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No. 175

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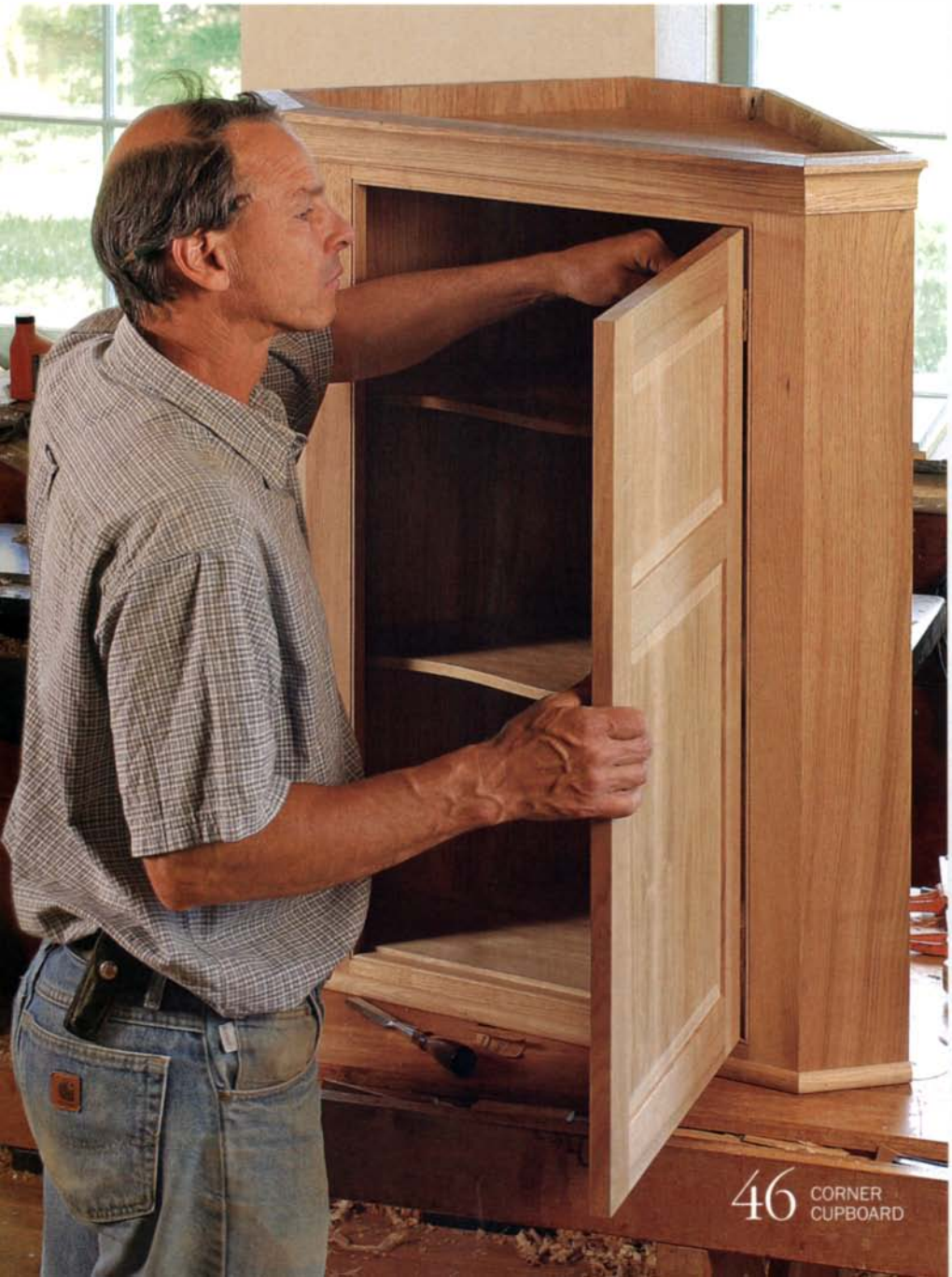

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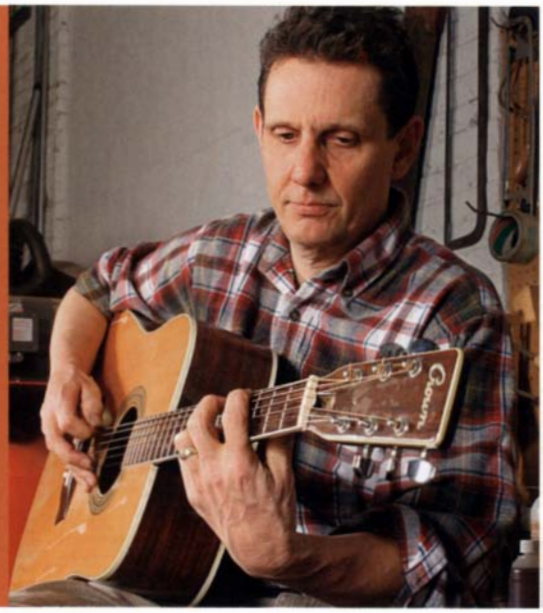

Jeff Jewitt (Finish Line) has been writing articles about finishing for *Fine Woodworking* for more than 10 years and in 2003 won the first-place Golden Hammer writing award for magazine articles. In addition to writing and running a finishing-supply company with his wife, Susan, Jewitt finds time to refinish furniture, teach, and cycle. Picking up from a somewhat disastrous earlier career as an aspiring musician, Jewitt composed and recorded the theme music for Scott Phillips' new television series *American HomeShop*, debuting in March on PBS stations nationwide.

Paul Schürch *("Drawing Big Curves")* designs and builds custom marquetry furniture in his workshop in Santa Barbara, Calif. He also teaches marquetry classes in his shop, at the Marc Adams School of Woodworking, and at other schools across the nation. When he's not working, Schürch enjoys sailing and camping with his kids in remote areas along the California coast.

Garrett Hack *("Corner Cupboard")* describes his furniture style as contemporary but based on classic forms. "I want to build furniture that works well, that's classic, elegant, rich with detail, and a little playful." Hack also is a farmer, with five children and a holding in Vermont, where he keeps a workhorse, two cows, chickens, an orchard, and a fruit and vegetable garden.

Aimé Ontario Fraser *(Fundamentals)* began her woodworking career as a boatbuilder more than 20 years ago. A former associate editor at *Fine Woodworking*, she has written two books, *Getting Started in Woodworking* (The Taunton Press, 2003) and *Your First Shop* (The Taunton Press, due out early this year). She lives in Westport, Conn.

Strother Purdy *("Tenoning Jigs")* began his woodworking career in 1985 as an apprentice in an architectural millwork shop. Today, Purdy splits his time among designing and building furniture in his shop in Bridgewater, Conn., teaching at the Brookfield (Conn.) Craft Center and the Woodworkers Club in Norwalk, Conn., and writing for *Fine Woodworking*. You can see some of his work at www.strotherpurdy.com.

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letters

From the Editor

LOOKING BACK AND MOVING FORWARD

I recently met a reader who remarked that he missed the days when *Fine Woodworking* was published in black and white. On one level I have to agree—black-and-white photography has a certain elegance and directness that color can't match. But since we began dabbling in color in 1983, we've been able to show you the rich tones of cherry, mahogany, and walnut and point out the difference between buttonlac and pale blond shellac, among other things.

The changes to the magazine over the years reflect both the needs of woodworkers and the evolving technology of publishing. The people who bring you this magazine are in both camps. As woodworkers, we embrace new challenges as well as more efficient ways to work. And as editors, we aim to satisfy your needs and figure out better ways to communicate. Toward that end, we've made a few changes.

You'll notice that parts of the magazine have a new look. We also have renamed some departments. Rules of Thumb now is called Fundamentals, and Current Work has been renamed Readers Gallery. Although the content is still what counts most, the names reflect more clearly what those sections of the magazine deliver.

—ANATOLE BURKIN, EDITOR

Greene brothers did not build furniture

In the article "Build a Greene & Greene Side Table" (*FWW* #171, pp. 36-41), the author states that Charles and Henry Greene were prolific furniture makers. Greene and Greene were wonderful architects and designed furniture and millwork; however, the furniture pieces were constructed by master woodcrafters Peter and John Hall in their cabinet shop in Pasadena, Calif.

—BOB BAGDASARIAN, Long Beach, Calif.

Kudos for magazine content

You are to be complimented, indeed praised, for the improvement in content and utility presented in *FWW* #172. You have approached the standard set by the first several years of the magazine before 1983.

As a professional woodworker for 20 years, I have seldom found so much good practical information in any such magazine, much less a single issue. I am particularly impressed by the detail of each feature, especially the how-to techniques. Recent articles by Brian Boggs, Dan Faia, Phil Lowe, and Charles Durfee are what I regard as really good publishing. Thanks again for restoring the original quality of your magazine.

—CLINE BARTON, Fredericksburg, Va.

Another way to adjust lathe motor speed

Ernie Conover recently answered a reader ("Q&A," *FWW* #172, p. 98) seeking recommendations on a variable-speed motor for a shopmade lathe.

I retrofitted my Delta wood lathe and swapped out the step pulleys with a variable-frequency drive (VFD) from a major motor manufacturer (Hitachi L-100 series). With it, I can control the speed of the lathe easily. The modification has vastly improved the ability of the lathe to turn large bowls, which at normal speed would cause the lathe to shake violently. The total cost for a 1-hp VFD and parts came to $203.

Here is a Web site that I found helpful in explaining VFD: www.joliettech.com/variable-frequency-drive.htm. In addition, manufacturer sites provide product manuals and specifications.

—HAL GETZELMAN, via email

Bandsaw tips to the rescue

When I received *FWW* #173 and read Michael Fortune's article on bandsaw setup, I couldn't wait to try out his tips on my machine. After making all of the adjustments described in the article, I cut a ⅛-in.-thick piece of veneer from a piece of 5-in.-wide figured cherry. The cut was off only 0.05 in. in 24 in., and a slight adjustment to the upper blade tracking brought the next cut to an even ⅛-in. thickness from one end to the other. I then ripped perfect 1-in. strips from the veneers. Hallelujah! I had just about worn out the fence-adjustment bolts on my machine trying to compensate for blade drift.

This is another example of why your magazine is the best in the field: simple, easy-to-follow advice that really helps home woodworkers.

—BILL KEPLEY, Richwood, Ohio

Correction

On p. 73 of the article "Tilt-Top Table" (*FWW* #173), the fourth measurement from the top of the turned column, in regards to the length of the segment, should read 1¾ in.

Writing an Article

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

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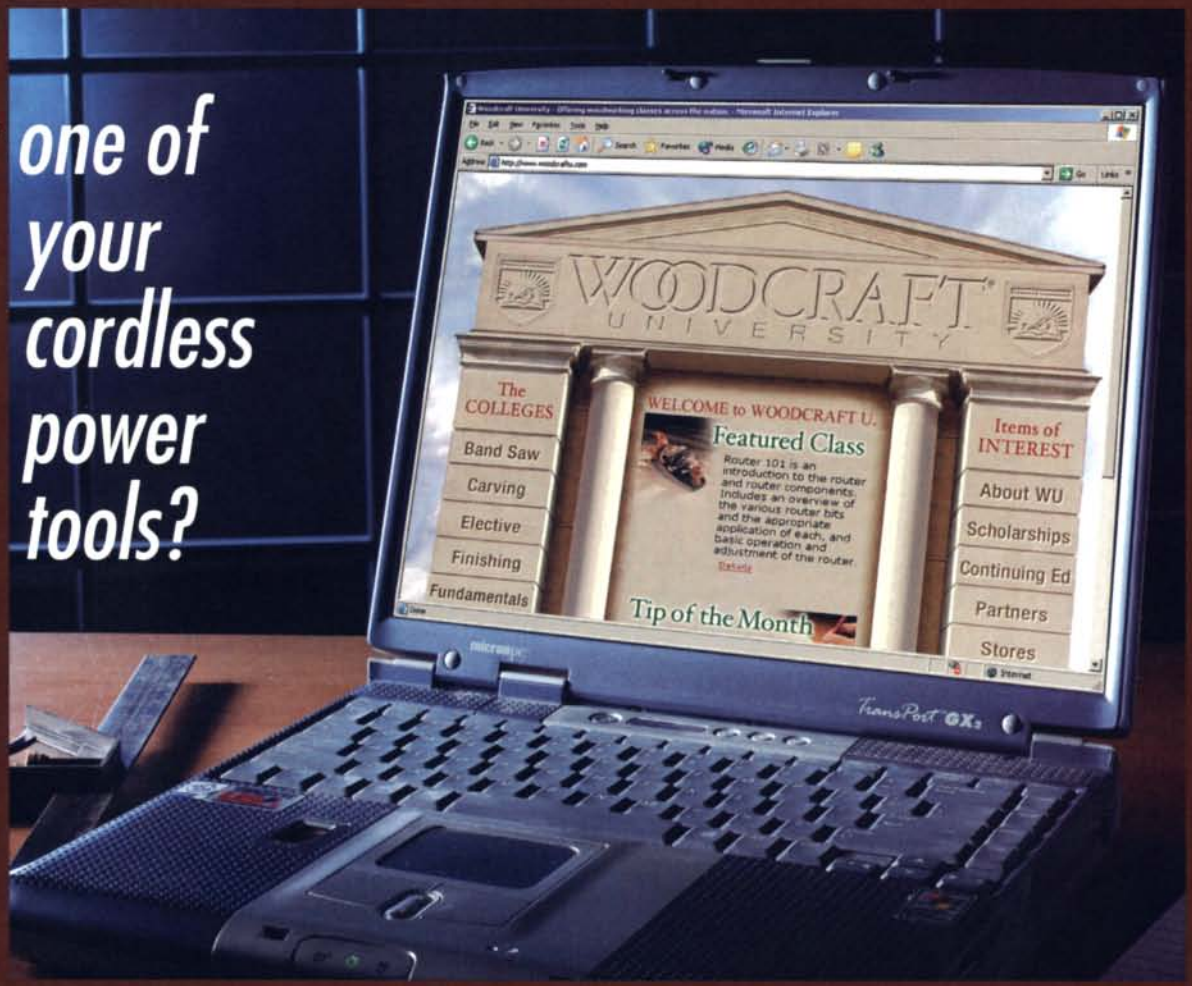

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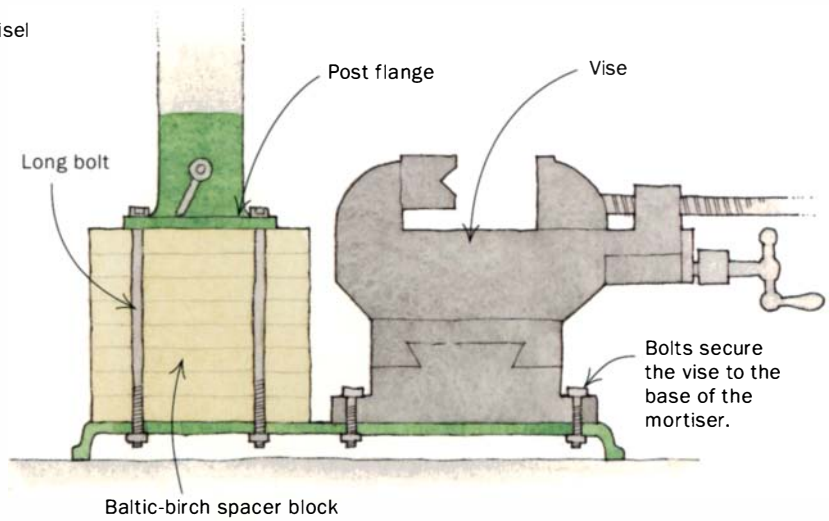
EDITED AND DRAWN BY JIM RICHEY

Best Tip

Improve a mortiser with a cross-slide vise

Tip submitted by John Jory

John Jory was never quite pleased with the clamping system on his benchtop mortiser, so he added a cross-slide vise to the machine. It solves the clamping and positioning problems that usually annoy users of benchtop mortisers.



Benchtop hollow-chisel mortisers typically suffer from two problems: They don't clamp the workpiece very securely, and they don't make it easy to reposition the workpiece once clamped. I solved those problems by mounting a cross-slide vise on my mortiser. The vise not only holds the workpiece with plenty of force, but it also lets me reposition the workpiece quickly and accurately, simply by turning a crank handle.

Before you can start cutting mortises, though, you need to modify both the vise and the mortiser. I used a vise with a 4-in.-wide jaw (model G1064) from Grizzly Industrial (800-523-4777; www.grizzly.com), which cost about $40.

The vise is modified by moving the upper cross-screw handle to the opposite side. Remove the plate that fastens the screw to the vise body, then unthread the screw handle and reinsert it on the other side, below the vise-jaw screw. After the cast iron is drilled and tapped for the mounting screws, mount the plate in its new location.

Modify the mortiser by adding a spacer block between the base of the mortiser and the chuck. The block must be high enough to account for the mortising depth lost due to the added height of the vise. I made the block from aluminum, but a wood block made from several glued-up thicknesses of Baltic-birch plywood also would work.

My modified mortiser has the same 5-in.-high mortising range as the original tool. I can cut 4-in.-long mortises without repositioning the workpiece, and the resulting mortises are straight and smooth.

—John Jory, Ashland, Ore.

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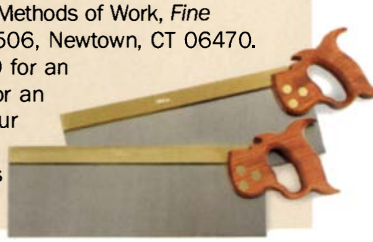


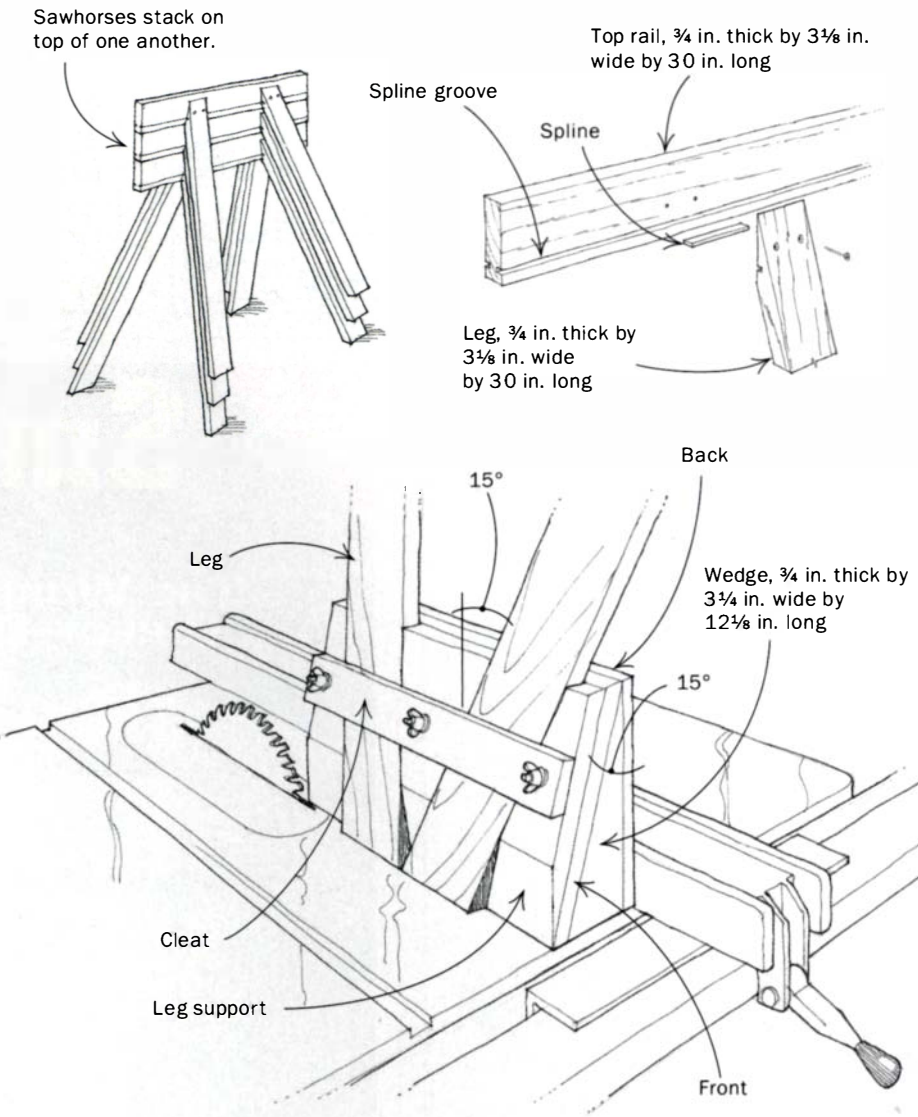
Light, strong sawhorses stack neatly

I've used these sawhorses in the shop since about 1978. Even though they're light, the horses have never failed. It's easy to make a bunch of them, and the entire lot can be stored in one neat stack.

The legs are attached to the sawhorse with a scarf joint that is glued, clamped, and screwed. A spline added to the joint boosts shear strength and maintains the correct angle for the splay during assembly.

Cutting the scarf on the leg is tricky. You'll need a jig similar to the one shown in the drawing at right. First, miter both ends of the leg with a compound miter, 15° and 15°. Then clamp a pair of legs in the jig, which holds them splayed both 15° front to back and 15° side to side. With the tablesaw blade set vertically, cut the cheeks. To cut the spline slot in a leg, first set both the miter gauge and the tablesaw blade at 15°. Then, with the scarf joint facing down, use the miter gauge to support the leg as it's passed over the blade.

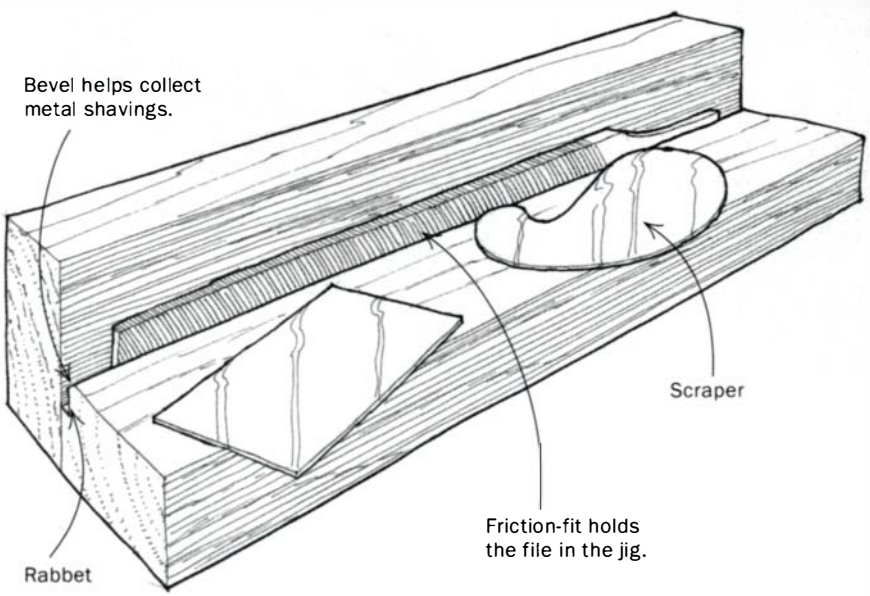
—Louis Mackall, Guilford, Conn.



Quick Tip

I use the plastic lid from a yogurt container as a glue dish. When the leftover glue dries, it peels right off, and I can use the lid again.

—MATT NAGEL, Lehi, Utah



Jig for filing a square edge on scrapers

This jig makes it quick and easy to put a 90° edge on a scraper. Just lay the scraper on the jig and rub its edge against the file.

To make the jig, cut a rabbet along one edge of a piece of hardwood. The rabbet should be just wide enough to accept the file thickness, and just deep enough to be one-third to one-half the width of the file. A bevel in the top corner of the rabbet allows metal shavings to clear. Now, screw a second hardwood piece to the rabbeted edge, as shown. The same concept could be used to hold a diamond stone.

—Jim Crawford, Brownstown, Mich.

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READER SERVICE NO. 136

Bringing plywood safely into a basement

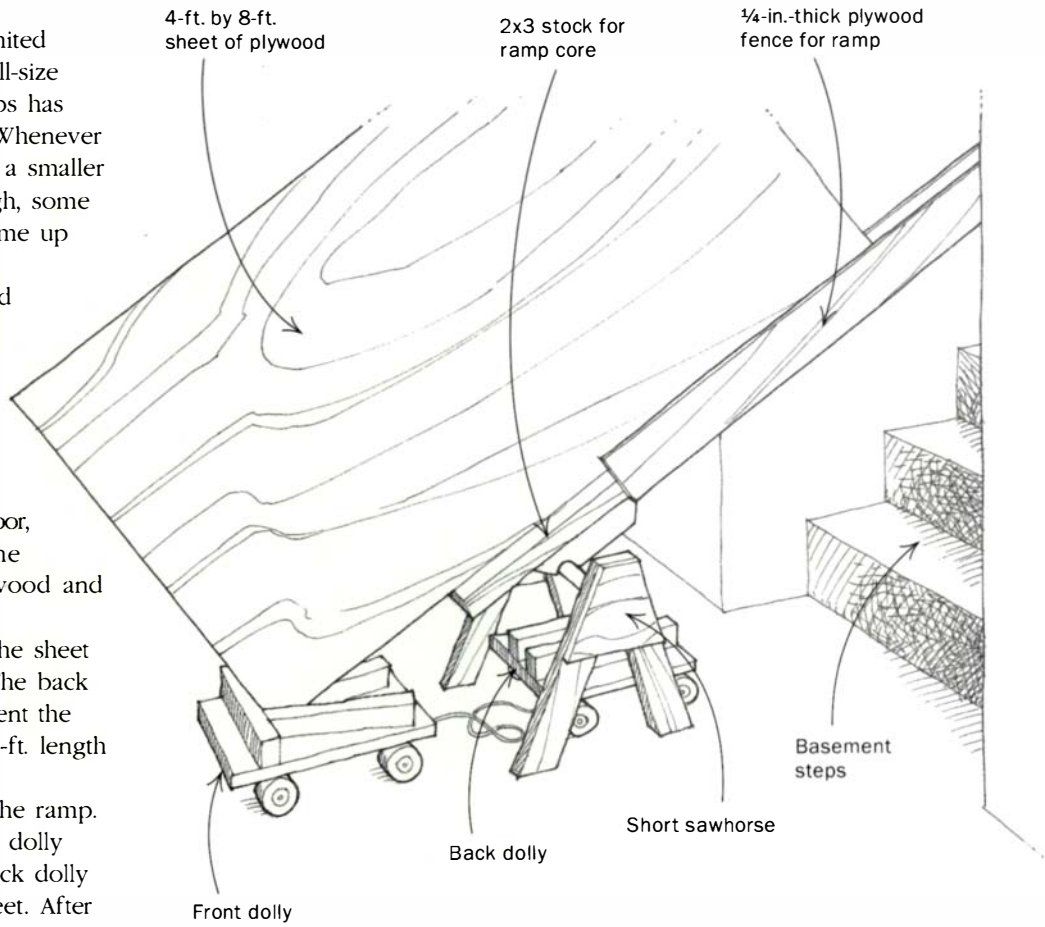
Exterior access to my basement shop is limited to a set of steep concrete steps. Getting full-size (4-ft. by 8-ft.) sheet goods down those steps has always been an awkward, tiring exercise. Whenever possible, I prefer to trim full-size sheets to a smaller size outside the shop. Unfortunately, though, some projects don't allow that option, so I've come up with a trick to manage these big materials.

I built a ramp from 2x3 stock sandwiched between fences made from ¼-in.-thick plywood. On one end of the ramp, I added a metal hook shaped to fit over the concrete lip of the bulkhead at the top of the stairs. The other end of the ramp rests on a short sawhorse.

To help ease the transition from ramp to floor, and to help move the sheet goods around the shop, I built two small dollies from plywood and skateboard wheels. The front dolly has a V-shaped cleat that catches the corner of the sheet of plywood as it comes down the ramp. The back dolly has two cleats in the middle to prevent the sheet from sliding off the dolly. I used a 4-ft. length of cord to connect the two dollies.

In use, the dollies start near the end of the ramp. The descending plywood catches the front dolly and pushes it away. The cord pulls the back dolly into position to catch the center of the sheet. After that, I need only to push and steer.

—Richard W. Beebe II, Hamden, Conn.



Quick Tip

After moving from a dry climate to a wet one, I began wrapping my steel tools with aluminum foil. Acting as a sacrificial anode, the foil corrodes, thereby preventing the steel from rusting. The foil also offers some physical protection should the tools bump against each other.

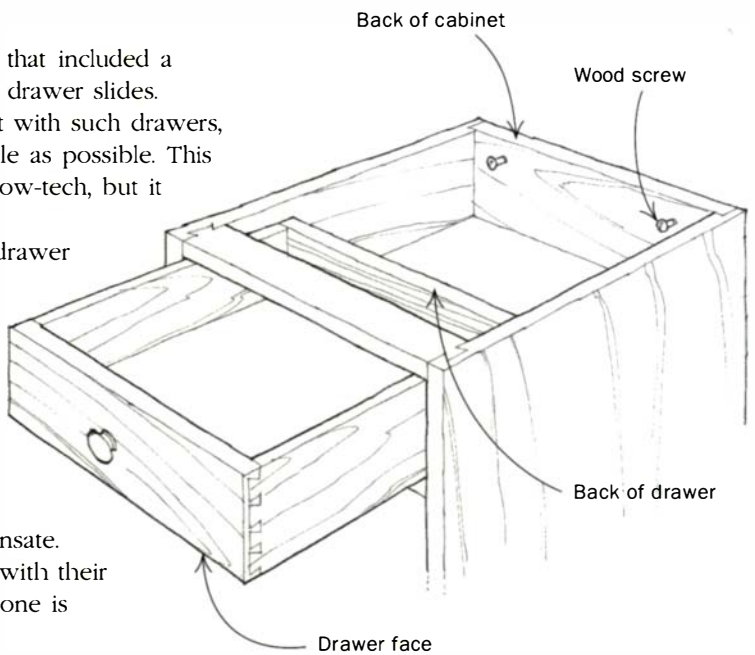
—CHRIS PATTISON, Auckland, New Zealand

Wood-screw drawer stops

I recently built a display cabinet that included a couple of small drawers without drawer slides. Because this was my first project with such drawers, I wanted them to be as adjustable as possible. This drawer-stop technique is pretty low-tech, but it worked for me.

Rather than use typical wood drawer stops, I simply added two wood screws inside the back of the cabinet. When the drawer is closed, the back of the drawer bumps into the heads of the screws. That way, even if the drawers end up a little out of square, I can adjust each screw to compensate. Now the drawer faces are flush with their supporting web frames, and no one is the wiser.

—Mike Repede, Rochester, Minn.



BY BARRY WIXEY

Universal electric motors

The ubiquitous universal motor. *Universal motors are found on almost all handheld power tools because of their high power-to-weight ratio, their compact size, and the ease of controlling their speed.*

Universal electric motors are used to power portable power tools as well as shop vacuums and small stationary and benchtop tools. Compared with the induction electric motors found on large stationary tools (see *FWW* #167, pp. 96-98), universal motors tend to be lighter and less expensive. They also are noisier, run faster, and wear out quicker, but with some routine maintenance, you can keep them humming.

How universal motors work

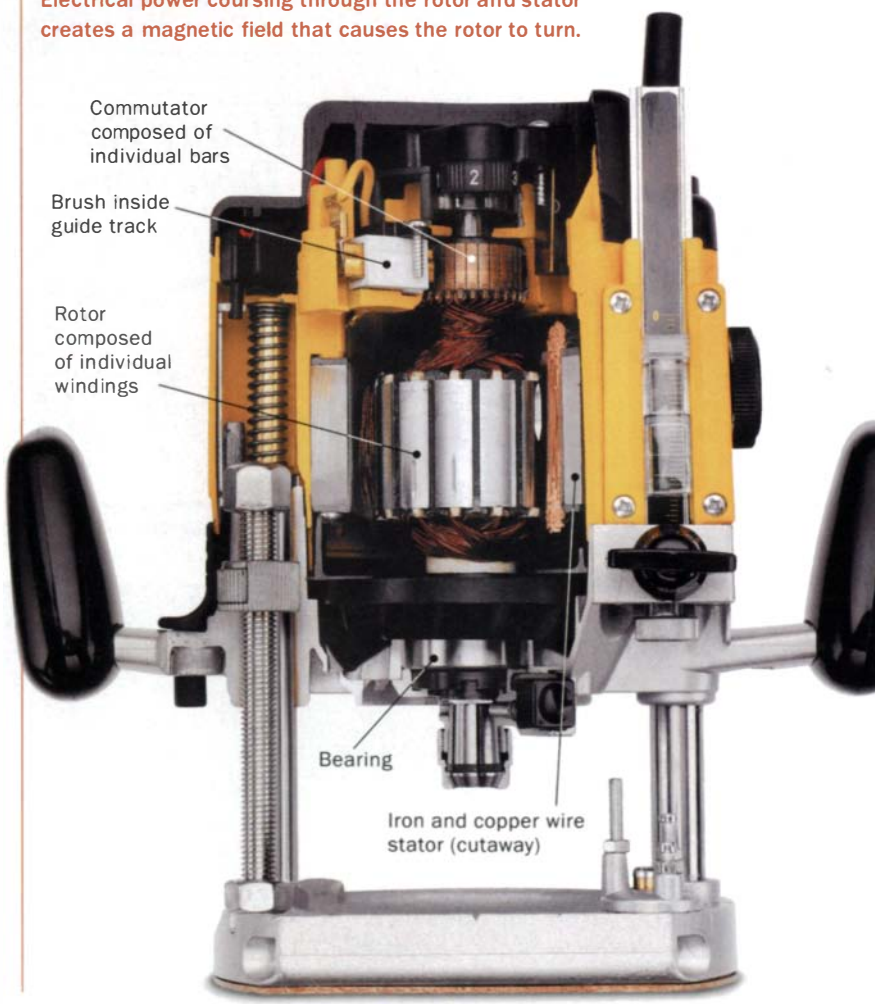
Universal motors consist of a rotor surrounded by a stator, both made from copper wire and iron. The rotor contains a number of separate coils or windings of copper wire, and the ends of these windings are attached to the bars on the commutator. Electrical power is fed to the rotor via this commutator and two carbon brushes, and to the stator through conventional wires.

