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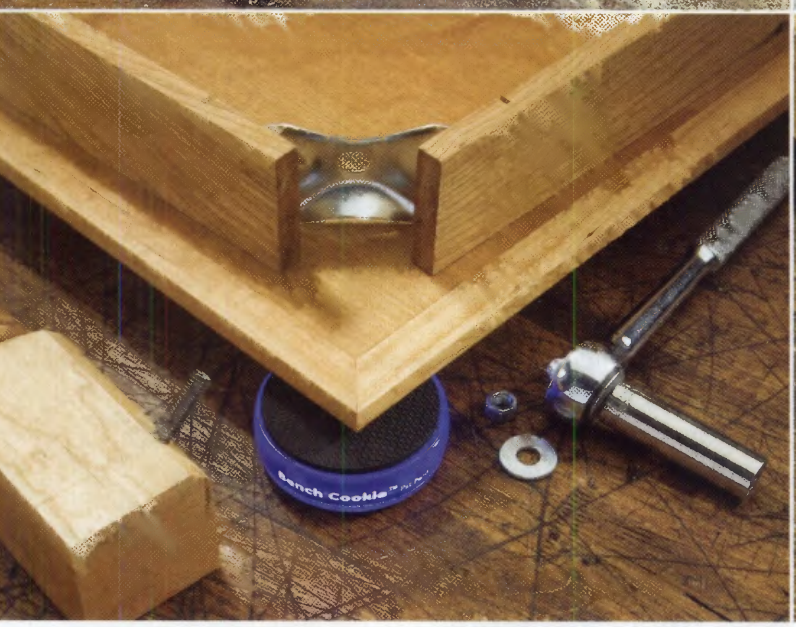

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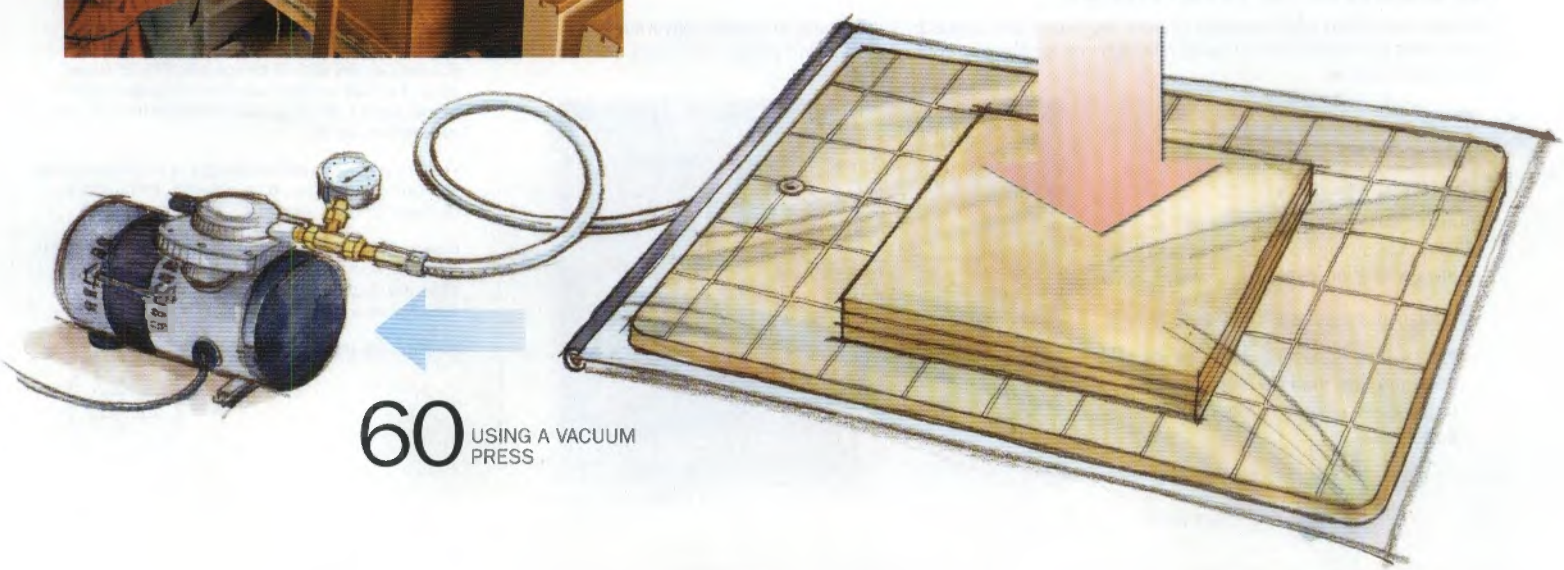

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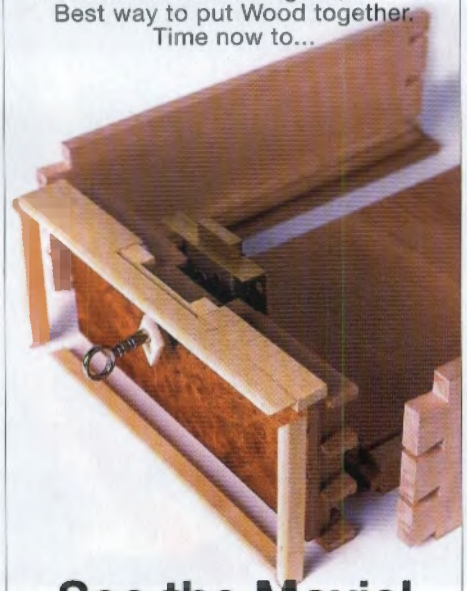

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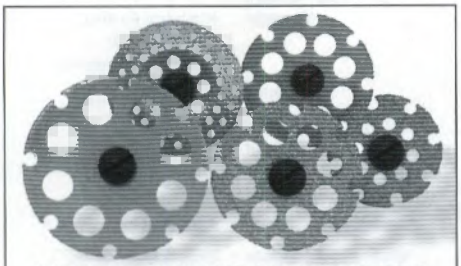

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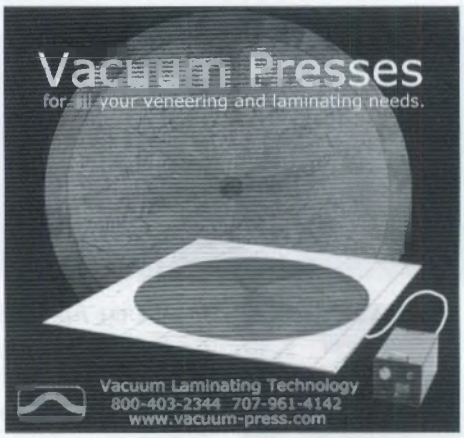

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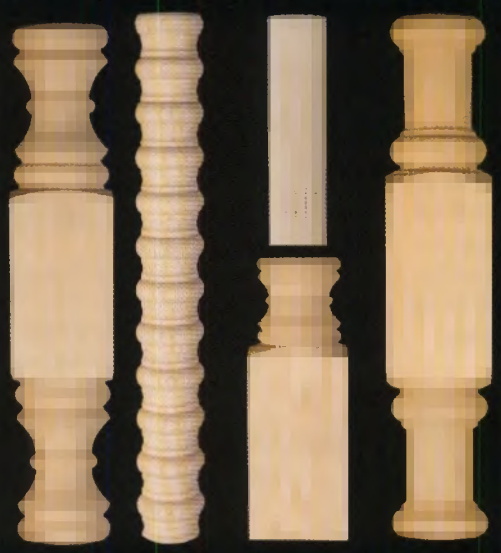

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contributors

For 20 years, Jim Budlong *("Display Cabinet, the Krenov Way")* has been teaching in the College of the Redwoods Fine Woodworking program, made famous by its founder and longtime director James Krenov. Growing up, Budlong spent summers doing repairs and refinishing in his father's woodworking business. After college, he spent some time restoring antiques and then attended the College of the Redwoods. After four years of woodworking on his own, he returned to the college as a teacher. Budlong (shown with his granddaughter Natalia) lives with his wife, Sue, off the grid on a 40-acre homestead near Comptche, Calif.

Among the most vivid childhood memories of **J. Speetjens** *("A Vacuum Press Makes Veneering Easy")* is building a sailboat with his father. Speetjens began his woodworking career after completing a course in stringed-instrument making at the Roberto Venn School of Luthiery in Phoenix. He worked for several instrument and cabinet makers before opening his own shop in Greensboro, N.C., in 1993. See his work at www.jspeetjens.com.

