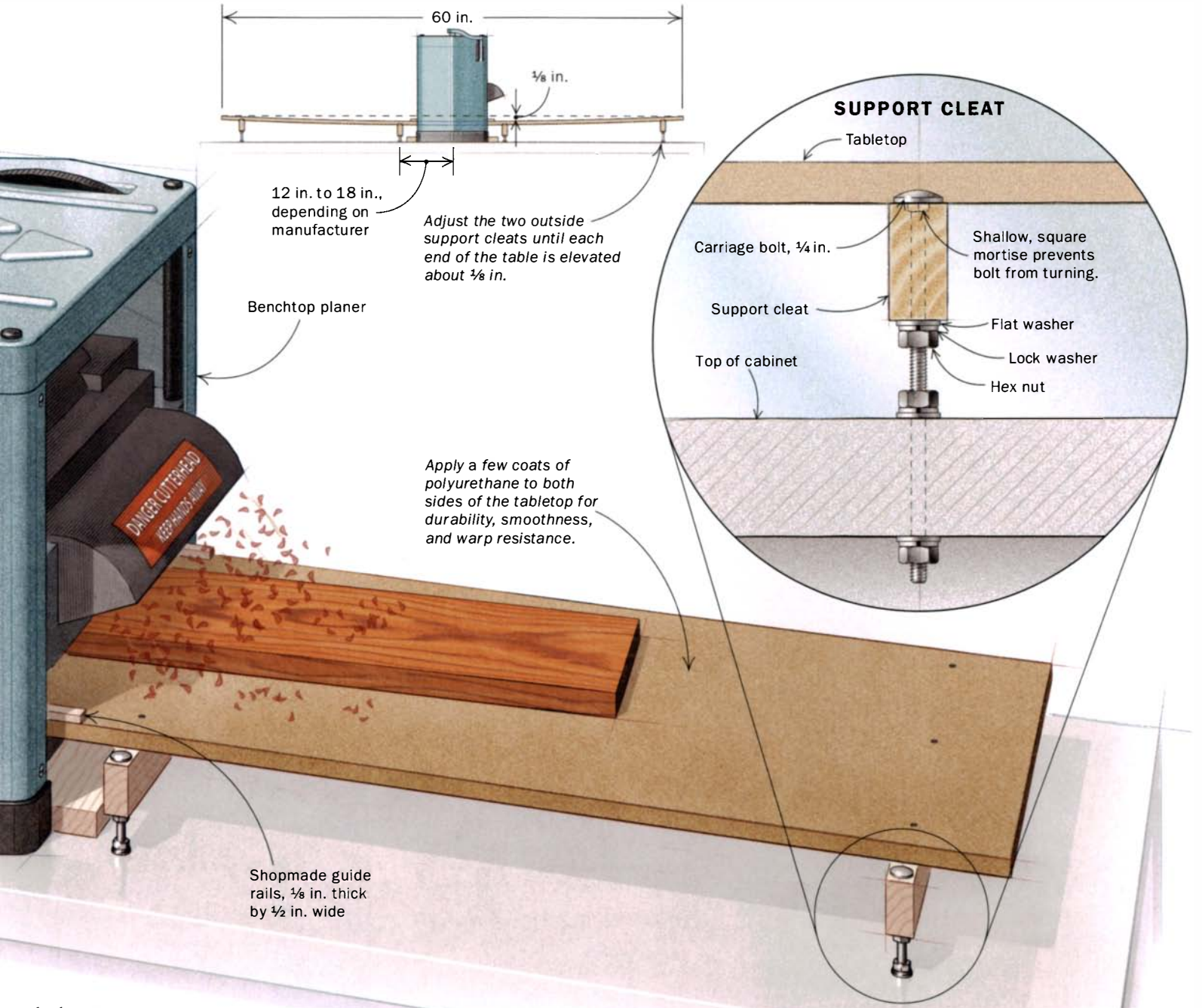
However, adding an adjustable table to a benchtop thickness planer can help make snipe a non-issue—if not by eliminating the problem, then at least by keeping it to a bare minimum. Snipe that measures less than, say, 0.004 in. is rarely a problem.

This adjustable table has only a handful of parts. Four support cleats—two in front of the planer, two behind—mount under a length of ½-in.-thick medium-density fiberboard (MDF) that serves as the tabletop. The cleats attach to the top of the planer cabinet with a few carriage bolts and washers. The bolts allow me to elevate the ends of the tabletop slightly, giving it a subtle bow. This slight rise at each end is the secret to reducing snipe.

I should mention that the adjustable table reduces the thickness capacity of my planer by ½ in., from 6 in. to 5½ in. But since 3½ in. is about the thickest stock I've ever planed, I don't expect the reduced capacity to be a problem. Also, you'll need to remove the folding infeed and outfeed table extensions that are attached to the saw.

After cutting the tabletop to width and length, attach the support cleats to the underside. First, though, drill both ends of each cleat to accept a carriage bolt. The

Photo: Tom Begnal; drawings: John Hartman



bolt accepts a series of flat washers, lock washers, and hex nuts that attach the table to the cabinet below.

Mount the two middle support cleats securely to form a stiff, flat table through the planer. Two wood guide rails keep stock on course as it travels through the machine. Then, with a 6-ft.-long level placed lengthwise on the bed, adjust the two outside support cleats until each end of the table is elevated about ⅛ in. above the level of the table under the cutterheads.

Fine-tune for best results

I ran test boards through the planer until I found the elevation of the tabletop ends that would best minimize snipe. Adjusting the outside support cleats is easy: After loosening the hex nuts adjacent to the cabinet, simply tighten the upper nut to raise the bed, or tighten the bottom nut to lower it. Because there are two bolts on each support cleat, both must be adjusted the same amount to avoid twisting the surface.

Once I determined the best table elevation, I locked the support cleats in place for good. Keep in mind that if you switch to stock that's thicker than about 2 in., you might need to readjust the elevation of the tabletop ends. That's because thicker stock can't flex as much and will not conform to as much of a bow in the table.

Try a test piece before committing an expensive board to the planer. □

Andy Beasley retired a few years ago from the Air Force, where he served as an instructor pilot in a variety of locations, including the Air Force Academy. He lives in Hillside, Colo.

Furniture for Your Next TV

Flat-panel screens and shallow boxes offer new design possibilities

BY STEVE CASEY

Televisions are getting shallower and wider

I've been designing and building custom furniture since 1978, much of it devoted to home theater, entertainment centers, and other pieces built around televisions. Recent years have brought major changes in TV technology, creating new furniture possibilities and making my work much more interesting.

TV screens are wider than ever, but the most important change for furniture makers is in how thin the sets have become. Two types of sets have led the way. The first are flat-panel sets with plasma or liquid crystal screens. Some of these displays measure 60 in. diagonally but are only about 5 in. deep. The other type of set is the large-screen projection TV, which used to be housed in a giant cabinet but now averages only about 17 in. deep. The advantage of the latter type is that they cost thousands of dollars less than plasma or LCD sets with comparable screen sizes.

The new sets allow designers to rethink the typical entertainment center and to create cabinetry and furniture for TVs that was not practical or even possible just a few years ago. Televisions today are attractive enough that they don't have to be hidden behind doors in the now-too-familiar black box. Many new designs put the set on display. Here are a few ideas.

Options for flat screens

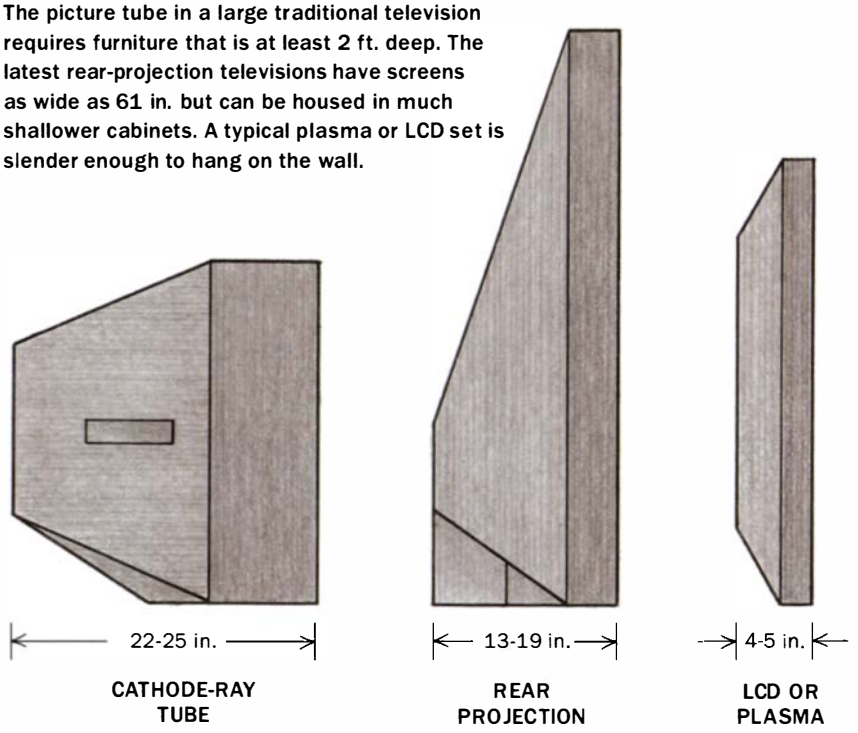
Because TVs now can be hung on the wall like pictures, with minimal intrusion into the room, furniture makers are not limited to "big box" solutions like armoires. Instead, we can create equipment consoles that sit beneath the screens, or mount screens into the shallow bookcase section of traditional built-in cabinets.