When current flows through the stator, it becomes an electromagnet. When power is applied to a bar on the commutator through the brushes, that particular winding causes the rotor to become an electromagnet, too, whose north and south poles are nearly aligned with the north and south poles of the stator. The north pole of the stator repels the north pole of the rotor, which causes the rotor to rotate. This in turn lines up a new set of bars and brushes, which move the magnetic fields back to their previous positions, and the poles are repelled over and over again, keeping the motor turning.

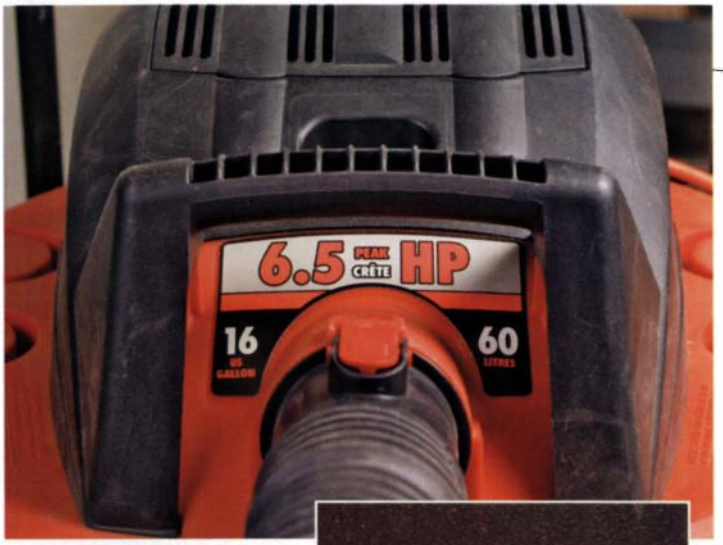
The speed of a universal motor is controlled in two different ways. Cheaper tools use a rheostat

THE PARTS OF A UNIVERSAL MOTOR

Electrical power coursing through the rotor and stator creates a magnetic field that causes the rotor to turn.



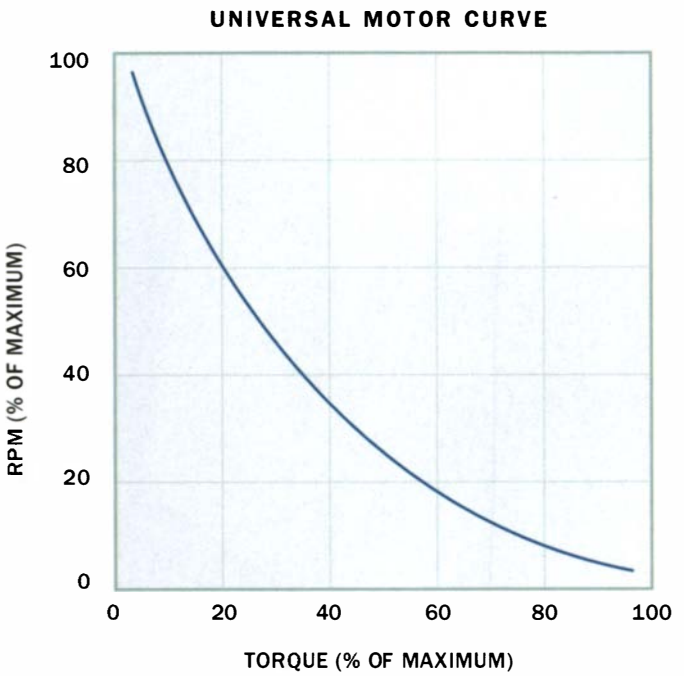
Photos, except where noted: Mark Schofield; this page (bottom): Courtesy of DeWalt



Big claim up front, small print at the back. *This shop vacuum states in large print that it can produce 6.5 hp at peak power. The small label on the rear states that it only consumes 12 amps. Assuming average motor efficiency, the maximum continuous horsepower is only around 1.35 hp when drawing 12 amps.*

Understanding power

Universal motors without electronic speed control will slow down as the load, or torque, increases. Eventually, the motor stalls at near-maximum torque.



(like a light dimmer) to reduce the voltage supplied to the motor and hence to slow it down. This system will not maintain the motor's speed when it is under load and is likely to be found on such items as inexpensive drills.

Some products use a constant motor-feedback system that either measures or calculates the motor speed and adjusts the voltage accordingly to try to maintain that speed. This type of system commonly is found in high-end routers.

What to look for in a motor

Manufacturers test universal motors to determine a specific amount of useful life. This testing usually consists of a mixture of mild use, heavy use, and stalls. It is not uncommon for the minimum life expectancy of upper-end professional tools to be 500 hours or more, whereas the minimum life span of some low-end consumer tools may be less than 100 hours. How do you determine which tool has the better motor?

Peeking through the cooling grills on most power tools allows you to see how many bars there are on the commutator. As a general rule, the greater the number of bars, the greater the life expectancy of the motor. Also examine the size of the contact area between the brush and commutator: The larger the area the better. Most important, check the amp rating of the tool. A higher-rated motor is designed to take heavier use.

Consider amps and watts, not horsepower—Like most people, you probably are confused by the outrageous power claims on some products. I have seen routers rated at 3.5 hp and wet/dry vacuums boasting more than 6 hp.

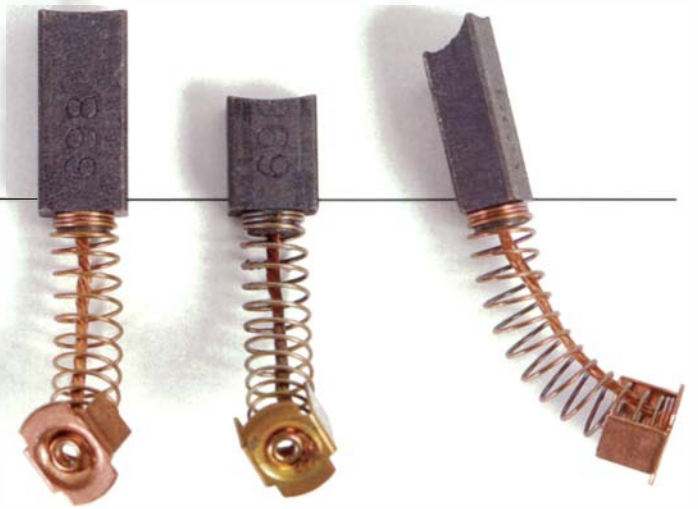
But the horsepower ratings start to fall apart when you do the math and consider all of the variables. A standard household outlet is rated for 15 amps at 120 volts; 15x120 = 1,800 watts; and 1 hp = 746 watts, so 1,800/746 = 2.41 hp. To muddy the waters even more, this 2.41-hp rating assumes the motor is 100% efficient. Motor efficiency is the amount of mechanical power out to electrical power in. In universal motors this efficiency is in the neighborhood of 65% to 75% when the motor is near its peak load. So assuming 70% efficiency in the example above, the output could be only 1.7 hp, with the balance of the power going to waste, mostly as heat.

So how can a 120v tool be rated any higher than around 1.7 hp? What you are witnessing here is a rating game reflecting a tool's peak power, not its continuous power. This game was started many years ago by a well-known major tool brand and has been adopted by some other power-tool companies over the years.

When approving a power tool, scientists at Underwriters Laboratories (UL) do not even consider horsepower as a means to rate the power of tools. The only power ratings they use are either amps or watts to measure a tool running continuously without failure. If a

Motor maintenance

Periodically remove the plastic caps and pull the carbon brushes out of the motor. Check if they have chipped or worn down below the recommended minimum length.



The good, the bad, and the ugly. *The brush on the left is new. The center brush has worn down and should be replaced. The one on the right has cracked and will cause excessive sparking in the motor.*

File to fit. *The brushes should slide into the housing easily so that the spring can keep the brushes in good contact with the commutator. If the fit is tight, smooth the edges of the brush with a fine file.*

power-tool company puts an amp rating or a watt rating on a tool that is UL approved, you can be assured that it can put out that much power continuously. The horsepower claims that a company makes can be derived by any test method the company chooses to adopt. The bottom line: When comparing power between different tools, it is best to look at the amp or watt rating.

Motor life—use and abuse

As mentioned before, no motor is 100% efficient, because the harder you push a motor, the more heat the motor produces. Compounding this is the basic nature of a universal motor. The torque versus rpm curve (see the graph on p. 20) shows that as the torque is increased by forcing a tool to take a bigger or faster cut, the rpm drops until the motor stalls. As the speed decreases, so does the fan speed and consequently the airflow needed to cool the harder-working motor.

If the temperature of the motor's copper wires gets too high, the varnish insulation can burn off, cause the wires to short out, and even eventually melt the copper.

An occasional stall where the power is removed immediately or the circuit breaker trips will not harm the motor or reduce its life. However, allowing a circular saw with no overload protection to stall repeatedly as you rip that oak beam will gradually raise the internal temperature to burnout levels. It's all about keeping the motor cool.

Maintenance for universal motors

If the air vents and the inside of the motor become packed with sawdust, excessive heat can develop quickly, even if you run a tool below its designed capacity. Dust also can clog the track that the brushes slide in so that the springs can't push the brushes properly against the commutator. This lack of contact causes arcing (sparks between the brushes and commutator) that can overheat the windings and destroy the commutator. Therefore, your most regular maintenance should be to remove any dust in your power tools with a vacuum.

Even when the brushes are making perfect contact, both they and the commutator will wear away gradually. On most universal motors you will be lucky to get 100 hours out of a set of brushes, but they can be replaced a number of times. Check the brushes regularly and compare their length to that specified when your manual says it is time to replace them.

This information should be helpful the next time you purchase a power tool. Check the motor specifications carefully so you are sure of the real power you are buying, and then take a look at the tool's overall construction. With proper use and regular maintenance, motors will give many years of trouble-free performance. □

Q&A

Dust collector or air cleaner?

Q: As I outfit my workshop, I need to decide whether to buy a dust collector or an air cleaner first. Any advice?

—NED WIGGINS, Oyster Bay, N.Y.

A: FOR SHOP SAFETY AND HEALTHY lungs, dust collection is a higher priority than air cleaning. Because a dust collector hooks up directly to a woodworking machine, it catches the bulk of wood chips and dust right at the source. An air cleaner will help capture airborne dust that the collector misses; consider the cleaner as a supplement to your dust-collection system.

—LON SCHLEINING,
frequent contributor to *Fine Woodworking*

An air cleaner complements a dust collector. *Air cleaners typically are hung from the workshop ceiling to catch airborne particles that escape the dust-collection system.*

Fiberboard comes in various weights

Q: Is there such a thing as high-density fiberboard? Can I expect to find it at my local lumberyard?

—BOB SWANSON, Greeley, Colo.

A: THE MAJORITY OF FIBERBOARD made and sold is medium-density fiberboard (MDF). But there are such things as high-density fiberboard (HDF) and low-density fiberboard (LDF), often called lightweight MDF. HDF and LDF panels typically are made for commercial applications, such as flooring (HDF) or conference tables (LDF). HDF has the hardest surface of the three and is the heaviest. LDF is the lightest, but it isn't as strong and is more porous. You'd have a hard time buying any HDF, but you can buy LDF from a wholesale plywood distributor (look under "plywood" in the Yellow Pages).

—WILLIAM DUCKWORTH,
associate editor

Solvents reveal planer marks

Q: Lots of times after finishing a project, I see planer marks that I missed when sanding. How can I spot these marks before the stain and finish are applied?

—BOB REDINGER, Shorewood, Ill.

A: BEFORE YOU APPLY A FINISH to a surface, wipe on a solvent such as naphtha, mineral spirits, or denatured alcohol, which, unlike water, will highlight planer marks without raising the grain. The solvent will evaporate quickly and won't interfere with subsequent stains or finishes that you may apply.

—MATT BERGER,
associate editor

Photos, except where noted: Marcia Ryan; this page (top and bottom right): Kelly J. Dunton

Are dovetail planes practical?

Q: I have a love for hand tools, and I'm contemplating buying a dovetail plane to shape sliding dovetails. Is a dovetail plane worth the expense? Will it do the job well?

—WALTER SPENCER, San Antonio, Texas

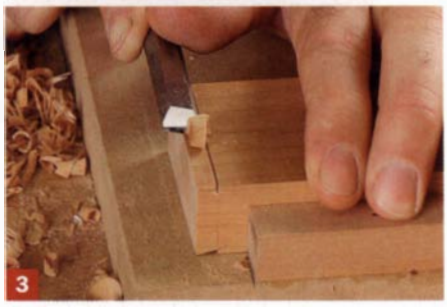
The Stanley No. 444 dovetail plane is hard to find. *It's also one of the more complicated planes to set up.*

A: STANLEY TOOLS ONCE MADE the No. 444 dovetail plane for cutting both the sliding dovetail pin and housing. Not many were sold, I suspect, because they were difficult to use. On today's market, this uncommon plane sells for perhaps $1,000.

If you want to cut sliding dovetails with hand tools alone, you can cut them precisely using a backsaw, a router plane, and a chisel.

With a beveled guide strip clamped in place, chop or saw out the sides of the housing. Use a router plane (No. 71 or No. 271) to clean out the bottom of the housing. Mark out the sliding pin and cut it with a backsaw and chisel, and fit it to the housing by carefully paring the sides of the pin. For more on sliding dovetails, see "Housed Sliding Dovetails" (*FWW* #123, pp. 62-65).

—GARRETT HACK, contributing editor



Three steps to a sliding dovetail. *First, cut out the dovetail housing with a backsaw (1) using a block cut at the appropriate angle to guide the saw. Then clean the bottom of the housing with a router plane (2). The Stanley No. 71 shown has a height-adjustment thumbscrew to lower the blade incrementally. Next, cut the shoulders of the pin and then pare the sides (3) with a chisel.*

Cutting round stock on the bandsaw

Solid support for round stock. *For a safe cut, clamp round stock in an L-shaped sled that's screwed to a miter gauge. For stability, be sure the clamp sits below the stock's centerline.*

Q: As I was pushing a 12-in.-dia. pillar through a ½-in. bandsaw blade against the fence, the blade suddenly went off track, chewing up the table insert and part of the door that covers the bottom wheel. What happened?

—BILL BALLEZA, Houston, Texas

A: MOST LIKELY WHAT HAPPENED WAS THE PILLAR ROTATED A BIT as you were cutting, snagging the back of the blade and forcing it forward out of the guides. For safety, the pillar should have been stabilized by fastening it to a plywood sled; if the pillar was long, the outboard end of the sled would need to be supported on a roller stand.

On a bandsaw, there is nothing restraining the blade from being pushed forward and out of the guides. It takes only a small amount of pressure on the trailing edge of the blade for it to shift forward. And a ½-in. blade needs to move forward only about ⅜ in. for it to push clear of the side blocks and damage the machine. That's why you should never try to back out of a cut with the blade moving.

—JOHN WHITE, shop manager for *Fine Woodworking*

Photo, this page (top left): John S. Sheldon

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*Source: Preference Test of the Varathane Line versus the Minwax Line of Interior Wood Stains. May 2003

notes & comment

Patrick W. Spielman, 1936-2004

Patrick Spielman. *In the classroom and in print, he encouraged new woodworkers with his knowledge and enthusiasm.*

PATRICK W. SPIELMAN, a prolific woodworking author who wrote authoritative and popular texts on the router and scroll saw, died Oct. 27, 2004, at his home in Fish Creek, Wis. He was 68.

Spielman wrote or co-authored more than 65 woodworking books. Two titles from the 1980s, *Router Handbook* (Sterling Publishing, 1983) and *Scroll Saw Handbook* (Sterling Publishing, 1986), sold more than a million copies each.

Spielman's first book, *Making Wood Signs*, was published by Sterling in 1978, and in the following years his books covered a variety of subjects, from carving to wood turning to clamping strategies. Among his favorite topics was the scroll saw, with numerous titles devoted to scroll-saw techniques and patterns.

Paul Schürch, a California furniture maker and woodworking instructor who uses scroll saws extensively, remembered Spielman's enthusiasm for the saw and called him a "fine educator."

"He was able to get a lot of people interested in the craft that otherwise wouldn't have done it," Schürch said.

Spielman taught high-school woodworking for more than 20 years. His writing, reflecting his classroom experience, usually was aimed at the novice or intermediate woodworker. His books featured clear explanations and emphasized practical or popular designs.

Popular topics. *Spielman's publisher said the author was early to recognize the appeal of the router and scroll saw.*

Charles Nurnberg, president and CEO of Sterling Publishing Co., called the author a "pioneer in the woodworking books industry."

Nurnberg also recalled the author's careful attention to detail. "He was meticulous in not leaving out steps, which a lot of the other technique books tend to do," he said.

Spielman was preparing two manuscripts at the time of his death.

—Steve Scott, associate editor

Hand-carved harp pleases eye and ear

Form and function. *The base features decorative carvings on top and serves as a precisely fitted mounting surface for the harp's soundboard.*

IN MORE THAN 20 YEARS AS A WOOD CARVER AND CABINETMAKER, Will Neptune, a former instructor at Boston's North Bennet Street School, has worked on hundreds of different projects. None has been as unusual, though, as this recently completed work: a 6-ft.-tall concert pedal harp in rock maple, hand-carved in the Art Nouveau style.

"It's the most challenging thing I've ever built," Neptune said, "hands down."

Cutting his design into the hollow column, which conceals part of the harp's mechanical workings, presented unique challenges. Removing too much material might weaken the structure, causing the column to bow or crack when the strings were tightened. Leaving too much wood behind, on the other hand, could make the finished harp too heavy to balance comfortably. Neptune color-matched his stock carefully and paid close attention in sawing and gluing up to ensure that the grain in the carved surfaces would not point to the gluelines.

The piece is finished with garnet shellac mixed with red-mahogany stain and topped with French polish. The instrument weighs 82 lb. but balances easily at the shoulder of a seated harpist.

—S.S.

Photos: Courtesy of Sterling Publishing Co. (top left and right); courtesy of Swanson Harp Co. (bottom left and right)

tools & materials

FINISHING

French polish in a can

Zinsser's new Bulls Eye finish eliminates much of the drudgery connected with the time-honored French-polish finish. To apply a traditional French polish, you need to keep the viscosity of the shellac in your pad just right, adding shellac, alcohol, or oil as needed. You must move at the right speed and use enough—but not too much—linseed or mineral oil as a lubricant. Because the oil will bleed out of the finish, leaving it blotchy, the final step is to clarify the completed finish with naphtha or alcohol. This generally has to be done several times over a period of days.

To make this premixed formula, Zinsser uses dewaxed super-blond shellac flakes and adds isoparaffin, a highly volatile oil, as the lubricant. The paraffin oil evaporates within an hour or two, negating the need for the clarifying step crucial to a traditional French polish. Following the directions on the can, I prepared a wiping pad. For the core, I used felted sheep's wool because it holds its loft indefinitely, and then I covered that with a piece of cotton cloth. I dipped the pad in alcohol and squeezed out the excess before loading it up with the finish. I then added a good amount of Bulls Eye French Polish and started polishing. The results were just as advertised: The finish built fast, and sticking never was a problem.

A 1-quart can costs about $13. Contact Zinsser for information on where to buy it: 732-469-8100; www.zinsser.com.

—Ernie Conover teaches woodworking at his school in Parkman, Ohio.

ROUTING

Foolproof raised-panel doors

Freud has put together complete router-bit sets with all of the profile cutters a woodworker needs to make raised-panel doors. In addition to stile-and-rail cutters and a raised-panel bit, each set includes an instructional video on an interactive CD and a printed poster of instructions illustrated with drawings. The bits, which come in a wooden storage box, are designed to be used on ¾-in.-thick stock, and the carbide knives on the cutters will work with hardwoods, softwoods, and panel products. The 3½-in.-dia. raised-panel bit features Freud's patented 2+2 design: It combines a back cutter with the raised-panel profile to shape both sides of the panel at once. All of the shanks are ½ in. dia. To find a Freud dealer near you, go to www.freudtools.com and click on the "Dealer Locator" button, or call 800-334-4107.

—William Duckworth is an associate editor.

No guesswork. *With the second cutter added to the raised-panel bit, you end up with a tongue sized to fit the groove made by the cope-and-stick knives.*

Photos, except where noted: Rodney Diaz; this page: Ernie Conover (top right)

SHARPENING

Lap-Sharp quickly brings tools to a mirror finish

Slow speed provides fast results. *The turntable on the Lap-Sharp, fitted with abrasive disks, revolves at less than 200 rpm, which minimizes the heat generated by friction.*

For years woodworkers have been searching for the ultimate alternative to sharpening by hand. Many electrically powered sharpening machines simply are too aggressive to achieve a truly sharp edge. The makers of the Lap-Sharp system want to change that.

The price of the LS-200 system is significant: $595 for the basic machine, plus $95 for the tool-guide bar and a self-squaring clamp, and another $34 for a starter pack of abrasives bring the initial total to $724.

The Lap-Sharp system uses 8-in.-dia. aluminum disks to which pressure-sensitive abrasives are applied, and the disks spin on a turntable at 170 rpm. Ample power is supplied through a ⅓5-hp motor that is controlled by a foot switch. The cast-aluminum machine base provides a stable platform.

The standard abrasives are aluminum oxide, but some are made from Trizact, a more durable silicon-carbide paper from 3M. Included with the basic machine are five aluminum disks fitted with aluminum-oxide abrasives ranging from 120 micron to 10 micron, roughly equivalent to about 120- to 800-grit sandpaper. The unit I tested also included an optional set of three honing disks---called the Polish-Pack (available for $67)—fitted with 5-, 3-, and 1-micron abrasives.

Tool-guide bar is adjustable. *For sharpening bevels, the guide bar supports chisels and plane irons at the correct angle (bottom). The bar can be removed for grinding flat surfaces (top).*

The Lap-Sharp can be used either wet or dry. To use it with a lubricant, the manufacturer recommends a water-soluble oil, such as that used by machinists, sprayed onto the disk.

The tool-guide bar comes with an anodized-aluminum clamp that holds the cutting tool firmly in place. The self-squaring clamp rides along the tool-guide bar and allows you to hold the cutting edge steady and to maintain a consistent bevel angle. The clamp works better with longer cutting irons, such as plane blades, than it does with shorter tools, such as Japanese chisels. For more information, contact the manufacturer, Wood Artistry L.L.C., at www.woodartistry.com or by phone at 707-838-1976.

—Tim Albers works wood and repairs machinery in Ventura, Calif.

COMING SOON

A rainbow of colors in MDF

Two corporations, BASF (a chemical company) and Weyerhaeuser (the forest products giant), have teamed up to create a medium-density fiberboard (MDF) that's dyed all the way through its thickness. Freshly cut edges are the same color as the surfaces of the panel, and you won't lose the color by sanding.

Weyerhaeuser is calling this product Color-Burst, and as of this writing, distribution plans were still in the making. For more information, email Bill.Anderson @weyerhaeuser.com.

—W.D.

Photos, this page: Tim Albers (top and bottom left)

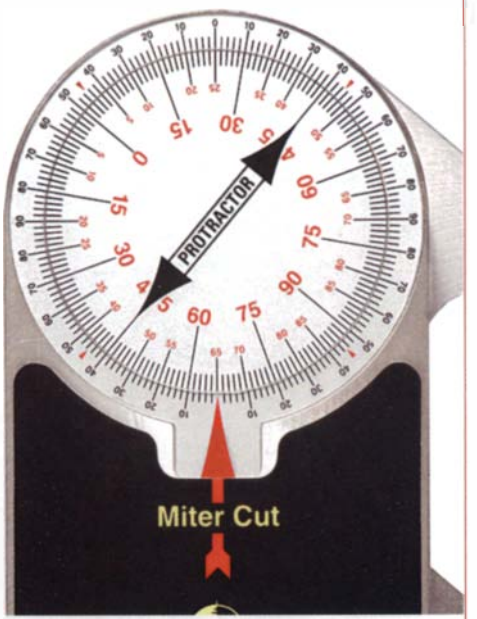
MEASURING

Large protractor for precise setups

The ProSite protractor made by Starrett (model No. 505A) was invented by trim carpenter Marc Shapiro. He became frustrated on a job installing a large amount of prefinished walnut trim (no room for error like a painted job would allow). After spending many hours jostling a sliding bevel and a small protractor to get readings on angles, and then transferring those angles to his miter saw, Shapiro came up with the idea of a tool that would do both. He worked out some of the kinks with wood prototypes before approaching Starrett to develop and manufacture the tool.

This protractor has two pivoting aluminum arms, ¼ in. thick by 2½ in. wide by 12 in. long. The tool works beautifully for what it's designed to do—read and set up miter-saw cuts—and you also can use it for tablesaw setups. The pivoting arms stay put when you've moved them into place to take a reading, and the scales have non-glare faces, so they're easy to read. You can buy the protractor from many woodworking catalogs, local tool-supply stores, and online tool sites for about $40. I'd like to see Starrett come out with a version of this tool that has a scale that doesn't stop at 90°, so you wouldn't have to interpolate to get the actual reading of an angle that's between 90° and 180°.

—W.D.



Two scales to choose from. *The red scale indicates the miter-saw setting for cutting two workpieces, the black scale for fitting one workpiece to an angle.*

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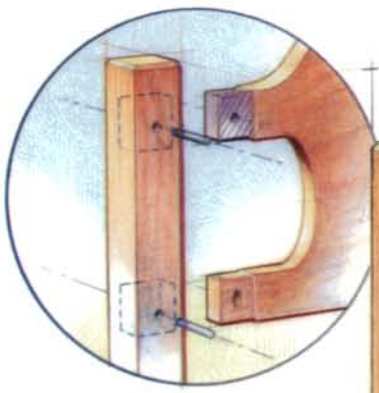


HEADBOARD

Headboards vary in design and can be made from a single, solid board or be of frame-and-panel or post-and-rail construction.

MATTRESS HEIGHT

Consider the thickness of the mattress and the choice of a slatted support or a box spring when determining the height of the side rails.

STANDARD MATTRESS SIZES

TWIN
39 in. by 75 in.

FULL (OR DOUBLE)
54 in. by 75 in.

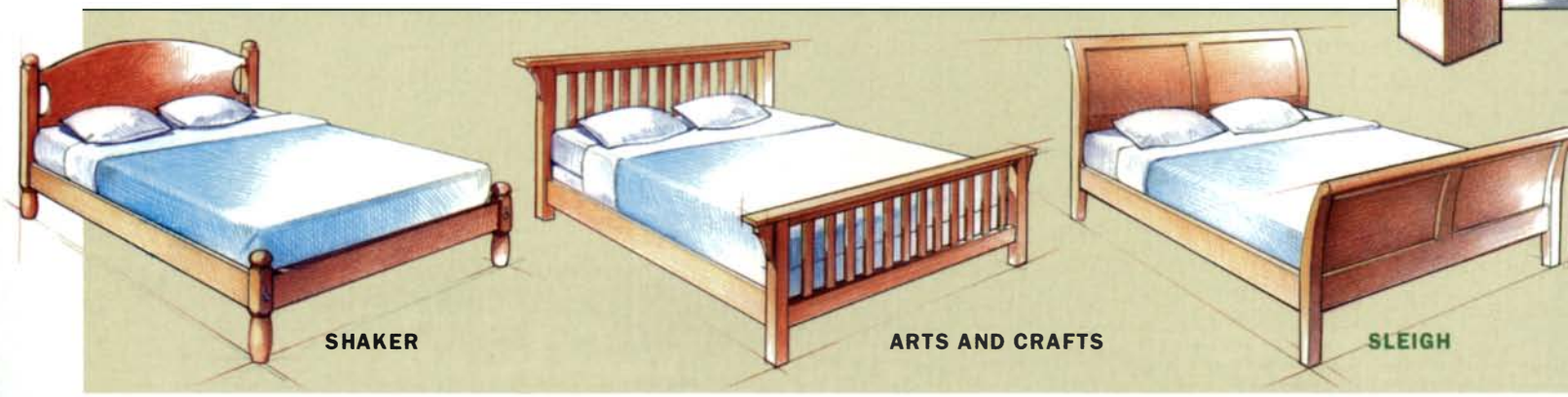
QUEEN
60 in. by 80 in.

KING
76 in. by 80 in.

CALIFORNIA KING
72 in. by 84 in.

POST-AND-RAIL CONNECTION

Bed bolts are the traditional method to obtain a rigid, squeak-free connection between posts and rails. The joint also must knock down for disassembly and transport of the bed.

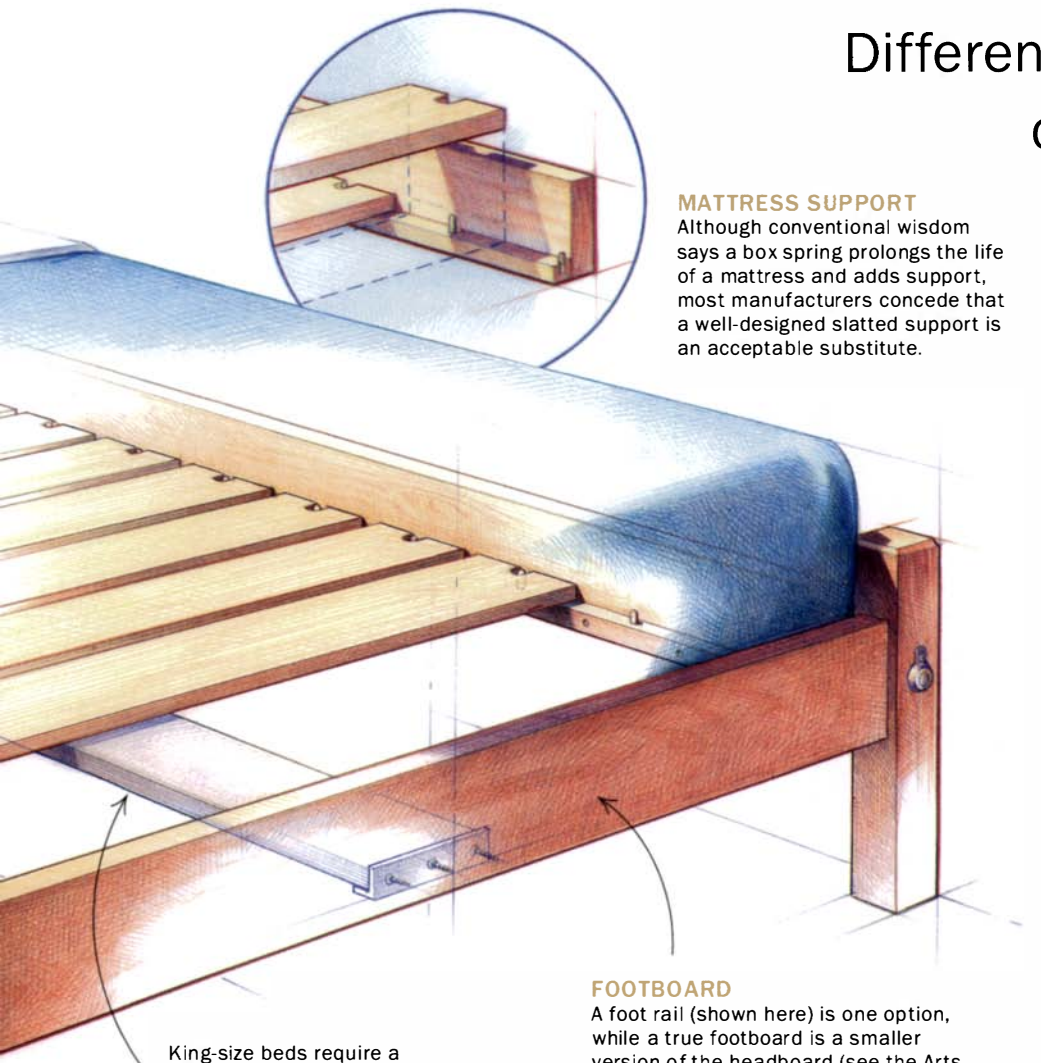


Drawings: Bruce Morser; photos: Mark Schofield

Anatomy of a Bed

Different styles share basic construction details

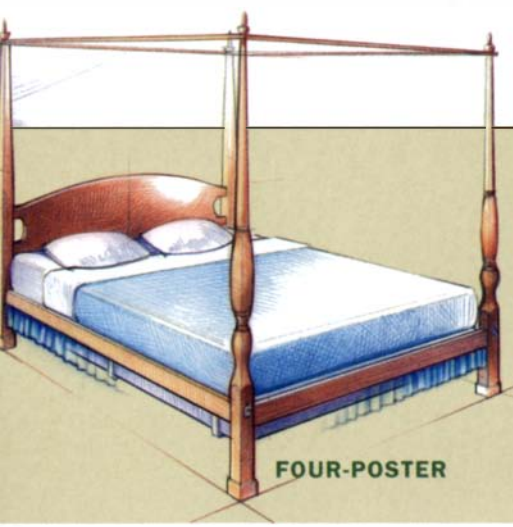
BY JEFF MILLER



MATTRESS SUPPORT
Although conventional wisdom says a box spring prolongs the life of a mattress and adds support, most manufacturers concede that a well-designed slatted support is an acceptable substitute.