After a half-hearted attempt at a law degree, **Alf Sharp** *("Shaping Wood by Hand")* decided he was meant to be a woodworker. Thirty years later, he's still at it with enthusiasm. He specializes in period furniture and was the 2008 winner of the Cartouche award, the Society of American Period Furniture Makers' highest honor. He's also well-known for contemporary work, and serves on The Furniture Society's executive committee. See his work at www.alfredsharp.com.

In a small shop in the Shenandoah Valley of Virginia, **Charles Neil** *("Finish While You Build")* crafts furniture for clients nationwide and teaches woodworking. Known for his Southern style of furniture, he has had his work included in *The Custom Furniture Sourcebook: A Guide to 125 Craftsmen* by Kerry Pierce (The Taunton Press, 2001). Over the past two years, he has attracted a growing audience for his online broadcasts and DVDs (www.charlesneilwoodworking.com).

Ernie Conover *("Scrapers: The Turner's Best Friend")* is a veteran woodworking author with eight books, many videos, and hundreds of articles to his credit. He is also a lathe designer who has developed his own model and worked on designs for Nova and Powermatic. He and his wife, Susan, run Conover Workshops, a craft school, where he also teaches (www.conoverworkshops.com).

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

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

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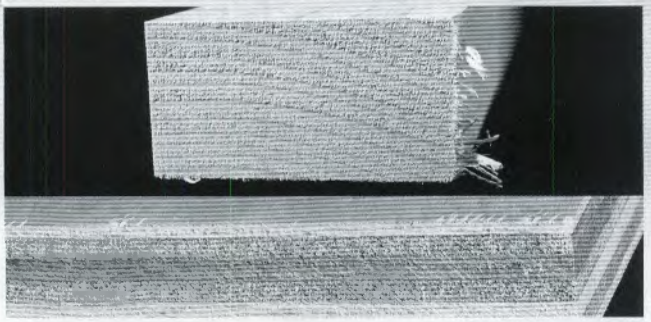

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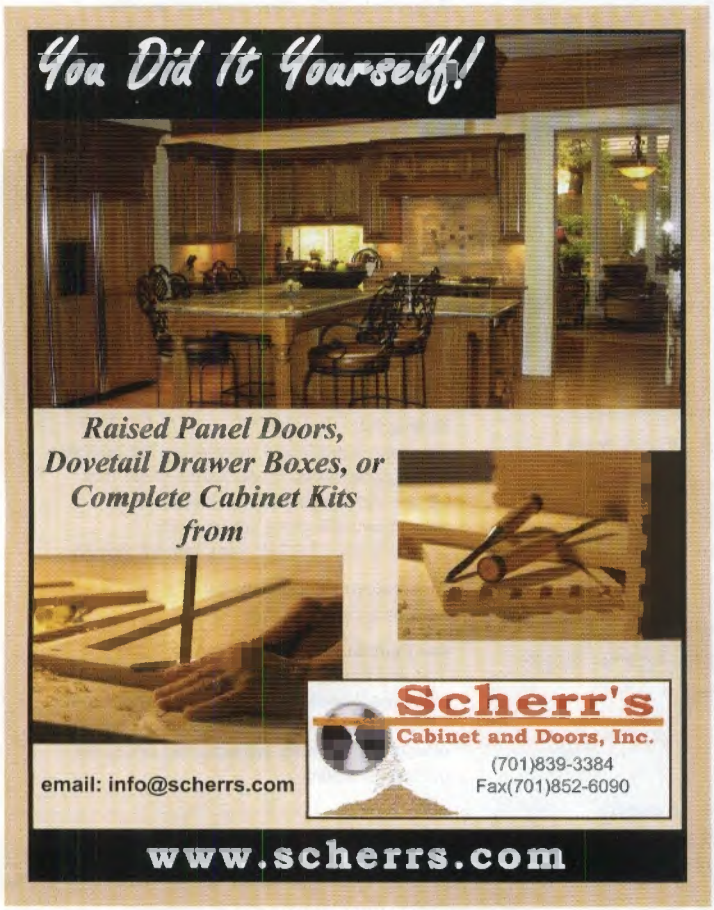

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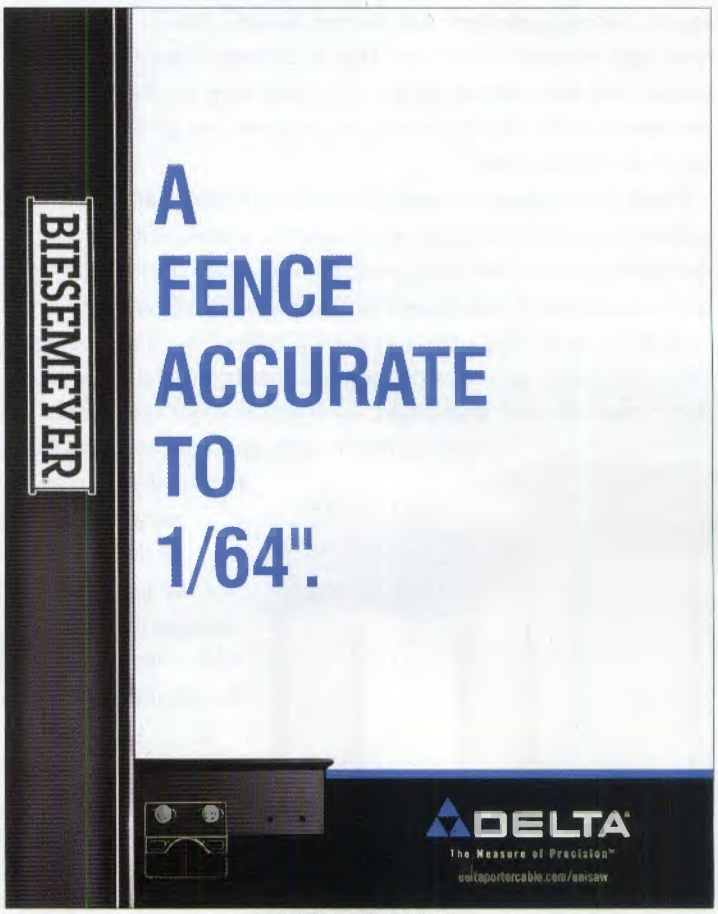

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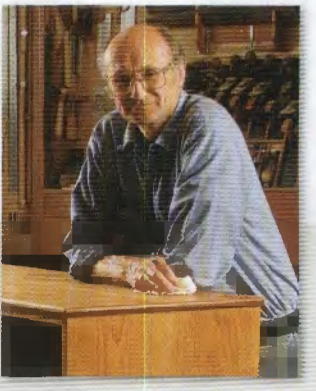

20 YEARS OF QUALITY

Editor's note: This year is Chris Becksvoort's 20th as a contributing editor. His mastery of the Shaker style and his wonderfully efficient techniques, honed over 30 years as a successful professional furniture maker, have made him one of our most popular authors. We recently asked him to look back on his history with the magazine. For the full, unedited version, go to FineWoodworking.com/extras.

It's been 20 years since Dick Burrows [editor of *FWW*, 1989–1991] stopped by and asked me if I'd be interested in becoming a contributing editor. I'd only submitted three or four articles, and I figured that *FWW* must be desperate, or that woodworkers who could string two words together were few and far between.

Since then, I've had the privilege of working with a group of talented editors. Though long gone from *FWW*, Vinny Laurence [assistant/associate editor, 1992–1998] and I have stayed in contact. In fact, I was the witness, best man, and sole celebrant at his wedding. I remember one time Vinny and I finished a shoot early, so we headed up the coast to my favorite antique-tool store. Just beyond Augusta [Maine] we found ourselves behind a slow truck that wouldn't let us pass. After a few miles, Vinny managed to pass him on a hill, just as a trooper crested the top. The lights went on, the trooper did a 180, and I thought we were doomed. But Vinny was an ex-Marine and an English major, and he talked his way out of an obvious ticket.

Things didn't always go smoothly for me as a writer. Although I've had over 40 articles published, I've had twice that many rejection notices. And I've had my slip-ups. Early on, I ran my hand into a bandsaw during a hectic photo shoot. Editors goof, too. I remember one made-up paragraph that slipped past me, making me look, let's say, less than knowledgeable.

Being a contributing editor has been gratifying, but has it brought me fortune and fame? Well, one doesn't get rich by selling furniture to woodworkers. As for fame, I've been told that "I must be Chris Becksvoort" by folks I've never seen before, at airports, hardware stores, lumber yards, and even restaurants. I've had visitors from all over North America, Europe, and as far away as Australia. They've managed to find me even on our dirt road in the backwoods of Maine. I've enjoyed meeting my fellow craftspeople, sharing our love of wood, tools, and craftsmanship. I hope it continues for years to come.