It is important to follow proper construction techniques when building equipment furniture and cabinetry. If you plan to build an entertainment unit based on any of the design ideas presented here, Brooks Tanner's article "Engineering an Entertainment Center" (*FWW* #159, pp. 78-83) provides the basics.

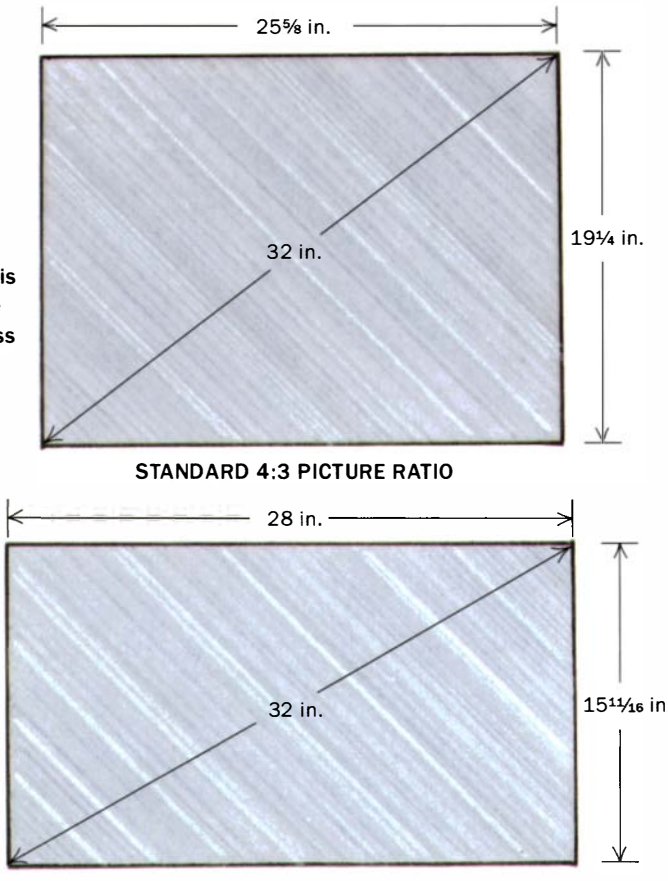
Console units—One piece I often build to go with flat-panel TVs is the console—an ideal furniture design for housing electronic gear in small spaces such as bedrooms or apartments. Consoles support or sit underneath the TV but do not enclose it.

The console's smaller scale offers several advantages over conventional wall units. It is relatively easy to move when users want to relocate the piece or get behind it to connect equipment. Also, because the console doesn't house the TV itself, there is no need to buy new furniture if you buy a bigger set. Being of smaller scale, consoles are less expensive and take less time to build than larger wall units or full-on cabinet systems. But

The picture tube in a large traditional television requires furniture that is at least 2 ft. deep. The latest rear-projection televisions have screens as wide as 61 in. but can be housed in much shallower cabinets. A typical plasma or LCD set is slender enough to hang on the wall.



Wide-screen televisions, many of them designed to carry digital, high-definition signals, have proportions much like those of a movie-theater screen. Screen size is measured the same way, however—across the diagonal. So a 32-in., wide-screen set (bottom) has a screen that is wider and shorter than its standard-ratio counterpart (top).



The console is a modern approach. *Positioned underneath a wall-hung television, consoles offer design freedom. They can be small or very large, they come with you when you move, and they don't have to be replaced when screen technology changes.*

since they function more as pieces of furniture than as cabinetry, they create opportunities for solid-lumber construction and traditional joinery—elements that might break the bank if used on larger built-ins.

Bear in mind that consoles have limitations. The unit's height almost always will require some kind of compromise. Ideally, the piece should be low enough so that it doesn't interfere with the ideal height placement of the TV (the screen should be centered at eye level from the viewing chair). Build a console this low, however, and you'll probably have to stoop down to load your VCR or DVD player. Fortunately, this isn't an issue in bedrooms, where the screen should be much higher off the floor for a viewer perched in bed.

Traditional cabinets—Flat panels can go where no large TV has gone before. A big TV in the shallow bookcase section of a traditional cabinet was not possible until this technology reached the market. The example on the facing page shows how little depth is

Photos: Dean Della Ventura

Solutions for LCD and plasma TVs

Modern technology mixes well with traditional cabinetry. *Because it requires so little depth, a flat-panel television can mount easily inside the bookcase section of a traditional built-in cabinet (left). A commercially available mount (above) allows a plasma or LCD television set to be pulled away from the wall and swiveled, either for service or for viewing.*

needed to build a flat panel into a piece of furniture. With a standard 10-in.-deep shelf, the TV still had to come forward a few inches in order to get the screen flush with the bookcase face frame. The leftover space was used for a mounting device with an articulating arm that allows the screen to be pulled forward and swiveled (see photo, above right).

Most plasma or LCD sets need plenty of open space around them so that air can circulate and keep the equipment from overheating. It's essential to bring the screen forward and to leave a decent amount of space around the display for cool-air draw and proper convection. If you plan to enclose a plasma or LCD set in casework, consult the screen's manufacturer for its specifications on ventilation.

On traditional painted cabinets (see photo, above), I like to use two-sided, pine-core melamine board for the closed case interiors. The melamine requires no further finishing and will take lots of abuse without showing wear. I used white inside the cabinets and black for the component rack because it complements and contrasts with the painted finish and goes really well with electronic equipment. I used MDF (medium-density fiberboard) for the bookcase sides and backs, maple plywood for the shelves, and solid wood for the raised-panel doors, face frames, and all of the trim. On this piece I also included a cherry countertop made from veneer-core plywood with solid trim.

Options for projection-style sets

Large-screen projection TVs are bulkier than flat-panel sets but they, too, allow for much thinner and less conventional furniture designs because they have minimal depth, size, and weight. Not long ago, a projection set with a 48-in. screen was nearly 3 ft. deep. A similar set today is only about 15 in. to 17 in. deep. The furniture I build to house much larger 60 in. or 70 in. projection TVs is typically only 20 in. to 22 in. deep. The TV no longer determines an entertainment center's maximum depth; the other home-theater components do.

Familiar casework with a smaller footprint—As TV displays get larger, clients are growing more comfortable with smaller furniture that shows off their TV instead of hiding it. The example at the top of p. 78 was designed by Deborah Goldstein of Interior Motives to replace a much larger cabinet that housed a much smaller TV. When "big" television screens were only 36 in. across, the sets were heavy and deep, but took up only a small percentage of the cabinet's face area. In this unit, the screen size accounts for more than 25% of the cabinet's face area. Today's large-format sets, in addition to being thinner, are also quite lightweight. I

Projection TV: Big screen fits in a shallow cabinet

This big-screen technology offers a crisp picture for less money than a plasma set, and still is much shallower than a traditional TV. This cherry unit (right) is only 18 in. deep. Another approach uses a plywood backboard instead of a full-height case (below), making the piece contemporary, more open-looking, and easier to install or move.

no longer need to build beefed-up TV-support shelves to hold lots of weight and prevent sagging over time.

The unit is only 18 in. deep and still allows 4 in. behind the TV for good ventilation. In this space, the idea of putting a big, deep cabinet so near the entry to the room would be bad design. The television's narrow profile allowed me to scale back the support furniture for an unencumbered entry to the space while providing a large-format viewing experience.

Put the picture in a frame—A contemporary approach (see bottom photo, facing page) frames and highlights the TV while hiding the equipment behind doors for a clean, sleek look. This design has a lower drawer base with a structural backboard attached. Using a plywood backboard instead of a full-height case gives the piece a more open look and makes it easier to install and move. With lighting and display, this kind of approach creates drama in the room.