FOOTBOARD
A foot rail (shown here) is one option, while a true footboard is a smaller version of the headboard (see the Arts and Crafts and sleigh beds below).

King-size beds require a center rail supported by an angle iron at each end and a leg in the center.



FOUR-POSTER

DESIGN DETERMINES JOINERY

Many styles of beds are united by similar post-and-rail construction. By changing a few details, it's possible to change the look of a bed to suit your taste. Shaker beds typically feature slab headboards and foot rails. Arts and Crafts style beds have both a headboard and footboard made of slats or square spindles. Sleigh beds introduce a curve to their frame-and-panel construction. To keep the lines clean, most designs use concealed hardware. Because of their height, four-poster beds must disassemble completely. All four rails are connected by bed bolts, and the headboard floats in mortises in the posts.

Bed designs may vary widely, but sound construction is a critical part of any design's success. Fortunately, there aren't too many structural issues to deal with. First, you have to figure out the best way to support the mattress and box spring. Also, because most beds need to be transportable, they must come apart quickly and easily, and when put back together be rigid and silent. That means you must choose the best systems for joining the rails to the posts, and the posts to the headboard. I've built countless beds during my woodworking career. Using the techniques I've learned, you can make any style of bed.

Beds come in a variety of standard sizes, but these standards are not absolutes. If your mattress is larger than standard, you'll have to adjust the frame size; but if it is smaller, you should size the frame for a standard mattress so when the time comes to replace it, a new mattress will fit. In general, plan to leave ¼ in. to ½ in. of space on the sides to allow room for the bedding. I sometimes leave a little more room at the end, with a footboard that rises above the mattress, so there is some space to hang your toes off the end of the bed or to accommodate the cord of an electric blanket.

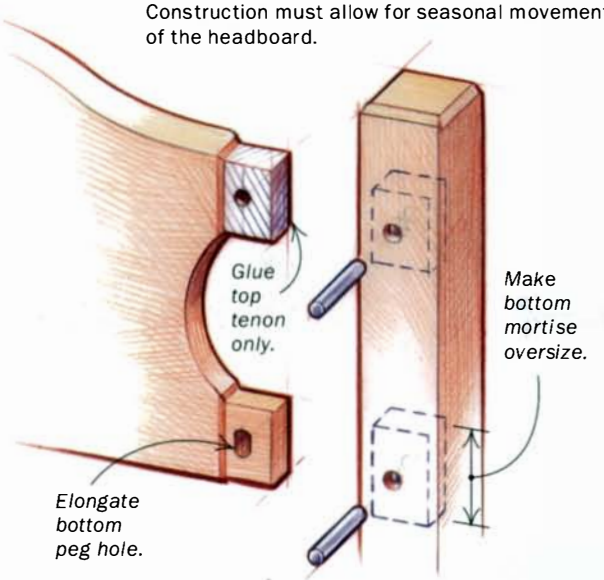
Jeff Miller is a furniture maker in Chicago and the author of Beds *(The Taunton Press, 1999).*

CONSTRUCT THE HEADBOARD

SOLID HEADBOARDS NEED ROOM TO MOVE

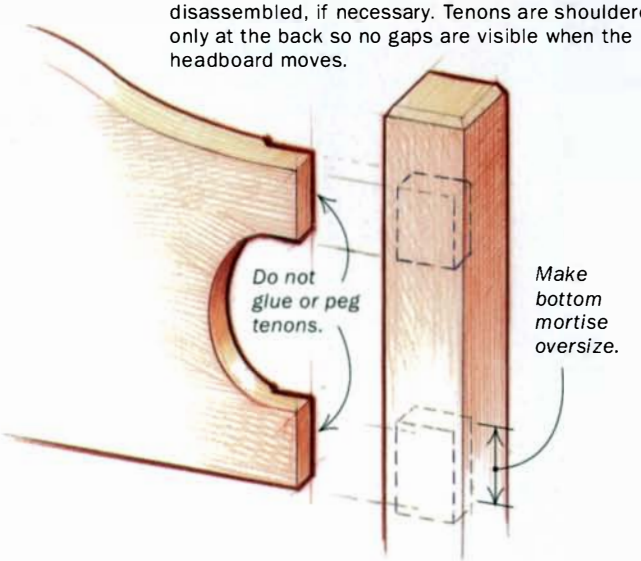
HEADBOARD WITH TWO TENONS

Construction must allow for seasonal movement of the headboard.



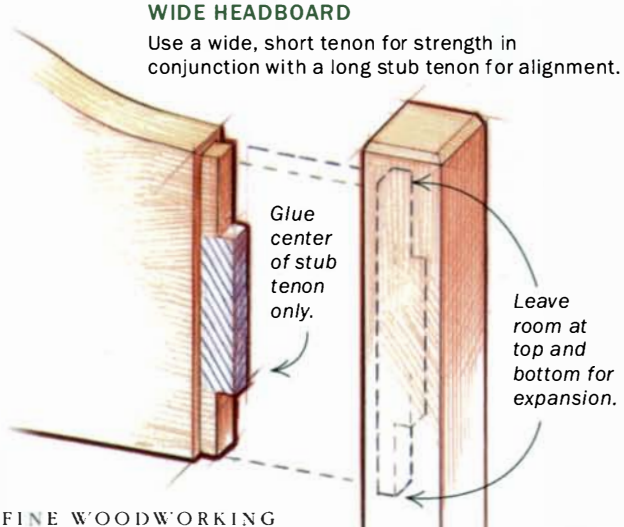
FLOATING HEADBOARD

Use this method to allow for the entire bed to be disassembled, if necessary. Tenons are shouldered only at the back so no gaps are visible when the headboard moves.



WIDE HEADBOARD

Use a wide, short tenon for strength in conjunction with a long stub tenon for alignment.

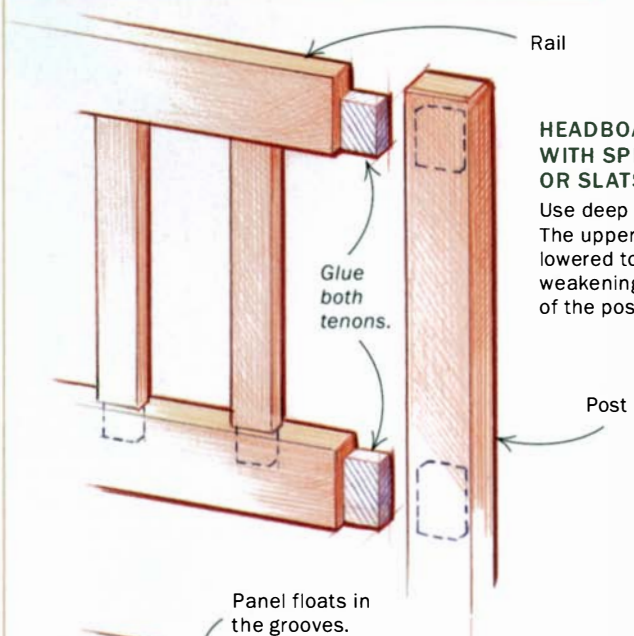


The headboard (and footboard, if there is one) assembly usually is built as a unit, with mortise-and-tenon joints connecting the rail to the two posts. The mortise-and-tenon provides the maximum strength to this connection, but the details of the joint vary based on the bed's design. On a wide plank headboard, some allowance must be made for wood movement. With two separate tenons, glue only the upper one, or use a wide, short tenon floating in a long, shallow mortise, anchored in the center with a full-depth tenon that is glued.

On a four-poster bed, the headboard plank simply floats (without glue) in deep, slightly oversize mortises. The headboard then can be removed when the bed needs to be disassembled.

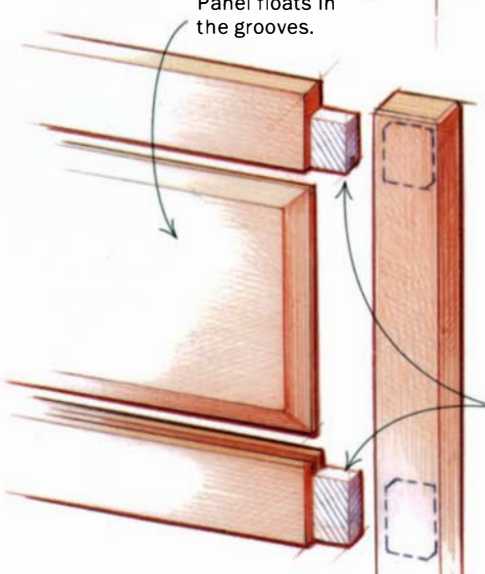
A headboard that has slats, spindles, or a frame-and-panel design will have a crest rail tenoned into the top of the posts. Be sure to offset the mortise-and-tenon joint toward the bottom of the crest rail so you leave as much wood as possible at the end of the post, above the joint.

SLATS OR PANELS REQUIRE POST-AND-RAIL CONSTRUCTION



HEADBOARD WITH SPINDLES OR SLATS

Use deep tenons. The upper tenon is lowered to avoid weakening the top of the post.



HEADBOARD WITH PANEL

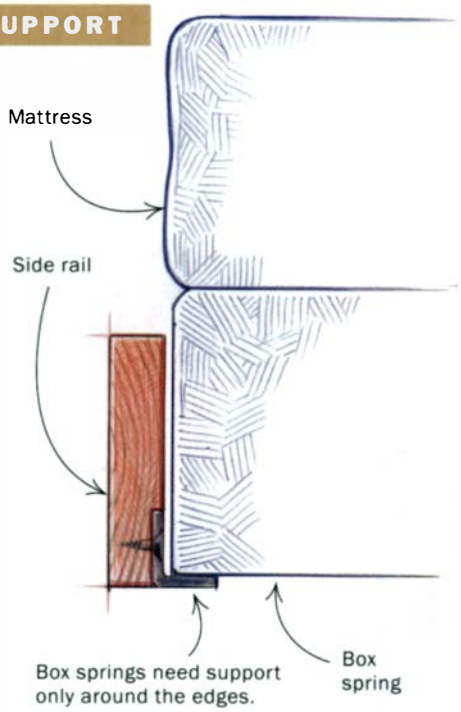
The panel's grain can run vertically or horizontally, but in either case, the panel must be sized to allow for movement.

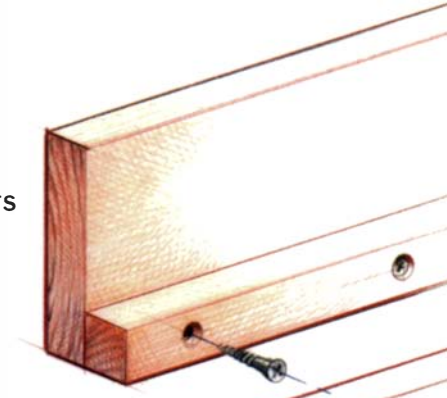
SUPPORT THE MATTRESS

BOX SPRINGS NEED EDGE SUPPORT

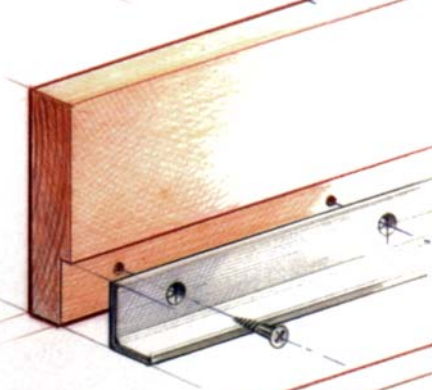
About 80% of the mattresses sold in the United States come with a box spring. Full- and queen-size box springs need support around the edges in the form of wooden cleats, angle iron, cast-iron hangers, or aluminum extrusions. All of these supports are screwed to (and sometimes recessed into) the side rails. King-size box springs come in two halves for portability and need an additional support down the center of the bed that's wide enough to support both halves, with a leg in the middle of this support.

The side rails are typically 5 in. to 8 in. wide and 1 in. to 1¾ in. thick. The combined width and thickness should be enough to prevent the rail from sagging under load. I usually use 6-in.- or 7-in.-wide rails with a box spring; but to hide the box spring completely, the rails must be close to 8 in. wide. This choice is strictly a design decision.

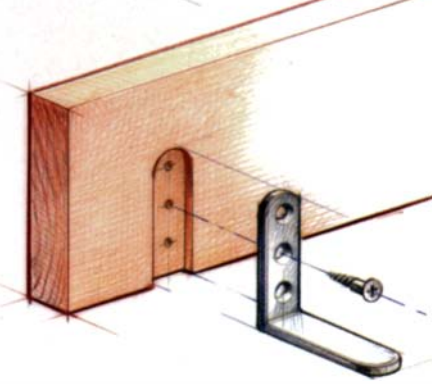




WOODEN CLEATS
An economical choice, wooden cleats are glued and screwed to the rails.



ANGLE IRON
Angle iron can be purchased or recycled from old bed frames. Run a rabbet in each rail, then screw the angle iron in place.



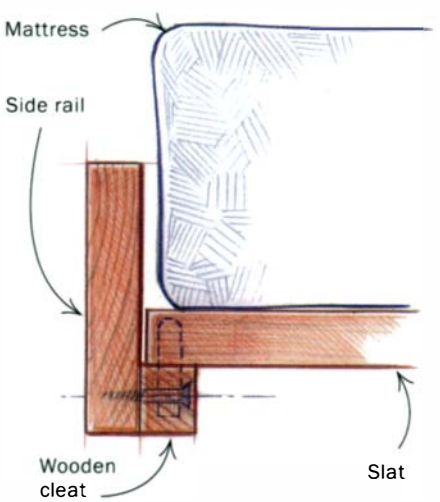
CAST-IRON HANGERS
Because of their length, cast-iron hangers support a greater range of box-spring widths. They can be mounted slightly below the rail to lower the mattress height.

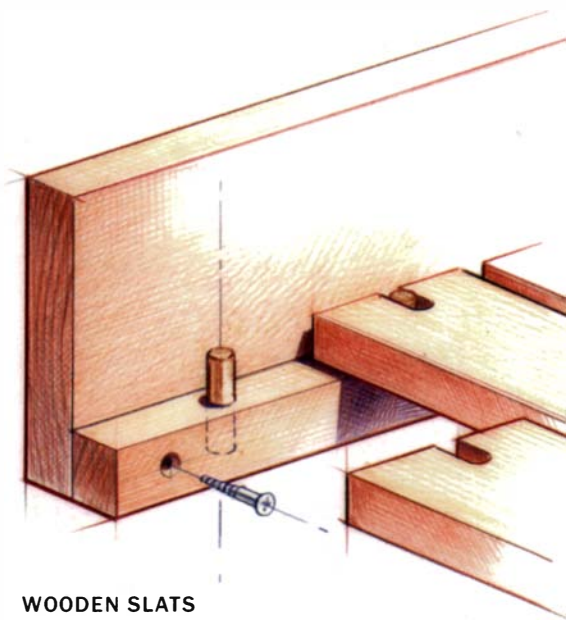
FOR A LOW PROFILE, USE SLATS INSTEAD OF A BOX SPRING

In Europe, 80% of mattresses are designed to be used without a box spring and to be supported by wooden slats. I find the slatted support a little firmer, but the choice is up to you.

I use ¾-in.-thick by 4-in.-wide slats, which are thicker and wider than commercially available ones. Spaced 1 in. apart, the slats provide some flex for comfort and also allow for air circulation around the mattress or futon. Soft maple or poplar makes good slats, but avoid softwoods, which are too flexible. The slats usually rest on wooden cleats. To keep the slats from shifting, I notch the ends, fitting each slat over a dowel that protrudes from the cleat. On a king-size bed, I add a strut down the center from headboard to footboard, with a leg in the middle.

Some mattresses are designed to be used with solid platforms, which are made of plywood with support underneath to prevent the plywood from sagging. However, because these platforms do not have built-in flexibility or give, they should not be used with regular mattresses.



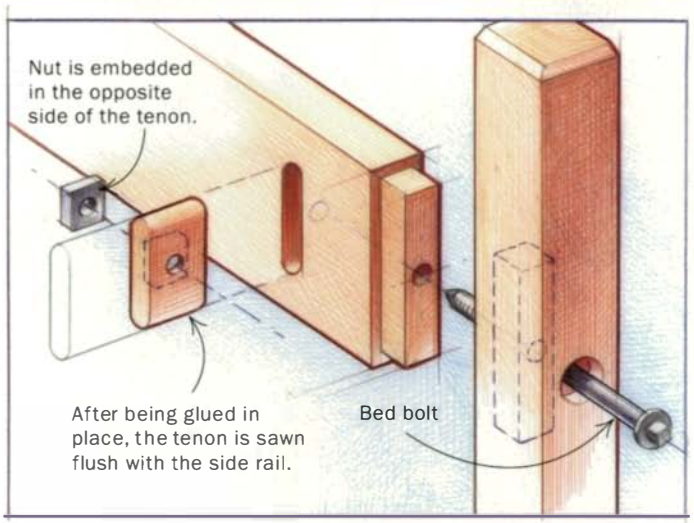


WOODEN SLATS
Slats combine the right amount of support and give for a mattress. Notching them to fit around dowels fixed to the cleats prevents the slats from shifting.

THREE SOLID POST-AND-RAIL JOINTS

Because the side rails support the mattress, the joints between the side rails and the bedposts are important to the overall solidity of the bed. Yet they need to be disassembled easily. This is an interesting challenge, considering that wood expands and contracts with seasonal humidity changes. Wood also can compress, either as a result of seasonal changes operating against a metal fastener, or due to the stresses placed on the bed in use. There are a wide variety of fasteners available that attempt to meet this challenge.

BED BOLTS ARE TRADITIONAL



Traditional bed bolts are forged to have a square-drive head that flares out, creating a broad bearing surface on the wood. Regular bolts employ a washer for the same effect. To install both types of bolt, a counterbored hole is drilled through the bedpost and into the rail, where it meets either a nut embedded in the rail (for the traditional bed bolt) or a nut and washer in a recess. The bolt alone is not enough to hold the rail securely and to prevent rotation, so either a shallow mortise-and-tenon or a pair of dowels is needed to complete the glueless joint.

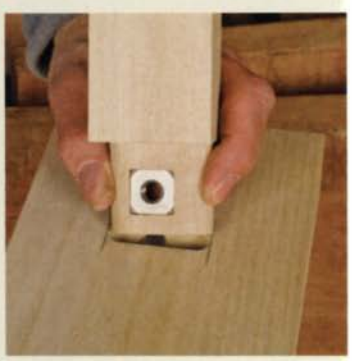
Another modern approach is to use bolts and washers with barrel nuts. This approach does not require a special wrench. Alignment of the drilled holes, however, is critical, and barrel nuts that are large enough to use with 5/16-in. or 3/8-in. bolts often require 1½-in.-thick rails. There are many approaches to dealing with the bolt hole in the post: The simplest is to treat it as part of a quality joint and to leave it exposed. More likely, you'll want to conceal the hole, either with a brass cover screwed to the bedpost above the bolt hole or with a simple mushroom-shaped wooden plug, although the latter tends to work its way loose.

A new bed bolt. *Traditional bed bolts (rear) have stood the test of time, but newer bolts with barrel nuts (front) are easier to install. Simply drill a hole on the inside face of the rail and drop in the barrel nut.*

INSTALLING BED BOLTS

Drill the bolt hole. *After drilling through the post into the tenon, remove the post and complete the hole to its full depth.*

A recess for the nut. *Use a plunge router and a straight bit to cut a mortise on the inside of the rail.*

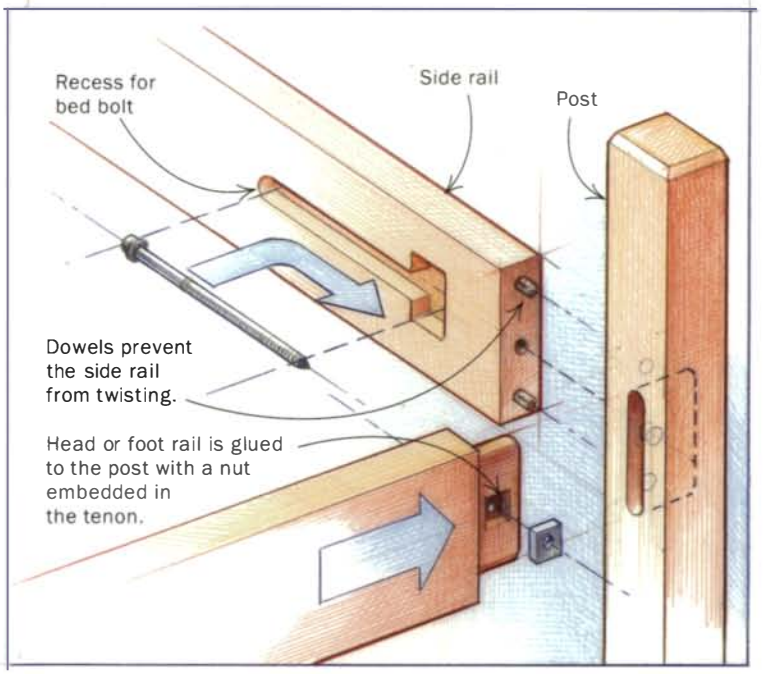


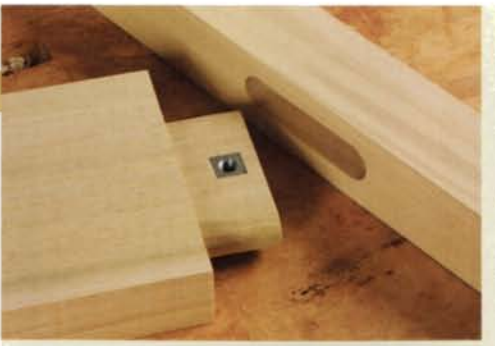
Locate the nut. *Fit a tenon into the mortise, insert the bolt, and give it a sharp tap to leave an indentation (left). Drill a hole at the mark and inset the nut into the tenon. Glue the tenon into the rail with the nut facing away from the post (right), and trim it flush.*

One tight joint. *After cutting the tenon flush with the rail, insert the bolt through the post and crank it tight with the bed-bolt wrench.*

HIDE BED BOLTS FOR A CLEAN LOOK

You also can bolt a bed together from the inside of the rail, leaving no holes or hardware visible on the outside. This involves embedding the nut in the tenon of the headboard or footboard rail, then routing a specially shaped recess on the inside of the side rail. It helps to make a jig for routing the recess in the rail.





INSTALLING HIDDEN BED BOLTS

Hidden nut. *The nut is inset into the tenons on the head or foot rail and faces away from the side rails.*

Hidden bolt. *Use a jig to rout a T-shaped slot inside the side rails (above). Then insert the bolt and tighten it into the nut embedded in the head or foot rail (right).*

BRACKETS ARE FAST AND INVISIBLE

There are many types of two-part fasteners for attaching the side rails to the posts. Look for the most solidly made hardware. Because screws driven into end grain don't have a lot of holding power, you should glue dowels into the rails to provide some long grain for the screws to pass through. Use the largest screws possible when attaching all parts of the hardware. If the fasteners loosen up, it is hard to fix the problem. For all of these reasons, my preference is to use fasteners only on occasionally used beds.

INSTALLING BED-RAIL BRACKETS

Install the clip plate. *Glue hardwood dowels into the inside of the side rail to give the screws something to bite into besides end grain.*

Make room for the clips. *The strike plate is recessed into the post. In addition, deeper mortises are required to accommodate the two clips.*

TOOL TEST

Tenoning Jigs

Tablesaw jigs ensure accurate and repeatable joinery

BY STROTHER PURDY

THE PARTS OF A TENONING JIG

A tenoning jig is similar to a miter gauge in that it slides front to back in the miter-gauge slot of the tablesaw while supporting a workpiece. In a tenoning jig, though, the workpiece is clamped in a vertical position.

Adjustable bar improves accuracy. *Any sloppiness in the fit of the bar to the miter-gauge slot can make for inaccurate cuts. On several of the jigs, the fit of the bar in the miter-gauge slot can be adjusted. Some jigs incorporate a spring-loaded ball-point (left) to do the job; others use a threaded pin.*

Photo, this page (top): Rodney Diaz

Examine any well-cut tenon, and you'll find cheeks that are flat, smooth, and parallel—three characteristics that help produce a strong mortise-and-tenon joint. And while tenons can be cut in an assortment of different ways, many woodworkers find they produce well-cut tenons most consistently with the use of a jig.

When cutting a typical tenon, the jig holds the workpiece square to the table in two directions—side to side and front to back. However, the jig may be adjusted for angled work.

You can cut the cheeks of a tenon in just two passes over the blade. Then, the tenoning jig is set aside and the miter gauge is used to cut the shoulders. The process is easy, fast, and accurate.

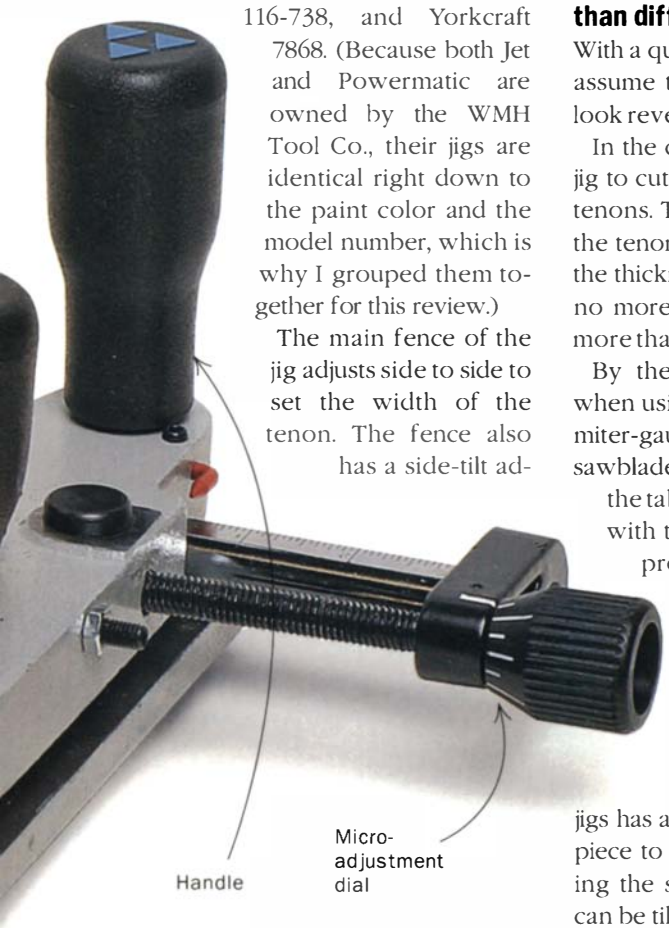
Currently, there are a number of tenoning jigs on the market, and I gave 10 of them an up-close look in my shop. The list includes the Delta 34-183 and 34-184, Garrett Wade 18P04.06, General 50-050, Jet/Powermatic 708295, Rockler 29840, Shop Fox H5782, Woodcraft 144755, Woodtek 116-738, and Yorkcraft 7868. (Because both Jet and Powermatic are owned by the WMH Tool Co., their jigs are identical right down to the paint color and the model number, which is why I grouped them together for this review.)

The main fence of the jig adjusts side to side to set the width of the tenon. The fence also has a side-tilt adjustment. A secondary fence offers front-to-back tilt adjustment that's also helpful when making certain cuts.

Achieving the right tenon thickness required a bit of fiddling with most of these jigs. First, loosen a large and then a small locking handle to move the main fence to approximately the right distance from the blade. Then engage a micro-adjustment dial to fine-tune the tenon thickness. Finally, after locking the fence in place by tightening both the small and large locking mechanisms, you're ready to make a cut.

On the Delta 34-184, however, the process was simpler. First, loosen just one locking knob. Then push a lock button that allows you to slide the main fence into its approximate position. Then fine-tune the position and tighten the locking knob.

All of the jigs feature a scale to provide some guidance when measuring the distance from the blade to the jig. But I found all of the scales to be somewhat crudely made, offering little practical value.



The jigs have more similarities than differences

With a quick glance at these jigs, you might assume they're all identical. But a closer look reveals some subtle differences.

In the course of the review, I used each jig to cut several 2-in.-wide by 1½-in.-long tenons. Then I measured the thickness of the tenons at several points. In each case, the thickness of any given tenon varied by no more than 0.002 in., a number that's more than acceptable.

By the way, to ensure accurate cuts when using any of these tenoning jigs, the miter-gauge slots must be parallel with the sawblade and the blade must be square to the tabletop. So before making test cuts with the jigs, I made sure my saw was properly adjusted.

Delta 34-183, Shop Fox, and Woodcraft—A pair of vertical handles distinguishes these three jigs from the others in this review. When an angled cut is called for, each of these jigs has a main fence that can tilt the workpiece to the left up to about 18°. Also, using the secondary fence, the workpiece can be tilted forward up to 45°, and an adjustable stop makes it easy to return automatically to the 90° position.

You need an Allen wrench to adjust the

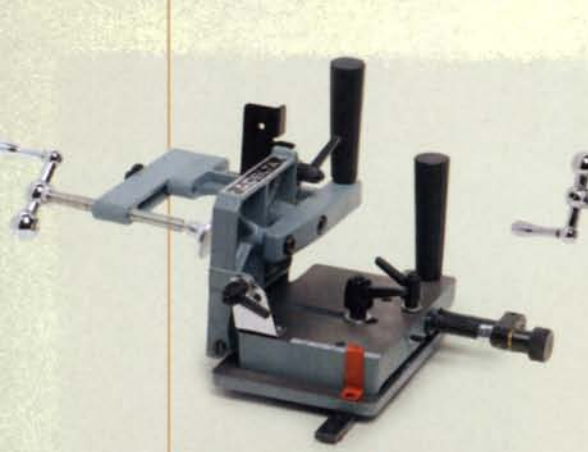
KEY FEATURES

Side-tilt adjustment. *The jigs have a main fence that can be tilted left up to 18°, 24°, or 45°, depending on the manufacturer.*

Front-to-back tilt adjustment. *Using the secondary fence, each jig allows the workpiece to tilt backward up to 45°.*

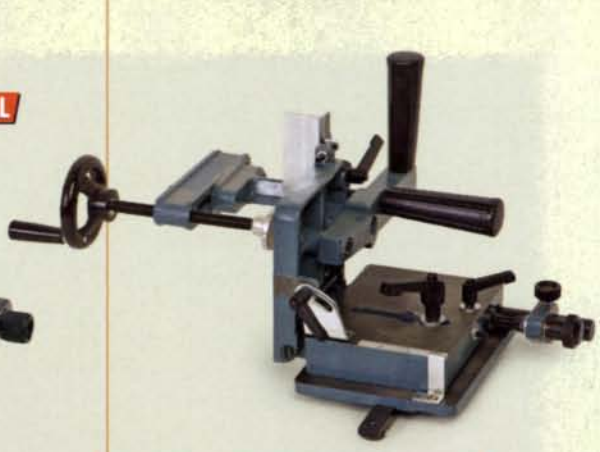
Side-to-side adjustment. *When it came to establishing the tenon width, the Delta proved easiest to use—just push a release button, slide the main fence sideways, and then fine-tune the location with the micro-adjustment dial.*

Photos, except where noted: Tom Begnal; this page (right column): Rodney Diaz



DELTA 34-183

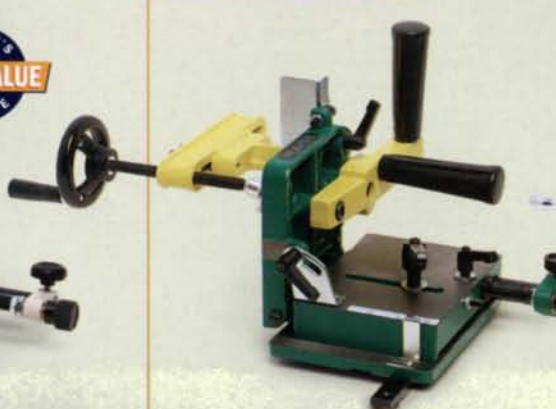
DELTA 34-184



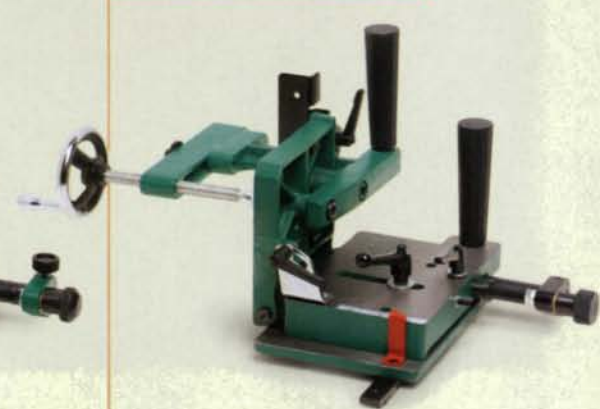
GARRETT WADE 18P04.06

Model	Contact	Price	Maximum workpiece thickness	Side tilt	Back tilt	Guide-bar adjustment
DELTA 34-183	800-438-2486	$85	3⅜ in.	18°	45°	Pin
BEST OVERALL DELTA 34-184	800-438-2486	$100	3⅜ in.	18°	45°	Pin
GARRETT WADE 18P04.06	800-221-2942	$100	3⅜ in.	24°	45°	None
GENERAL 50-050	514-326-1161	$100	2⅝ in.	45°	45° (front and back)	Ball-point
JET/POWERMATIC 708295	800-274-6848	$100	3⅛ in.	24°	45°	None
ROCKLER 29840	800-279-4441	$106	3⅜ in.	24°	45°	None
SHOP FOX H5782	800-840-8420	$80	3⅜ in.	18°	45°	Pin
WOODCRAFT 144755	800-225-1153	$70	3⅜ in.	24°	45°	Pin
WOODTEK 116-738	800-645-9292	$80	3⅜ in.	24°	45°	None
BEST VALUE YORKCRAFT 7868	800-235-2100	$60	3⅜ in.	24°	45°	Ball-point

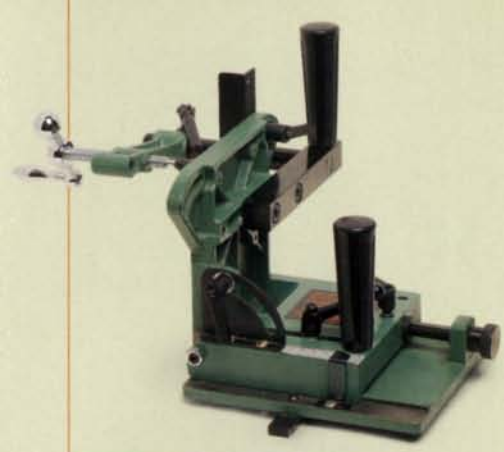
YORKCRAFT 7868



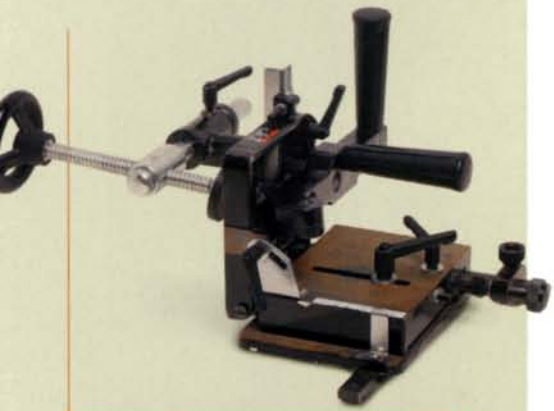
WOODTEK 116-738



WOODCRAFT 144755

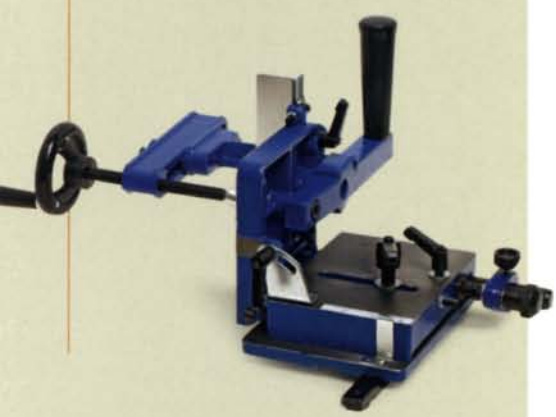


GENERAL 50-050

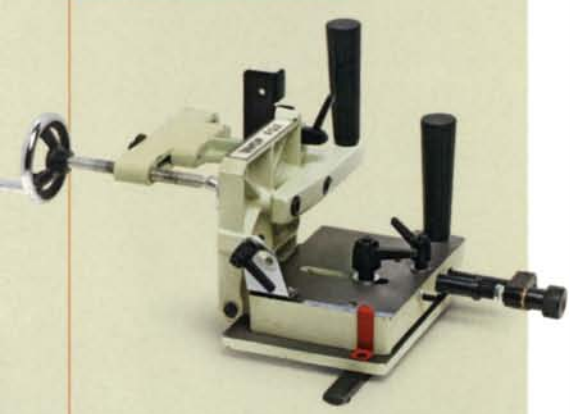


JET/POWERMATIC 708295

ROCKLER 29840



SHOP FOX H5782



position of the clamp on these jigs. A knob would have made the process easier.