—Christian Becksvoort

His next act. *Don't miss the January/February issue, where Becksvoort will show how to build two versions of a Shaker table.*

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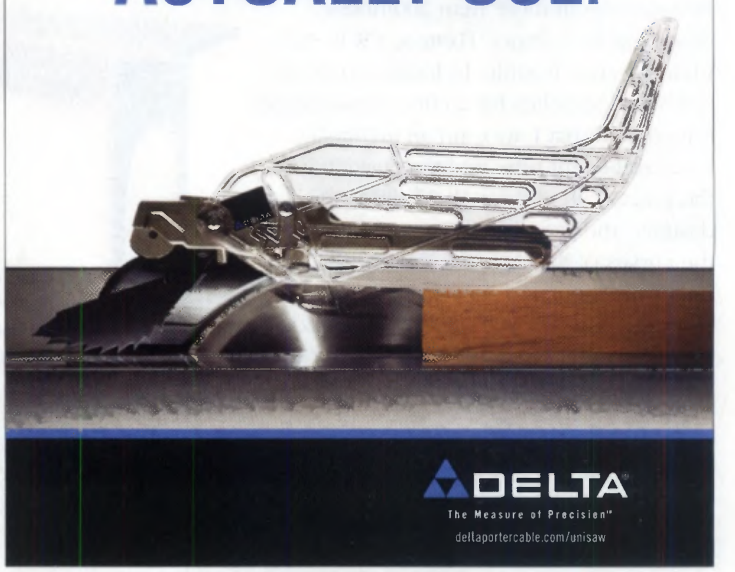

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High gloss in minutes

Like Sean Clarke ("High-Gloss Finish Made Simple," *FWW* #206), I use an electric polisher and automotive polishing compounds to create a mirror finish, but I've got some tips to speed up the process. The most important step is to make sure the lacquer or shellac finish is very well cured. Even if it seems very dry to touch, the sandpaper can gum and mar the finish. Second, I gently use a card scraper to remove large defects (dust specks, tiny runs on verticals, etc.). Then I use Mirka's Abralon foam-backed wet/dry pads on a random-orbit sander to level the surface and begin polishing it. The pads come in grits up to 4,000, so I can get the surface very polished before I even start with the compound! To buff it to a high gloss, I use the Porter-Cable 7424 random-orbit polisher/sander with 7-in.-dia. foam pads and water-based abrasive compound. I use Super Swirl Remover (available at www.poorboysworld.com; product no. SSR2.5), which has diminishing abrasives that break down as you use them to give a really glossy polish. Last, I find that the rotary polisher Clarke suggests can be hard to control, cutting too aggressively at times (like a belt sander vs. a random-orbit sander). My 7424 sander-polisher is more user-friendly, and it doubles as a sander.

—ROBERT HILLSTROM, Oregon City, Ore.

Is it an architect thing?

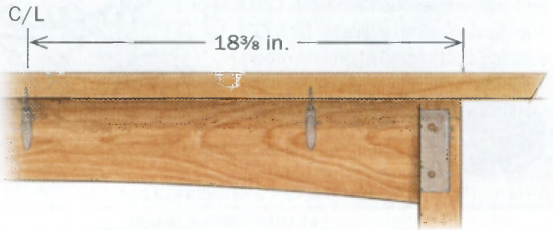
When Matt Stark commented that he couldn't believe that "architect Mark Bellonby spent more than 200 hours designing his cabinet" (Letters, *FWW* #207), I had no such trouble. In looking over my notes and sketches for a curvy music stand (I'll confess that I, too, am an architect), I realize I spent nine months designing the piece. I went through 17 different designs, and then I had to carefully plan the curves of the legs, the joinery, the steps in construction, and how to best use the two pieces (only two) of curly redwood I had. So my fairly small music stand cost me about 180 hours to plan, and another 70 to build (including five jigs). I've also designed 25 homes, and I disagree with Stark's comment that a house can be designed in less time than Bellonby took, not when you include meetings with clients, site visits, and changes. Design is not just pencil or mouse to paper or screen, it's all the hours spent before and after you have an inspiration.

—DARYL ROSENBLATT, Manhasset, N.Y.

Corrections

A number of savvy readers wrote in to point out that the Delta Unisaw was introduced 71 years ago, not 40 as we said in our review of the redesigned Unisaw (Tools & Materials, *FWW* #207).

In "A Bench That Fits Every Room" (*FWW* #207), the centerline dimension should have referred to the size of the base, as shown, not the length of the seat.



The Maloof legacy

I visited Sam Maloof years ago to get his autograph on his book, and a 10-minute visit turned into three hours. Editor Asa Christiana's reaction to Maloof's old and new homes, the wealth of his work, and his hospitality ("Two Days with Sam Maloof," Letters, *FWW* #207) was the same as mine, 20 years previous. When I heard of his death, I was working on a teak and walnut side table for my daughter. As you can see, I am still influenced by Sam's wonderfully simple, rounded designs.

—BILL DINGWELL, Dartmouth, Mass.

Echoes of Maloof. *When he heard about Maloof's passing, Bill Dingwell happened to be working on this table.*

As the videographer on *FWW*'s Sam Maloof profile in the 1990s, I was able to spend a considerable amount of time watching Maloof build his rocker. Your retrospective on him and his work (*FWW* #207) was very compelling but made no reference to what I consider his most enduring legacy: his chair joinery. His unique dado-rabbet seat joints enable curvy, sculpted pieces to melt into each other. And the strength of these joints frees his chairs of lower stretchers.

—DAVID DONNELLY, Boise, Idaho

New tools don't make the woodworker

The recent reviews of the Delta Unisaw and Blue Spruce chisels (Tools & Materials, *FWW* #207) are too long and too effusively enthusiastic. Very few of us are interested in $3,000 saws and $400 sets of chisels, so the space in the magazine would be better used for how-to articles.

I have two old Craftsman tablesaws with cast-iron tops that are entirely satisfactory. One cost $75, the other $200. Aside from not-very-good splitters, both tables are flat and both arbors have near-zero runout, better than many new ones you review. My two shapers, jointer, planer, drill press, and two saws did not cost $3,000 all together. My accomplishments are limited entirely by my skill, not my tools.

—WILSON LAMB, Hillsborough, N.C.

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

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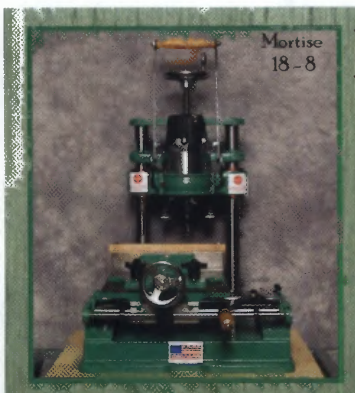

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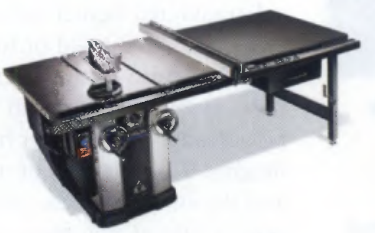