I like to build contemporary pieces like this using plywood with a Douglas-fir core and an MDF layer just below the hardwood face veneer. The MDF layer ensures flat surfaces, while the fir core provides structural strength and screw-holding ability. With a few matched sheets, I can play with the grain and do wonderful matched faces and backs. The face frames are solid wood. I typically use hot-melt edge tape to veneer the door and drawer edges.

Assembling the backboard panel on the matched veneer seams gives an illusion of one seamless back even though the final piece might be three parts and 9 ft. across. I used biscuits and tight-joint fasteners to hold the panel together. The backboard did not have to be secured to the wall but is secured to the cases. This helps to prevent racking and provides a way to attach the smaller, floating shelves. Everything is held square and in place on the backboard with biscuits and then secured with drywall screws inserted from the back. All of the equipment is behind doors in the closed cases. The drawers below store DVDs, videotapes, and CDs. □

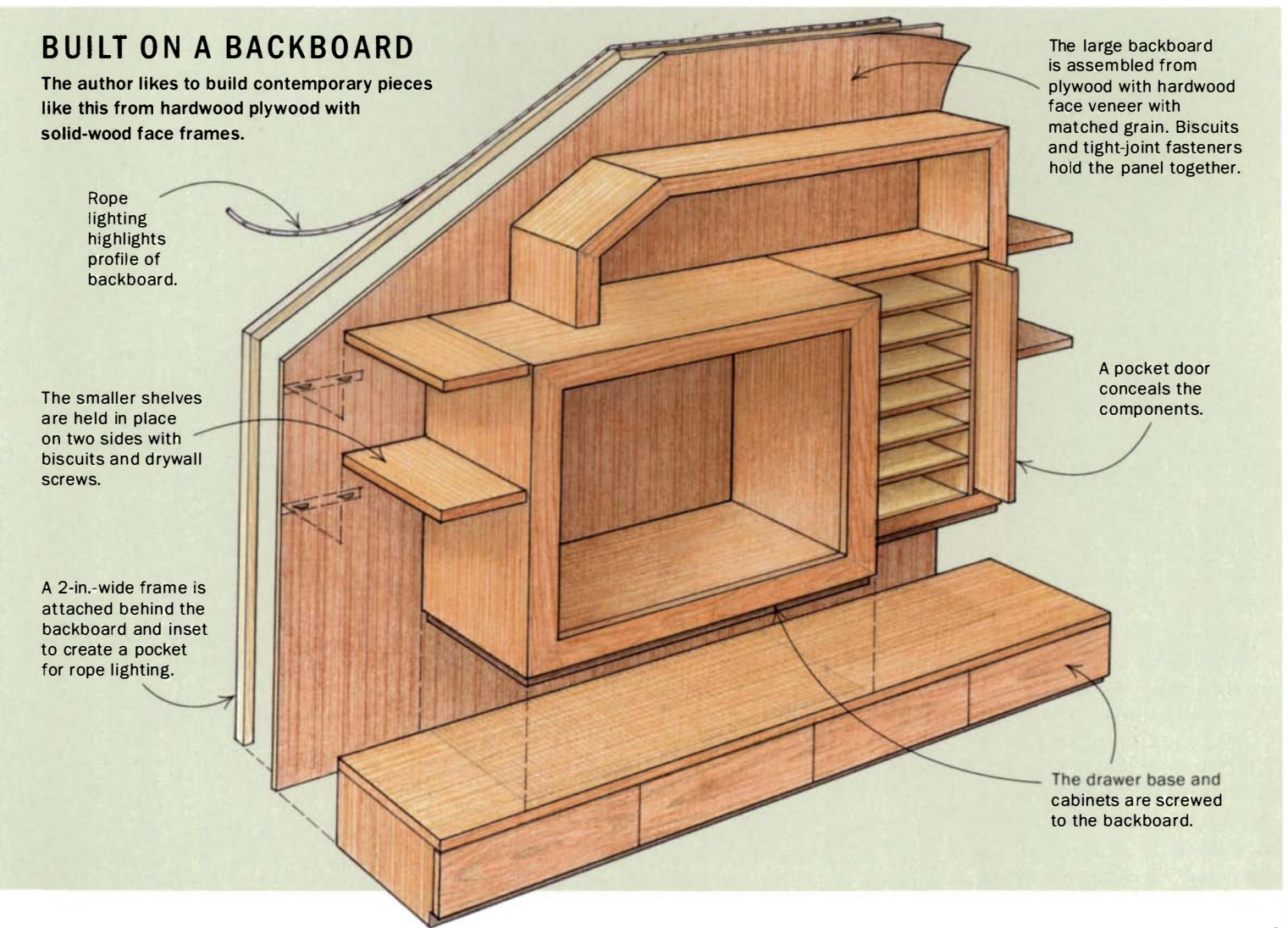
FineWoodworking.com

Project Diary: Watch online and ask questions as author Steve Casey builds a modern entertainment center. His weekly weblog entries and photos will document the project step-by-step at www.FineWoodworking.com/projectblog.

Steve Casey builds custom furniture and cabinets in Los Angeles.

BUILT ON A BACKBOARD

The author likes to build contemporary pieces like this from hardwood plywood with solid-wood face frames.



readers gallery

DAN KLEIN
Medford, Mass.

Most beds are designed for a good night's sleep, but Klein's twist on the traditional sleigh bed has a lumbar curve in the headboard to make it more comfortable to sit up while reading. Made of walnut, wenge, and curly maple, with quilted maple veneer, the bed is 67 in. wide by 102 in. long by 50 in. tall and took about 230 hours to build. The finish is water-based stain, garnet shellac, and catalyzed lacquer. PHOTO: JEFFREY DODGE ROGERS

DAVID S. BEACH
Leesburg, Va.

In building this Philadelphia-style Chippendale lowboy, Beach tried to reproduce an original (ca. 1760-1770) he had seen in Albert Sack's *The New Fine Points of Furniture* (Crown Publishing, 1993). Instead of the original walnut, however, Beach used curly cherry, with secondary woods of maple and poplar. To his delight, he found a magnificent 22-in.-wide board for the top. The lowboy is 21½ in. deep by 35 in. wide by 30 in. tall, with hardware made by Ball and Ball Hardware Reproductions. The finish is wipe-on varnish.

BRIAN J. LEWIS
Berwick, Pa.

Lewis's blanket chest is a reproduction of a black unicorn chest from Bern Township, Berks County, Pa., ca. 1765-1810. Made from boards cut from a 300-year-old eastern white pine tree, the piece is 24 in. deep by 51 in. wide by 28 in. tall and features bracket feet, two drawers, and an interior till with two secret compartments. It is finished with walnut husk stain as a base coat, milk paint (distressed), shellac, and wax; the decorative painting is by Lindsey Keenie and Bess Naylor of the Olde Mill Cabinet Shoppe in York, Pa.

PHOTO: GORDON WETZEL OF IMPRESSIONS PHOTO

MATTHEW SCHER
Troy, Mich.

When a client wanted a cabinet in the James Krenov style, Scher added his own touch to the design by incorporating widely flared legs. Measuring 17 in. deep by 40 in. wide by 49 in. tall, the cabinet is made from Swiss pear, spalted maple, and wenge. The finish is shellac followed by an application of wax.

JERRY K. ELMORE
Catlin, Ill.

Elmore, a retired patternmaker, says he took up turning "to keep [his] brain and hands from getting dull." This segmented vase (6½ in. dia. by 5¼ in. tall, with a consistent ¼-in. wall thickness) is made of walnut, maple, and padauk. The piece took about 40 hours to make and is finished with high-gloss polyurethane.

Attention Toolmakers

Do you make your own tools for woodworking? We want to showcase your shopmade wares in our annual *Tools & Shops* issue. We'd also like to include photos of restored vintage hand tools and machinery. Send entry forms (available at www.FineWoodworking.com) and photos (unaltered digital images, prints with negatives, or slides) to Readers Gallery, Fine Woodworking, 63 S. Main St., Newtown, CT 06470, or email fwgallery@taunton.com.

STEVE ANTONELLIS
Glastonbury, Conn.

For this demilune table in mahogany (18 in. deep by 36 in. wide by 29 in. tall), Antonellis drew inspiration from 18th- and 19th-century card tables. He meticulously hand-cut more than 400 pieces of veneer for this project. The fan-shaped top has veneers of crotch mahogany, holly, and ebony, with the stringing giving the appearance of a fan. The legs are decorated with inlaid bellflowers and holly stringing, topped off with paterae of ebony and shaded holly. The finish is oil and wax.