Delta 34-184—This Delta jig offers two handles, both positioned vertically. The main fence tilts left to about 18°. The secondary fence tilts forward up to 45° and includes an adjustable stop that automatically returns the jig to 90°. You need only turn a knob to adjust the clamp position.

Garrett Wade, Jet/Powermatic, Rockler, Yorkcraft, and Woodtek—Each of these jigs has a main fence that tilts left to about 24° and a secondary fence that tilts forward up to 45°. And they all have an adjustable stop that allows you to get back to exactly 90°. All of these jigs have one vertical and one horizontal handle. The Jet/Powermatic also could be set up with two vertical handles.

Jet/Powermatic makes it easy to position the clamp arm—you just turn a handle. Garrett Wade, Rockler, Yorkcraft, and Woodtek make you look for an Allen wrench.

General—The left-tilt mechanism on the General achieves 45°—no other jig tilts that far—but the horizontal handle must be removed to provide clearance. In addition to the typical 45° backward tilt, the General is the only jig that tilts forward the same amount. But in both cases it lacks an adjustable stop to establish repeatable 90° settings.

The clamping arm swivels up and down, as well as back and forth, to accommodate a wider range of workpiece sizes and shapes. But it has only two front-to-back positions. So, to switch from one to the other, you have to remove the handle, then unthread the rod from one position, rethread in the other one, and remount the handle.

There are four holes in the jig for the two handles, giving a range of options both horizontally and vertically.

Oddly, the General jig does not automatically align itself parallel to the tablesaw blade when tightened in position. There was play between the fence and base, about 1/32 in. over 3 in., which is more than enough to cut a misaligned tenon. To avoid the problem, you need to make sure the fence always bears against the same side of the base when you tighten it.

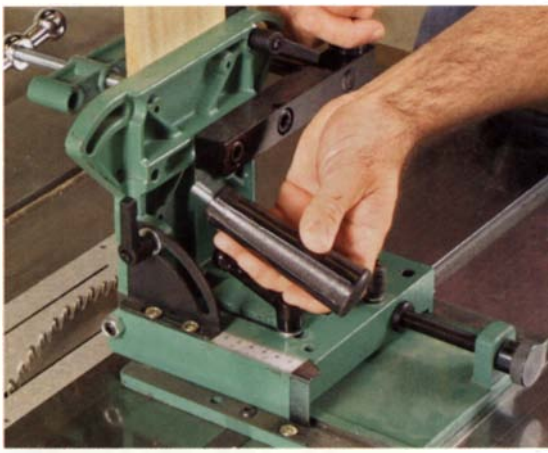
Also, the fence didn't reach all the way to the blade on my Powermatic 66 saw, which has a slot that's 5½ in. from the blade. So I had to add a scrap block to the fence of the jig to serve as a spacer.

Choosing a favorite

Each of these jigs was able to do a good job cutting tenons. So the differences among them came down mainly to ease of use.

My favorite among this bunch of jigs was the Delta 34-184. Positioning the workpiece proved to be quick and easy, making it the simplest jig to use. It had an easy-to-adjust clamp system. The bar can be tweaked for a snug fit in the miter slot. And the front-to-back tilt includes an adjustable stop.

If you're on a tight budget, consider the Yorkcraft. It made satisfactory cuts, yet it sells for $60, some 30% less than the average price of about $88 for these jigs. □



Adjustable handle. *Most of the jigs offer at least one alternate handle position.*

Knob makes adjustments easier. *When wide stock dictates that the clamp arm has to be slid forward, Purdy preferred the jigs that locked the arm with a knob (shown) over those that called for an Allen wrench.*

Strother Purdy is a furniture maker in Bridgewater, Conn.

Corner Cupboard

This space-saving piece enhances any room

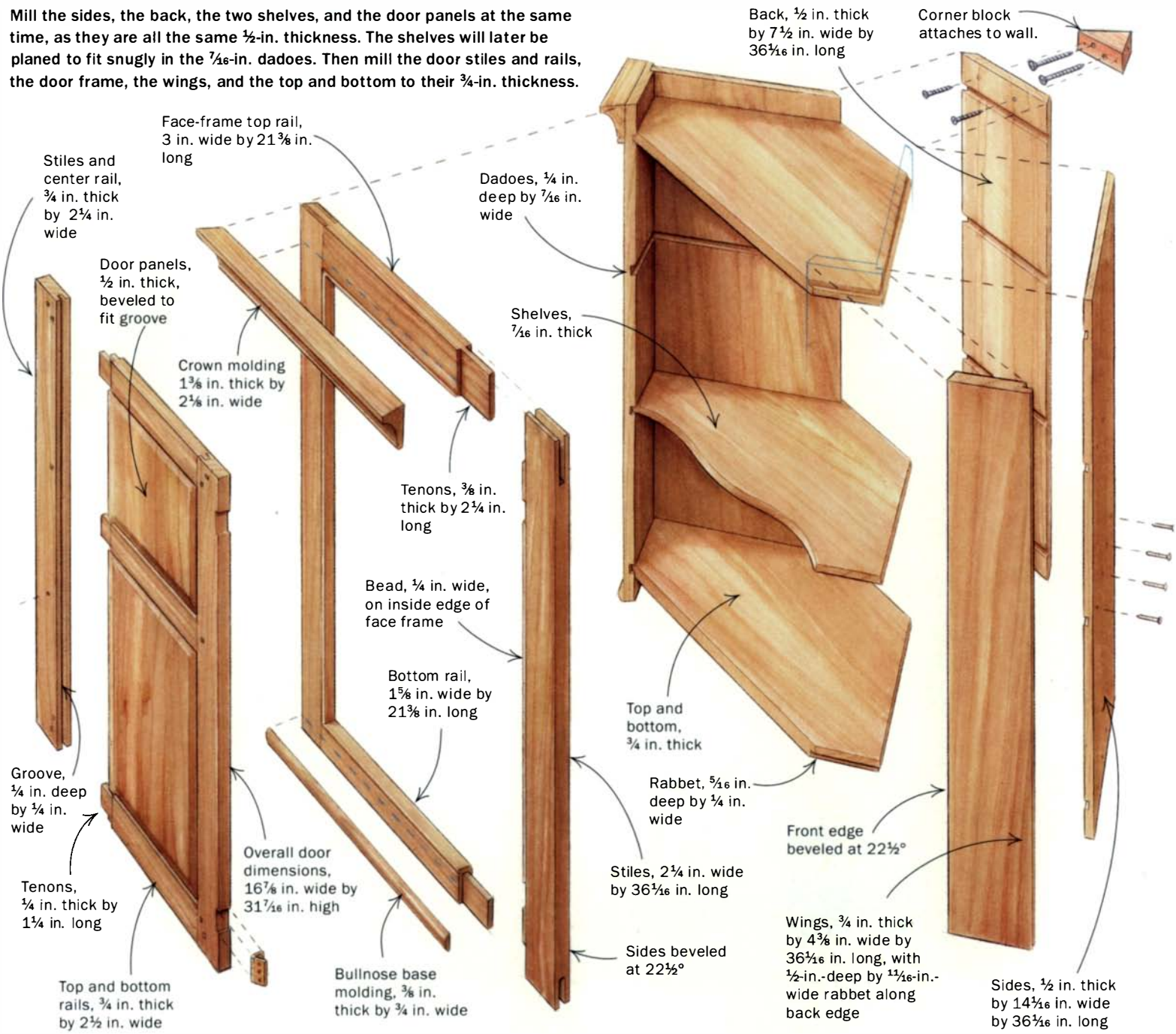
BY GARRETT HACK

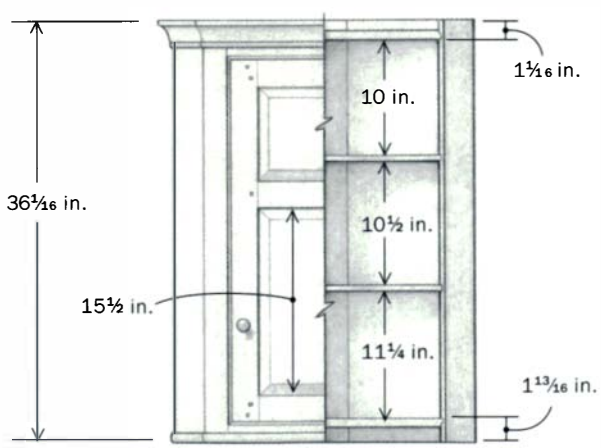
On every trip to the Shelburne Museum near Burlington, Vt., I visit a favorite object—a small hanging corner cabinet. With a single curved door, nicely shaped cornice, and molded base, the cabinet beams from its corner. Shelburne's cabinet was on my mind as I set about designing one for my house. The result is a country-style piece with delicate details.

Because so much of the carcase is hidden, a possibility is to build most of it from a less-expensive secondary wood, and the cabinet's facade from some special figured wood. However, I decided on butternut, walnut's country cousin, for the entire piece because of its warm brown color,

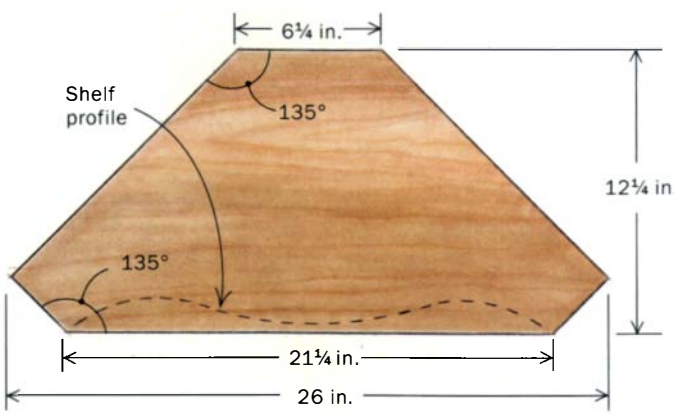
CORNER-CABINET CONSTRUCTION

Mill the sides, the back, the two shelves, and the door panels at the same time, as they are all the same ½-in. thickness. The shelves will later be planed to fit snugly in the 7/16-in. dadoes. Then mill the door stiles and rails, the door frame, the wings, and the top and bottom to their ¾-in. thickness.





NOTE: The top, bottom, and shelves have the same dimensions, but the shelves are cut with a decorative curved front.



Drawings: Bob La Pointe

CONSTRUCT THE CASE AROUND THE SHELVES

Lay out the pieces. *Use a combination gauge to lay out the lines on the top, bottom, and shelves where the wings will meet the sides (left).*

Profile the shelves. *Stick the two shelves together with double-faced tape and then use a bandsaw to cut the profile on both pieces.*

pleasing grain, and delightful workability with plane and chisel.

Use a full-size plan to help cut parts with odd angles

A full-size plan helps me visualize the parts, their angles, and the way they join together. It also allows me to lift dimensions and joinery details directly from the drawing, which results in fewer errors.

Mill the sides, the back, the two shelves, and the door panels at the same time, as they are all the same ½-in. thickness. The most economical and efficient way to do this is to resaw an 8/4 plank, grain-match the pieces, and glue up the parts. If you have some wide boards, so much the better. Then mill the door stiles and rails, the face frame, the wings, and the top and bottom to their ¾-in. thickness. Leave every part square edged for now.

Now cut the shelves, top, and bottom to shape, measuring from the plan. A useful way to get all of these parts the same size is to clamp them together and plane each set of four edges at once. Check with a large square that the two sides are angled at 90°.

The top and bottom are rabbeted on all edges but the front, to produce a tongue to be fitted into the dadoes in the back, sides, and wings. When rabbeting the bottom of the top, note that it's a visible surface. Finish planing the inside surface of the bottom (the first shelf) before creating the tongue, so as not to change its size. I used a rabbet plane to fit each tongue in a dado cut in scrap to avoid damaging the actual piece. Chamfer the edges of the tongue so that it will enter the dado easily when gluing up.

Cut to length the sides, wings, and back, and lay out the four dado cuts on one of the parts. I cut the dadoes on a tablesaw, but they also could be cut using a router. Reference each dado cut from the bottom of each part, and run the same dado on the back, wings, and sides with each setup. The dadoes are ¼ in. deep by 7/16 in. wide; the shelves are planed to a snug fit. Be sure to run the same dado on a scrap or two to aid fitting the top and bottom later.

Photos: Mark Schofield

Join the wings and sides. *Check that the wings and sides meet at 90°, then glue the joint, reinforcing it with brads.*

On each of the wings, first rabbet one edge at least 3/16 in. wider than the thickness of the sides to create a small extension for fitting the cabinet to the wall later. Referencing from the rabbeted side, cut each wing to width and at the bevel angle it will meet the face frame—22½°. Plane this edge for a tight-fitting miter. Cut the cabinet sides to width and their back edges at 45°. Plane and sand the insides of the sides and the wings and glue them together. Make sure the dadoes are aligned and the parts are square to one another. Clamp them and add a few small screws or brads.

Dry-fit the case and shape the shelves

Dry-fit the two side and wing pieces, the shelves, and the top and bottom, using a screw or two to hold things together, if needed. Now mark where the curve of the

Dry-fit the carcase before final assembly. *To check how the parts fit, lay one side and wing on the bench, insert the top, bottom, and shelves in their dadoes, then lower the other side into place (above). For the final assembly, secure the sides with glue and screws. Angle the holes forward so that the screws securing the top, bottom, and shelves bite into side grain. Attach the back using only screws to allow for seasonal movement (left).*

1 MAKE THE FACE FRAME

Bead the inside edge. *The beading on the inside edges of the stiles and rails can be cut using a scratch stock, a router, or a molding plane.*

Cut the bridle joint. *Use a tenoning jig to cut a slot in the end of each stile of the face frame. The rails of the frame are tenoned to fit the slots in the stiles, completing the bridle joint.*

Mitered bead. *Using a guide block that straddles the stock (top), cut the face-frame beading at a 45° angle. Done correctly, the joint is seamless.*

shelves starts, on the inside of the cabinet where the bevels of the wing and face frame meet. The front edges of the top, bottom, and shelves should be flush with the inside edge of the wings' bevel. The back edges of the top, bottom, and shelves should extend nearly ¼ in. to enter the dadoes in the back piece.

Disassemble the case and mark out the shape of the front edge of the shelves. Cut close to the line on the bandsaw and use a spokeshave to plane it to a smooth and fair curve. If you wish to display plates, cut a plate groove in the shelves and/or bottom with a tablesaw or router. The groove should be ¼ in. deep by ⅜ in. wide, and stop 2¼ in. from the sides.

Bead and build the face frame

The face frame consists of two rails and two stiles. The frame strengthens the cabinet, adds rigidity to the door opening, and provides a place to attach the cornice and base moldings. The stiles of the frame have beveled edges that mate with the cabinet's wings. Leave the stiles at least 5/16 in. oversize in width and square edged.

Before cutting any joints, bead the inside edges of the stiles and rails with a scratch stock, a router, or a molding plane. Use scrapwood to set up the tablesaw to cut the slots and tenons for bridle joints that connect the rails and stiles. To produce the neat appearance of a mitered bead at each inside corner of the face frame, cut away a section of wood from the side of the tenon and the slot. The width of this cut is equal to the width of the bead. With a guide block straddling the stiles and rails, use a chisel to pare away the bead and quirk at a 45° angle.

Trial-fit the face frame and beads, sand the beads smooth, and mark out and cut mortises for the hinges. Finally, glue the frame together, leaving it oversize in width.

Assemble the case

Before assembling the case, plane or sand the shelves and the inside surfaces of the top (the bottom was done earlier). Do one last dry-fit of the entire case, less the face frame and back, which will be added later. Drill holes in the sides for the screws, angling them toward the front to grab some of the side grain of the top, bottom, and shelves.

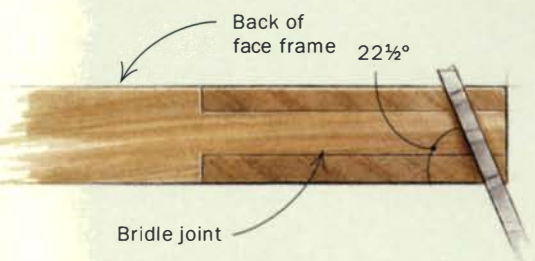
Glue the bottom, shelves, and top to one of the side pieces; then with this assembly lying on its side, add the other side. Very little glue is needed.

Be careful not to damage the exposed miters on the wings. Check that the shelves, top, and bottom are in their proper position, and screw the case together. Cut the back to size, plane or sand the inside surface, and attach it to the sides using screws but no glue because it is cross-grain to the shelves.

The last and trickiest part of the assembly is to fit the face frame. To gauge the location of the miters, lay the frame on the carcase, centered in the opening. Mark the miters with a pencil, and then go to the tablesaw and rip both at 22½°, leaving the lines visible.

2 FIT THE FRAME TO THE CASE

Bevel the face frame. *Rip a 22½° bevel on the stiles of the face frame. Make sure to leave a little margin that can be planed away when fitting the frame.*



What's tricky about the final fitting is maintaining the miter angles where the face frame and wings mate, and fitting the frame tightly against the top and bottom. With a handplane, take a shaving at a time from the frame and/or the top of the wings, checking the fit as you proceed.

Both long-edge miters are glued as well as the front edges of the top and bottom. Apply glue sparingly so as not to have much squeeze-out on the inside surfaces, where it will be difficult to clean up. To achieve clamping pressure at the correct angle for the miter joint, rip a 22½° bevel on one corner of two strips of scrapwood. Clamp a strip to each stile and then use clamps pulling on the strip and the back of the case to pull the miter together.

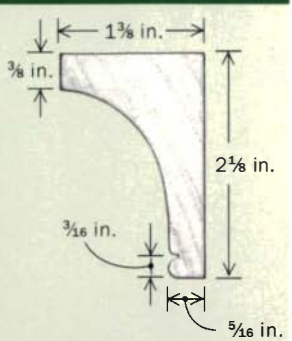
Add moldings to the top and bottom

The style of the case moldings can dramatically alter how this cabinet looks (see the bottom drawing on p. 52). I chose a cove for the crown that can be cut on a tablesaw

Fit the face frame. *Check that the wings and frame form a tight miter joint when the frame is in contact with the top and bottom of the cabinet.*

A tricky clamping angle. *Clamp a strip of wood with one corner beveled at 22½° to the face frame. Use this as a caul to draw the face frame and the wing together at the correct angle.*

ATTACH THE CROWN MOLDING



A perfect fit. *When mitering the molding, fit the center section first, and then cut the side sections to fit. Use the quirk between the bead and the cove to hide the brads that help secure the crown molding to the face frame.*

or shaper, with a scratched bead at the base. The bullnose base molding is formed on a router table.

Starting with the center section, mark and miter the molding around the front of the cabinet. Each piece can be glued in place and secured with brads from the front or with small screws from behind. The side pieces of the molding should extend right to the outside edge of the wings so that they can be fitted to the wall with a block plane when the cabinet is hung.

Build and hang the door

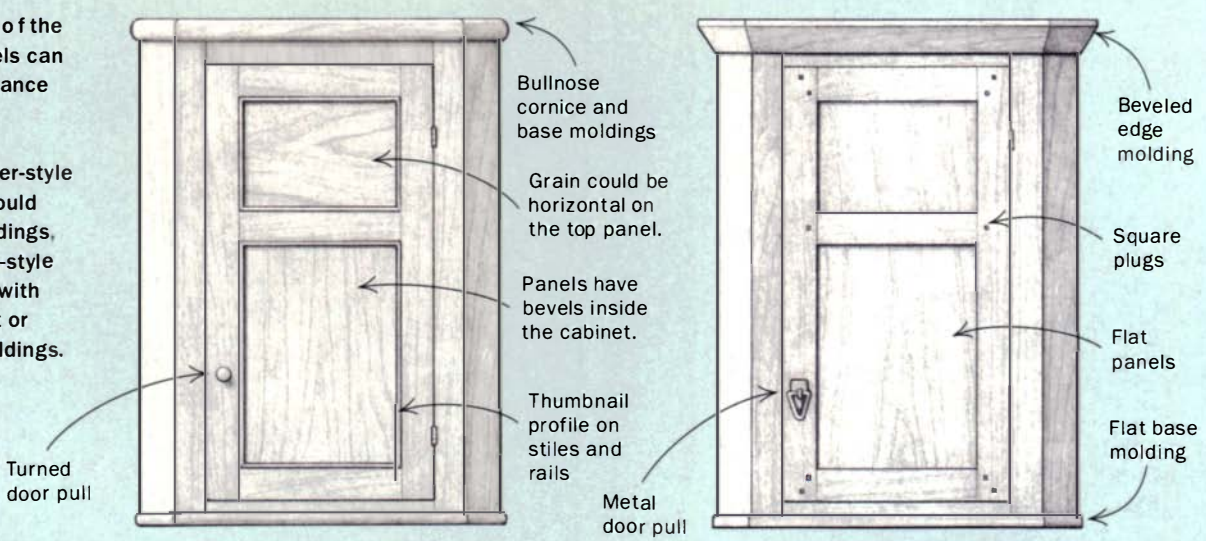
When building the frame-and-panel door, size it ever so slightly large to allow some planing for a final fit. Lay out and cut the haunched mortise-and-tenons. Cut grooves for the panels all relative to the front face of the door.

The panels can be made many ways: as a traditional fielded panel, as a flat panel, with beaded edges, or with very fine bevels, as in this design. After dry-fitting the door and panels, disassemble the door parts enough to remove the panels and chamfer the inside edges of the frame with a plane.

Plane and sand the door parts, then glue them together. Fit the door tightly to its opening by first fitting along the hinge side, the bottom edge, the other stile edge, and the top edge. The final fitting happens after the door has been hung. Secure the hinges to the face frame (in their

DETAILS DEFINE THE STYLE

Changing the style of the moldings and panels can change the appearance of this cabinet dramatically. For instance, the Shaker-style corner cupboard could have bullnose moldings, and the Craftsman-style one could be built with flat panels and flat or angled cornice moldings.



BUILD AND HANG THE DOOR

Raised door panels. *The delicate bevel on the front of the door panels can be cut with handplanes. A block plane works best on the end-grain bevels.*

previously cut mortises), hold the door in place against them, mark out the hinge locations, and cut the mortises on the door stile. Hang the door and adjust the final fit by planing the unhinged stile and the top and bottom rail as needed.

The last step in building the cabinet is to turn a knob on the lathe and wedge it in place on the door.

Apply a finish and hang the cabinet

I finished this cabinet with three coats of a thinned oil/varnish mixture, and buffed out the final coat with 0000 steel wool and my special beeswax finish (see *FWW* #150, pp. 37-38).

The simplest way to hang the cabinet is to find the first two wall studs away from the corner and screw into them through the sides above the top. Then screw through the top of the back into a corner block secured to the wall. Fit the cabinet to the wall by scribing and then planing the small extensions on the wings. □

Garrett Hack is a contributing editor.

Assemble the door. *The cabinet door is a frame-and-panel design with mortise-and-tenon joinery. The extra length on the ends of the stiles is sawn away after the door has been glued.*

Mark the hinge locations. *With the door held in place, transfer the hinge locations from the face frame to the door.*

Chop the mortises. *When cutting the hinge mortises in the stiles, protect the door from the vise with a piece of leather.*

An Oil-and-Wax Finish

This low-luster finish highlights the wood and is easy

I strongly believe that a finish should not come between the end user and a piece of furniture. Hence, I stay away from plastic-type finishes, such as polyurethanes and lacquers or varnishes. These finishes tend to sit on top of the wood rather than soak into it, obliterating the subtle textures left by handplanes. One of the most frequent comments from visitors to my showroom is, "We saw the furniture and came in to feel it."

All finishes have their drawbacks; this one lacks durability and high-gloss sheen. However, I am prepared to forego the durability because I get repairability (without having to refinish the whole piece) and better aging. My furniture is meant to be functional as well as beautiful: Even if it gets dinged and scratched, an occasional rewaxing and reoiling allows these defects to become part of the piece, making it feel like an antique that has weathered the storms of time. With a high-gloss finish, the repair of scratches and dings can become a horror story.

Equally important, this finish is low tech. It requires no special tools or a spray booth. In my shop, I don't employ a dedicated finisher. Each craftsperson builds his piece from rough lumber to buffing the wax finish, a method most readers should relate to.

Surface preparation is the key to this finish

After the wood has been through a thickness planer, handplane all surfaces. On areas in which the grain has torn out, use a card scraper. The aim is for the surface to have that smooth and fresh, straight-from-the-blade look.

Selectively sand with 220-grit paper—There's still quite a bit of sanding involved, mostly in areas that won't cut clean, such as difficult grain patterns, end grain, and edges. Sand large areas with 220-grit paper on a palm sander, but be careful not to stray into cleanly planed areas.

When working on confined areas, it's better to fold the sheet of

1 PLANE, SCRAPE, AND SAND

Good surface preparation is essential for a penetrating oil finish. One of the reasons Shackleton likes this finish is because it doesn't obliterate faint marks left behind by hand tools.

Smooth all surfaces. *Begin by handplaning the surfaces to level and smooth them (left). Clean up any torn grain with a card scraper (above).*

Sand only where needed. *Use a palm sander with 220-grit paper to break sharp edges and smooth the end grain. Don't stray onto areas already planed smooth.*

BY CHARLES SHACKLETON

to apply and renew

sandpaper into quarters and sand by hand, working with the grain or close to it. Sandpaper is powerful stuff, and things can happen faster than you imagine, so be careful not to create hollow areas in the surface.

Raise the grain and resand the surface—Wipe down the whole piece with a damp cloth, being careful only to dampen the surface, not wet it. Use distilled water, which doesn't contain minerals that can react with tannin in the wood and cause stains. The moisture causes grain that has been crushed by the planing to rise. After about half an hour, the surface will be dry and noticeably rougher.

Lightly hand-sand every surface with 400-grit paper in the direction of the grain. Working by hand gives you a better feel for what's going on. Don't underestimate the cutting power of even 400-grit paper—you'll be amazed how quickly you can remove the crisp texture of a handplaned surface. A bright light held at a low angle is a great help, but monitor your progress by checking the texture of the surface with your hands.

The final step before applying the oil is to rub down the whole surface with Liberon 0000 steel wool or a gray abrasive pad. This further smooths and slightly burnishes the surface, which will allow the oil to penetrate the wood more evenly, reducing the chances of blotching.

Be generous with the oil

On most woods I use boiled linseed oil because it gives a darker, aged appearance to the furniture. The exceptions are maple and ash, on which I use pure tung oil to keep the wood's appearance as

2 RAISE THE GRAIN

Wet the wood (left) and let it dry. Then sand with 400-grit paper and rub the surface with either a gray abrasive pad or 0000 steel wool. Burnishing the surface this way (above) lessens the chances of unequal oil penetration and blotching.

3 APPLY THE OIL

Flood the surface with oil. *Soak a small piece of toweling in a bowl of boiled linseed oil and wipe the oil generously onto the wood.*

Don't forget the end grain. *If you leave the end grain until last, it may be hard to blend in darker drip marks.*

Wipe off the surplus oil. *After an hour, use a series of clean, dry cloths to remove any oil that remains on the surface. Wipe the wood thoroughly to avoid a sticky residue.*

light as possible. In either case, pour the oil from the can into a container 6 in. dia. by 6 in. deep. Put on a pair of disposable gloves, immerse an 8-in. by 8-in. bit of toweling in the container, and use it to apply the oil. Slosh the oil over the surface liberally, but make sure you do end grain early on, or you may wind up with drip marks there. As with all finishes, be sure to coat both sides of all surfaces.

Let the oil soak in for about an hour, then wipe off all of the excess, using pieces of clean cloth.

SOURCES OF SUPPLY

BOILED LINSEED OIL
www.woodcraft.com; 800-225-1153

LIBERON STEEL WOOL AND WAX
www.woodfinishingsupplies.com; 866-548-1677
www.kingdomrestorations.com; 800-344-9257

ABRASIVE PADS
www.woodcraft.com; 800-225-1153

Let me repeat the warning I give all of my employees about disposing of oily rags in a safe manner: When wadded up, the rags are highly combustible, so hang them outside to dry or immerse them in water before disposing of them.

After wiping off the excess, let the workpiece dry for two days. Then apply a second coat of oil in the same manner as the first coat. This time there should be no areas where the oil soaks in completely, as the first coat should have formed a barrier. If there are areas where the oil does soak in, particularly on surfaces that will be subject to wear, you will need to repeat the oiling process a third time after the second coat has dried for two days.

You may find the dried oiled surface slightly rough, so before going onto the final step of waxing, burnish the surface using a very fine white abrasive pad.

Apply the wax sparingly

The purpose of applying wax is not to feed the wood, as commercials are fond of implying, but rather to give the surface a soft luster

Photos: Mark Schofield

and a silky-smooth feel. You also can alter the wood's tone subtly by using colored wax. Apply thin coats of the wax in a circular motion using a 6-in. square piece of toweling furled into a ball. This circular motion ensures that the wax gets worked into all of the pores and acts as filler.

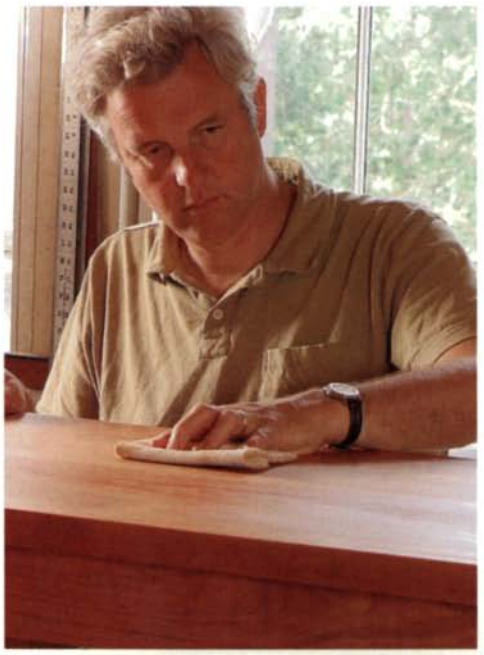
On surfaces where there are multiple boards glued together, work across the surface board by board. Every 20 seconds or so, go back over the last section, wiping it with the grain. This avoids any swirl marks in the dried wax. Check that the wax is being applied evenly and smoothly; little lumps of wax cause big problems later as they smear around when you are trying to buff a shine.