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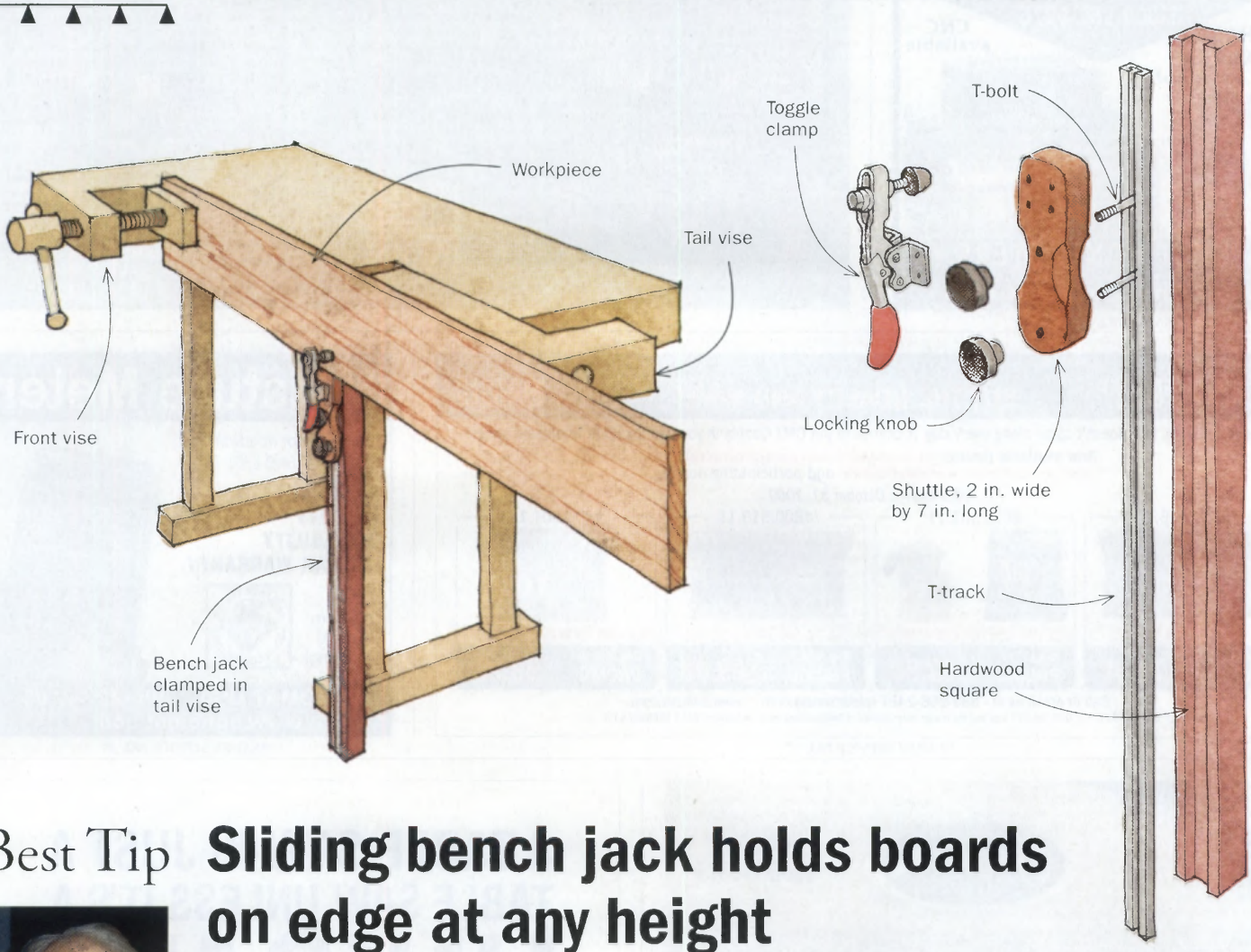
methods of work

EDITED AND DRAWN BY JIM RICHEY



Best Tip

Sliding bench jack holds boards on edge at any height

Abraham Tesser's furniture has appeared in several juried shows and national publications. To see more of his work, visit www.tesserfurniture.com.

To plane a long board on edge, woodworkers often clamp one end in a front vise and support the other end on a device known as a bench jack.

A traditional bench jack is clamped into the tail vise (either L-shaped or full width) and uses a dowel to support the workpiece. The jack often has holes from top to bottom that allow the dowel to be adjusted for different board widths and working heights. This adjustment method is relatively crude and doesn't restrict the board from wobbling from side to side as you plane it. So I came up with this design, which features a sliding shuttle equipped with a toggle clamp (DeStaCo No. 225-U; www.grainger.com) to hold the board against the bench.

In use, the bench jack rests on the floor and is clamped into the tail vise (for a bench without a tail vise, you might attach the jack permanently). I adjust the shuttle by loosening the knobs and simply sliding it up or down its T-track. Once the height is locked in and the material is resting on the shuttle, I flip the toggle clamp. The toggle clamp can be adjusted to accept materials as thin as the shuttle (¾ in. in this case) or up to almost an inch thicker. If the workpiece is thinner than the shuttle, I add a spacer between the clamp head and the workpiece.

With the workpiece supported and clamped into the jack, it is ready for planing, shaping, or sanding. The material will be held firmly at the desired height with much less side-to-side movement.

—ABRAHAM TESSER, Athens, Ga.

A Reward for the Best Tip

Send your original tips to Methods of Work, *Fine Woodworking*, PO Box 5506, Newtown, CT 06470. If published, we pay $50 for an unillustrated tip; $100 for an illustrated one. If your tip is the best, you win Jet's framing clamp kit, which includes four parallel-jaw clamps and handy accessories.

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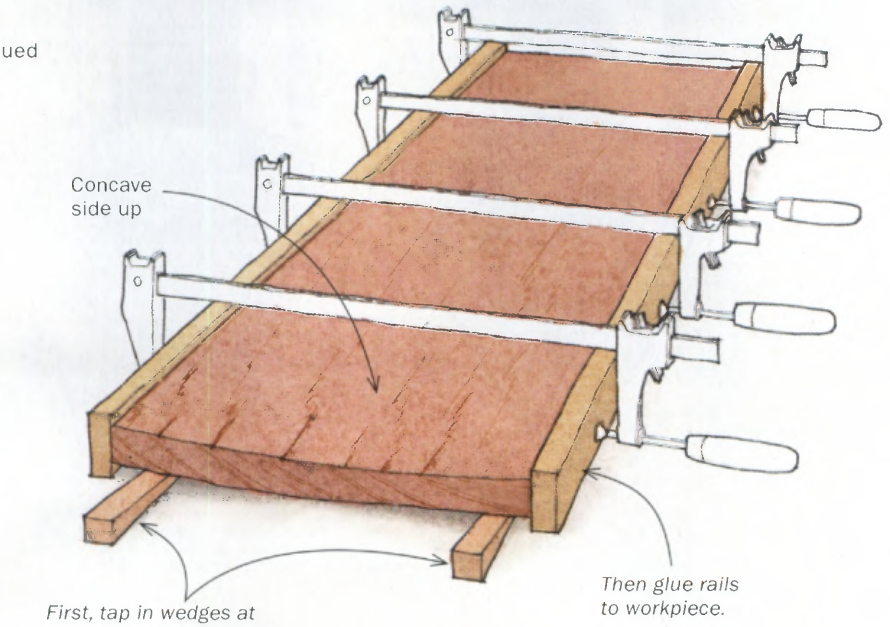
Glue on rails to flatten a wide board

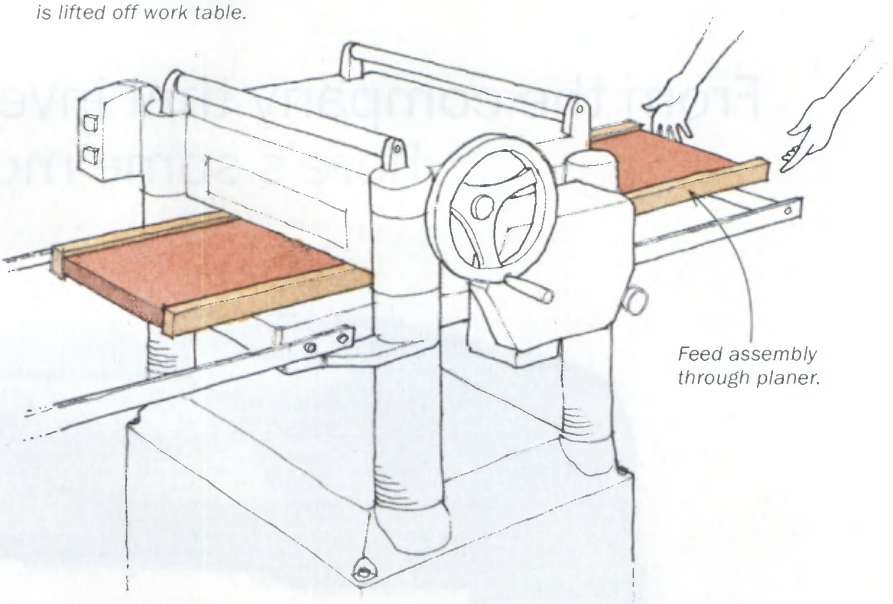
I've seen complicated jigs for flattening a wide board in a thickness planer, but I have a simpler method that uses rails glued to the boards. I use basswood for the rails because it's inexpensive and soft. First, cut the board into the shortest length possible and joint or handplane the edges straight. Position the board cupped side up on a flat work surface. Insert wedges at each end near the corners until the board is lifted off the table with between 1/16 in. and 1/8 in. of clearance and doesn't rock.

Now glue the 3/4-in.-thick rails to the board's edge so their bottoms rest flat on the work table. After the glue has cured, remove all clamps and double-check that the side rails are still sitting flat on the work table. Remove any high spots with a handplane.

Now run it through the planer. Once the concave section is flat, flip the board and plane the other side. Then rip off the side rails.

—JERRY H. LYONS, Glasgow, Ky.