JIM SYVERTSEN
Chesapeake, Va.

Syvertsen's hollow vessel is an homage to the work of David Ellsworth, Kim Blatt, and Cindy Drozda, all of whom have perfected the craft of making hollow turnings. The vessel (6½ in. dia. by 7½ in. tall) is made of briar burl and finished with Waterlox Original Satin. The finial, made of African blackwood, was left unfinished. Syvertsen achieved the elegant low luster simply by burnishing the finial on the lathe using ultrafine sandpaper (up to 1,200 grit).

THOMAS WETZEL
Middle Grove, N.Y.

A furniture maker by trade, Wetzel built this fancy sack-back Windsor chair on commission. The design is based on a Wallace Nutting original, but Wetzel made his version out of tiger maple at his client's request. The chair is finished with aniline dye and shellac and is 22¾ in. deep by 28 in. wide by 47⅛ in. tall. PHOTO: MICHAEL L. NOONAN

TIM VAN HOOK
Atherton, Calif.

With this side table, Van Hook wanted to evoke the sinuous curves of a living tree. Each element of his black walnut table (18 in. deep by 46 in. wide by 38 in. tall) is assembled from sections steam-bent into concave and convex forms. The curved sections were glued together and the seams deftly melded with handplanes. The piece took approximately 180 hours to build. The finish is Danish oil.

GUSTAVO SILVA
Moosup, Conn.

Silva put his woodworking education to good use when building this Sheraton-style washstand (22 in. deep by 27 in. wide by 50 in. tall). He began making the piece as part of the two-year cabinet- and furniture-making program at North Bennet Street School in Boston. The piece is solid mahogany, except for the doors, which are a coopered poplar core with mahogany crotch veneer. To create the deep, lustrous finish, Silva applied potassium dichromate to darken the wood before finishing with shellac, applied with a French polishing technique. PHOTO: LANCE PATTERSON

CONNIE HUTCHINS
Boone, N.C.

The S-curves in the tops of Hutchins's benches and table are based on the switchback in a mountain trail. The motif is echoed in the stretchers of the benches and, surprisingly, in the shape of the through-tenons. The stretchers were bent-laminated in a vacuum press. Hutchins cut the curved mortises using a pattern, drill, and router; she trimmed the tenons on the tablesaw and then hand-carved them to fit the mortises. The table is 34¼ in. wide by 72 in. long by 29¼ in. tall; the benches are 14½ in. wide by 72 in. long by 16½ in. tall. Each piece has a walnut base with a cherry top; the wedges in the tenons are ebony. The finish is wipe-on polyurethane.

Managing moisture

TIPS FOR SEASONING LUMBER AND BUILDING WITH MOVEMENT IN MIND

BY GARRETT HACK

When I was still wet behind the ears as a furniture maker, I once built a tabletop that shrank so much against the breadboard ends that it cracked.

I hadn't taken into account the amount of shrinkage the top would experience in the dry air of the first winter. As it tried to shrink against the pegs of the breadboard ends, two fine cracks opened up. It didn't matter how old the wood was or if it was kiln- or air-dried, it was doing what wood forever will do—shrink and swell as it loses or absorbs moisture from the atmosphere.

Despite modern glues, well-engineered joinery, and sealing finishes, wood's moisture content demands attention if you want your work to last. Out of necessity, I've developed strategies for dealing with moisture content as I'm seasoning the stock, milling the wood, and building my furniture.

Seasoning and milling the stock

When lumber arrives in my shop, I stack it loosely on end against a wall or on horizontal racks with stickers between the layers so that air can move through the pile. Then I leave it alone. The simplest way to reduce potential moisture problems is to let the wood acclimate to the shop well in advance of starting a project.

In the winter, softwoods can acclimate in a week, and dense hardwoods in a few weeks. If I need to speed the process, I rough-cut parts and stack them in the gentle warmth above my shop heater. Even in the summer, when the atmosphere is at its most humid, the wood dries further. The longer it adjusts, the better.

For a long time I have relied on empirical methods that I'm sure past cabinetmakers also used. Dry wood feels warm, and produces shavings more crumbly than those that clump together. For thick stock, I drill into a waste section to see if the borings seem dry.

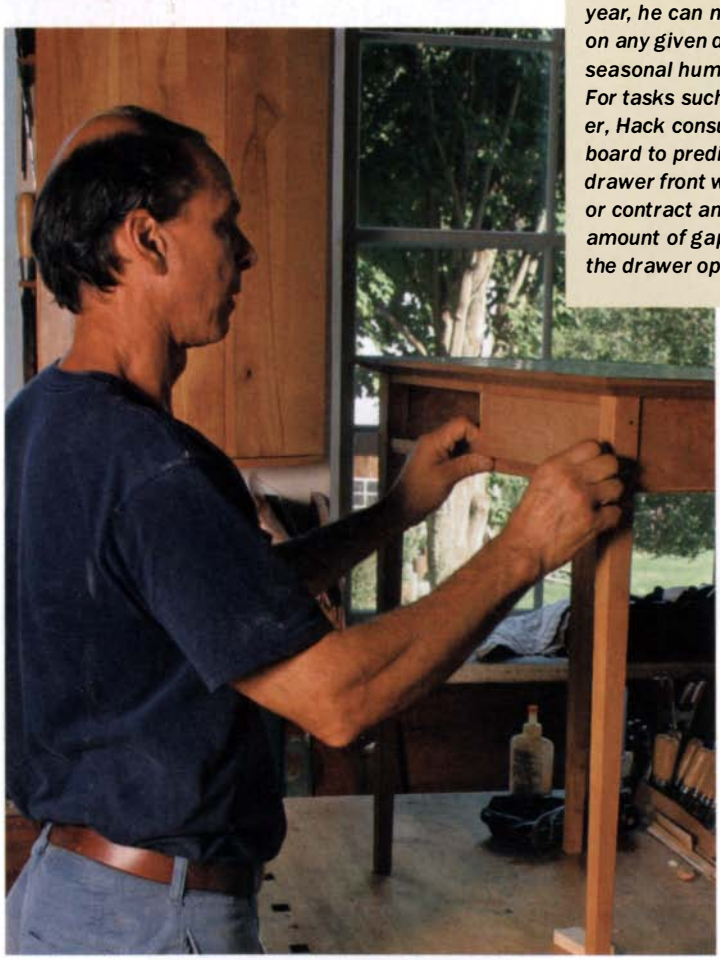
Only recently have I also begun to use a moisture meter to know exactly how quickly the final drying is progressing. A simple meter that uses two pins inserted into the wood surface costs about $125.

My milling strategy is aimed at producing stable parts with the same moisture content inside as on the surface. Wood not fully acclimated, especially thick stock, can be wetter inside than out. A few days of rain, however, and very high humidity, can leave boards drier inside than on the surface. If I have time, I cut parts to rough dimension first and let them acclimate further for a

STEP 1: LET NEW STOCK ADJUST TO YOUR SHOP

When bringing wood into the shop, allow the moisture content to balance with shop conditions. The easiest way is to stack boards vertically (above) or horizontally on racks in the shop for a few weeks. A moisture meter can be used to check the seasoning process by comparing readings from newly arrived stock (top right) with an average reading from boards that have already acclimated to the shop (bottom right). Finally, mill stock in stages. Leave extra material when ripping boards to width (below) or surfacing them with the jointer and planer. Variations in moisture content within boards can cause them to warp after milling. Excess material allows room to correct this later.

Photos: Steve Scott



STEP 2: KEEP TRACK OF YOUR SHOP'S CLIMATE

To predict how furniture components will expand or contract in the future, it is important to know the working conditions in the shop. The author uses scraps to create a seasonal barometer of wood movement (top). By tracking and recording this moisture board's width throughout the year, he can measure the board on any given day and assess the seasonal humidity of the shop. For tasks such as fitting a drawer, Hack consults the moisture board to predict how much the drawer front will expand and/or contract and to decide the amount of gap to leave along the drawer opening (bottom).

few days. Cutting up the parts exposes more surfaces to the atmosphere of my shop and alerts me to parts that have internal stresses, for they will warp right away. I also don't mill to final thickness in one go, but mill some from both sides evenly and let the parts acclimate again. Planing only one side can cause moisture-induced warp in an otherwise stable piece.

Gauge and plan for seasonal movement

Even after careful seasoning and milling, wood's moisture content will continue to balance itself with the relative humidity in the surrounding air, fluctuating with the seasons. This means that the same piece of wood can have slightly different dimensions at different times of year or if moved from the shop to an environment that is markedly wetter or drier. It's important to know how to estimate these changes ahead of time and plan for them when building furniture.