Leave the wax to dry for at least half an hour, then buff it using another piece of toweling and plenty of elbow grease. Your piece should now have a lovely shine.

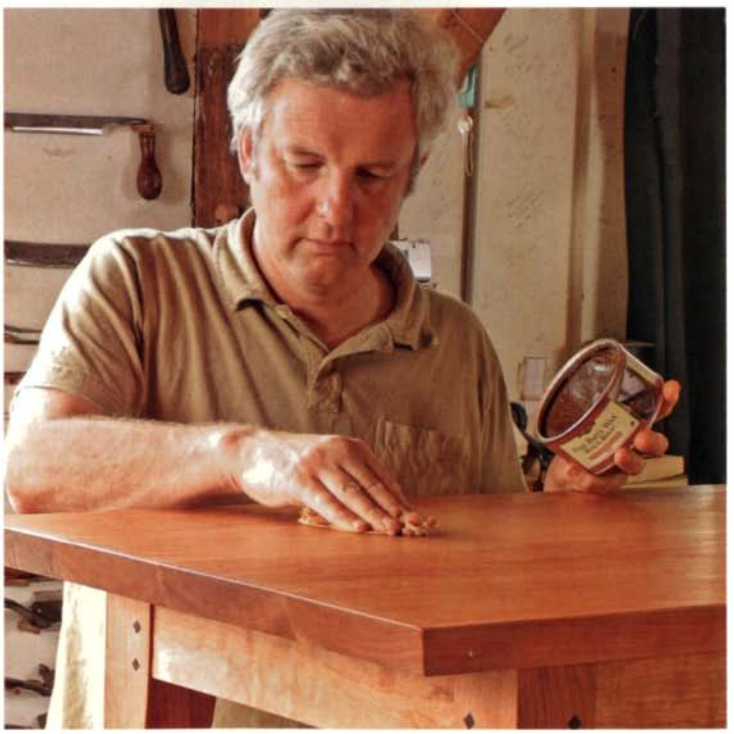
Any wax finish will lose its gleam over time, particularly if it's a dining table that gets wiped down with a damp cloth after meals. But it is a simple task to apply and buff up another coat of wax. If moisture from a cold glass of water leaves a white ring, you can fix the problem by rubbing the area with 0000 steel wool or a gray abrasive pad.

As I said, I have used this finish for nearly 18 years and have had very few complaints. For some odd reason, the most common complaint (about three times) has been from people who had left a pumpkin to rot on their table. This required us to replane the surface, but I'm sure *Fine Woodworking* readers take better care of their furniture. □

4 BURNISH AND WAX

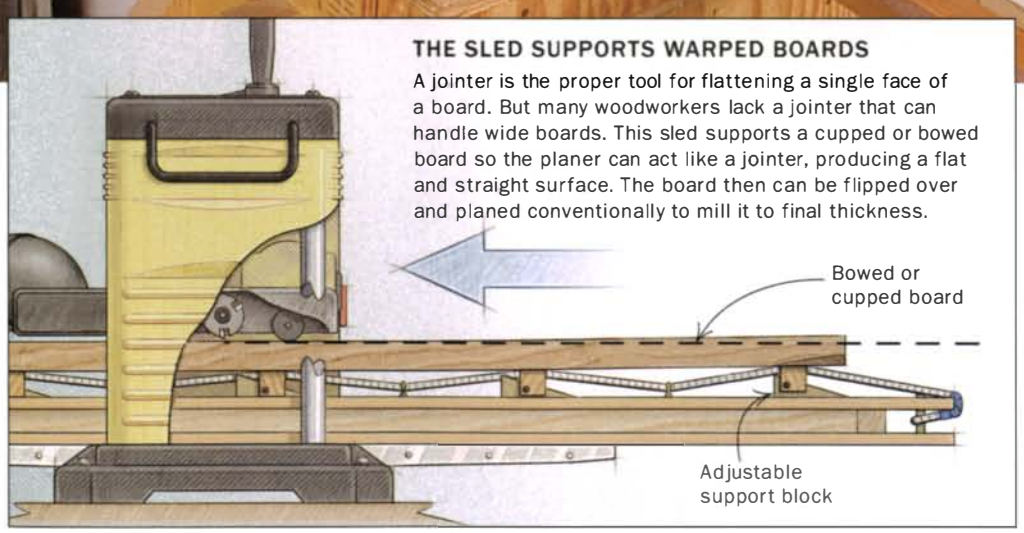


After the last coat of oil has dried for two days, burnish the surface with a white abrasive pad (left) to smooth the surface prior to waxing. Finally, sparingly apply paste wax (below), rubbing first in a circular motion to fill any pores, and then with the grain. A colored wax can be used to darken the appearance of a piece.



Charles Shackleton is the owner of Charles Shackleton Furniture in Bridgewater, Vt.

Flatten Boards Without a Jointer



THE SLED SUPPORTS WARPED BOARDS

A jointer is the proper tool for flattening a single face of a board. But many woodworkers lack a jointer that can handle wide boards. This sled supports a cupped or bowed board so the planer can act like a jointer, producing a flat and straight surface. The board then can be flipped over and planed conventionally to mill it to final thickness.

A sled lets you use just your planer to mill lumber to any thickness

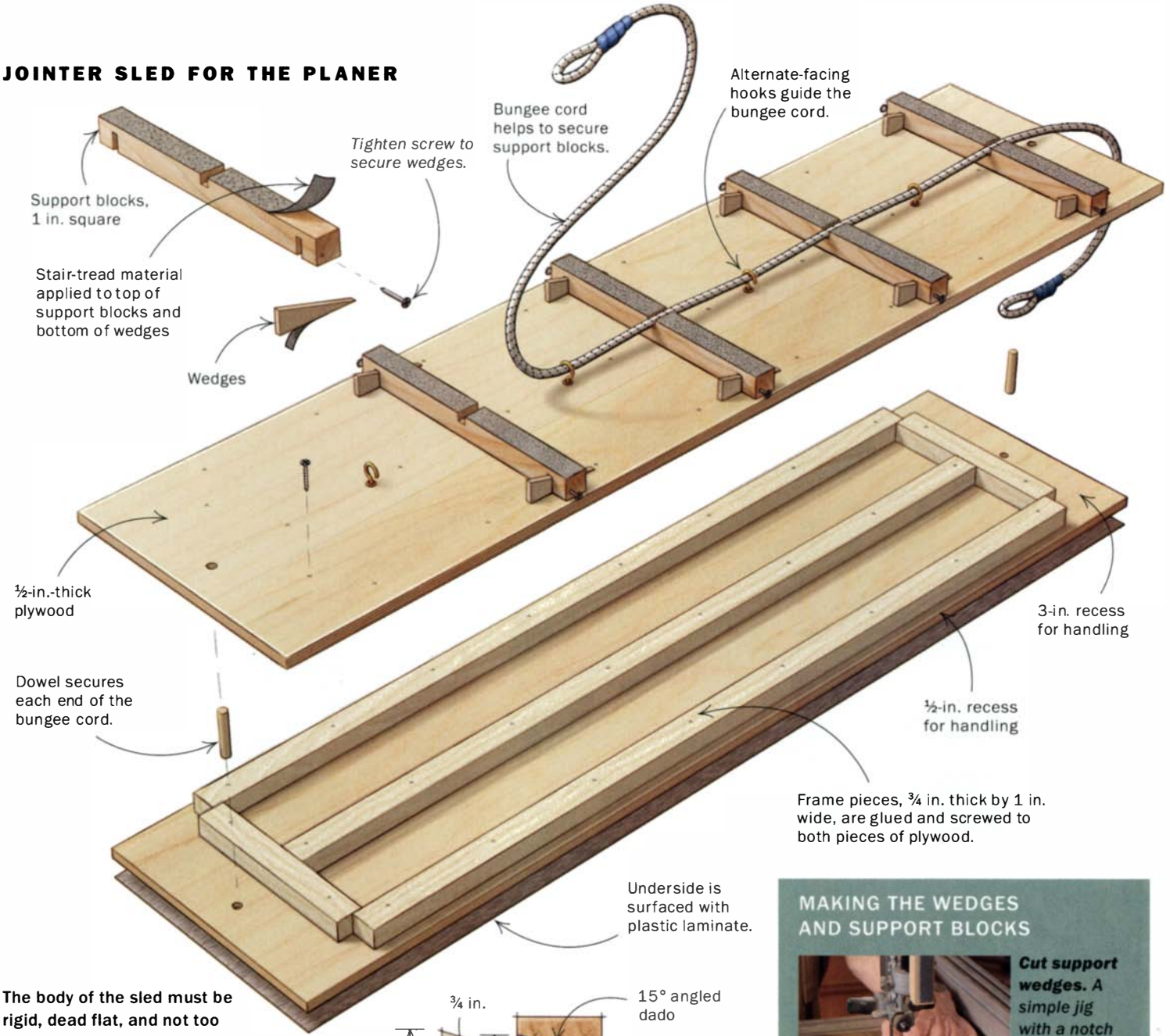
BY KEITH RUST

Working with wide lumber is a joy: The figure and color are seamless, just as it came off the log. But many woodworkers face a problem when it comes to flattening one side of a wide board. We can rip the board into narrower pieces, use a 6-in. or 8-in. jointer, and then rejoin the parts, but a perfect match is not always possible. The alternative is to handplane one side flat, a laborious process.

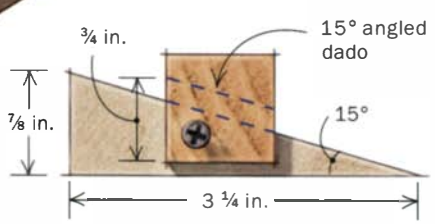
Now, I like handplaning as much as the next guy, but I prefer to save my energy and let machines dimension lumber. To this end, I designed an adjustable sled that allows me to face-joint lumber with a thickness planer. The sled is reliable and quick to set up and adjust without using any tools. To make it, you first need to determine the maximum width the bed of your planer

Photos: Mark Schofield

JOINTER SLED FOR THE PLANER



The body of the sled must be rigid, dead flat, and not too heavy, which makes a torsion-box design the best choice. The rough board that needs flattening rests on a series of supports that are adjusted to fit the board using sliding wedges.



WEDGE DETAIL

will accept and how long a sled you want. My 12½-in. portable planer could handle a sled of the same width, but to avoid having too tight a fit, I opted for a 12-in.-wide sled.

The sled's body must be flat and rigid

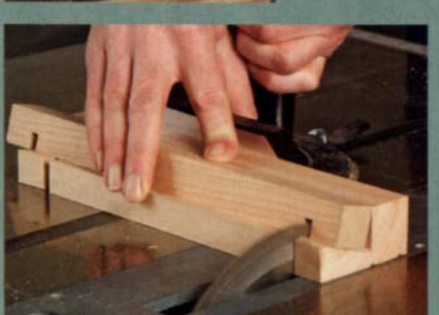
I had a sheet of 5-ft.-square, ½-in.-thick Baltic-birch plywood, so I ripped two 12-in.-wide pieces the full length to create the upper and lower bed sections. If you work alone, resist the temptation to make the sled too long and unwieldy. Build it on a flat surface, such as a workbench or outfeed table, to ensure the sled also will be flat.

The frame pieces, ¾ in. thick by 1 in. wide, were cut from a couple of dry 2x4 studs. I recessed the pieces ½ in. on the sides and 3 in. on each end so I could grip the sled easily. The frame pieces are glued and screwed to the upper and lower bed sections.

The top of the sled has a series of stock supports made of hardwood milled to 1 in. square. To determine their length, measure your planer's inside clearance, keeping in

MAKING THE WEDGES AND SUPPORT BLOCKS

Cut support wedges. *A simple jig with a notch in it allows Rust to band-saw multiple 15° wedges.*



Cut angled slots in the support blocks. *Use a sled angled at 15° to cut a slot in the underside of the support block.*

Drawings: John Hartman

SLED SETUP

Place the board on the sled. *If it is cupped, rest it with the concave side facing down. Rock the board to locate high spots.*

Adjust the support blocks. *Slide the wedge until the block just touches the board. Then tighten the drywall screw by hand to lock the wedge in place.*

mind that the supports will have about ½ in. of a drywall screw sticking out each end. My planer allowed for 11½-in.-long supports with no danger of a screw head touching anything on the way through.

In use, the supports are raised or lowered using 15° wedges made from ¼-in.-thick medium-density fiberboard (MDF). To keep the supports parallel to the sled's surface as the wedges are inserted, cut a slot ¾ in. from each end of the support blocks, also with a

finewoodworking.com

Visit our Web site to see Rust demonstrate his planer sled.

15° slope. This is done on the tablesaw with a dado set, using a sled that carries the support block at a 15° angle. While the dado set is on the saw, cut a square dado in the top of each support for a bungee cord. The cord secures the supports when the sled is in use and when it is stored vertically. I stretch the cord through the notches in the supports and through small hooks on top of the sled, securing it at each end with a dowel.

To hold the wedges in place, drill a hole in each end of the support blocks for a 1¼-in. drywall screw. Just tightening the screws by hand keeps the wedges from moving once they are in position.

When I first built the sled, I had problems with the planer pulling boards out of position as the sled went through. To solve that, I put self-stick plastic stair-tread material on top of the supports. I avoided sandpaper because of the likelihood of grit breaking off and getting in the planer. I also put a coarser stair-tread material on the bottoms of the wedges to keep them from slipping. Last, I put plastic laminate on the bottom of the sled to reduce drag through the planer.

Setting up the sled for use

Loosen the support screws by hand and slide the wedges back so that the supports all rest on the sled. Orientation of the board is important: If the board is cupped, place the concave side down so that the edges rest on the supports. Do this regardless of the fact that you may now have a board that bows up at each end. Space the supports to have one at each end and two or three along the rest of the board.

Find the high corners of the board by putting pressure on opposite corners and rocking it. Use the wedges to raise the supports that need it, trying to raise each one an equal amount, and tighten the screws by hand. It takes only a little pressure for the fine point of the drywall screw to bite into the MDF and secure the wedge. Test to see if the rocking is gone. Now go down the length of the board and find loose supports. Use the wedges to raise the ones that need adjusting, but avoid coming up too high. Doing so can cause other gaps to appear.

Roller stands at each end of the planer and a removable support arm attached to the box my planer sits on help support the sled. The arm has a top of heavy plastic (available from Woodcraft) that reduces the friction of sliding the sled across from the outfeed end of the planer to the infeed side.

Using the planer as a jointer

Once the board is stable, raise the cutterhead high enough to accept the entire

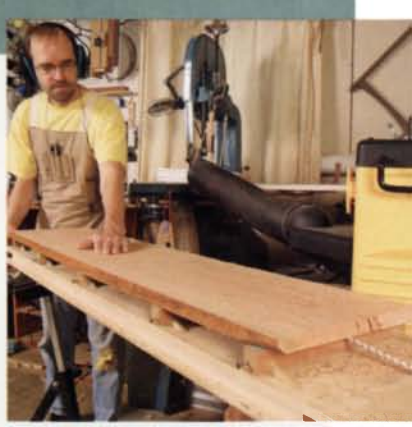
package and, without turning on the power, slide everything into the planer to find the highest point. Pull it back out, crank down a bit, and you're ready to joint the board. This is one of those cases where describing the process takes far more time than doing it. It's easy to put a board on the sled, adjust the supports, and be planing in 30 to 45 seconds. It helps to know the combined thickness of the sled and supports so that you can have the planer opening set to the approximate thickness.

After the first pass, check to see if anything has shifted and adjust the wedges as necessary. Send the sled over the fixed arm and back to the input roller, lower the head, and make another cut. I recently built a chest of drawers with bent-laminated drawer fronts and had no trouble using this sled to flatten 11-in.-wide hard maple to make drawer-front plies. This is a jig (unlike some I've attempted) that has proven to be worth far more than the original time invested in designing and building it. □

Keith Rust lives in Arlington, Texas.

USING THE SLED

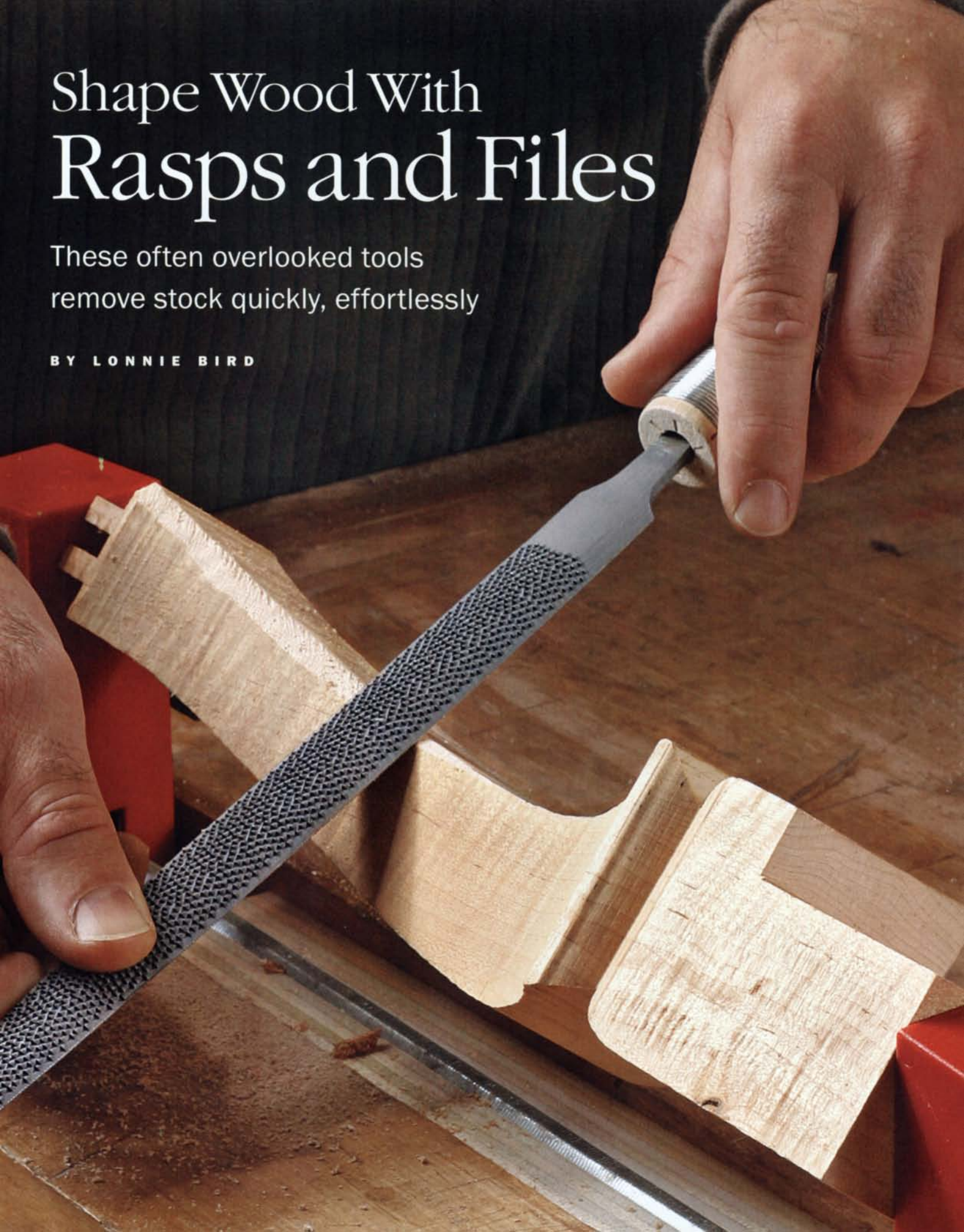
With the planer turned off, slide the sled through to check for obstructions and to determine the highest point on the board (above). After the first pass, check and adjust the wedges (left), if necessary. Once you have flattened one surface of the board (below), you can dispense with the sled and run the other side of the board through the planer to thickness it.



Shape Wood With Rasps and Files

These often overlooked tools remove stock quickly, effortlessly

BY LONNIE BIRD



There's probably no other group of hand tools more overlooked than rasps and files. They're humble in appearance, lacking the rosewood handles or brass fittings found on many other bench tools. Yet they are among the most useful hand tools in the shop for shaping and smoothing wood.

I use rasps and files for a variety of tasks—from shaping the fluid curves of a chair arm to smoothing the sinewy talon detail of a ball-and-claw foot. Each tool has a specific function, and the nature of the work determines which rasps and files are best suited for it. I recommend starting with a basic collection and then adding to it according to your needs. Technique, maintenance, and an understanding of the various profiles and grades of coarseness will help you get the most out of these useful hand tools.

Rasps remove stock aggressively

Like a spokeshave, a rasp is used to shape and to refine sawn curves. But unlike a spokeshave, a rasp won't catch and tear out the grain, even when working a difficult wood such as curly maple. Using a rasp requires skilled hand-eye coordination, so it's a good idea to practice on inexpensive stock such as poplar.

The teeth on most rasps are made from hard high-carbon steel, and it is the size of the teeth that determines the coarseness of the tool. The wood rasp is the most coarse, and the cabinet rasp is less coarse, followed by the fine patternmaker's rasp, which has two grades—second cut and smooth.

The teeth on a rasp can be oriented uniformly in rows or set in a random pattern. Both patterns cut aggressively, but rasps with teeth set in straight rows or columns tend to create a more ragged surface on wood than rasps with randomly set teeth. I often use the Nicholson #49 patternmaker's rasp, which has teeth that are hand-cut in a random pattern. The tool cuts aggressively yet leaves behind a relatively smooth surface.

Rasps are available in a number of shapes that include flat, round, and half-round profiles. The Nicholson #49 patternmaker's rasp has a half-round profile on one side and a flat profile on the other. Having both profiles on the same rasp allows me to work more efficiently than with a rasp with only one profile. If I encounter a changing contour as I work, I can just flip the tool and continue to shape the workpiece without stopping to pick up a different tool.

Files remove coarse scratches

For finessing the compound curves of a leg shaped by rasps or smoothing intricate

RASPS ARE FOR SHAPING

Rasps are ideal for removing a lot of material fast without the risk of tearout. Because of their aggressive cut, care must be taken when shaping parts. The surface left by the rasp, although not as rough as you might imagine, will need to be cleaned up with files, a card scraper, or sandpaper.

Various grades of coarseness and tooth patterns. *Three common types of rasps, ranging from coarse to fine, are the wood, cabinet, and patternmaker's rasps. Rasps with teeth cut in a random pattern, such as those on the patternmaker's rasp, leave a smoother surface. For versatility, Bird prefers a rasp with a half-round profile. The flat side can be used on flats and convex curves (facing page), and the rounded side can take care of most concave shapes (left).*

WOOD RASP

CABINET RASP

PATTERNMAKER'S RASP

NEW CHOICES IN RASPS

Two new contenders for your woodworking dollars are the Microplane and Shinto rasp. The Microplane's stainless-steel blade is perforated with rows of razor-sharp teeth and comes with interchangeable blades with various profiles. Unfortunately, the short cutting area and the thin blade, which tends to flex, prevent you from making long and powerful strokes. The other option is the Shinto rasp, which is like a bundle of hacksaw-type blades that are woven in a pattern and held in place with rivets. The long cutting surface allows for long, powerful strokes. However, both the coarse and fine faces are flat, so the tool is not useful for shaping the compound curves of furniture. But for shaping broad, convex curves, you may find that the Shinto rasp is a useful tool.

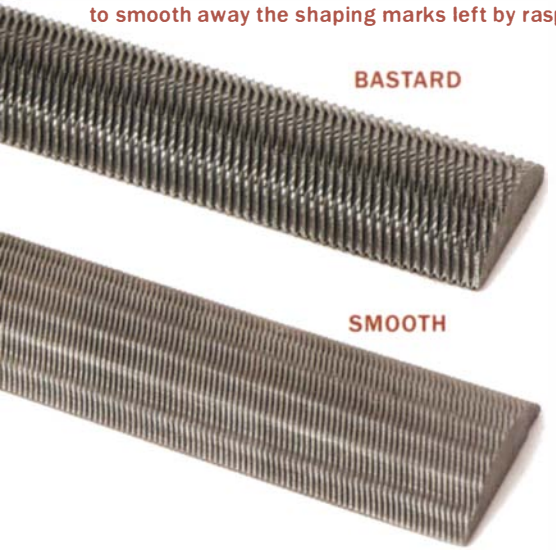
MICROPLANE

SHINTO RASP

Photos, except where noted: Karen Wales; facing page: Michael Pekovich; this page (individual rasps): Kelly J. Dunton

FILES ARE FOR SMOOTHING

Files have teeth that are smaller than those on rasps. They are used to smooth away the shaping marks left by rasps or the bandsaw.



Half-round files for broad curves. *Both the bastard and smooth half-round files are used to clean up rasp and bandsaw cuts on easy-to-reach surfaces. But the smooth half-round file, with its small teeth and tight rows, leaves a smoother surface.*

Round files are best for tight curves. *The bastard and smooth round files are small and coarse enough to clean out tight concave areas.*

bandsawn contours, a file will do the job. Available in many sizes, types, and profiles, files are similar in appearance to rasps but have smaller teeth. These short, unbendable, and hard teeth, made of high-carbon steel, allow files to cut through wood, aluminum, brass, and even mild steel, such as the dull burr along the edge of a cabinet scraper.

Files cut with rows of tiny teeth. Because the size of the teeth limits the cutting depth, you can achieve a controlled cut with no tearout. Single-cut files have a series of single rows of teeth, and double-cut files have sets of two opposing rows. Generally, single-cut files cut smoothly and slowly, whereas double-cut files cut quickly and aggressively, leaving a rougher surface in their wake.

SOURCES OF SUPPLY

MSC
800-645-7270
www.mscdirect.com

Lee Valley
800-871-8158
www.leevalley.com

Garrett Wade
800-221-2942
www.garrettwade.com

Most files are available in three grades, or tooth sizes, which dramatically affect the cutting action. Bastard files feature the largest teeth and give the coarsest, most aggressive cut, followed by second-cut files with smaller teeth, and then smooth-grade files. Although second-cut and smooth files create smoother surfaces than bastard files, their small tooth patterns also clog quickly and require frequent cleaning.

Files are available in lengths from 4 in. to 16 in., but I seldom use any that are longer than 10 in. The shorter files, those in the 4-in. to 6-in. range, allow you to shape and smooth tight, intricate contours. Larger files provide greater control when smoothing broad curves. Like rasps, files are available in a number of different shapes that include flat, round, and half-round profiles. A good selection for the workshop includes 10-in., 6-in., and 4-in. half-round and round files in both bastard and smooth grades.

Rifflers get into tight spots

Another classification of rasps is rifflers. These tools are curved along their length and can access areas that ordinary rasps and files can't. Rifflers are particularly useful for shaping small or tight curves such as those found on flame finials and ball-and-claw feet. Like standard files and rasps, rifflers also are available

Photos, this page (individual files): Marcia Ryan

in various grades of coarseness. Owing to the variety of shapes and to their costs, I recommend acquiring one riffler at a time, according to your needs.

Tips for using rasps and files

When shaping a curve with a rasp, cut away the high spots first. Position the rasp slightly askew and use long, smooth strokes. You can control the amount of stock removal by adjusting the degree of downward pressure. As with all edge tools, you'll create a smoother surface if you cut downhill with the grain. As the curve and grain change direction, reverse the rasp and pull it toward you, starting at the opposite end of the piece. If you have a half-round rasp, use the flat face to shape the convex surfaces. As you move from the convex surface to a concave profile, flip over the rasp and use the convex side.

Once the curves of the workpiece are flowing smoothly, begin to round the corners. This is where the actual sculpting begins. It's best to sketch boundary lines on the workpiece to act as a guide. As you push the rasp forward, roll it sideways, and remember to use long, smooth strokes that follow the grain and curves of the workpiece. Stop periodically and examine the curves at arm's length, looking carefully for balance and continuously flowing lines.

Once the curves of the piece look pleasing to the eye, switch to a bastard file to smooth the surface. Use the same technique with the file that you used with the rasp. After filing, smooth the surfaces further with a card scraper and sandpaper. □

Lonnie Bird teaches woodworking in Dandridge, Tenn. For information on classes, go to www.lonniebird.com.

RIFFLERS ARE FOR TIGHT SPACES

Rifflers are small rasps that cut aggressively yet smoothly. Rifflers come in a variety of shapes (right) and are ideal for intricate work such as shaping a ball-and-claw foot (below).

CARE AND STORAGE OF RASPS AND FILES

The steel in these tools is very hard and will hold an edge for many years with proper care. Files and rasps should be stored separately and kept away from moisture; allowing them to bang around inside a drawer or a tool chest will dull them, as will rust, which attacks the thin cutting edges first.

The cutting ability of a file will be reduced dramatically if the teeth become clogged with debris; the fine teeth of a smooth file are especially prone to clogging. A file brush is the answer. The short, stiff, angled wire bristles are perfectly designed for cleaning between the teeth.

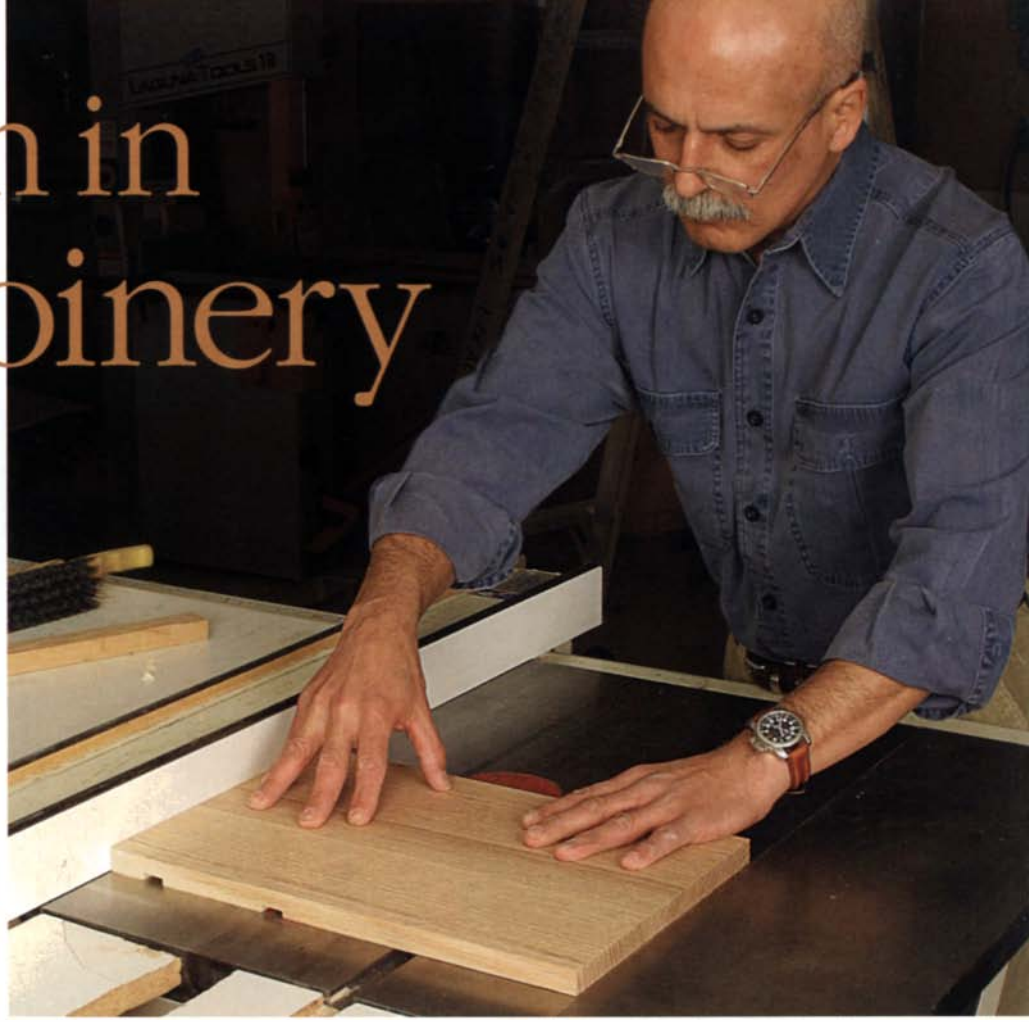
Although most new files and rasps come without handles, fitting them with handles is a good idea. A handle will protect your hand from the pointed tang and provide greater leverage and control during use. Although a simple wooden handle serves the purpose, I prefer a threaded handle that screws onto the tang (Lee Valley; www.leevalley.com) because it holds tightly to the file or rasp and does not loosen with aggressive use.

Photos, this page (individual rifflers): Marcia Ryan

A Lesson in Basic Joinery

Practice cutting dadoes and rabbets while building a handy organizer

BY MARIO RODRIGUEZ



My students always find it more satisfying to perfect their joinery by creating a piece of furniture rather than by adding to the kindling in the scrap bin. The dado and the rabbet are fundamental woodworking joints found in all kinds of furniture, from bookcases to highboys. Building this organizer, which either can be hung on a wall or stood on a table, allows you to practice these joints while creating a useful piece of furniture.

This piece features dadoes that run the width of the sides to support the shelves, and stopped dadoes in the upper shelf and the underside of the top to receive the partitions. Rabbets in the cabinet include those at the top of each side piece and partition as well as in the drawer construction. Both joints provide accurate alignment of the parts, load-bearing capability, and increased glue surface. They can be cut accurately on the tablesaw, with or without a dado set, and with a router using various fences and jigs.