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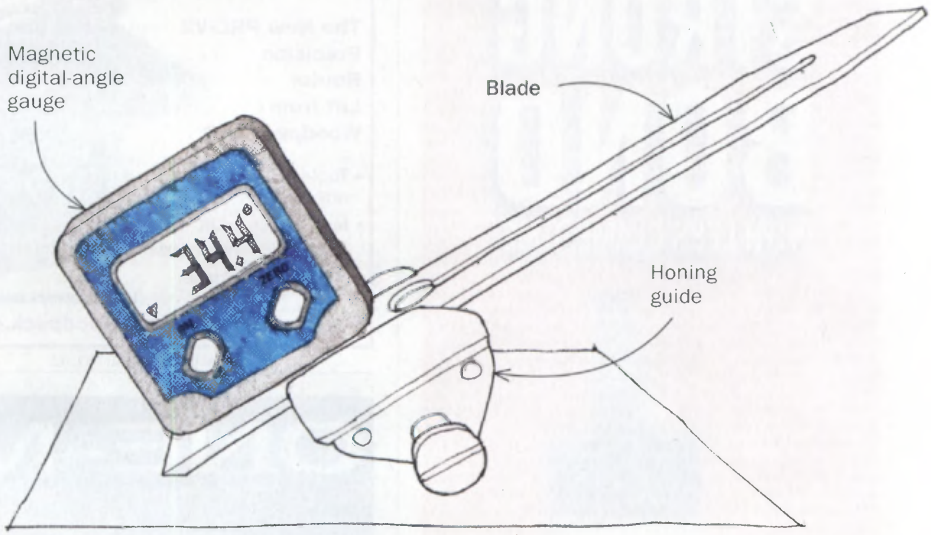
Angle gauge adds precision to honing-guide setup

Here is an easy way to get consistent and fast results when sharpening plane blades and chisels. Creating a microbevel using a stone or abrasive paper on glass takes only a few strokes if the blade is set to the exact right angle. To set the blade at the right angle consistently, I now use a magnetic digital angle gauge.

To use the gauge, I zero it on the same flat surface that the blade will be honed on. Then I place the magnetic base on the blade in the honing guide and move the blade in and out of the guide to set the angle. The gauge shows the angle to one-tenth of a degree. When the angle is right, I write it on the plane blade with a fine-tip felt pen so that there is no guesswork next time I need to hone.

—A.D. (TONY) IRWIN, Duncan, B.C.



Quick Tip

Pipe cleaners make good applicators for a small dab of paint, epoxy, or glue. They often are just the thing to clean out a small opening. I also use them as a simple tie, wrap, or paint-brush hanger.

—BRUCE D. SMITH, Hancock, N.H.

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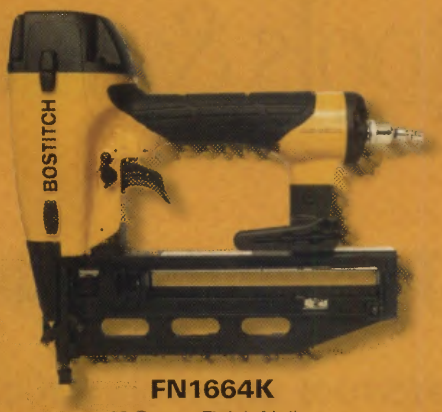

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■ POWER TOOLS

Two compact drills span the price range

Unmatched versatility. *Right-angle, eccentric, and quick-release chucks are included with Festool's T15+3 cordless drill.*

FESTOOL DRILL/DRIVER CAN DO IT ALL

Get in there. *The eccentric chuck positions the bit almost flush with the housing, so you can get holes and fasteners close to inside corners.*

FESTOOL'S 14.4-VOLT LITHIUM-ION cordless drill, model T15+3, arrived at the same time I was testing 18-volt drills ("Tool Test: Compact 18-volt Cordless Drills," *FWW* #207), so I was able to test it along with its bigger cousins. Remarkably, the Festool showed more torque and better battery life than most of the 18-volters.

The T15+3 includes four chucks that can be slipped on or off the spindle in an instant. In addition to a conventional ½-in.-dia. keyless chuck, there is a right-angle adapter, and eccentric and quick-release bit holders. The quick-release chuck accepts hex-shanked bits and if space is especially tight, you can simply insert a hex bit directly into the spindle, giving you a drill that's only 6¼ in. long.

There is nothing else like the T15+3 on the market. But if you're wondering if all this versatility is worth the stratospheric price of $570, keep in mind that the rig might replace a dedicated right-angle drill, and the eccentric chuck could make life easier. Also, the innovative brushless motor should last much longer than conventional ones. For more information, go to http://tdrill.festoolusa.com.

—Tom Begnal is a former associate editor at Fine Woodworking.

GOOD VALUE FOR FURNITURE MAKERS

A real chuck. *Instead of a hex-shaped bit holder like those found on many sub-compact drivers, the Ridgid ($140) has a conventional chuck that can handle a wider array of bits.*

WE DON'T NORMALLY REVIEW UPDATED TOOLS—but once in a while a redesign stands out. Ridgid recently released a new version of its 12-volt lithium-ion cordless drill/driver model R82008. The company claims a more powerful drive train doubles the torque rating to 240 in.-lb. Also, a second speed has been added, and the kit now includes a flashlight in addition to the drill, charger, and two batteries.

Even when it's outfitted with a 1-in.-dia. spade bit, the drill is only 12 in. long, so it fits easily between wall studs. I was able to drill 12 holes through the studs on one battery charge. Continuing in home-building mode, the drill easily drove #8-by-2½-in. screws into the studs. The clutch was effective in controlling the depth.

To replicate the needs of a furniture maker, I drove #8-by-1¼-in. screws in both cherry and maple, first using a combination pilot hole/countersink bit. It also comfortably drilled holes in maple using both regular and Forstner bits up to 1 in. dia. This drill will not compete with the power of an 18-volt drill, but its size, price, and capabilities fit a furniture maker just right.

—Robert Nash is the FWW *shop manager.*

Photos: staff

■ HAND TOOLS

New take on an old beading tool

Little more than a holder for a scratch stock, or cutter, beading tools were the original embellisher of edges. Where Lie-Nielsen chose to replicate the tried-and-true Stanley 66, Veritas designed its beading tool from scratch (no pun intended). I compared the Veritas back to back with my Stanley 66 and found that even though the Veritas cutters are half the thickness of the Stanley cutters (1/32 in. vs. 1/16 in.) there was less blade chatter with the Veritas. The 5¾-in.-long handle and adjustable knob are comfortable to hold and the fence can be positioned for straight and curved runs. I especially liked the fine-pointed quirks of the Veritas beading and reeding cutters compared to the flat-bottomed Stanley cutters. The Stanley's angled blade makes it easier to start a cut, so make your first pass very light with the Veritas. The Veritas costs $70 and comes with six cutters, one profiled and the rest blank for you to file custom profiles. Profiled beading and fluting cutters come in sets of three ($9 each set) and reeding cutters in a set of two ($7 per set). For information, go to www.leevalley.com.

—Roland Johnson is a contributing editor.

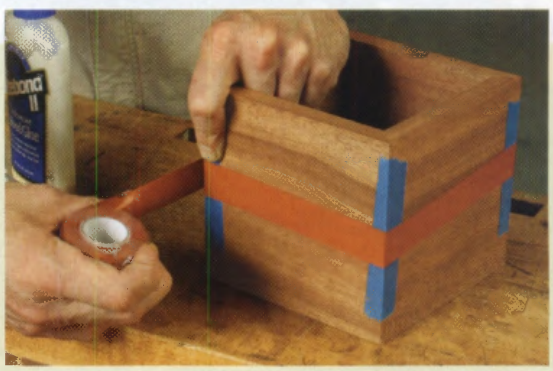
Get an edge. *The Veritas Beading Tool is sold with a single-bead cutter and five blank cutters for custom profiles. Profiled beading and fluting cutters (shown) are sold separately.*

■ ACCESSORIES

Two amazing tapes

WHEN A COUPLE OF TAPE ROLLS arrived on my desk claiming to be better than duct tape, I took them home to find out. X-treme Tape comes in two versions: a 1½-in.-wide by 25-ft.-long roll called Duct Hose Wrap ($18) and a 1-in.-wide by 10-ft.-long roll called Quick Clamp Wrap ($7). Both are made of silicone and when stretched adhere permanently to themselves but leave no residue on the workpiece. I tried the Duct Hose Wrap where my dust-collection hose connected to a Y joint. The tape held fast despite the dust. Then I tried it on an engraving drill's leaky air fitting. A dozen wraps sealed the 50-psi leak. I was sold. To test the Quick Clamp Wrap, I clamped up a mitered box, using masking tape to align the sides first. After a few hours I carefully peeled apart the tape, thinking I might be able to use it again. But the tape can't be reused. Both tapes are available at Woodcraft (www.woodcraft.com).

—Mark Schofield is the managing editor.