The best way to predict how dimensions will change from season to season is to measure the wood movement in a board over the course of a year. For this purpose, I have a few "moisture boards" hanging in my shop. One is a wide, white-pine plank and another is a crosscut scrap from a cherry tabletop. I use white pine for drawer bottoms and case backs; its movement is similar to that of basswood and aspen, other woods I use. Cherry moves much like other hardwoods.

I measure the boards' width throughout the year and mark the readings on the boards. Because they mirror what the rest of the wood in my shop is doing, as well as the moisture content highs and lows, I use them to know how tightly to fit drawers or panels in any season.

Here's how it works: When I'm ready to fit drawers into a case piece, for example, I consult the moisture board. If the board measures 14 in. wide at the driest time of year and 14$\frac{5}{32}$ in. at the wettest, and measures 14$\frac{1}{32}$ in. today, I know to expect a slight amount of shrinkage and much more expansion during the coming year. If the drawers are 7 in. wide, or half as wide as my moisture board, I can calculate fairly accurately how much movement to expect (about half of what the board says, or $\frac{1}{16}$ in. expansion and $\frac{1}{64}$ in. shrinkage). In practical terms, I guess—and err on the side of a slightly larger gap.

Work with dry wood and heat your shop

I prefer to work with wood as dry as is practical, so that tabletops or case sides will expand slightly before any shrinkage occurs. If the parts expand first, they can work against any tight fasteners and create some slack for later contraction.

On the other hand, on frame-and-panel work such as cabinet doors, I don't worry so much about a little excess moisture. I'd rather have the panels shrink a little instead of expanding and blowing out the joints.

To help avoid dramatic changes in climate when moving a finished piece from my shop to its destination, I heat my shop as I do my house. This results in a moisture content somewhere between 7% in winter and 11% in summer. Also, a good finish will slow moisture transfer (but won't stop it).

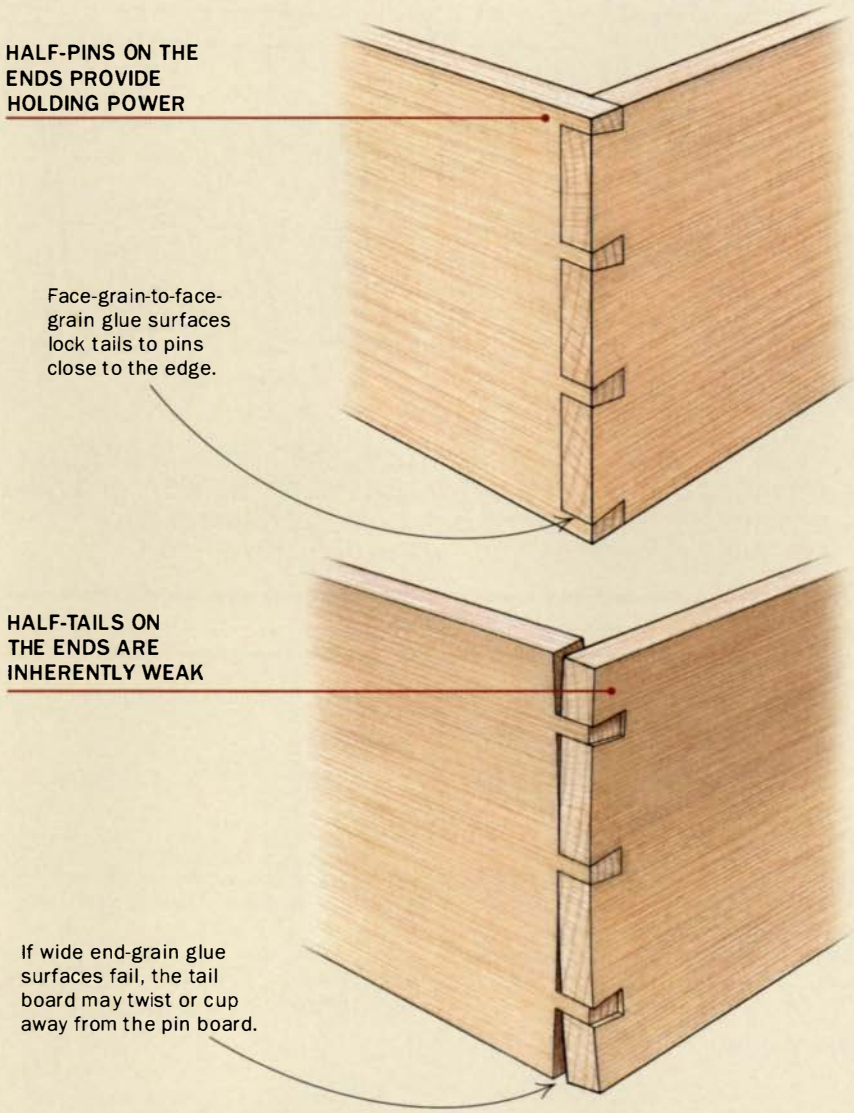
There are a variety of ways to outfit a shop with heat (for information, see "Heating Your Shop," *FWW* #181, pp. 74-79), but if this isn't practical, you could always store your lumber in the dining room—if you can get away with it. □

Q&A

Strongest way to lay out dovetails

Q: I am designing a wooden briefcase to carry samples for sales trips. The sides and bottom are ½ in. thick, and the top (where the handle will be) is ¾ in. thick. I want to use hand-cut dovetails in the case, but I am not sure whether to end on the half-pins or half-tails. Is there a difference structurally?

—MARK KNOLL, Watonga, Okla.



A: WHEN IT COMES TO DOVETAILS, you want holding power as close to the ends as possible. Traditionally, a half-pin is used on both ends because it takes advantage of a strong face-grain-to-face-grain glue surface. Problems may arise if the first full pin is 1 in. or more from the corner because it creates a larger, weaker, end-grain glue surface. Should that weak glue joint let go, the ends of the pin board could cup or twist away from the tail board. If you do decide to use tails on each end, make sure that the first full pin is close to the corner.

—Christian Becksvoort, contributing editor

Ask a question

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

Never connect a grinder to a dust collector

Q: I'd like to collect dust from my grinder, but I'm concerned about collecting it with a wood-dust collector for fear of igniting a fire. Is there an appropriate collection system for standard high-speed bench grinders?

—BRIAN T. DERBER, Presque Isle, Wis.

A: YOU SHOULD NEVER CONNECT A BENCH GRINDER to a dust-collection system in your shop. The sparks generated from grinding certainly will ignite a fire in that environment. Although there are collection units made for grinders, they are expensive and designed for industrial applications, not home woodshops.

—Curt Corum, sales manager at Air Handling Systems, Woodbridge, Conn.

Drawings: Vince Babak

Coloring wood putty for a perfect match

Q: What's the best way to fill nail holes in furniture I intend to stain? It seems every filler I've tried won't take stain like the natural wood.

—JOHN BIPPUS, Alcoa, Tenn.

A: ON SOME WOODS, PARTICULARLY DARKER ONES, I've had some luck mixing fine sawdust with liquid hide glue and using it as filler before staining. Unlike most other glues, hide glue will take a stain.

But the best method I've found is to use colored wood putty. Minwax makes an oil-based product, while the Color Putty brand is available in both water- and oil-based forms.

First, stain the piece and put on a sealer coat. For the sealer, you can use almost anything—dewaxed shellac, water- or solvent-based polyurethane, oil, lacquer—as long as it won't be dissolved by the type of putty you choose (water- or oil-based).

Buy several colors of the putty (I keep a variety on hand), and blend them until the color matches the wood surrounding the area you're filling. If the tone is too dark, lighten it with white putty; if the tone is too light, blend in some black putty. More than likely, you'll blend several colors. Fill the holes and allow the putty a day or two to dry. If the putty shrinks significantly, refill any gaps before topcoating with an appropriate finish.

Before trying any of these methods on your finished piece, experiment on scrap stock of the same species.

—Andy Engel, senior editor

Mix a few colors together. *Play with the mixture until you get a close match. Test the color on a sample board.*

Now you see it. *Use a putty knife or your fingers to jam the mixture into the nail hole.*

Now you don't. *With a close color match, the putty is practically invisible.*

Are there aftermarket riving knives?

Q: Has anyone ever found an aftermarket riving knife (and I don't mean the numerous aftermarket splitters of various designs)?

—ERIC ANDERSON, Ann Arbor, Mich.

A: THERE ARE NO AFTERMARKET RIVING KNIVES. A riving knife must be built into the arbor assembly so that it rises, descends, and tilts with the blade.