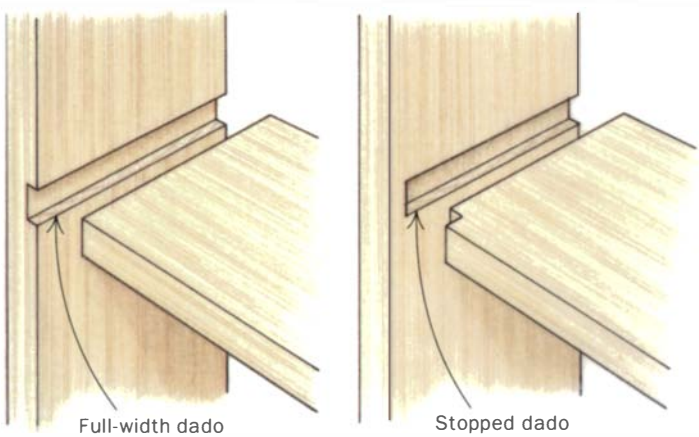
Materials are cheap and easy to find

I chose red oak as the primary wood for this project and pine for the drawer boxes and the back slats. If you can find 11-in.-wide oak boards, you will be spared the step of gluing up panels, but glue-up is not a big procedure for a project this size. The oak for the partitions needs to be

SIMPLE BUT USEFUL JOINTS

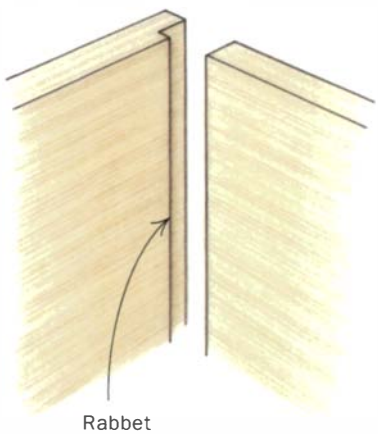
DADOES

The dado, a square, flat-bottomed recess cut across the grain of one board to receive the end of another, can run the full width of the board or stop short of one or both edges.



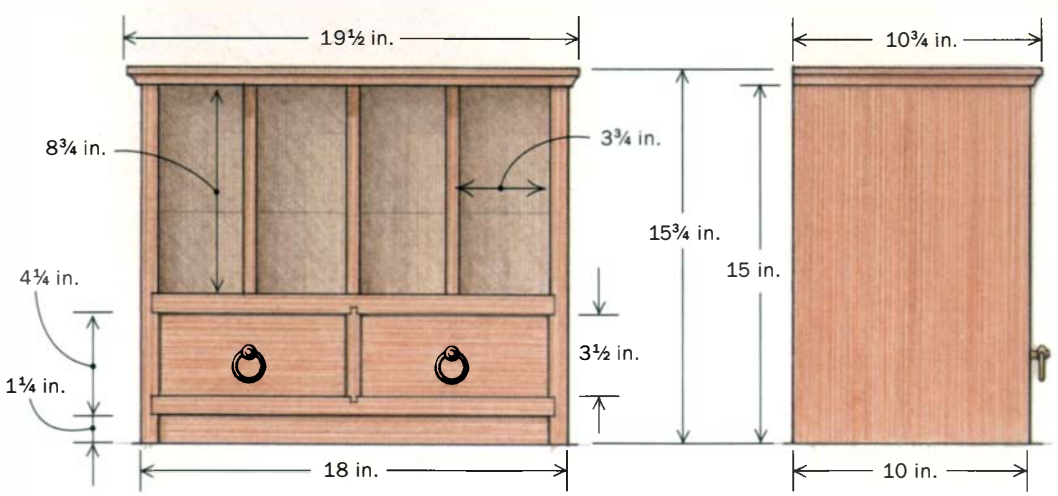
RABBETS

The rabbet is an open-sided recess cut along the edge or end of a board to receive the edge of another.



Photos: Mark Schofield

SMALL STORAGE CASE ASSEMBLES EASILY



Red oak is the primary wood for this project because it is handsome, hard wearing, and not difficult to work. Pine was used for the drawer boxes and the back slats. Both woods are readily available at home centers at a moderate price. Look for oak boards that are quartersawn (growth rings perpendicular to the face of the board) for a sleek, high-quality appearance. Most home-center lumber is milled to ¾-in. thickness, so the board's grain should be easy to see.

Drawings: Vince Babak

CUT FULL-LENGTH DADOES AND RABBETS ON THE TABLESAW

TWO TYPES OF DADO BLADES ARE AVAILABLE

The outside cutters of a stackable set of blades (above) are placed on the arbor first and last, with chipper blades between them. The width of the cut is fine-tuned by placing metal or paper shims between the blades. Adjustable blades (right), also called wobble blades, can be adjusted to width by rotating a dial on the side of the blade.

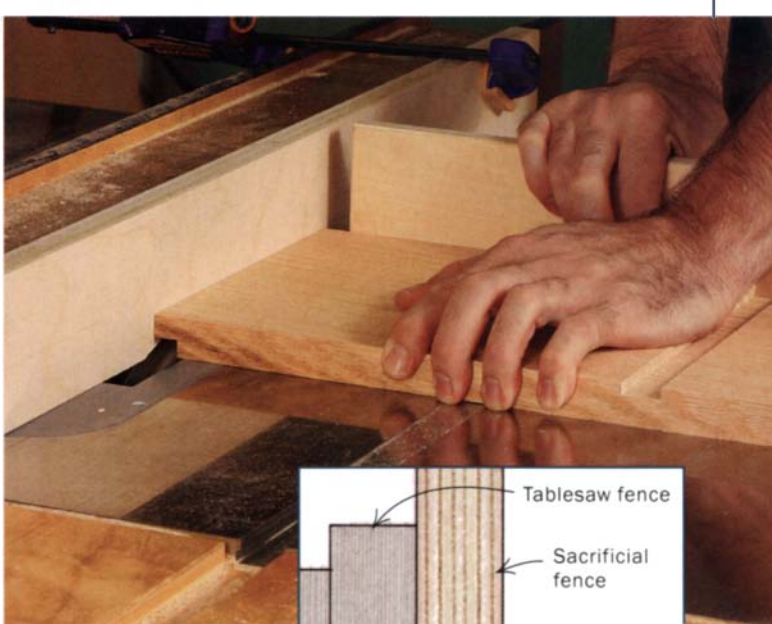
Cutting a dado. *The depth of the dado should equal about a third of the wood's thickness. Apply constant pressure both against the fence and downward to ensure that the cut is consistent in depth across the piece. With narrow workpieces, use a miter gauge for guidance and support.*

thicknessed to ½ in., and most of the pine needs to be ⅜ in. thick; this is best done with a planer rather trying to resaw thicker stock. You will need about 18 ft. of 8-in.-wide oak boards, and 7 ft. of pine, which includes an extra 20% to be on the safe side.

Dadoes and rabbets can be cut on the tablesaw

Most of the dadoes and rabbets for this project can be cut on the tablesaw using a set of dado blades. There are two types of dado blades (see the photos above): stackable blades, which consist of two outside blades to cut the sides of the joint and multiple chipper blades to remove the waste in the middle, and adjustable blades, also known as wobble blades. I prefer the stackable dado set because it makes a cleaner cut. Install a throat insert made for a dado set. Mount the two outside blades and sufficient chippers to make a cut just under ¾ in. wide. Using a piece of surplus oak as a gauge to make test cuts, fine-tune the width by adding or removing shims between the blades until you achieve a snug fit.

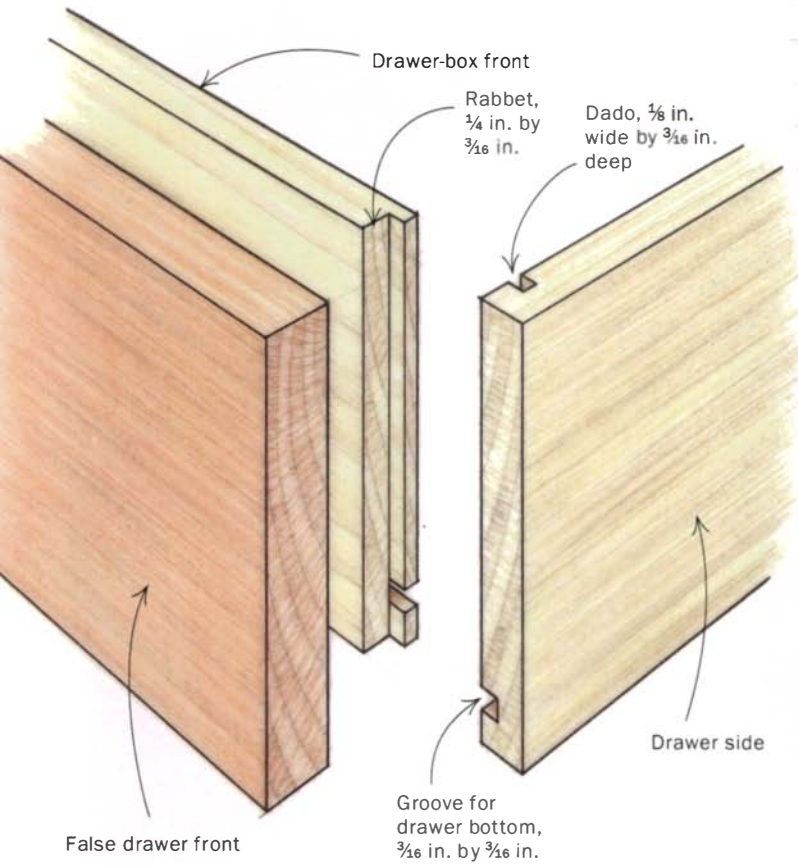
Each side piece gets a pair of dadoes for the shelves, and the top and bottom shelves each receives one narrow dado for the drawer divider. Dadoes shallower than ¼ in. deep can be cut in one pass, but feed the workpiece slowly to achieve a clean cut and avoid straining the motor. Use the rip fence to guide the location of each dado, making the same cut on both side pieces before adjusting the fence for the next dado. Apply firm downward pressure on the workpiece to ensure that the depth of each dado is consistent throughout its length.



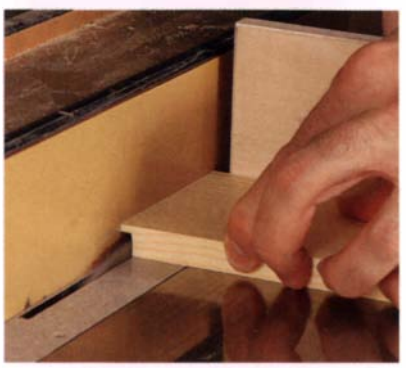
Cutting a rabbet. *After cutting the dadoes for the shelves, flip the board and cut the rabbet on the top of each side, creating a narrow tongue that will enter the top. To avoid damage to the rip fence, clamp on a sacrificial plywood fence.*

A QUICK DRAWER JOINT MADE WITH DADOES AND RABBETS

The front, back, and sides of the drawer boxes are connected by dado and rabbet joints cut on the tablesaw. The false fronts are mounted with screws after the drawers have been assembled.



Cut dadoes in the drawer sides. *The positions of the dadoes on the drawer sides are determined by the thickness of the front and rear drawer pieces.*



Rabbet the front and rear pieces in two steps. *Move the front and rear drawer pieces vertically across the blade (above) to make the first part of the rabbet. Use a zero-clearance insert plate around the blade to support the workpiece. With the piece flat on the table (left), make the second cut, leaving a tongue that will connect with the side pieces.*

Even though the cut for the rabbets on the top of each side piece is ⅜ in. square, there is no need to reset the width of the dado set. Instead, clamp a piece of ¾-in.-thick plywood or medium-density fiberboard (MDF) to the rip fence, locate the fence for the cut, and gradually raise the blade so that it eats into this sacrificial fence.

The final cuts with the dado blade are ⅛-in.-deep by 3/16-in.-wide rabbets on both sides of each end of the three partitions, and 3/16-in.-deep by ¼-in.-wide rabbets on overlapping sides of the pine back slats. Known as a shiplap joint, this allows the boards to move seasonally without creating a gap between them.

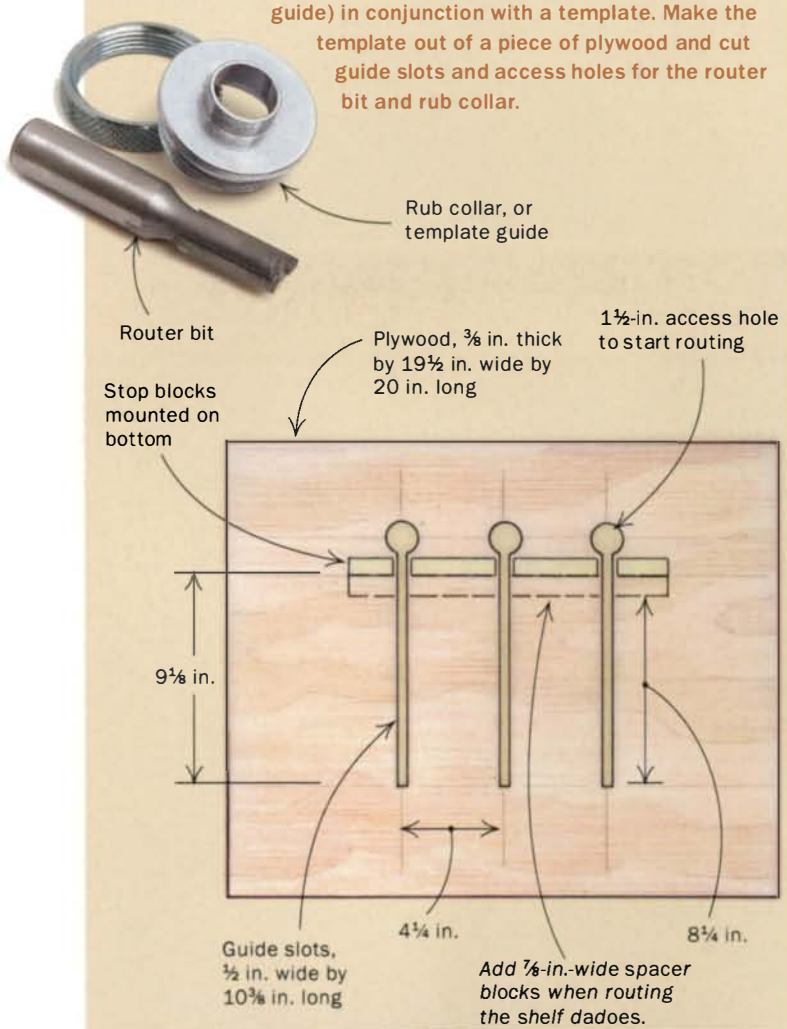
Stopped dadoes are best cut with a router

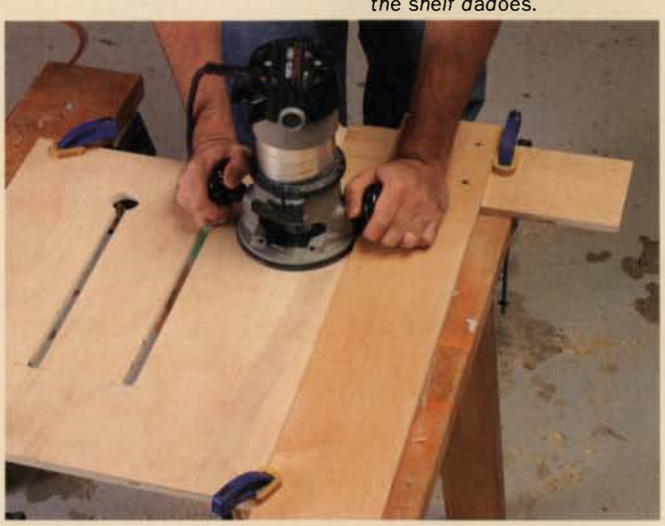
On this project the partitions are secured in stopped dadoes in the upper shelf and the top.

The stopped dadoes must be cut in identical positions on the top shelf and the underside of the top piece. To achieve this I use a rub collar (also called a template guide) in conjunction with a template. The collar has a tubelike piece of metal that surrounds the router bit and guides it by means of a template placed on the workpiece. When laying out the job and making the router template, the difference between the outer diameter of the rub collar (in this case 5/16 in.) and the router bit (¼ in.) must be taken into account. Blocks of wood glued to the underside of the template

USE A TEMPLATE FOR MATCHING DADOES

The partitions are secured in stopped dadoes in the upper shelf and the underside of the top. Because the cuts must be in matching positions, use a rub collar (also called a template guide) in conjunction with a template. Make the template out of a piece of plywood and cut guide slots and access holes for the router bit and rub collar.





Cut the template guide. *With a T-square guide clamped to the edge of the plywood template, rout a slot for the template guide to ride in.*

Router template spaces partitions evenly. *Because the stopped dadoes for the partitions must be cut precisely and in identical positions on both the upper shelf and the top, it is best to use a plywood template to guide the router.*

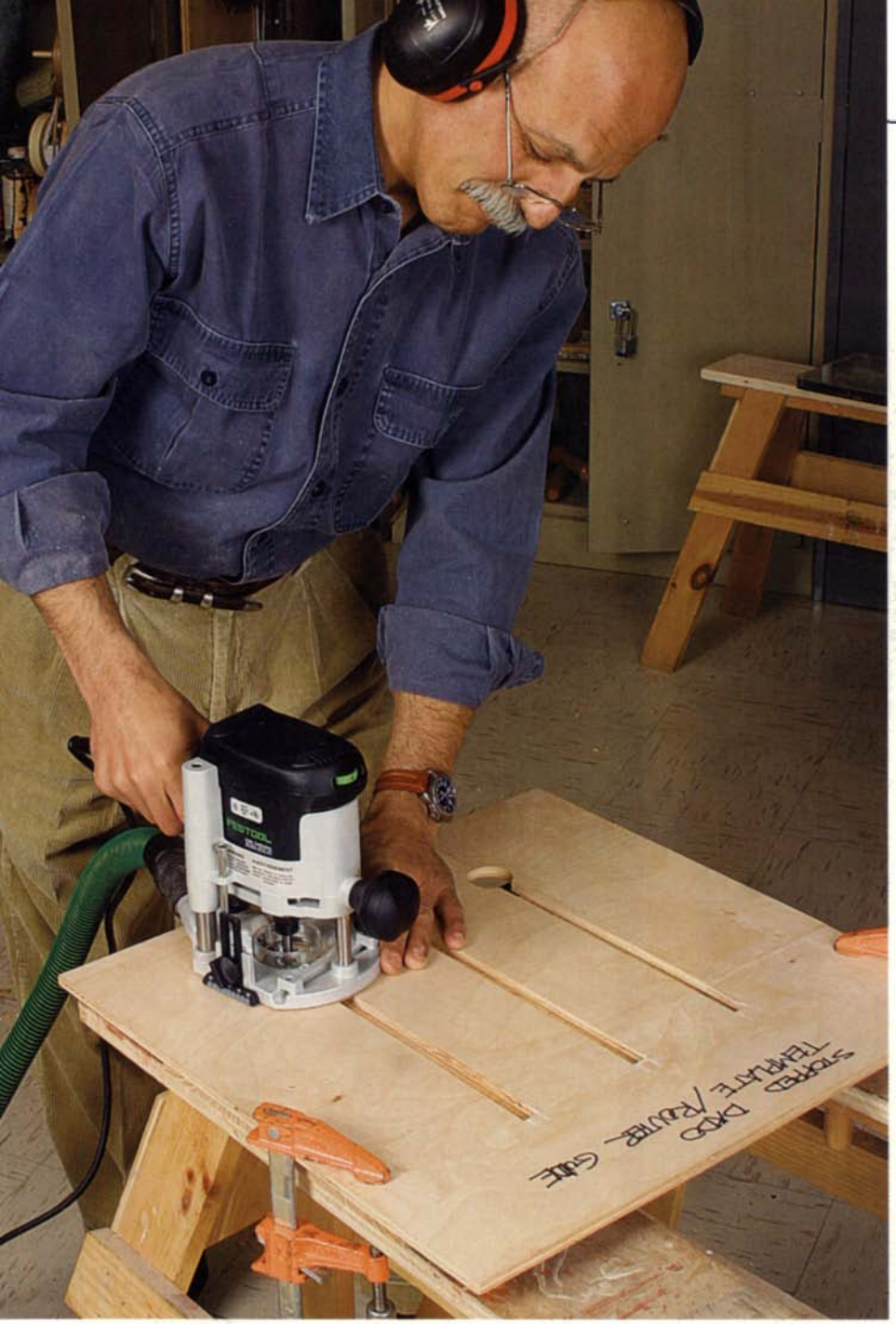
act as stops to ensure accurate placement on both of the pieces to be cut.

I also use the router to cut ⅜-in.-square stopped dadoes on the sides for the back slats and on the underside of the top for the sides. Because these cuts are near the edges of the workpiece, a fence attached to the router and guided by these edges works well. You will need to stop the router just before the end of each cut and square up the end with a chisel.

While you have the router out, now's a good time to profile the edge of the top. Although the piece shown here has a cove on the underside of the front and sides of the top piece, you may prefer the look of a chamfer. Regardless, use a bearing-guided bit running along the edge of the workpiece. For a clean cut with minimal tearout or burning, make the cut in two stages with the second cut at the final depth removing only a small amount of wood.

Cut the drawer parts using the tablesaw

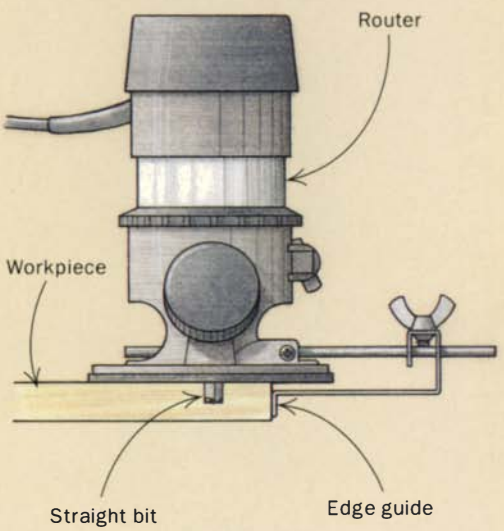
Because the drawers have false fronts and are fitted with guides, it is safe to make up the drawer boxes before the carcase is assembled.



The template guides the router. *A rub collar (or template guide) screwed to the router base runs against the template, guiding the router bit.*

AN EDGE GUIDE IS ANOTHER OPTION

After cutting the stopped dadoes for the partitions, add an adjustable fence to the router and cut the stopped dadoes at both ends of the top to receive the sides.



The front, back, and sides of the boxes are connected by dado and rabbet joints cut on the tablesaw: First cut two dadoes on each side piece; the distance from the end is determined by the thickness of the front and back pieces.

Because the next cut is made with only a thin section of wood in contact with the tablesaw, install a zero-clearance insert around the sawblade to prevent the workpiece from getting wedged between the table and the blade. In two cuts you can make rabbets on the ends of the drawer back and sides to create a tongue that connects with the dadoes on the drawer sides. Before assembling the boxes, cut grooves on the inside of the front and sides, and cut away the back of the drawers so that the bottom can be slid in.

The drawer partition simply is a ¾-in.-thick piece of pine that is joined to the two shelves with ¼-in. dadoes. These can be cut on the tablesaw with two passes over a conventional blade. To avoid having end grain exposed on the front of the cabinet, use a tongue-and-groove joint to attach a thin facing piece of oak.

Assemble the carcase and fit the drawers

You will find that the assembly of this project will be much easier to do on a pair of sawhorses, because the gap between the horses allows more room for clamping. Glue the shelves to the cabinet sides and slide in the drawer divider from the front. When these joints are dry, slide in the back slats, glue in the three partitions,

CONSTRUCT THE CASE AND FIT THE DRAWERS

Assemble the piece. *Begin by gluing the sides to the two shelves. Apply some glue to the grooves and slide in the drawer divider from the front. Then slide in the back slats and glue in the partitions. The last piece of the case to be attached is the top. Working on a pair of sawhorses gives you more options for clamping positions.*

Drawer guides have a rabbet and stop 1½ in. from the back slats. *This allows the thickness to be trimmed with a block plane after they have been installed.*

Fit the drawer fronts. *After cutting the false fronts to size, mark the location of the drawer box on the back of each, including the holes. To attach the drawer front, drill the holes in the drawer box slightly oversize to allow for fine-tuning to the opening.*

and then glue on the top. Screw the center of each back slat to the sides.

Before fitting the drawers, mill some rabbeted drawer guides from pine and set them in place with glue. The rabbet along the bottom and the fact that they are 1½ in. short allow them to be trimmed in place with a block plane.

Once you have achieved a snug fit for each drawer box, mark its location on the back of each false drawer front. Transfer the location of the holes on the drawer box and drill pilot holes in the false front to avoid splitting the wood with the screws.

finewoodworking.com

Visit our Web site to see the author cut rabbets and dadoes using a tablesaw and router.

The last pieces to add are a valance that is set just in from the sides and glued to the lower shelf, and a two-part French cleat if you are going to hang the organizer on a wall. Before assembly you should sand the interior sections with 100-, 150-, and 220-grit paper. With the piece assembled, plane all of the joints flush and repeat the sanding sequence on the outside. Wiping the wood with denatured alcohol will reveal any glue that has squeezed out. Sand these areas again with 220-grit paper.

Finish the wood with three coats of an oil-varnish mixture, such as Waterlox, sanding between the first two coats with 220-grit paper. When the finish has cured, rub the cabinet with 0000 steel wool, and wax and buff the wood for a smooth, satin finish. □

Mario Rodriguez is a contributing editor.

Drawing Big Curves

Let drawing tools, jigs, and a little intuition help you design graceful furniture

BY PAUL SCHÜRCH

For centuries, wooden-boat builders have been drawing templates and designing components that feature long, curved lines and surfaces, thus creating boats of grace, beauty, and strength. The term *fairing a curve* comes from boatbuilding and refers to the process of creating an organically flowing line that continues gracefully without flat spots or kinks, bringing various curved surfaces into alignment. If a line is not fair in a boat design, it can undermine the boat's beauty and strength. Having worked as a boat builder early in my career, I find that creating pleasing curves is equally as important when designing furniture.

Everyone has the ability to look critically at a curve, but I find that many woodworkers distrust their intuition. When evaluating whether or not a line works in a piece of furniture, it comes down to instinct and gut feelings. Just as important as trusting your design sense, though, is having the right tools and jigs to draw and shape curved furniture components.

Tools for drawing circles

One of the most basic curves that can be incorporated into a furniture piece is the radius curve, or arc. These are prevalent in every type of woodworking, from tabletops to aprons to the doors on a cabinet.

Producing an arc is relatively straightforward. We're all familiar with drawing a portion of a circle with a compass. The only adjustments you can make are to increase or decrease the radius.

When it comes to drafting furniture components, you often will require large-scale radii. To draw these large-radius arcs you need trammel points, which are standard drawing aids available from

Photos, except where noted: Matt Berger

many woodworking-, art-, and drafting-supply dealers. Trammel points act like an oversize compass when mounted to a beam. The only limitation to the size of the radius they can draw is the length of the beam. You can create a simple trammel using a stick, a nail (for the pivot point), and a pencil that is secured to the stick.

To draw a curve with a trammel, tape your drawing paper to a large, flat surface, such as a sheet of smooth plywood, melamine, or medium-density fiberboard (MDF), and then draw a centerline beyond the paper, at least the length of the desired radius. Plant the pivot point of the trammel along the centerline and draw an arc with the secured pencil. If the radius seems too dramatic, you can flatten out the arc simply by moving the pivot point farther away from the centerline.

Arc jig—Another way to draw an arc without a compass is with a simple arc jig. This jig consists of two long, narrow strips of plywood fastened together at an angle at the center of the arc's radius (see the drawing on the facing page). Drive a nail into the drawing surface at each end of the desired arc, and set the angle of the jig so that the strips intersect at a height above the nails equal to the highest point of the arc.

Moving the jig from side to side against the nails—with a pencil at the intersection of the plywood strips—will create a perfect arc. To change the radius, increase the pitch of the angle where the two pieces of plywood are fastened together. In addition to drawing arcs, I have used this jig with a router to cut arc templates.

Fair curves with a batten

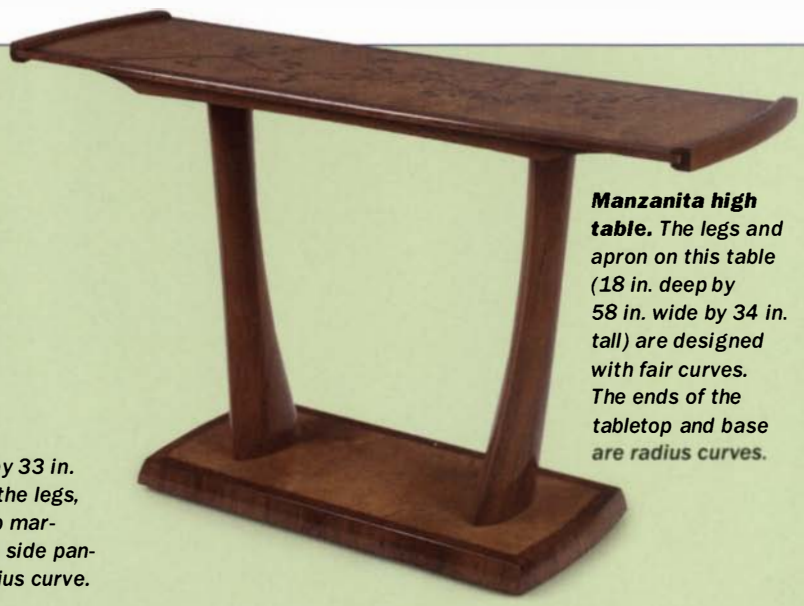
I often use a type of changing-radius curve, better known as a fair curve, in my furniture. These are a bit more challenging to create because they can't be plotted mathematically or with a compass. One portion of the curve might be a dramatic bend that gradually flows into a straight line.

I make most fair curves using a long and straight, defect-

Furniture with curves

Much of the curvy work in my portfolio was drawn full-size using fair- and radius-curve drawing tools. My plans require a great deal of time. Once they're down on paper, the furniture has been methodically built in my mind. The easy part is going out to the shop and constructing it.

Rose Chest. *This piece (21 in. deep by 46 in. wide by 33 in. tall) features fair curves on the legs, an oval medallion on the top marquetry, and bowed front and side panels created with a 10-ft. radius curve.*



Manzanita high table. *The legs and apron on this table (18 in. deep by 58 in. wide by 34 in. tall) are designed with fair curves. The ends of the tabletop and base are radius curves.*

Photos, this page (bottom left, right) and facing page (bottom left, right): Wayne McCall

SIMPLE ARCS

Radius curves, also called arcs, are the most common curves used for tabletops, aprons, and some door frames. Because they have a single center point, they are the simplest to draw.

TRAMMEL POINTS

Commercially available trammel points are excellent for drawing large-radius circles and curves. Because the two-part drafting tool can be mounted on a beam cut to any length, they allow you to draw circles and arcs of almost any diameter.

A JIG FOR LARGE-RADIUS ARCS

This simple jig requires two nails and two long, narrow strips of plywood. First, locate the nails at the desired width, or run, of the arc. Connect the nails with a straight line, then draw a perpendicular line at its center point to indicate the height, or rise, of the arc. Position the plywood strips so that they rest against the nails and intersect at the rise. Screw the strips together and place the pencil at the intersection to draw the arc.

Arc jig. *This simple jig allows you to draw a perfect arc of almost any size without having to calculate the radius.*

Folding screen. *This hinged three-panel screen (56 in. wide by 64 in. tall) has bamboo marquetry laid out with fair-curve tools. The top and bottom rails are designed with a radius, while the outermost leg rails are fair curves.*

Round table. *Schürch's Ribbon Butterfly coffee table (42 in. dia. by 19 in. tall) features a circular tabletop and lower shelf and fair-curve legs.*

Adjustable jig for fair curves. *Schürch designed this pinch fairing jig to create fair curves when drawing full-size furniture plans.*

free square stick, called a batten. When held under slight tension, a batten usually will yield a fair curve and can be adjusted easily.

Depending on the curve you wish to produce, you can make a batten from a number of materials, as long as they are free of internal tensions, knots, or defects that otherwise would create kinks or flat spots in the curve. The best materials include MDF, mahogany, spruce, a long, thin metal rule, or even a plastic pipe.

The thickness of the batten also is important and depends on the size of the curve you are making. For example, a 4-ft.-long bend in the back leg of a chair can be done with a batten measuring about ¼ in. square. Whereas an 8-ft.-long bend may require a batten that is 1 in. square.

There are a few basic principles to follow when bending a batten into a fair curve. After determining the two end points of the curve, secure the batten slightly past these two points; then apply pressure to any point along the length of the line to create the curve, lining up the jig so the batten crosses over the two end points. Then trace the line with a pencil.