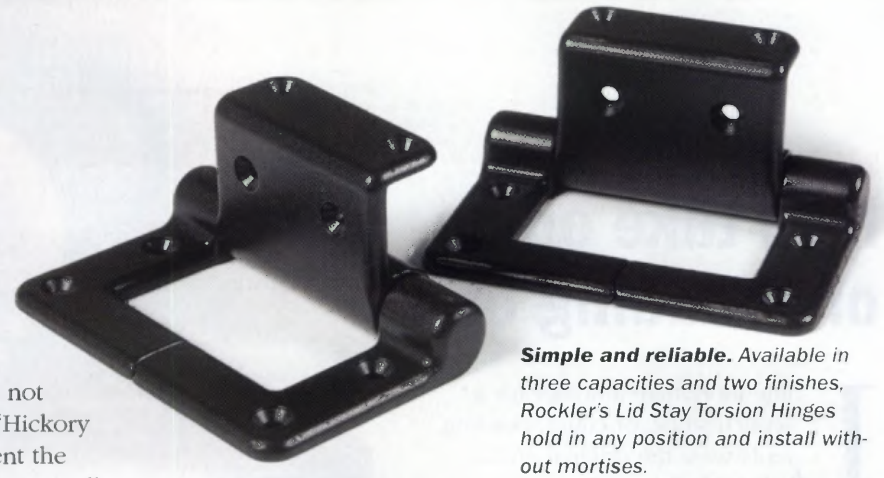


Problem shapes? No problem. *The Quick Clamp Wrap provides a firm grip on mitered boxes and other forms that don't clamp easily.*

Hold on tight. *X-treme Tape's Duct Hose Wrap sealed this leaky air hose where duct tape and hose clamps failed.*

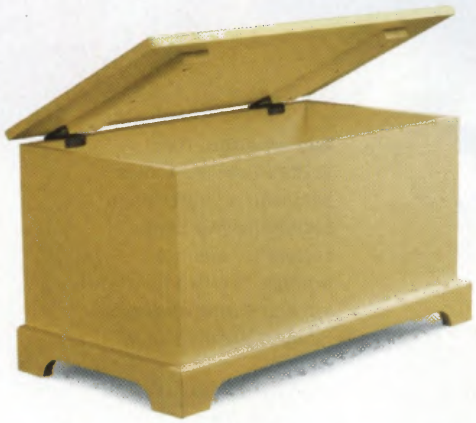
HARDWARE

Torsion hinges save little fingers



Simple and reliable. *Available in three capacities and two finishes, Rockler's Lid Stay Torsion Hinges hold in any position and install without mortises.*

SEVERAL READERS CRITICIZED PETER TURNER for not installing special hinges on his blanket chest ("Hickory and Ash Blanket Chest," *FWW* #203) that prevent the lid from falling—a life-threatening hazard for very small children. Happily, Rockler has recently increased its range of lid-stay torsion hinges. I tried out a pair.



The hinges come in three weight capacities; it is important to match the weight and size of the lid to the hinges. To make this easier, Rockler has a calculator on its Web site (www.rockler.com) where you enter the weight and depth of the lid, and it tells you the capacity and number of hinges you'll need.

You can install the lid flush with the back of the case or with an overlay. The hinges mount flush without mortising, but the back of the base must be ¾ in. thick. While they don't look as good as traditional hinges, you can always retrofit the chest with something more traditional once the children are grown.

Once installed, the lid has a steady resistance when being opened or closed, and it will stay open at any angle, similar to the screen on a laptop computer. The hinges come in rustic bronze or zinc finish, and cost $20 each or $38 for a pair—a bit steep, but the peace of mind is worth it.

—*M.S.*

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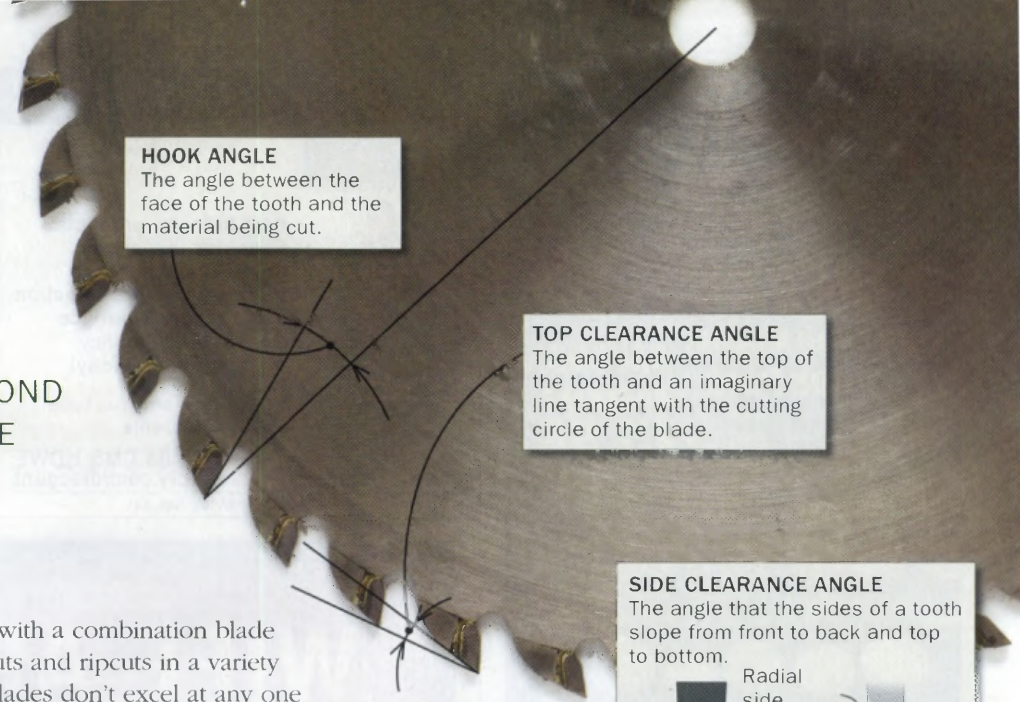
a closer look

Sawblades

FOR CLEANER CUTS, LOOK BEYOND THE BASIC COMBINATION BLADE

BY TOM WALZ



Most tablesaws come equipped with a combination blade designed to make both crosscuts and ripcuts in a variety of materials. However, those blades don't excel at any one task, which is why manufacturers make blades designed specifically for crosscutting or ripping, and for cutting chip-prone materials such as melamine-coated plywood.

With one of these specialized blades, you can get cleaner cuts with less effort. But before you buy one, you need to understand some basic sawblade geometry, which blades match up to the woodworking you do, and what to look for when buying a blade.

Rip blades

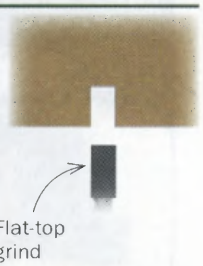
NEED FOR SPEED

Ripcuts are easier to make than crosscuts, so they can have a faster feed rate. To help clear chips, the typical 10-in.-dia. rip blade has 24 teeth, leaving wide gullets between the teeth to accommodate the chips while the tooth is still in the cut. The top edge of each tooth is flat (perpendicular to the plane of the saw plate). Known as a flat-top grind (FTG), it is durable and relatively economical to sharpen. It has the advantage of cutting both sides of the kerf simultaneously, which reduces sawblade stresses and vibration and leaves a cleaner cut.

To accommodate a higher feed rate, the teeth have a hook angle of 20° to 25°, meaning that each tooth leans forward. This helps pull the wood into the blade.

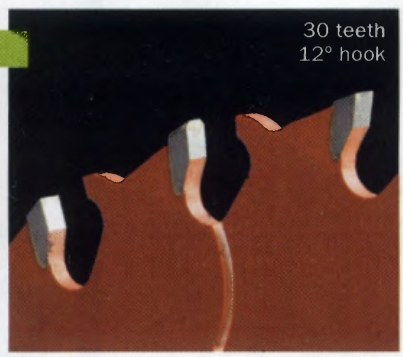
To counteract tearout, many rip blades have low clearance angles that cause the chips to drag on the side of the teeth, creating friction, heat, and residue buildup. If you tend to make one or two ripcuts at a time, this may not matter. But in a production shop, this blade will need cleaning more frequently than other blades. A rip blade will help anyone get cleaner cuts, but where time is money, a rip blade pays for itself very quickly.