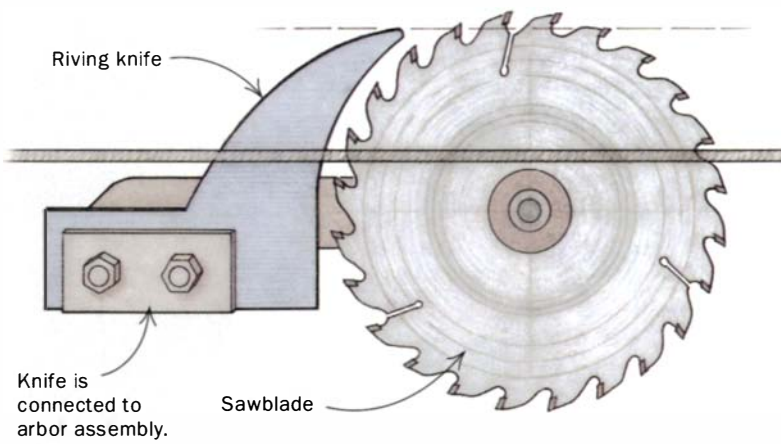
Riving knives have been standard for years on European sliding tablesaws. American-style machines equipped with a riving knife include the SawStop (reviewed in *FWW* #174, pp. 66-67) and the new Powermatic (model 2000).

The next-best thing is a wooden splitter fit into a shopmade throat plate.

—William Duckworth, contributing editor

RIVING KNIVES HELP PREVENT KICKBACK

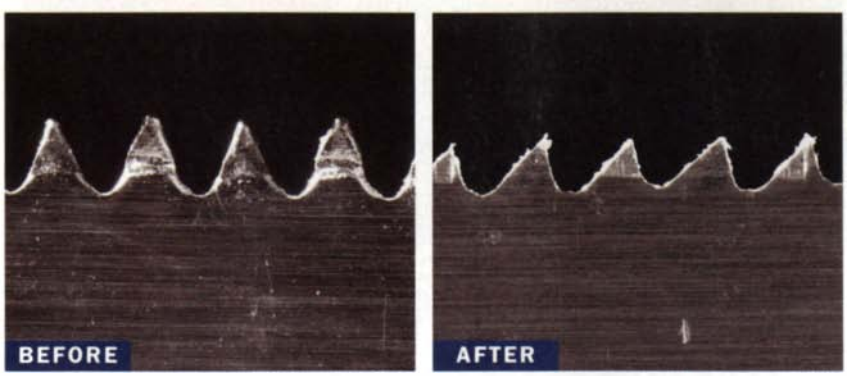
A riving knife is attached to the arbor assembly and set close to the blade. This prevents the wood from closing or pivoting onto the blade, which could result in kickback. The top of the knife sits below the top of the blade, so it seldom has to be removed.



Shopmade alternative. *Retrofitting a riving knife to most saws is impractical. But fitting a wooden splitter into a shopmade throat plate will also prevent kickback (see* FWW *#139, pp. 70-71).*

Photos, except where noted: Thomas McKenna; this page (bottom right): Marcia Ryan

Resharpen, restore a dovetail saw



From rough to ready in under an hour. *It doesn't take long to convert a slow-cutting saw with poorly shaped teeth into a fast, smooth-cutting saw suitable for fine work.*

FIVE EASY STEPS TO A SMOOTH, STRAIGHT-CUTTING SAW

BY CHRIS GOCHNOUR

Over the years, I have sent out dovetail saws for sharpening to many different services, and the results have ranged from fair to downright unacceptable. Consequently, I decided to bite the bullet and acquire the skills of saw sharpening myself. As it turns out, this task is not difficult, and the tools required are minimal.

Although all saws dull, not all can be resharpened. Japanese-style saws, which cut on the pull stroke, have thin, razor-sharp blades that are difficult to resharpen. When they dull, they often are sent out for sharpening or simply discarded. Western-style saws, which cut on the push stroke, have thicker blades that can be sharpened easily. And with my approach, any Western-style dovetail saw can be tuned up to perform as well as an expensive, finely tuned saw.

Most dovetail cuts are made with the grain, so I sharpen my dovetail saws with a rip-tooth pattern. Generally, sharpening takes five simple steps: jointing, shaping, setting, sharpening, and honing.

Only saws with irregularly sized teeth—some big, others small—or with an undesirable rake angle (the angle of the front of the sawtooth) require all of these steps. If a saw's teeth are in relatively good shape, you can proceed directly to the sharpening step (see photos, p. 96).

Most of these steps require you to hold the saw in a vise. If you don't own a saw vise, make one out of scrapwood (see top photo, left). Size it to fit into your bench vise, and be sure it is long enough to hold the entire blade of the saw.

Jointing levels the playing field

Jointing flattens the sawteeth and brings them to a consistent height. Working from the heel of the saw (the handle end) to the toe (the tip), take a pass with an 8-in. mill bastard file, keeping it in line with the blade but exactly perpendicular to its sides, so that the teeth are flattened squarely, not milled at

Photos: Thomas McKenna; drawings: Michael Pekovich

1. Joint

Secure the file in a holder. *The holder is easy to grip and keeps the 8-in. mill bastard file perpendicular to the blade, ensuring a perfectly flat surface along the length of the blade. Work from the heel of the saw to the toe, keeping the fence of the holder against the blade. File until all of the teeth have been touched at least lightly by the file.*

Flat teeth are ready for shaping. *The flat faces on the tops of the teeth will serve as a reference for the shaping step (below).*

an angle. If one side of the teeth is higher than the other, the saw will drift or curve in the cut. A file holder (available from www.leevalley.com) will come in handy here.

After one pass, you probably will notice that some of the teeth have flat spots, while others have not been touched. Take more passes until all of the teeth have been touched at least lightly by the file, but no further. If your saw has a few broken teeth, don't worry about them; eventually, through repeated filings, they will "grow back."

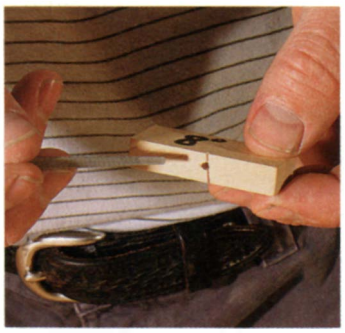
Shaping restores teeth to proper form

The objective of shaping is to bring all of the teeth to a point—the same height and the same shape, with gullets of uniform depth. Some people prefer to shape sawteeth with a 0° rake, which means the fronts are vertical, or at right angles to the blade. This can make for a fast-cutting saw, but one that is difficult to start and makes a rougher cut. A rake angle of 15° makes for a saw that is easier to start and cuts smoothly, albeit slowly. I favor an 8° rake angle, which gives a nice compromise between speed, ease of start, and smoothness of cut.

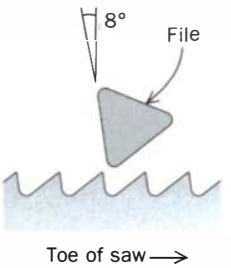
There's a lot to be done during shaping, but the right tools can make the task easier. Start with proper lighting to improve your chances of success. I like to use low light that rakes across the tops of the sawteeth clearly. I sometimes use a lamp with a magnifying lens to help me see what I am doing.

You also will need a triangular saw file of the proper size, which is determined by the number of teeth per inch (tpi) of the saw being filed. Use a 5-in.-long extraslim taper on saws with 11 tpi to 14 tpi, and a 4-in.-long extraslim taper for 15-tpi to 18-tpi saws. A handle for the tang of the file makes

2. Shape



Wood guide block helps ensure consistency. *Align one face of the file with a line scribed at the desired rake angle—in this case 8° (above). Work from the toe of the saw to the heel, pushing the file across the blade through each gullet (right). Check your progress after a couple of strokes.*



Flat tips become pointy. *As you file, you'll slowly remove the flat spots created during the jointing phase.*

3. Set

Adjust the saw set to its lightest setting. *A saw set has an adjustable anvil that regulates how much the top of the tooth is bent. The ideal set for a dovetail saw is between 0.004 in. and 0.008 in.*

Squeeze the set firmly and consistently. *Be careful not to crush or break a tooth. Reset all of the teeth bent away from you (left), then rotate the saw in the vise and repeat. The set of the teeth should be consistent along the entire blade (above).*

the tool easier to control and protects your hands in case of slips. I also insert the file into a wooden guide block that helps me to maintain a consistent rake angle.

To begin shaping, clamp the saw with its teeth just barely above the jaws of the vise to dampen any vibration during filing. Start filing in the first gullet at the toe of the saw and work from gullet to gullet toward the heel. Take one or two strokes, filing the front of one tooth and the back of another at the same time.