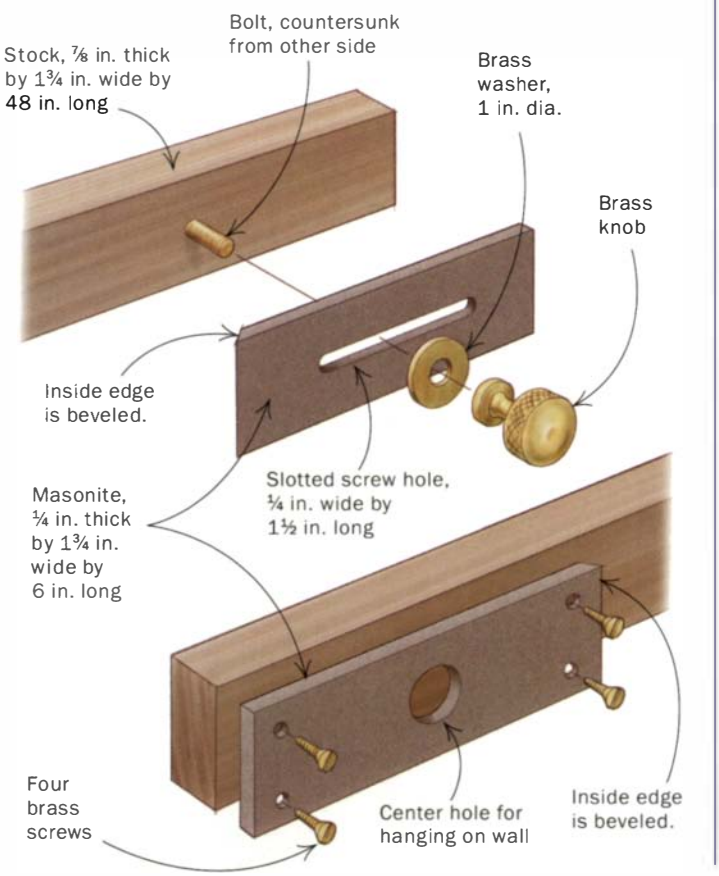
Adjustable pinch fairing jig—If my desired curve isn't too long, as when designing the top of a frame-and-panel door or the legs of

GRACEFUL CURVES

A fair curve has an ever-changing radius and mimics the graceful curves found in nature. A truly fair curve flows naturally, with no awkward transitions.

ADJUSTABLE PINCH FAIRING JIG

Fair curves are easy to create with this jig, which bends a metal rule into a curve and then allows you to set the apex of the curve anywhere along its length with a dowel.



Commercial drawing tool. *A flexible curve, available from a woodworking-, art-, or drafting-supply catalog, can be bent into a fair curve and hold its form.*

Drawings: Chuck Lockhart

Play with the stops until the curve looks right. *Position one brick stop at each end of the metal-rule batten to set the end points, and then push on the apex of the curve with a third brick stop.*

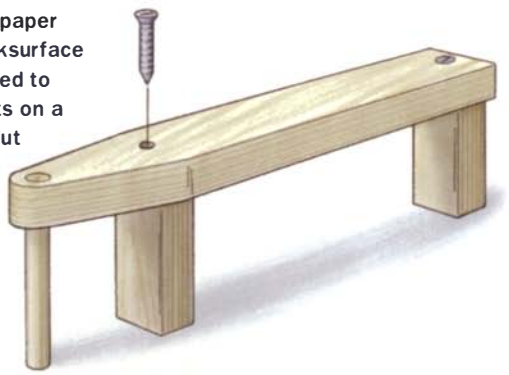
a chair or cabinet, I use a shopmade jig that bends a metal rule. This pinch fairing jig traps both ends of the rule and creates a bend when the two points are compressed slightly. Then, when you jam a dowel along the length of the curve between the rule and the jig, it creates a pressure point on which the fair curve wraps.

The pinch faring jig is mobile and keeps the fair curve fixed when you move the jig. It can be flipped over to create the mirror image for drawing the other side of a piece of furniture, or used to draw a reveal next to your original fair line when shifted to the new location on the drawing. Don't compress the metal rule too much, or the jig will yield a nonfair curve. Let the dowel do the bending.

Brick-stop batten for long curves—When drawing long curves, such as the 86-in.-tall stile on my folding screen (shown on p. 75), I use a brick-stop jig to hold a batten at three points of a bend. One brick stop at each end secures the batten a little past its start and stop point, and the third brick stop pushes on any one point along the length of the batten to create a curve. There should be light pressure on the bend to ensure that the batten will be fair while under tension. Try bending battens of different dimensions until

BRICK-STOP BATTEN

A simple plywood jig, anchored by a brick wrapped in heavy paper to protect the worksurface and drawing, is used to set the three points on a batten for laying out a fair curve.



MDF for big curves. *MDF is an ideal material for drawing long curves because it has a consistent density and no stress points.*

Thin stock for dramatic curves. *A thin piece of straight-grain mahogany works well for drawing tight curves like the bamboo marquetry on Schürch's hinged three-panel screen.*

you achieve the correct tension for the curve. When sighting down the curve, you should see no flat spots or kinks, and there should not be so much tension that the bricks slide while you're applying pressure with the middle brick stop.

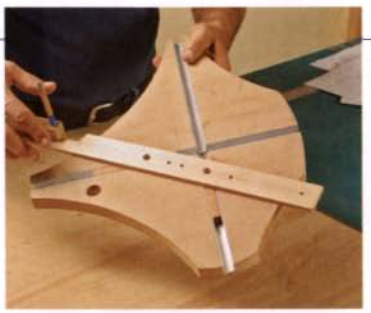
Elements of an ellipse

Another curve I like to use in marquetry designs or tabletop shapes is an ellipse, which can be plotted mathematically using two focal points located on the long axis. Ellipses have a notable characteristic: You can measure from any point on the ellipse to each focal point, and the sum of those two distances will always be the same.

There are several ways to draw an ellipse (see *FWW* #138, p. 112), but I find the easiest method is with an oval maker's jig, which can be made in the shop or purchased commercially. My shopmade version is essentially an MDF board that has dadoes cut at 90° to each other in which hardwood axis blocks can slide. My jig has axis blocks sliding in ½-in. aluminum U-channel that I found at the hardware store. The pencil arm is loosely screwed onto each

PRECISE ELLIPSES

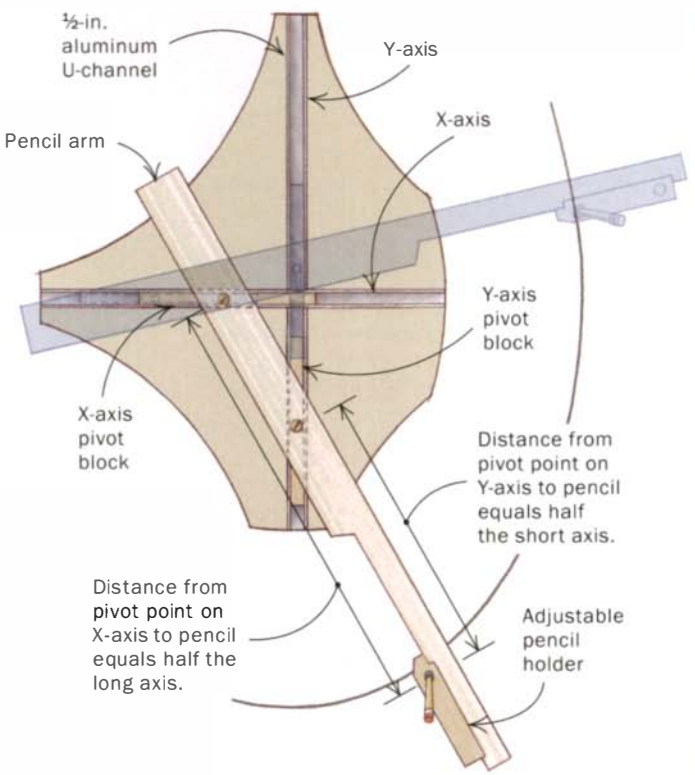
An ellipse often is used for tabletop designs. It has an X-axis and a Y-axis, which can be lengthened or shortened to create everything from a circle (equal axes) to an elongated oval. A jig can help you draw ellipses of all sizes.

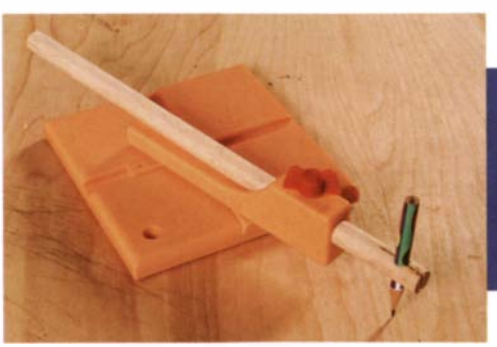


How to change the shape and size of an ellipse. *Adjust the axis locations on the pivot blocks as well as the location of the pencil.*

OVAL MAKER'S JIG

This jig for drawing ellipses (or circles and ovals) has a pencil arm attached to two pivoting axis blocks, which ride in T-tracks as the arm rotates around a center point.





Oval drawing jig. *This commercially available jig allows you to draw ellipses, circles, and ovals with a maximum axis of 30 in.*

axis block. When the arm is rotated, both axis blocks move back and forth within the dadoes.

Begin plotting an ellipse by drawing the rough shape on scrap paper and then aligning the jig so that its center is rooted where the X-axis and Y-axis intersect. Then measure the distance from the center of the rough ellipse to the farthest point on the short axis, drill a hole in the arm, and screw it onto the axis block. Repeat the same procedure to determine the distance of the long axis. After drilling and fastening both axis blocks to the arm, manipulate the jig to ensure the action is smooth enough to draw the ellipse. The axis blocks cross over the center when you draw the full ellipse.

The height-to-width proportions of the ellipse are adjusted by drilling new pivot points through the arm where it fastens to the axis blocks. To increase the size and maintain the proportion, simply move the pencil farther out on the arm.

Another way to enlarge or reduce the size of the ellipse is to draw one on paper and then enlarge or reduce it on a copy machine. For my jig, I have cut the MDF down on two sides to make smaller ellipse sections. The oval maker's jig is good for drawing tabletops, crown or apron elements on a cabinet, and decorative veneering designs. □

Paul Schürch builds custom furniture in Santa Barbara, Calif. You can see more of his work online at www.schurchwoodwork.com.

Adjust the curve of the sole. *In addition to setting the blade, an adjustment knob on the compass plane changes the curve of the sole to a convex or a concave shape.*

A handplane for curves

Compass planes, also known as radius planes, have a long history in furniture making and boatbuilding due to their unique ability to handplane curved surfaces. I find a compass plane indispensable for shaping curves. This tool lets me take curved plywood templates as well as curved workpieces straight from the bandsaw to completion. It creates a smooth line and leaves a square edge on the template to aid bearing-guided router bits better than a sanded edge.

A compass plane works similarly to a standard bench plane and has a depth-adjustment screw and a lateral adjustment lever for the iron. Unlike a bench plane, though, its thin metal sole can be adjusted to a convex or concave curve. When setting up a compass plane to fair a concave curve, give the sole a slightly tighter inside radius than the curve to be planed. For convex curves, set the plane to the precise curve. When set correctly, it takes only a few passes with the plane to create a smooth, fair curve.

The Stanley No. 113 compass plane I use is no longer being produced, but it can be purchased secondhand. At least two toolmakers, Kunz and Anant, currently have compass planes on the market.

Plane a concave curve. *Tune the sole to a slightly tighter inside radius than the curve to be planed and keep pressure on the nose with each pass.*

Plane a convex curve. *With the sole of the compass plane set to the desired curve, make several passes, putting pressure on the nose of the plane until the curve in the workpiece is fair.*

27 Books Every Woodworker Should Read

Experts and editors weigh in on the volumes that fostered and fed their careers

Ask around and you may find two common themes among woodworkers: Their shops are overrun with old handplanes, and their bookshelves are brimming with inspiring tomes on the craft.

We decided to survey *Fine Woodworking*'s staff members and regular contributors to find out which books have had the greatest impact on their woodworking careers. Many remember the book that first got them hooked or was responsible for influencing the techniques and philosophies that they continue to practice in their shops today.

While some popular titles didn't make our list, the ones we compiled can serve as a great source of inspiration, as well as provide answers to many questions about the properties of the materials, about the concepts of furniture design and craftsmanship, and about the techniques that have been practiced in the woodshop for centuries. They include some not-so-obvious titles as well as a few always-referenced ones, such as Ernest Joyce's *Encyclopedia of Furniture Making* and R. Bruce Hoadley's *Understanding Wood*. While some of these books could be considered antiques, the information they promote remains fresh.

If you ask us, all of these books are must-reads. And if nothing else, adding them to your collection may be just the inspiration you need to get started on that new bookcase you've been meaning to build.

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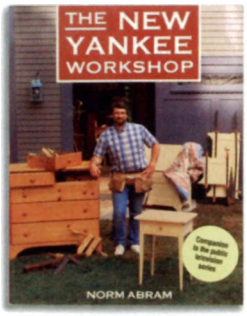
Tell us your favorite book. Visit the Knots forum to discuss it on the Web.



Launchpad for beginners

***The New Yankee Workshop* by Norm Abram. Little, Brown & Co., 1989.**

After watching many episodes of *The New Yankee Workshop* with a mixture of admiration and disdain, I was surprised with the book as a Christmas gift from my wife in the early 1990s. I ended up building three or four projects of the dozen inside, including the workbench that I still have. Advanced woodworkers like to poke fun at Abram with his every-power-tool-ever-made mentality and his reliance on combination stains and finishes, but he guides novices into woodworking, and for that we all should be grateful.

—Mark Schofield is an associate editor.

A chair maker's chair maker

***Make a Chair From a Tree* by John D. Alexander. Astragal Press (look for the enlarged 1994 edition of the 1978 original).**

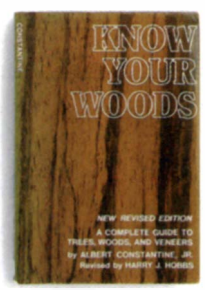
This was the first book that I read from The Taunton Press, and to me it's the reference point for green-wood chair making. It came out in 1978 when very few people were riving out green wood and building projects with it. The book teaches about ring-porous woods such as oak, how they shrink, and what to expect out of them when used green. The author spent a lot of time researching the subject and running his own tests, and much of the information in the book remains sound, despite recent innovations. It's a wonderful testament to its quality that the book has been able to withstand 26 years of scrutiny during a period of time when green woodworking has proliferated.

—Curtis Buchanan is a chair maker in Jonesborough, Tenn.

Encyclopedia of woods

***Know Your Woods* by Albert Constantine Jr.; revisions by Harry J. Hobbs. Scribner Book Co., 1987.**

I bought this book 25 years ago—a young and ignorant woodworking novice eager to learn about wood.



The author was active in the wood-supply business for many years (his family began importing mahogany to New York in 1812), and the book reflects his experience. In his introduction Constantine states, "The information given has been selected to provide the craftsman and layman with a broad, practical knowledge of woods." The book does exactly that, giving quick hits of several hundred kinds of wood. Each one is listed by its preferred common name and its scientific name, along with a brief description of the color, uses, and physical properties of the lumber. This book is now out of print, but used copies are not hard to find (for more on buying out-of-print books, see the story on p. 85).

—William Duckworth is an associate editor.

The Windsor revival

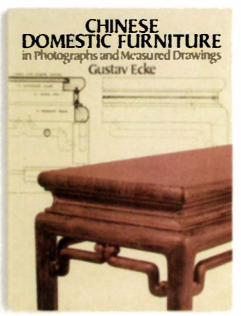
***Make a Windsor Chair with Michael Dunbar*. The Taunton Press, 1984.**

Hand-crafted Windsor chairs have been rediscovered in the past 20 years. Both hobbyists and professionals enjoy creating these classic pieces; the fact that they can be built in small shops without power equipment is appealing. Dunbar's book often is credited with inciting this revival. While he was in college, Dunbar became fascinated with Windsor chairs and set out to uncover much of the history behind them, building and selling them along the way. Over the past 20 years, he has taught thousands of students, and many of the professionals across the country who make Windsor chairs learned from his books or classes. Since the book was released, Dunbar has streamlined some of his methods, but his book offers all of the theory behind how the methods work.

—Kim Carleton Graves is a furniture maker in Brooklyn, N.Y.

Mysteries of the East

***Chinese Domestic Furniture* by Gustav Ecke. Dover Publications, 1986 (a reprint of the 1944 original with history, photos, and measured drawings).**



Because I lived in San Francisco during my formative years as a woodworker, my approach to furniture design is heavily influenced by the styles of classic Japanese and Chinese furniture. Ecke's book was the first I found that provided inspiring photos, measurements, and detailed renderings of the complex and almost magical joinery required by these centuries-old furniture pieces I've always admired. While I don't yet have the skills or patience to hand-cut these joints, the original pieces presented in the book give me something to look forward to.

—Matt Berger is an associate editor.

Textbook woodworking

***Furniture and Cabinet Making* by John L. Feirer. Bennett Publishing Co, 1983.**

This was one of the first books I picked up when I started woodworking and needed a one-stop source for information. By today's standards, the photographs and examples of furniture look rather dated. But the information is timeless, and I still rely on this book when I need to look up something esoteric, such as how to draw an ellipse, or find tips on built-in cabinet construction. It reads like a typical high-school or vocational-school textbook—very dry—but the content is solid with lots of photos and illustrations. You won't learn how to fine-tune a handplane here, but you'll learn about the history of woodworking and its most common tools.

—Anatole Burkin is the editor.

Photos: Matt Berger

Simply beautiful furniture

***American Furniture from the Kaufman Collection* by Michael Flannigan. National Gallery of Art, 1986.**

If I were trapped on a desert island, and I could have only one book with me, it would have to be this one. The large and brilliant color photos of these extraordinary furniture pieces suck me in every time I flip through its pages. The book shows off work from as early as 1690 through the mid-19th century (part of philanthropists Mr. and Mrs. George M. Kaufman's private collection exhibited in 1986 at the National Gallery of Art in Washington, D.C.). While it provides good background information on each piece, the book's greatest strength is in the variety of work shown.

—Steve Latta builds period furniture and teaches woodworking in Lancaster, Pa.

The most practical, page for page

***Tage Frid Teaches Woodworking—Book 1: Joinery; Book 2: Shaping, Veneering, Finishing*. The Taunton Press, 1996.**

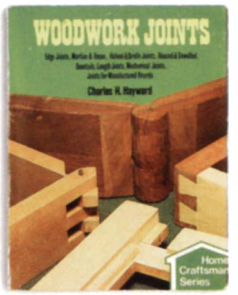
Just a few years after James Krenov wrote *The Cabinetmaker's Notebook*, Frid offered us his indispensable trilogy (Book 3 is sold separately). Krenov's books had turned the world of woodworking upside down, revealing a special world without compromise. Meanwhile, Frid's books—like his approach—were more practical. There are no pets lolling in the background or mugs of steaming coffee perched on the workbench. His is the kind of woodworking practiced in basement shops and garages. The techniques are clearly grounded in the nitty-gritty rituals and small setbacks of everyday woodworking. While they aren't the prettiest books, they're absolutely crammed with useful knowledge. Page for page, I don't think you can learn as much from any other book. If I were going to feast on woodworking books, I'd order a main course of Frid with a little Krenov on the side.

—Mario Rodriguez is a contributing editor.

The bible of joinery

***Woodwork Joints* by Charles Hayward. Sterling Publishing, 1979.**

This book is filled with easy-to-understand illustrations of woodworking joints and how-to explanations on cutting and fitting the joints. Hayward's clarity in visual presentation and the simple language he uses in the description of each joint, its construction and its function, make this book a leader in the field of books on woodworking joinery. Hayward also is co-author of *Wood Carving* (Sterling Publishing, 1979), a book I turned to regularly as I was learning to carve wood.



—Karen Wales is a woodworker and woodworking teacher.

Classic American pieces

***American Furniture in the Metropolitan Museum of Art* by Morrison H. Heckscher. Metropolitan Museum of Art and Random House, 1985.**

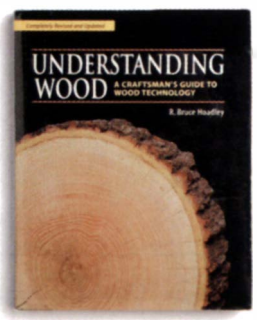
From a design perspective, the descriptions and partial measurements in this book are priceless. While I do occasionally make a total reproduction, typically I like to design new pieces within the parameters of 18th-century furniture. To do this, I visit museums and study classic pieces. There's nothing better than visiting a museum, but when you can't go back for a quick look, it's great to have this resource within arm's reach. It includes descriptions, historical background, and some dimensions.

—Lonnie Bird is a woodworking teacher and furniture maker in Dandridge, Tenn.

"Krenov's books had turned the world of woodworking upside down, revealing a special world without compromise. Frid's books—like his approach—were more practical." —Mario Rodriguez

First on most shelves

***Understanding Wood* by R. Bruce Hoadley. The Taunton Press, 2000 (updated and revised since the 1980 original).**



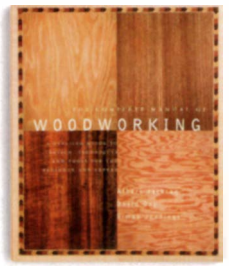
I have a library with upwards of 100 texts on botany and wood-related subjects. But most of them are a little technical and too specialized for the typical woodworker. I think this is the best book for beginning woodworkers who are interested in understanding the properties of the medium. Also, for those who want to develop skills in wood identification, Hoadley's *Identifying Wood* (The Taunton Press, 1990) is the right place to start.

—Jon Arno is a regular contributor to Fine Woodworking.

One-stop resource for beginners

***The Complete Manual of Woodworking* by Albert Jackson and David Day. Knopf, 1996.**

Wonderfully sketched illustrations and no-nonsense explanations made this the only resource I turned to



when I began woodworking as a hobby. The book covers topics ranging from wood identification to furniture ergonomics to power- and hand-tool techniques thoroughly and succinctly; the answer to any basic question is undoubtedly somewhere inside. But you might have to scour through every scribble of handwritten captions to find it. *—Matt Berger*

Finishing primer

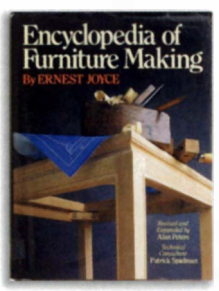
The Complete Illustrated Guide to Finishing **by Jeff Jewitt. The Taunton Press, 2004.**

There are many accurate and informative books on finishing, but most of them lack the one characteristic I appreciate most in my teaching: practicality. Jewitt clearly comes across as someone who works at the art of finishing every day. He details what works and what doesn't when it comes to hand-applied and spray finishes. From the beginning Jewitt reveals very clearly his philosophy about doing all the right preparation steps. He also reveals secrets for setting up a finishing area for the correct temperature, humidity, and lighting, as well as tips on the tooling and products needed for proper surface preparation. The book also covers the gamut of finishes, including dyes and pigments, grain fillers, color layering with glazes, and all of the various topcoats, but it doesn't get bogged down with heavy commentary or chemical jargon. It's just simply how to do it. This is the book that all woodworkers and finishers alike must have on their shelf, right next to the can of Danish oil.

–Teri Masaschi is a professional finisher and teacher near Albuquerque, N.M.

Woodworking from A to Z

Encyclopedia of Furniture Making **by Ernest Joyce; revised by Alan Peters. Sterling Publishing, 2000 (a revision of the 1970 edition).**



For good reason, this book sometimes is called the Woodworker's Bible. The original version, published in England in 1970, was created as a text for students entering the woodworking trades. The book covers all facets of furniture making: materials, tools, techniques, joinery, design, finishing, and restoration. In 1987, Alan Peters and Patrick Spielman took on the job of revising and updating the text. Some of the furniture styles in this book look terribly dated, but the technical information offered in the text is extensive and significant.

—William Duckworth

The elegant engineering of casework

Solid-Wood Cabinet Construction **by Franz Karg. The Taunton Press, 1991.**

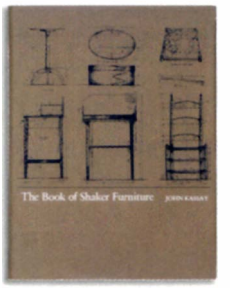
Flip through this book too quickly, and you'll easily overlook its strength: the details. It sat on my bookshelf for years before I discovered it. The 70 modern-leaning designs found here—even if they're not your favorite—are brilliantly engineered and instructive, no matter what style you build. This book isn't weighted down by words, but the photos do just as well telling the story.

—Matthew Teague is the former managing editor of Fine Woodworking.

Quintessential Shaker

The Book of Shaker Furniture **by John Kassay. University of Massachusetts Press, 1980.**

Shaker craftsmen pared their furniture to the essentials of proportion, detail, and construction. I often leaf through Kassay's book to look at the elegant simplicity of Shaker work, its economy of construction and technique. Looking at the book is much like touring an extensive Shaker museum—only better. There are good descriptions of more than 70 pieces, explaining unusual features, dimensions, and woods used, and an excellent variety of each furniture type to compare side by side. But unlike any museum, Kassay takes some pieces apart through clear drawings and cutlists. He has taught me much about joinery that lasts, the scale of parts such as drawer sides and bottoms, and how to use different woods.

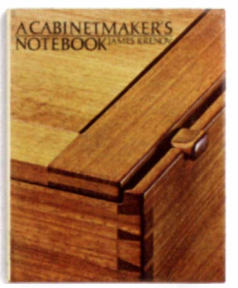


—Garrett Hack is a contributing editor.

The philosophy behind a revolution

A Cabinetmaker's Notebook **by James Krenov. Linden Publishing, 2000 (originally published in 1976).**

The furniture of James Krenov has influenced many woodworkers, but his philosophy of woodworking has influenced many more. I discovered Krenov's book while I was in college, and it has inspired a lifelong passion for the craft of woodworking. It also has taught me to take my time and do it right even where no one is looking. Krenov's writing is friendly and intimate with a focus more on the why rather than on the how-to of woodworking. The simple elegance and consummate craftsmanship of his furniture pictured in the book are an appropriate illustration of his ideas and philosophies. Krenov published two more books before he moved to Northern California in 1981 and attained his semi-cult-figure status: *The Impractical Cabinetmaker* (Linden Publishing, 1999 reprint) and *The Fine Art of Cabinetmaking* (Sterling Publishing, 1992 reprint). These books also are worth reading.



—Michael Pekovich is the art director.

Stickley: ready to build

Shop Drawings for Craftsman Furniture: 27 Stickley Designs for Every Room in the House

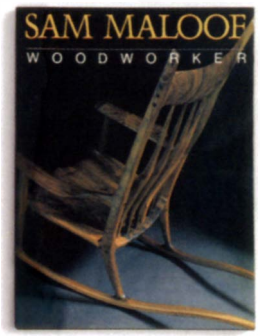
measured and drawn by Robert W. Lang. Cambium Press, 2001.

No matter what your level of woodworking, if you like to build Arts and Crafts furniture, you'll like this book. Lang has taken photos from old Stickley catalogs, scaled them, and then produced working drawings and cutlists. The book also offers a brief history of the style and how-to information for the most commonly used Craftsman techniques. Lang has produced three more books in this series.

—Matthew Teague

Woodworking for a living

***Sam Maloof: Woodworker* by Sam Maloof. Kodansha International, 1989.**



The author's handwritten business card reads "Sam Maloof, Woodworker." This autobiographical book of the same title is loaded with Maloof's sketches, practical woodworking tips, measured drawings, and a generous mix of both color and black-and-white photographs. This is a must-read for anyone trying to make a living at woodworking.

—Lon Schleining is a frequent contributor to Fine Woodworking.

Don't fear the chair

***Chairmaking and Design* by Jeff Miller. The Taunton Press, 1997.**

For years I was intimidated at the thought of building a chair, but this book demystified the process and walked me through the first few chairs I built. When it comes to a good all-around book on the construction of eight chairs, there's nothing better on the market. And if Miller's often generic designs don't inspire you, check out the small drawings scattered throughout the book—all of them are easily built using Miller's instructions.

—Matthew Teague

Federal at its finest

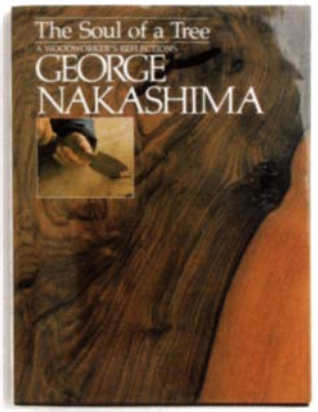
***The Furniture Masterworks of John & Thomas Seymour* by Robert D. Mussey Jr. Peabody Essex Museum, 2004.**

This is a new release, but it is an absolutely wonderful treatment of these two craftsmen who produced great work while living in Boston during the high point of the Federal period. The book is the culmination of a 10-year study by Mussey, and he's done a phenomenal job putting his findings down on paper. Likewise, the photography is exceptional, capturing all of the details that make these pieces so exquisite.

—Steve Latta

The first "woodworker"

***The Soul of a Tree: A Woodworker's Reflections* by George Nakashima. Kodansha International, 1988.**



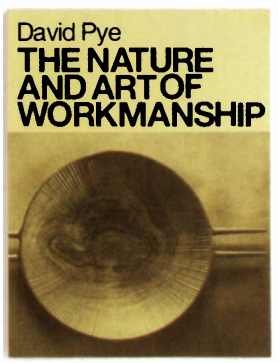
If you want to know how the modern era of woodworking was launched, this is a must-read. However, like the man, the scope is much greater than furniture making alone. Nakashima's tale, told beautifully in the first person, is a story of the entire 20th century, from his childhood memories of the Pacific Northwest to a quest for personal truth that led him in the 1920s and 1930s from Paris and Tokyo to an ashram in India, and finally, to New Hope, Pa., where he raised his family and developed a style of furniture and craftsmanship that has been widely influential. Rich photographs, many good enough to frame, document Nakashima's life, his process of selecting wood and building furniture, and the many revolutionary buildings and houses he designed at his New Hope compound.

—Asa Christiana is the managing editor.

"If you want to know how the modern era of woodworking was launched, *The Soul of a Tree* is a must-read." —Asa Christiana

How to work efficiently

***The Nature and Art of Workmanship* by David Pye. Cambium Press, 1995 (a reprint of the original 1968 book).**



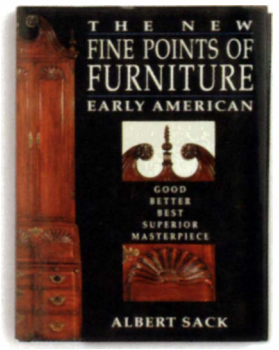
Much of the thinking and approach to woodworking taken by my generation of woodworkers was shaped by Pye. He was a scholar, craftsman, and philosopher who taught furniture design at the Royal College of Art in London until 1974. He used his credentials to establish a wide-reaching philosophy on the state of the craft. Particularly important, Pye introduced us to the concept of "workmanship of certainty versus workmanship of risk," in which he draws the distinction between rough and precise workmanship, and good and bad workmanship, noting that rough is not necessarily bad, just as precise is not necessarily good. Many of the misconceptions

and arguments among woodworkers would disappear if more of them were familiar with Pye. Also by Pye, *The Nature and Aesthetics of Design* (Cambium Press, 1995) is an important overture to furniture design. In it, he reveals a vocabulary he developed that can be used to solve any design dilemma.

—Mike Dunbar is a contributing editor.

Last word on American furniture

***The New Fine Points of Furniture* by Albert Sack. Crown Publishers, 1993.**



This is one of the most important books on American period furniture that you can own. Styles and elements are discussed in detail, from the humble beauty of the Pilgrim chair to the grandiose masterpiece secretaries of the Chippendale period to the classical tables of Duncan Phyfe. Comparisons of similar pieces are made, with Sack giving each one a rating ranging from good to masterpiece. This well-written and beautifully photographed book gives a privileged initiation into the world of the great American master furniture makers. *—Karen Wales*

An old barn spills its guts

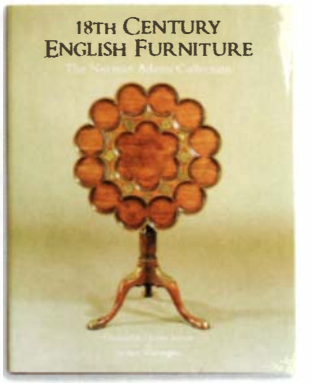
***A Reverence for Wood* by Eric Sloane. Dover Publications, 2004 (first published in 1965).**

In a relaxed, narrative style, following the process of taking down an old barn, Sloane explains the early American's knowledge of and reliance on wood. The eastern forests contained hundreds of species of wood, each with its own use. He explains how early craftsmen used specific species for very special purposes: one wood for hinges, several different woods for doors, four or five woods for a chair, and a multitude of woods for boats, barns, and wagons. This book really opened my eyes to the variety of woods, their uses, and the knowledge required to work the woods on hand for optimum results.

—Christian Becksvoort is a contributing editor.

18th-century eye candy

***18th Century English Furniture: The Norman Adams Collection* by Christopher Claxton Stevens and Stewart Whittington. Antique Collectors Club, 1998.**



This book includes hundreds of photos of high-end furniture from what I regard as the apex of furniture design. I rarely try to copy a piece exactly, but I try to replicate the perfect proportions of a leg or a cabinet. The book shows how designs evolved from the slightly clunky to the almost perfect. *—Mark Schofield*

What the government knows about wood

***Wood Handbook: Wood as an Engineering Material.* Agricultural handbook No. 72. U.S. Forest Products Laboratory, 1999.**

When I need a technical reference, I reach for this book most often. Whether I am calculating wood movement, looking for the working characteristics of a certain species, trying to determine how much load a shelf can take, or figuring out what kind of fasteners to use, it's all in this book. Want to know how to cut and lay cedar shakes or timber-frame a house? Yep, all that's here, too. There are things in this book you didn't even know you needed to know. *—Matthew Teague*

How to find out-of-print books

Many of these suggested readings are out of print, but that doesn't mean they're out of reach. Several sources on the Internet make it possible to find and purchase dated or obscure titles.

The granddaddy of online booksellers is Amazon.com, which began as an Internet-only bookseller and now sells everything from tablesaws to books about tablesaws. Most of its inventory is new titles, but a number of independent booksellers also offer used books through Amazon.com.

Powell's Books (www.powells.com), based in Portland, Ore., isn't as large as Amazon, but it still has an impressive inventory of new and used books to sort through on its Web site. eBay, the online flea market, is another source.