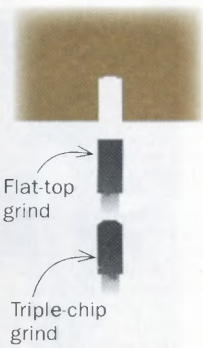
GENERAL RIPPING



Big teeth, far apart. *A typical 10-in. rip blade has 24 teeth, each with a flat-top grind (FTG) and a hook angle of 20° to 25°, which helps pull the stock into the blade. The deep gullets help clear the large volume of chips created by ripping. A rip blade will cut thick stock far quicker than a combination blade and with less user effort.*

FOR PANEL GLUE-UPS





Ready for glue. *The Glue-Line Rip Blade from Freud (item No. LM74R010) is designed to leave supersmooth edges that won't need jointing—but only on boards up to 1 in. thick. The 30 teeth alternate between FTG and triple-chip grind (TCG).*

Photos: staff; drawings: Kelly J. Dunton

Crosscut blades

MORE TEETH MEAN CLEANER CUTS

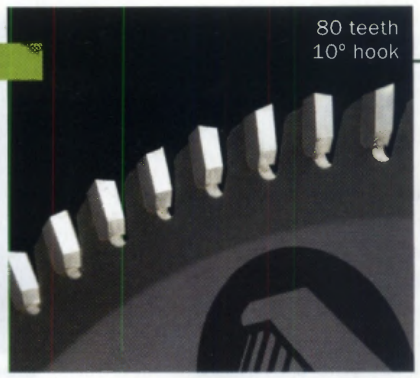
When crosscutting, the problem is not getting rid of chips, but minimizing tearout and chipout. Everything else being equal, while few teeth mean a faster cut, lots of teeth equate to a smoother cut. And the first thing you'll notice about a crosscut blade is the number of teeth. A typical blade has 80 teeth packed together with only a very small gullet between each one. The hook angle is low—usually in the 5° to 15° range—to accommodate the slower feed rate used in crosscutting.

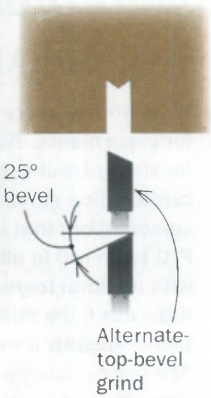
The teeth are ground with an alternate top bevel (ATB). One tip comes to a point on one side while the next has its point on the opposite side. This profile allows the teeth to cut with a scoring action, reducing the cutting pressure and almost eliminating tearout.

The ATB design has its disadvantages. There is a greater likelihood of damage to the leading points of the teeth. That could mean more frequent sharpening, which is more expensive because it is difficult to maintain an equal bevel and equal diameter across the points of the teeth around the blade. ATB blades are generally used for crosscutting wood, and for all cuts on plywood, veneer, hardboard, fiberboard, and particleboard.

If you work with large quantities of expensive, hardwood-faced plywood, an ATB crosscut blade is certainly worth buying.

CROSSCUT SOLID WOOD





Lots of teeth. *The 80 teeth of a crosscut blade have alternate top bevels to score the sides of the kerf, designed to cut solid wood without tearing out either the top or bottom surface. Because each tooth creates relatively little dust, only small gullets are needed. The hook angle ranges from 5° to 15°.*

Laminate blades

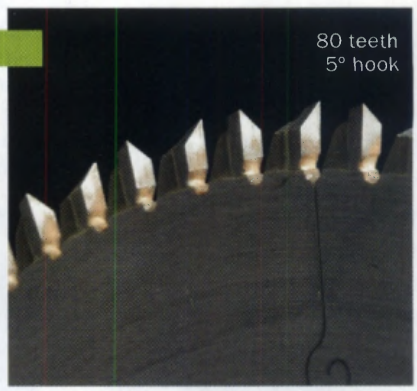
ELIMINATE CHIPS IN MAN-MADE MATERIALS

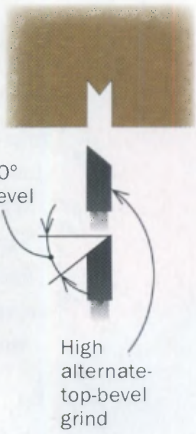
When cutting brittle surfaces, such as veneered plywood, laminates, or phenolic plywood, even an ATB crosscut blade has trouble preventing tearout. To cater to this need, manufacturers offer two modified versions of the ATB blade. One, called a high ATB, has teeth ground to a higher bevel angle, around 40°. The other has teeth ground to an angle on their tops and on their faces. With this alternate top, alternate face (ATAF) grind, you get a sharper, more pointed cutting edge to slice the most brittle materials.

You also can get a blade with a triple-chip grind (TCG). The first, or lead tooth, has a 45° bevel on each corner that leaves a kerf with sloped corners. This is followed either by a pair of beveled teeth that square up the corners, or by a flat-topped raker tooth ground slightly lower than the lead tooth. In this way, tearout or cracks from the lead tooth are removed by the teeth that follow.

If you work extensively with brittle sheet goods, it is well worth buying one of these specialist crosscut blades. You'll get a durable blade and clean cuts, and you'll save wear and tear on your combination blade.

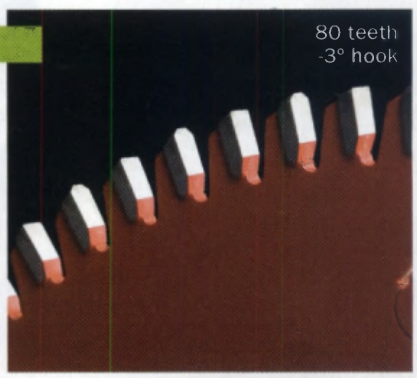
SHARP TEETH, NO TEAROUT

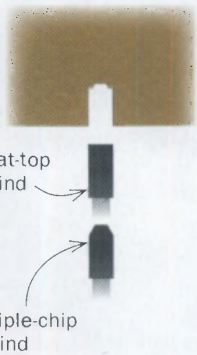




No tearout. *Some sheet goods are notoriously difficult to crosscut cleanly. A high-ATB blade cleanly shears the most brittle of veneers. However, the sharp tips on the teeth of a high-ATB blade are more easily damaged than those on rip or combination blades.*

MORE DURABLE OPTION





Clean cuts for the long haul. *If you cut large amounts of double-sided laminate or melamine, the 80-tooth TCG blade makes cuts that are almost as clean as a high-ATB blade, but is more durable.*

Combination blades

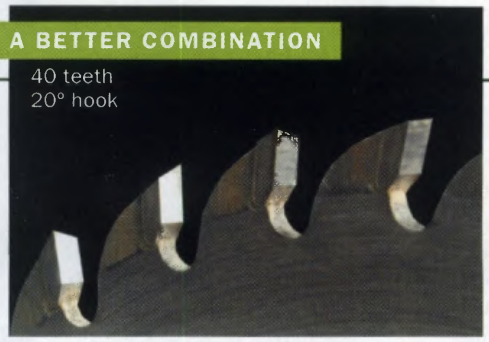
TWO GREAT OPTIONS

Most woodworkers use a combination blade for convenience. But you don't have to settle for sloppy results. Better blades have a combination grind (also known as a planer combination) that is a mixture of ATB and FTG teeth (40 in all). Four ATB tips cut a kerf with minimal tearout but leave a V-shaped ridge down the middle. A square-tipped raker tooth—slightly lower and narrower than the ATB teeth—follows to remove the central ridge. The raker also helps make cleaner cuts by keeping the blade running straight and square in the cut.

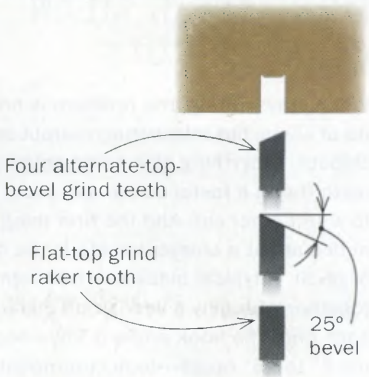
If you work mostly with solid wood, a planer combination blade will fit your needs. But if you mostly use plywood, a Plymaster combination blade is a better choice. This combination blade has 10 ATB teeth followed by a single raker tooth. Although it will crosscut better, it will not rip as fast and freely as other combination blades.

Special blades, special sources

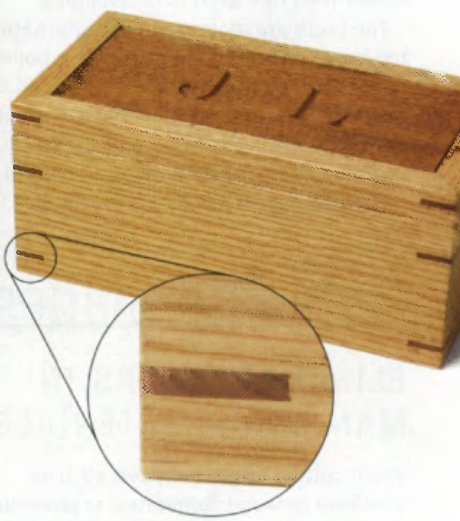
Your local hardware store or home center may carry a choice of brands, but few blade styles. You'll have better luck buying a special-purpose sawblade from a specialist source. Fortunately, there are online sites with excellent information and clear descriptions. These include www.amanatool.com, www.forrestsawbladesonline.com, www.freudtools.com, and the author's own company's Web site, www.carbideprocessors.com.