The objective is to reduce the flats on each side of the file by 50% and maintain a consistent rake angle. Keep the file perpendicular to the blade and parallel to the benchtop to ensure that all teeth are filed uniformly. Make sure the rake-angle guide block is parallel with the sawteeth. Don't drag the file back in the gullet, because this will dull it prematurely. If you observe, for example, that one flat is larger than the other, exert a little extra pressure toward the larger flat to reduce the size of the larger tooth while allowing the smaller tooth to grow. Keep filing until all flat spots have been eliminated.

Proper set creates clearance

Once the teeth have consistent size and shape, the next step is to set the teeth, or adjust the amount that the teeth protrude from the sides of the blade. Setting the teeth allows them to cut a kerf that is wider than the blade's body.

I aim for a total set ranging from 0.004 in. to 0.008 in. To determine the set of a saw, measure the thickness of the blade with dial calipers. Then use the calipers to measure opposing teeth, tip to tip. The difference equals the total amount of set.

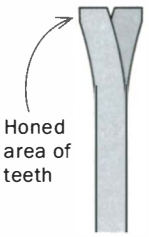
Place the saw in the vise with its blade fully extended. Then, using a saw set adjusted to its lightest setting, reset all of the teeth that are bent

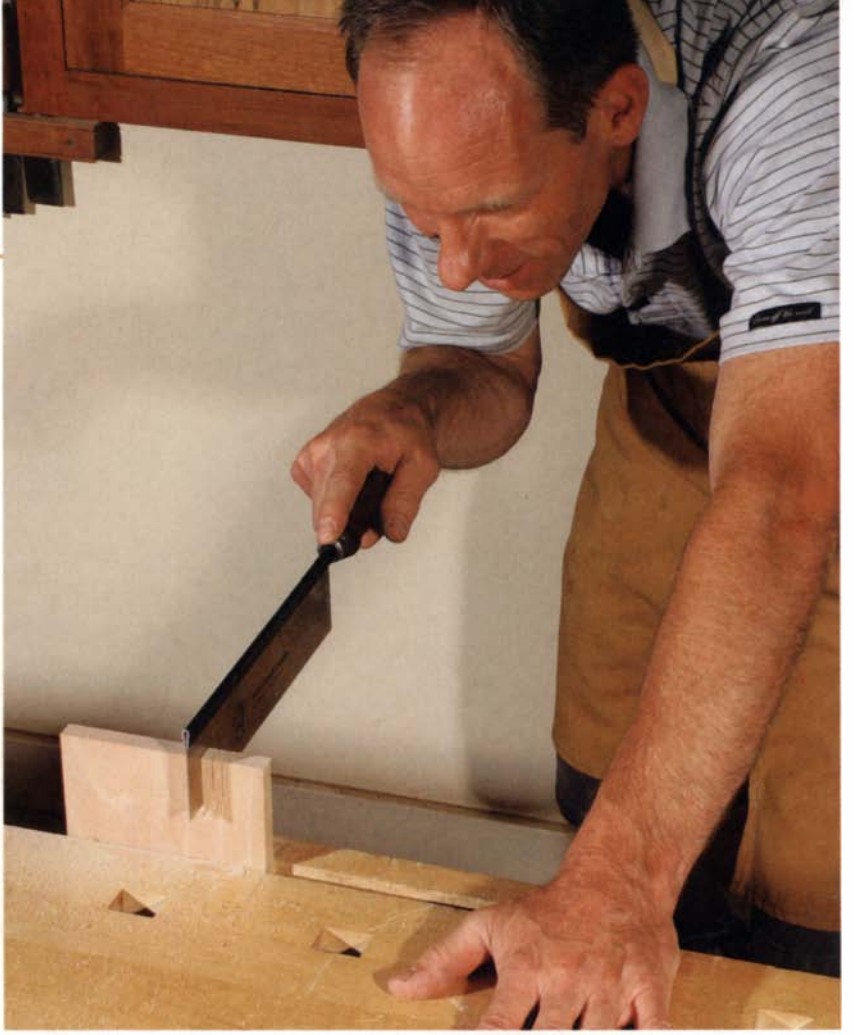
4. Sharpen

Joint lightly, then refile. *One or two passes with the mill bastard file should be enough to flatten the teeth (right). Then take light passes using the triangular file and guide block (far right). Work every other gullet from opposing sides of the saw, removing just enough material to restore sharpness.*

5. Hone

Honing removes filing burrs and evens out the set on both sides of the blade. *Place the saw flat on a bench and run a small diamond stone down the side of the teeth from heel to toe. Repeat on the other side.*





Test drive. *Make a few test cuts, checking to make sure the saw is tracking straight. If it pulls to one side, hone the saw again on the side toward which it is pulling.*

away from you. Note that only the upper half of each tooth is bent. Once you have set the teeth on the first side, turn the saw around and reset the teeth that are bent away from you. Excessive or inconsistent set will be corrected during the honing phase.

Sharpening adds bite

Sharpening is similar to shaping, but where shaping removes more material and all filing is done from one side of the saw, sharpening removes only enough material to restore sharpness. Also, during sharpening the filing is balanced by working every other gullet from opposing sides of the saw.

Start by giving the saw a light jointing. This ensures that all the teeth are level, and just as important, it creates tiny flats on the tops of the teeth that will help you determine how much material to remove.

Now, clamp the saw with its handle to the right and its teeth just barely above the jaws of the vise to dampen vibration. Start filing at the toe of the saw and work toward the heel. Again, use the rake-angle guide block.

Place the file in the first gullet that has the front of the tooth bent away from you. Take one or two strokes, keeping the file perpendicular to the blade, and watch the flat spots on both sides of the file diminish. Move the file to the right, skipping one gullet, and file again. This gullet should also have the front of the tooth bent away. Then, skip a gullet and repeat all the way to the heel of the saw.

On the first pass, the objective is to reduce the flats by 50%. When one side of the saw has been filed from toe to heel, rotate the saw 180° so that the handle is to the left. Because the teeth are now pointing in the opposite direction, you must turn the guide block end for end so that you are holding the file correctly. Now file the gullets you skipped on the first pass, this time moving from heel to toe. Stop filing when all the flat spots are gone.

Honing evens out the set

At this point, all of the teeth should be sharp and the same height. Honing removes filing burrs and equalizes the set on both sides of the blade. Place the blade flat on a bench, and run a small oilstone or diamond stone down the side of the teeth from heel to toe. Repeat on the other side of the saw.

After honing, make some test cuts. If the saw pulls to one side, hone the saw again on the side toward which it is pulling. Be careful not to overdo it and remove too much set.

Once you have a razor-sharp, well-tuned saw, the joy of hand-cutting dovetails can begin again. □

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Visit our Web site to watch the author sharpen a Western-style dovetail saw.

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Does oiling wood enhance its figure?

BY MARK SCHOFIELD

One of the rules of finishing is that it takes an initial coat of oil to bring out the full beauty of figured wood. A recent experience led me to question this truism.

After building a room screen with veneered panels of figured woods, I wiped each panel with a coat of oil. The next weekend I was about to spray the panels with shellac when I noticed that I'd missed oiling a panel. Reluctant to leave one panel unfinished, I sprayed it, too.

After applying the high-gloss finish, I found that I couldn't tell which panel I hadn't oiled. So I decided to test whether an initial coat of oil really does bring out a wood's figure.

Three species, two types of oil, and four finishes

I used highly figured maple, cherry, and walnut to compare woods that are light, medium, and dark in color. I cut each board into three, and to maximize oil penetration handplaned each one, followed by a light hand-sanding with P220-grit paper.

I coated one board of each species with boiled linseed oil, coated another with tung oil, and left the third bare. I applied the oil generously, recoating areas that absorbed oil, and wiping away the surplus after 30 minutes.