For some of the more hard-to-find books, there's Biblio.com, an online marketplace for rare, out-of-print titles. It combines the inventory of hundreds of independent booksellers from around the world into a single search engine. Type in the title or author you're looking for, and the site will retrieve purchasing information from all participating dealers that have the particular book in stock.

Finally, for a comprehensive selection of woodworking titles, both current and out of print, there's Cambium Books (www.camblumbooks.com). Cambium's inventory comes from a number of publishers around the world, and it runs a small imprint of its own that produces new titles. The Connecticut-based company also has made a habit of buying the rights to popular woodworking books that are no longer available and bringing them back into print. Examples include two of David Pye's influential books. Linden Publishing (www.lindenpub.com), out of Fresno, Calif., runs a similar operation and has republished some notable titles, including two of James Krenov's popular books.

readers gallery

JAY COCHRAN
Old Westbury, N.Y.

Cochran grew up surrounded with English and early-American furniture. This influence, combined with his passion for fine woods and furniture making, inspired him to create this claro walnut table (19⅝ in. deep by 3¾ in. wide by 31⅞ in. tall), his first attempt at replicating the furniture he loved as a child. The piece is finished with orange shellac and wax.
PHOTO BY PETER HARHOLDT

DAVID PARKER
Ann Arbor, Mich.

The design for this doussie and canary-wood cabinet was influenced by the work of a former College of the Redwoods student, John Babot. While the original piece was much smaller, Parker kept the overall design of his cabinet (14 in. deep by 26 in. wide by 42½ in. tall) similar to the original. The case sides gently curve, and the legs are five-sided. The piece is finished with shellac and wax. PHOTO BY DAVID WELTER

MIKE MAHONEY
Provo, Utah

Mahoney turned this set of eight natural-edge nesting bowls using box-elder burl salvaged in his home state. In its less-ornate form, box elder is ideal in density and elasticity for making salad bowls. The largest bowl in the set is 13 in. dia. by 10 in. tall; the smallest is 3½ in. dia. by 1½ in. tall. In addition to producing a matching collection, Mahoney said making nesting bowls is a great way to get the most out of unique woods. The technique enables you to cut several bowls from one blank using a set of special cutting tools.

KEVIN A. SHAW
Ithaca, N.Y.

Shaw made this quartersawn white-oak blanket chest as a gift for his wife to celebrate the completion of her doctoral work. The chest (21 in. deep by 41 in. wide by 26 in. tall), based loosely on the Stickley style, features resawn, book-matched panels and a cedar-lined bottom. The finish is two coats of tung-oil varnish and Danish oil.

JERE WILLIAMS
Smyrna, Ga.

This leather-upholstered chair and ottoman duo, titled The Beardsley Lounge, is one in a series of three designed and crafted by Williams for his solo show, Seating, at the Woodruff Arts Center in Atlanta last year. The chair is 36 in. deep by 31 in. wide by 36 in. tall. The ottoman is 20 in. deep by 30 in. wide by 14 in. tall. The wood in both pieces is cherry, finished with Watco oil and wax.

OREN B. HELBOK
Unityville, Pa.

The design of this high-back bench started out as a settee in the style of Charles Rennie Mackintosh. But once Helbok had the 10-ft. cherry plank that serves as the seat in his possession, he increased the dimensions of the settee to 21 in. deep by 97½ in. wide by 46 in. tall. The mixture of cherry and soft maple creates a subtle contrast, Helbok said, and the square cutouts in the top rail lighten the bench visually. The square plugs in the legs hide ⅜-in.-dia. lag bolts, which reinforce dado and rabbet joints. The bench is finished with six coats of a mixture of polyurethane, tung oil, and linseed oil. PHOTO BY MARK ANDERMAN/ TERRY WILD STUDIO

ED ZBIK
San Diego, Calif.

Zbik turned this 9-in.-dia. by 7-in.-tall gourd-shaped vessel—aptly titled Lizard Bowl—from walnut. The lizard-skin pattern on the exterior was created by carving grooves and adding inlaid acrylic coloring to them. "When you run your hands over it, the surface even feels like scales," noted Zbik. The piece has an oil finish.

HUBERT ZAWADZKI
Vancouver, B.C., Canada

Influenced by modern high-rise architecture, such as the Sears Tower in Chicago, Zawadzki updated the traditional Japanese dansu step chest by setting back the middle and top sections. He constructed the piece (18 in. deep by 39 in. wide by 70 in. tall) from Douglas fir as well as cedar, maple, hemlock, and pine. The case features eight sets of hand-cut dovetails. To simplify assembly and glue-up, the carcase was assembled in seven stages. It is finished with oil, polyurethane, and wax.

DAVE BOYKIN AND TOM PEARCE

Denver, Colo.

Drawing heavily from Asian influences, Boykin and Pearce designed and built this storage cabinet to house a customer's treasured sheet music. The piece is full of subtle design details, including a slight concave curve on the bracket base as well as thoughtfully book-matched veneered drawer faces and cock beading. The cabinet (17 in. deep by 36 in. wide by 42 in. tall) is crafted out of cherry and Carpathian-elm burl veneer, finished with conversion varnish.

KEN BRANDT

Hershey, Pa.

Brandt, a dairy farmer, finds woodworking to be a relaxing escape from the rigors and long hours of farm life. He built this linen press (18¾ in. deep by 38⅜ in. wide by 77 in. tall) from plans drawn by Carlyle Lynch, based on a 1790 original. The piece is constructed of solid walnut and features crotch-walnut veneered, raised-panel doors, and hand-cut dovetail joinery. The finish is a stain mixture, varnish oil, and wax.

FRANÇOIS MASSE

Montreal, Que., Canada

Masse reused an ancient Indian pediment carving in the apron of this hall table, which measures 16 in. deep by 66 in. wide by 34 in. tall. He regularly incorporates antique elements in his furniture, surrounding his finds with simple lines "out of respect for the skill of the artisan who so painstakingly gave the original life in another time and place," Masse said. He used anegre for the top, walnut for the legs, satine for the drawers, and West Indian locust for the shelf. The table is finished with oil and sprayed lacquer, and the drawers are lined with Japanese paper.

Submissions

Readers Gallery provides design inspiration by showcasing the work of our readers. For an entry form, visit www.finewoodworking.com. Send photos and entry forms to Readers Gallery, *Fine Woodworking*, 63 S. Main St., Newtown, CT 06470.

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Patrick T. Hankard–South Windsor, CT

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Carl Stude–Burbank, CA

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Index to issues 168 through 174

This alphabetical index covers all the issues of *Fine Woodworking* published during 2004 (*FWW* #168 through #174). For a more comprehensive index, go to www.finewoodworking.com. The format of each index reference is issue number:page numbers. A hyphen between page numbers means the discussion is continuous; commas between page numbers indicate an intermittent discussion. This index, like all previous indexes to *Fine Woodworking*, was prepared by Harriet Hodges, chair maker.

BY AIMÉ ONTARIO FRASER

Listen to your tools

THEY MAY BE TELLING YOU THAT SOMETHING'S WRONG

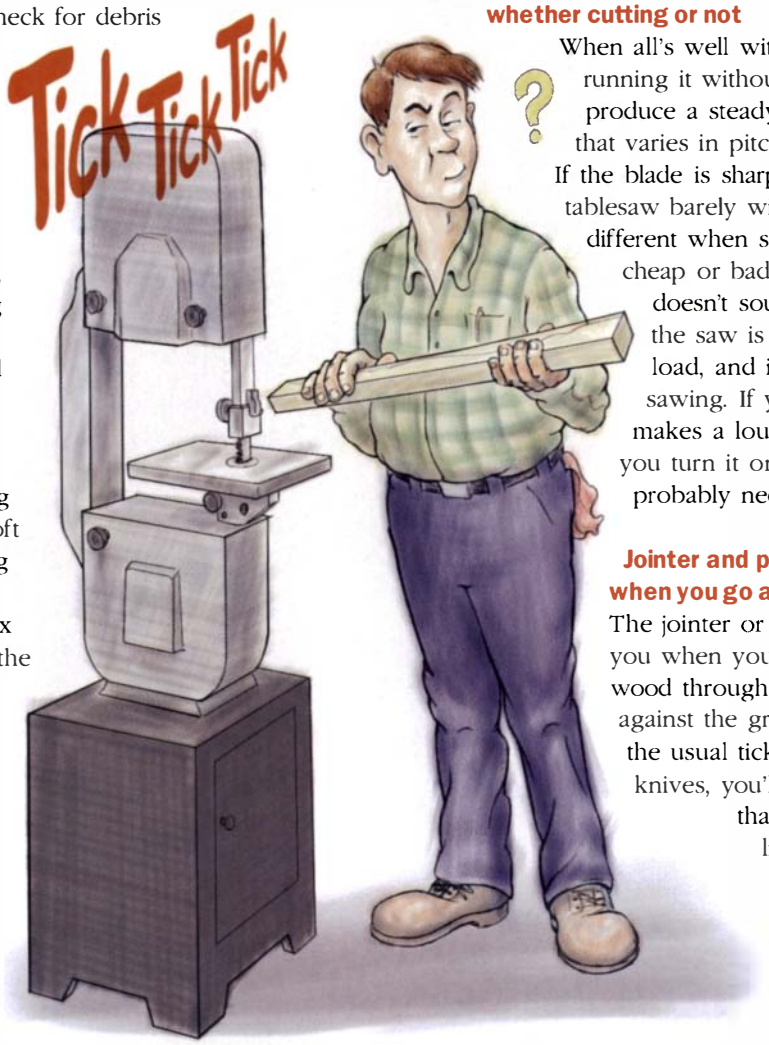
Listen closely to your tools, and they'll speak volumes. The sounds a tool makes can alert you to a dull blade, an incorrect setup, or a faulty technique. If you learn their language, your tools will tell you about issues so you can set them right before they become problems.

Bandsaws should hum

The bandsaw is one of the most vocal tools in the shop, so hear what it has to say before you start sawing. If all's well, you'll hear nothing but the motor's hum and the whirling wheels. If you hear scratching, something's touching where it shouldn't. Check for debris in the lower guide, or see if the blade guard is rubbing on the upper wheel or if the guides are too close to the blade. When the blade tension is inadequate, you'll hear a slapping sound just above the table on the left-hand side of the machine.

A rhythmic ticking means that one spot on the blade is hitting the guides. If it's a soft tick, it's likely nothing more than a rough weld on the blade; fix it by taking a file to the spot, but be careful not to damage the teeth or change their set. A loud tick means there's a kink in the blade that could break at any moment. The kink may have formed when you tried to saw a radius tighter than the blade could manage. Next time you cut a tight curve, listen for the blade's wailing moan that says, "The blade is jammed against the guides. You've turned too far!" Forcing the turn beyond this point will damage the blade.

Learn when to adjust the feed rate by listening to the motor's pitch as you cut. When the pitch starts getting slower and deeper in tone, you've exceeded the speed limit. Back off the cut. Adjusting the feed rate based on pitch holds true for all saws—and just about every other power tool as well.



Tablesaws should whir smoothly, whether cutting or not

When all's well with the tablesaw, running it without load will produce a steady, breathy whine that varies in pitch for each blade. If the blade is sharp and true, the tablesaw barely will sound any different when sawing wood. A cheap or badly balanced blade doesn't sound smooth when the saw is running without load, and it clatters when sawing. If your tablesaw makes a loud thunk when you turn it on, the belts probably need tightening.

Jointer and planer complain when you go against the grain

The jointer or planer will tell you when you're running the wood through the machine against the grain. Rather than the usual ticking noise of the knives, you'll hear something that sounds more like tearing, a kind of *kkkkkrrrrriiiick* as the chunks rip out. It's a

Drawings: Chuck Lockhart

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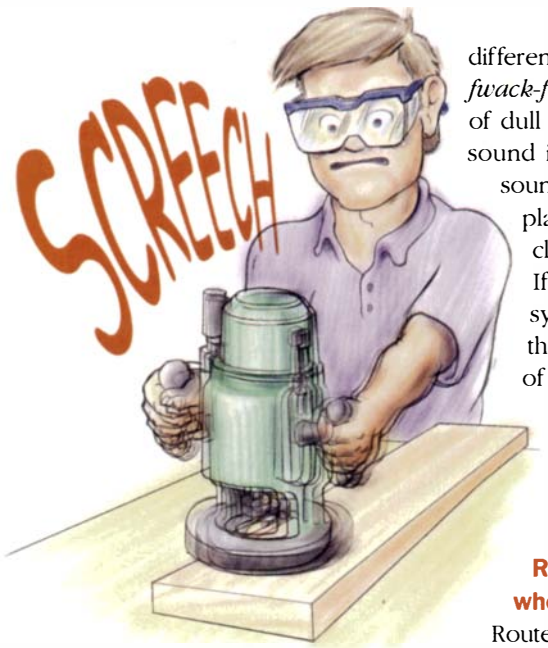

different sound from the *fwack-fwack-fwack* slapping of dull knives. This dull sound is similar to the sound the jointer and planer make when clogged with chips. If the dust-collection system isn't working, the slapping sound of the blades will be muffled by the chips lodged between the knives and the wood.

Routers change pitch when there's a problem

Routers whine a lot, but a screech or a wail means something's wrong—likely a bad bearing. A lower pitch means the router is taking too big a bite and bogging down. You should reduce the cut or feed rate.

When approaching a corner on the workpiece with an edge-trimming bit in the router, you can avoid tearout by listening for tearing undertones and backing off the instant you hear them. Take a light pass around the corner in the wrong direction to stop or at least reduce tearout. These backward, or climb, cuts feel funny—be prepared for the router to buck and squirm a little. Once you have cleared the way, go back to routing from left to right and complete the corner.

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Visit our Web site to hear how tools should and should not sound.

If you're using a template bit, keep the amount you cut to less than the radius of the bit. If it's more, the router won't necessarily slow down, but you will hear tearing noises as the outer edge of the bit rips away little chunks of wood (though not always so little—watch out for debris).

Drills have their own language

Even a cordless drill sounds off. You probably know how it sounds when the battery is fully charged or when it's nearly dead. But can you tell when the bit is about to punch through the wood? Listen closely next time, and you'll hear a slight lowering in pitch as the drill labors through those difficult final rotations. In metals or hardwoods, you'll also hear a little screech that means it's time to ease off on your pushing and to prepare for that wrist-wrenching kick.

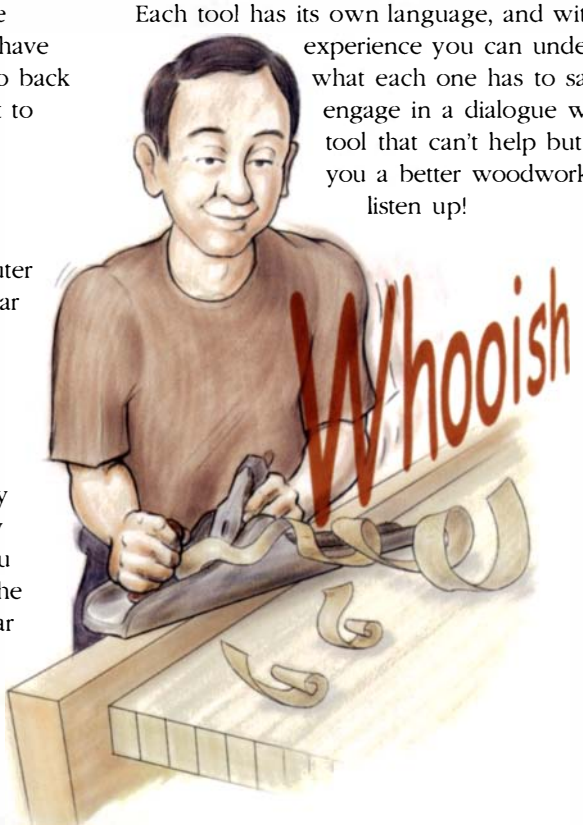
Drills make other helpful sounds. A pounding noise when driving screws means that the driver's not fully engaged—it's bouncing in and out of the screw head. Push harder to keep the driver engaged in the slot. A choppy whine means the speed switch is stuck between high and low. And, of course, there's the *brrrrripp* of the clutch release, which means the screw is in as far as it can go on that setting.

Hand tools tell you when they're happy

When all's well with a handplane, it emits a smooth *whoooooisssssh*, like the tearing of silk. A dull blade makes a series of *kwooooochhhh* noises, similar to the sound of someone getting ready to spit. When the iron is sharp, but you're planing against the grain, you'll hear an undertone of ripping as the fibers break off rather than get cleanly sheared.

If a handsaw is dull or is the wrong type for the job (such as ripping with a crosscut saw), you can hear it in the cut. Rather than the businesslike *voo-ba* of a good saw (or the *ba-voo* of a Japanese saw), you'll hear a less-accented *huff-ha*. If your saw is cutting well, maintain a steady rhythm. You may have to alter your stance and alignment until you get that sound for several seconds. Then you can let loose and saw right through.

Each tool has its own language, and with a little experience you can understand what each one has to say. You'll engage in a dialogue with the tool that can't help but make you a better woodworker. So listen up! □



A stronger miter

BY SETH JANOFSKY

There are many good ways to join two pieces of wood—mortise-and-tenon joints, bridle joints, lap joints, dovetails—and they all have a place in a woodworker's repertoire. Aside from their structural suitability to the job at hand, each visible joint imparts a particular character to a piece of furniture.

Aesthetically, sometimes the miter joint is the best choice. For example, when you have two pieces of wood coming together at a right angle, the simple miter joint is as close as you can come to not having a visible joint at all. So if you are working, say, in a clean, contemporary style, you will find the mitered look indispensable. The miter joint also is commonly associated with Scandinavian, Japanese, and Chinese furniture.

Why add a tenon to a miter?

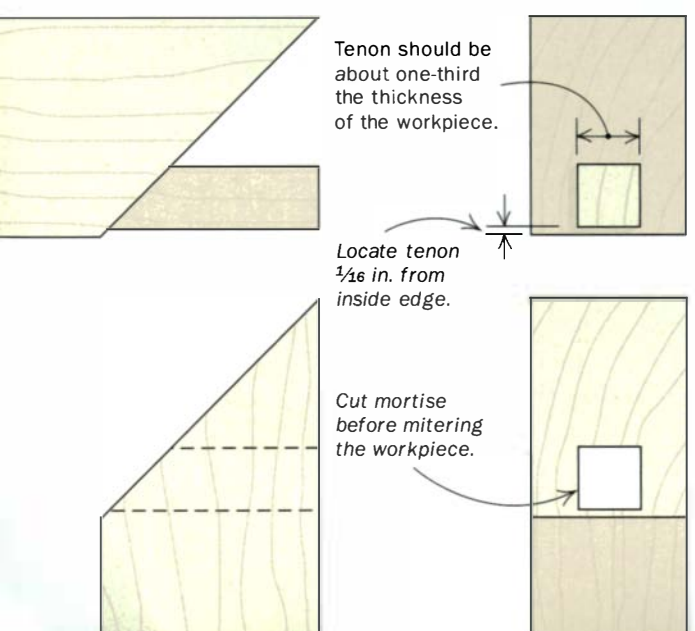
Construction-wise, the miter is one of the weakest joints because there is no mechanical interlock of members to add strength, and because the glue joint is basically end grain to end grain. Also, it often is difficult to clamp the assembly perfectly in position and keep it there while the glue sets up.

The tenoned miter joint solves these problems. Adding a mortise-and-tenon to the joint—visible or not—increases strength and causes the parts to lock in perfect position while being glued.

If you want to make Japanese- or Chinese-style furniture, you will be called upon to cut a tenoned miter. If you will be working in a modern style, you can use a variation where the tenon is not visible in the finished joint.

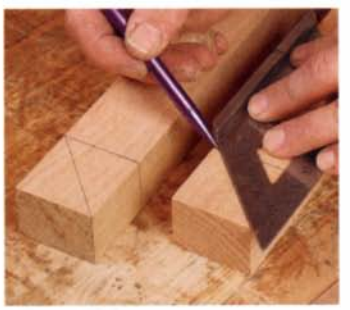
The tenoned miter joint can be made by hand or by machine. I usually find that the most efficient and accurate method is a hybrid of the two: I cut as much of the joinery as possible on

GEOMETRY OF A TENONED MITER

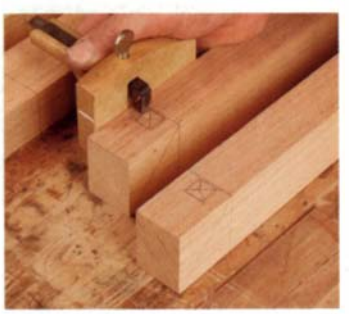


STEP ONE

Precise layout is essential



Lay out the miters. *Draw the 45° miter and then scribe a baseline around the workpiece.*



Lay out the mortises on both sides of the workpiece. *Locate the mortise 1/16 in. up from the inside edge of the joint.*

Lay out the tenons. *Locate them so they will align precisely with the mortises. Also, lay out all sides of the sawcuts that will form the cheeks of the tenon.*

Drawings: Michael Pekovich

STEP TWO Cut the mortises in two steps

Cut most of the mortise from the inside out. *Do not drill and chop all the way through the workpiece; stop ¼ in. short of the outside. Then finish the outer portion by hand. Drill through from the other side with a slightly undersize bit and square the outside of the mortise with a chisel (right).*

the tablesaw and finish up with precise handwork.

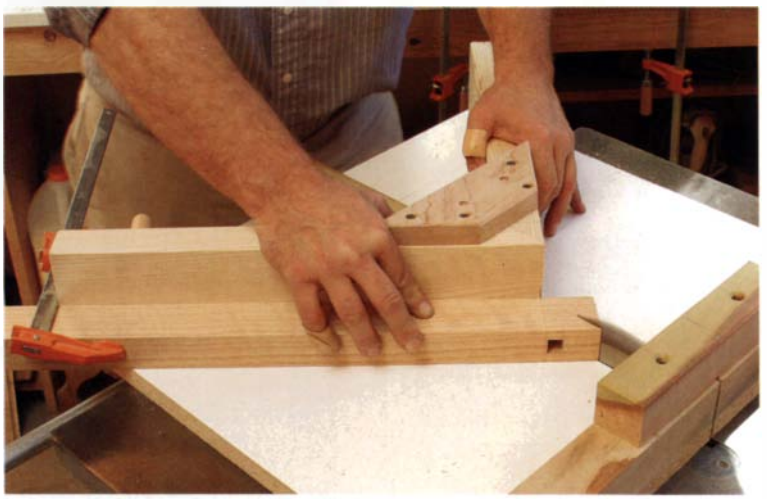
Accurate layout is critical

To make a tenoned miter, first mill the stock squarely and cut the pieces to their exact lengths. Then mark all of the parts precisely. I use a machinist's square, a miter (45°) square, and a sharp pencil, starting with the miters and including each face of the mortises and tenons. Because of the miters, you can't transfer the mortise location to the tenoned piece accurately, so the finished joint depends on accurate layout beforehand.

The mortises and tenons should be neither too big nor too small. A good rule of thumb is about one-third of the total thickness of the parts. Locate the mortises and tenons as close to the inside of the frame as possible, about 1/16 in. This places the tenon as far as possible from the outer corner of the joint for strength, while leaving a small shoulder at the inside of the joint for tidiness.

The mortised pieces are easy

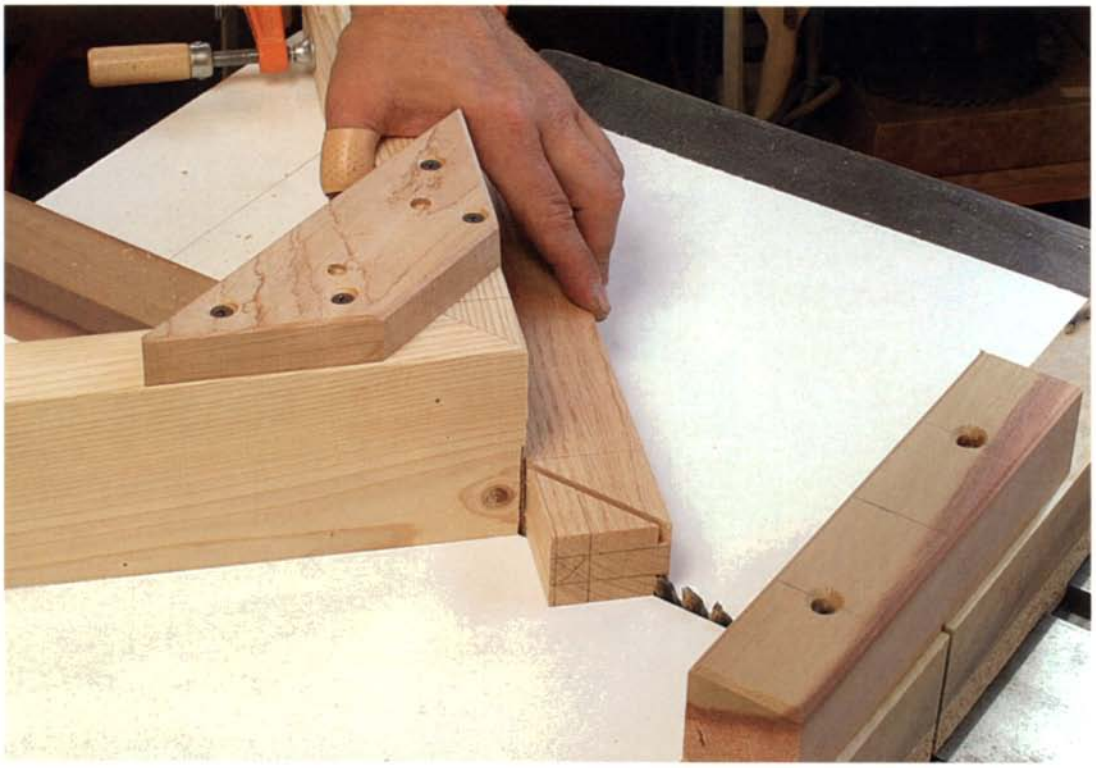
Before cutting the miters, I use a hollow-chisel mortiser to cut the mortises, working from the inside face of the pieces. If it's a through-mortise in fine work, the outside of the joint (the visible part) should be precise, so set the depth stop on the mortiser to ¼ in. short of the outer face, drill through the leftover stock carefully afterward with a slightly smaller drill, and then square up the remaining part



Miter the mortised pieces. *To cut clean miters, build a miter sled for the tablesaw. Make the two-sided fence exactly square and center it on the sled. Make these cuts carefully, or the mortise won't line up with the tenon. Keep your hands clear of the blade's path.*

Photos: Asa Christiana

STEP THREE Tenons require some handwork



The tenoned pieces are mitered in stages. *First, use the tablesaw sled to miter the side shoulders. Set the blade height to just reach the layout lines on each side of the tenon.*

of the mortise carefully by hand. For a blind tenon, simply set the depth stop where you need it.

To cut the miters on the mortised pieces, use a miter sled on the tablesaw (see the photo above).

The tenoned pieces take more work

Because the miter cuts stop at the tenon, the pieces must be flipped over to cut each shoulder from opposite sides, and the miter sled must be accurate on both sides of the blade. In other words, the 90° fence on the sled must be perfectly square, and the blade must bisect it exactly, so each side of the fence measures 45°.

Use the layout lines on the pieces to set the blade height. After using the tablesaw to cut the side shoulders, return to handwork to complete the tenoned pieces.

With the workpieces clamped upright in the bench vise, saw down the two outside cheeks of the tenon with a fine Japanese saw or backsaw, cutting right to the line. Next, with the waste on either side of the tenon gone, you must redraw the other two cheeks of the tenon before sawing them. The last sawcut removes the outside part of the mitered shoulder. For this cut, stay a little shy of the tablesawn shoulders, leaving a tiny piece to pare away with a sharp chisel. Then carefully trim away the waste on the inside face of the tenon, too, defining the little bit of miter there.

Assembly should be a breeze

In theory, you should have a perfect-fitting, strong joint, ready to clamp and glue up. Dry-fit the joint first. The miter should come together cleanly as the tenon fills the mortise. Be careful not to break out the end of the mortise as you push the tenon through. Trim the tenon, if necessary. □

Cut the tenon cheeks first. *Use a handsaw, cutting right to the layout lines.*

Lay out and saw the last two sides of the tenon. *Then saw a little shy of the mitered face to remove the waste.*

Finish the mitered faces with a chisel. *Pare away the small step left behind from sawing.*

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Easy-to-make stains offer unique effects

BY JEFF JEWITT

Long before there were man-made dyes, woodworkers discovered that chemicals could change the color of wood. Applied chemicals react with others naturally present in the wood to form compounds that add color or an aged appearance.

There are several reasons why woodworkers still should consider chemical staining. First, the chemical reaction usually produces a pigment colorant within the wood fibers rather than one that sits on top. This makes the color lightfast, transparent, and less prone to bleeding and transfer. (Transfer happens when a clear finish is brushed or wiped on, and it dissolves the stain beneath.) Second, the color intensity depends on the variable concentration of chemicals in the wood, so you get interesting and sometimes offbeat effects not achievable with regular dyes.

Rules that apply to all chemical stains

The three chemicals that I use to stain wood—ferrous sulfate, iron buff, and sodium carbonate—aren't toxic or caustic. However, all chemicals need to be treated as hazardous and kept out of the reach of children.

One important thing to remember when using chemical stains is that the reaction between chemicals and wood is highly unpredictable, so you should test the color on a scrap of wood, the same kind used in your project. Likewise, avoid using sapwood or boards from different trees in the same panel. If you need to control the color closely, such as when trying to match an existing finish, it's far better to use dyes or pigment stains.

Most chemicals can be purchased as powders (with the exception of iron buff) and dissolved in warm water. A starting point is 1 oz. powder (by weight; equals roughly 2 tablespoons) to 1 qt. water. Add

Safer chemical stains. *Unlike nitric acid or lye, used in the past to stain wood, these chemicals aren't toxic or caustic and are easily available.*

Mixing the stains

For chemicals in powder form, stir 1 oz. (by weight) of powder into a quart of warm water. Let the mixture cool, and try it on scrap.

Ferrous sulfate. *Also known as copperas, this chemical turns most woods various shades of gray.*

Iron buff. *Shred a pad of steel wool into a pint of white vinegar. The solution turns some woods black.*

Sodium carbonate. *Available as washing soda, this chemical mimics the effects of age.*

Photos: Mark Schofield

Apply with a brush

All of the chemicals are applied the same way as a water-based stain would be applied. Flood the surface evenly with a synthetic bristle or foam brush. Blot up the excess and wait at least four hours for the color to develop.

the chemical to the water while slowly stirring. Wait for the solution to cool to room temperature and strain the mixture to remove any residue. Try the mixture on a test piece and dilute as necessary.

All of the chemicals are applied the same way as a water-based stain. Flood the surface evenly and liberally using a synthetic bristle or foam brush, working from the bottom to avoid drips on bare wood, and then blot up the excess. Never spray a chemical stain. Wait at least four hours for the color to develop completely. If you don't want to apply another coat, make sure you rinse the wood with plenty of clean water to neutralize any residue.

Smooth the raised grain with 220-grit sandpaper, and then proceed with the remaining finishing steps.

Ferrous sulfate turns most woods light gray

Also known as iron sulfate or copperas, ferrous sulfate can be purchased as dry granules (www.earthguild.com; 800-327-8448). It reacts with tannin in the wood to form iron compounds similar to the gray/black stains visible on wood that's been in contact with iron. It works well producing grays on most species, a color difficult to obtain with dyes and pigments.

Iron buff produces grays and blacks

The simplest way to make iron buff is to shred 1 oz. steel wool (one pad) into 1 pt. white vinegar. Mix the solution in a glass or plastic container that has a hole in the top to allow the hydrogen-gas by-product to escape. Before use, pass the liquid through a medium paint strainer and then through a coffee filter to remove all particles of steel wool.

One day of "cooking" makes a solution that creates light grays on tannin-rich woods such as oak, cherry, and walnut. Leaving the steel wool in the vinegar for a week yields stronger iron acetate that produces colors ranging from dark gray to a deep blue or black. For an ebonized look, apply iron buff to cherry, walnut, or oak. Let it dry and then sand with 240-grit paper. Apply the solution again, let it dry, and then do one of two things: Apply an ebony pigment stain (such as Minwax) or an alcohol-based dye. My preference is the pigment stain. On sapwood, an alcohol-based dye will darken the pores in open-pored woods such as oak, imparting a deeper color.

Sodium carbonate gives an aged appearance

Sodium carbonate is not as strong as lye, but it's much safer. It's works well duplicating the yellowish-brown patina caused by photooxidation from sun and air exposure. Start with a mix of 1 oz. washing soda to 1 qt. water and increase or decrease the amounts to deepen or lighten the effect. □

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Mad About Yew

Some marriages are memorialized in sonnets or portraits, in fiction or family lore. For Timothy Coleman, of Shelburne, Mass., the medium was cabinetry. Building this twinned cabinet out of western yew, English sycamore, and imbuia was Coleman's way of celebrating his two-decade relationship with his wife, Mary Beth.

With its merged cabinets, shared legs, and interlaced oval stretchers, his piece embodies the symbiosis of marriage. He elaborated the theme with shallow relief carving in the lower bands of each cabinet and intertwined in the upper bands.

Coleman began by building the double stand and remembers that the imbuia filled his shop with "a spicy, cinnamony scent." To make the oval frame-and-panel cabinets, he sliced veneers from a plank of yew and bent-laminated most of the parts. In the patterned areas he glued a veneer of English sycamore over the yew and carved through it.

After four months of work, the time came to name the piece. His wife was on hand when Coleman suggested Yew and Me. "She laughed," he said, "so the name stuck."

—Jonathan Binzen

Photos: Charley Freiberg