A high-gloss finish is the best surface for revealing figure, but I wanted to see if different types of clear finish also affected the final appearance. I chose representatives of four popular finish types: Zinsser's SealCoat

Applying the oil. *Boards of curly cherry, tiger maple, and curly walnut were cut into three sections each. The first was wiped with boiled linseed oil, the second with tung oil, and the third left bare.*

A variety of finishes. *To see whether different clear finishes affected the final appearance, the author divided the oiled and non-oiled boards into four sections and finished them with shellac, water-based finish, lacquer, and varnish.*

Photos: Mark Schofield

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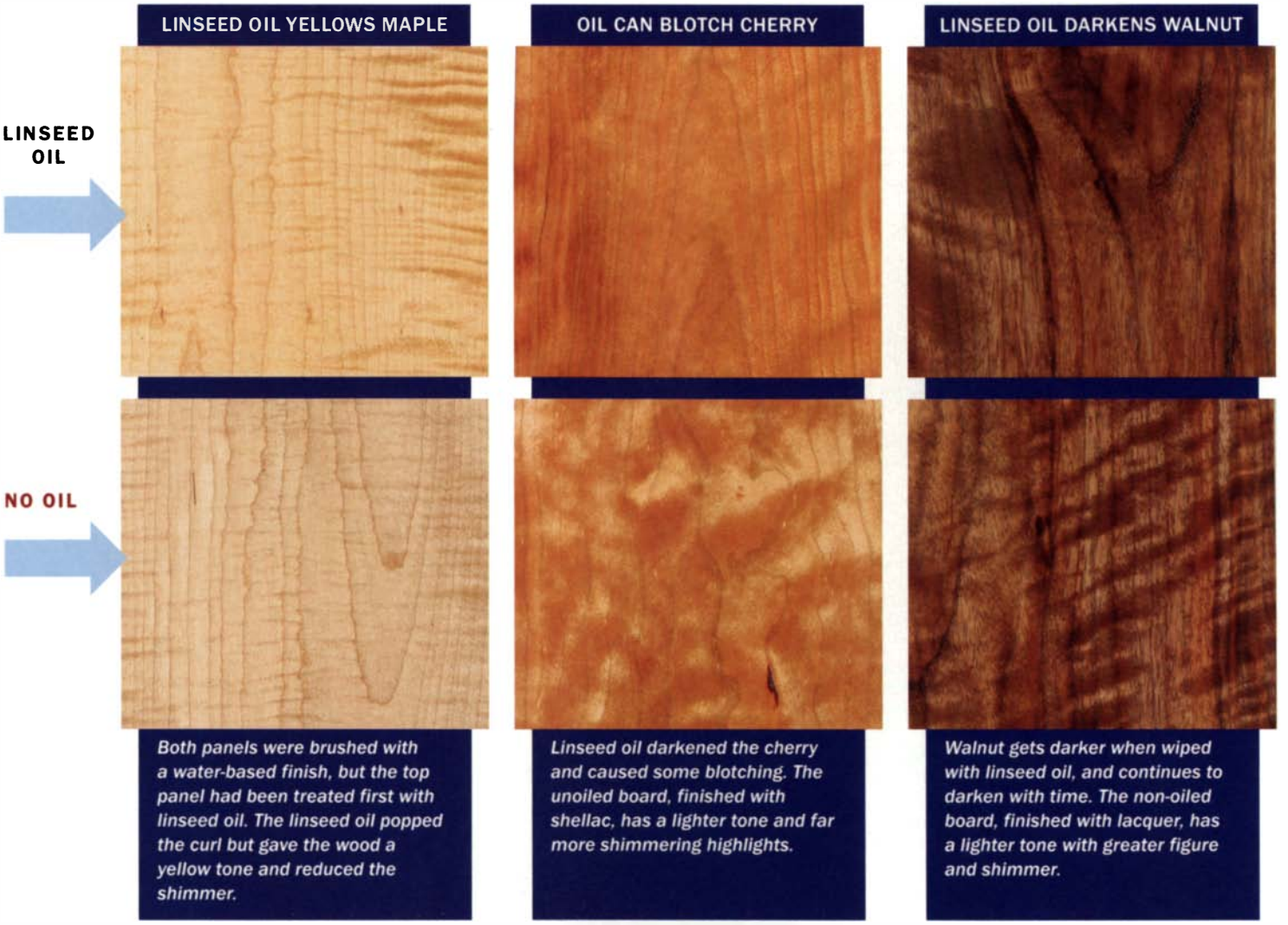
Sometimes oil causes problems



shellac, Behlen's brushing lacquer, Minwax's water-based polycrylic, and McCloskey's Heirloom varnish. I let the oil dry for five days, and then divided each board into four equal sections. I applied each finish and sanded between coats.

The oils and the finishes have different effects

Two conclusions can be drawn from all three woods: First, if you use an oil-based finish, don't bother to pre-apply a coat of oil. The varnished sections of each wood were identical. Second, while oil made the major figure more pronounced, it reduced the shimmer, or chatoyance, in all three species. This luster is subtle, best seen when moving a board under a bright light and very hard to photograph, but it brings the wood to life.

Tiger maple: Pronounced curl means less luster—Both oils made the tiger figure much more pronounced by darkening the stripes. Linseed oil gave the wood a distinct yellow tone, so if you prefer your maple with a just-planed look and pronounced stripes, apply tung oil followed by lacquer or a water-based finish. The non-oiled maple finished with shellac, water-based finish, or lacquer had a real shimmer to it, but the stripes were far less pronounced.

Curly cherry: Oil can lead to blotching—The effect of oil was most noticeable on the cherry, and not always for the best. Both oils gave the wood a pleasant orange tone, but produced dark blotches around the curl. On the non-oiled board, however, the water-based finish gave it a gray, lifeless look. In contrast, the non-oiled panel finished with shellac had a warm tone, no blotching, and plenty of shimmer.

Curly walnut: Hold the oil—The non-oiled walnut board, regardless of the final finish, had a shimmer that was lacking on the oiled boards. It also was considerably lighter in color than the linseed-oiled board.

In the end, beauty is in the eye of the beholder, but before you automatically oil figured wood, try making a sample board with and without oil and applying the clear finish of your choice. You may surprise yourself and decide to skip the oil. □

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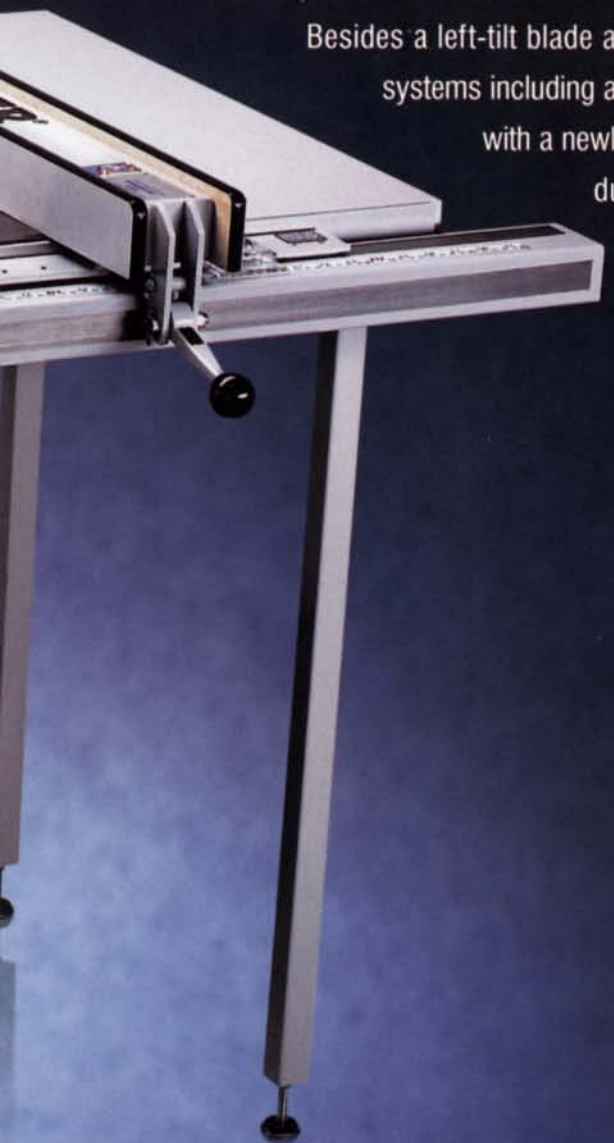

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West Coast Federal

Bob Stevenson may be a longtime resident of the San Diego suburbs, but aesthetically he never really has left his boyhood home on Boston's North Shore. Nearly all of the furniture he builds, including his just-completed serpentine-front secretary bookcase, is immersed deeply in the Federal style, in particular the peerless work of Boston father and son cabinetmakers John and Thomas Seymour. Some elements of the piece, such as the bookcase doors with Gothic arches and the interior of the butler-style desk, are based on Seymour originals; others, like the hearts that terminate the arches of the crown molding and the leaf-carved capitals on the reeded zebrawood front legs, are more interpretive. Working almost exclusively with hand tools, many of them from the period, Stevenson built the piece in about 1,400 hours. He used Santo Domingo mahogany for the carcase and veneered the doors and drawer fronts with mahogany crotch, primavera crotch, and satinwood banding.

—Jonathan Binzen

Photos: Craig Carlson