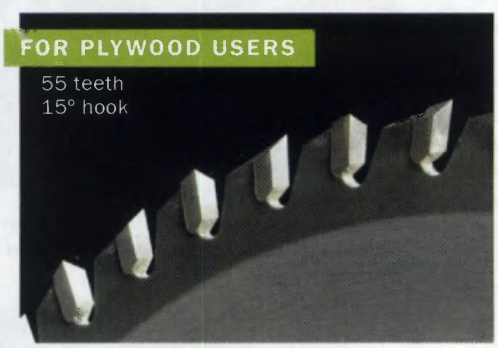


Cleaner cuts. *Most all-purpose blades have only ATB teeth. A combination-grind blade has one FTG tooth between four ATB teeth, which reduces vibration.*

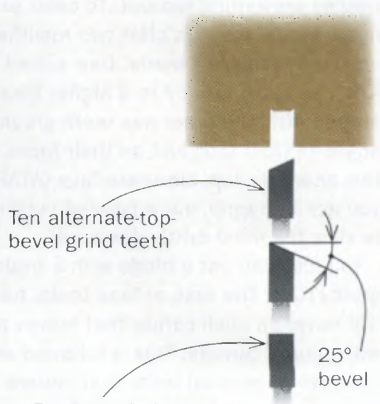


Good for joinery. *Made for ripping and crosscutting, a blade with a combination grind (ATB and FTG teeth) will leave a kerf with a nearly flat bottom. This is useful for joinery. In this example, it leaves no visible gap between the spline and the box.*





Plymaster combination blade. *The sequence of 10 ATB teeth and a single FTG tooth leaves clean cuts on plywood, particularly crosscutting.*



One blade for plywood. *If you use mostly sheet goods and don't want to switch blades, the Plymaster blade may suit you.*

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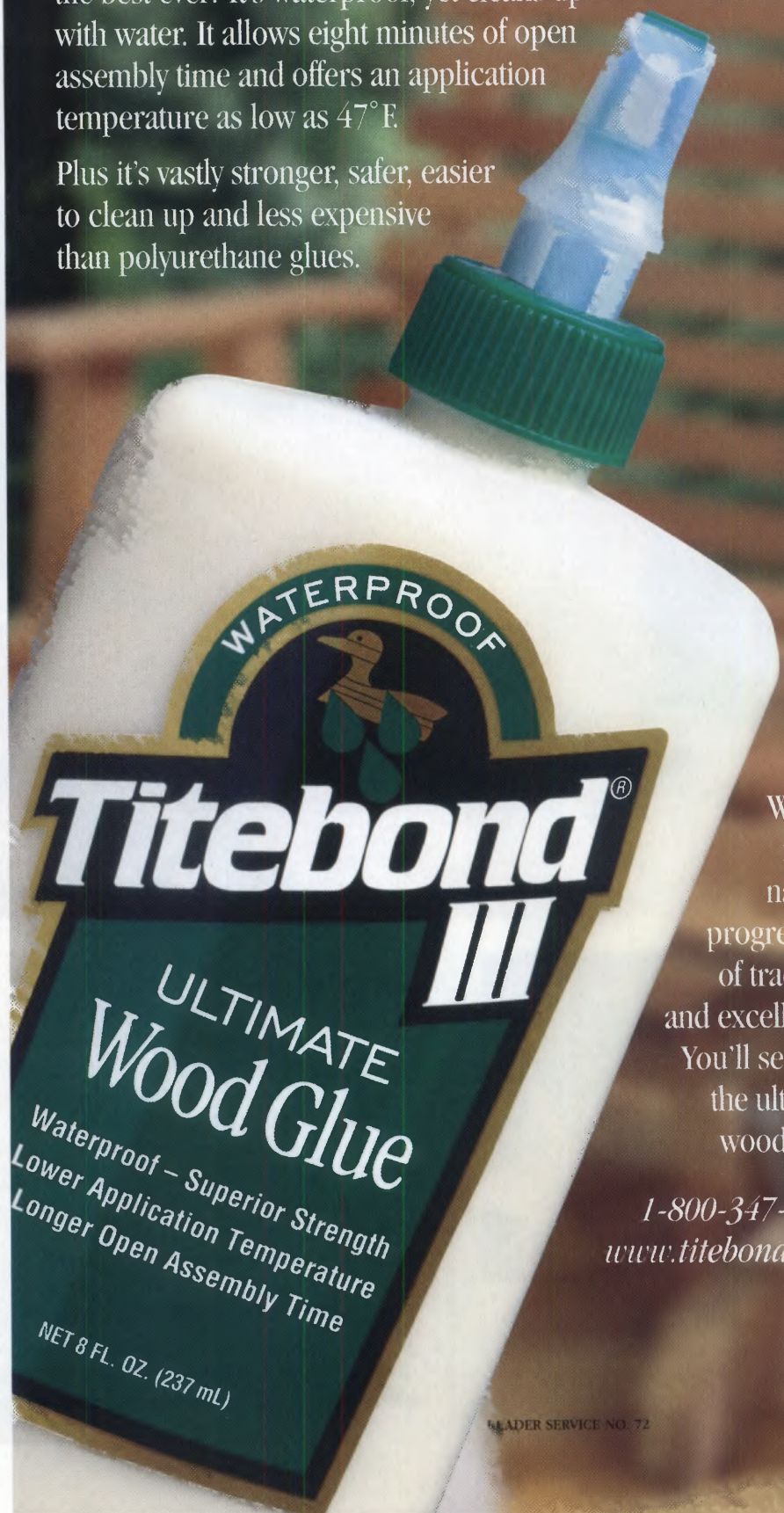

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Creating an attractive tabletop

Part 2
Edge-jointing and glue-up

BY BOB VAN DYKE

WHERE WE LEFT OFF...

In **Part 1** (*FWW* #207), we chose the lumber, milled it to dimension, selected the final sequence of the boards, and marked them with a large triangle.

There are a lot of ways a tabletop can go wrong. In this second article of my three-part series on making a tabletop, I'll address two more common pitfalls, showing you how to make joints that will stand the test of time, and how to keep the boards aligned during clamping. That alignment makes a world of difference when it comes to post-glue-up planing and sanding.

Put a spring in your joints

The first step is to run the adjoining edges of each board over the jointer to form the glue joint. Check that the jointer fence is at 90°, but alternate the faces of boards against the jointer fence to cancel any error in the jointer setup. If one edge measures 91°, the angle on the adjacent edge will measure 89° and the boards will lay up flat. Sometimes this means jointing against the grain and risking tearout, so make light cuts with a slow feed rate.

To ensure that the joint closes along the edges of the boards, take a bit more wood from the middle than from the ends, creating a slight gap in the middle of the joint. This is called "springing" the joint. As the clamp pressure closes the gap in the middle, the joint will only get tighter toward the ends of the boards.

Photos: Mark Schofield; drawings: John Tetreault

Is it square? *Adjust the jointer's fence so that it is 90° to the outfeed table just past the cutterhead.*

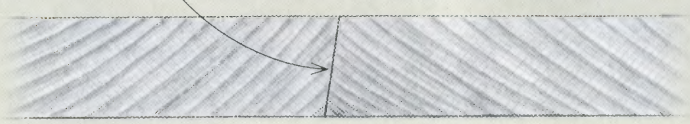
Spring-joint the edges

TIP

ALTERNATE FACES AGAINST THE FENCE

If the jointer fence is not exactly 90°, you can still achieve a flat tabletop by putting one board facing inward (I) against the fence and the adjacent board facing out (O).

Alternating faces when jointing will make up for any fence inaccuracy. (Angle is exaggerated for clarity.)



To spring the joint, set the jointer to take a light cut and use a slow feed rate. Begin the cut by exerting a small amount of downward pressure on the board as it goes across the cutterhead. When about 6 in. of the board is on the outfeed table, push down hard on the board with your left hand just past the cutterhead. Continue with this slow feed and heavy pressure until about 6 in. remains. At that point, lighten up on the board until you're exerting almost no downward pressure, and finish the cut. Do the same to the adjacent board.

The gap in the center will be too small to see, but you can test the joint by standing the boards up with their sprung edges together. Now try to swivel the top board. The points of contact at either end should provide enough friction to prevent this. If the top board swivels on the bottom one, you have a small lump somewhere. Rip 1/16 in. off the sprung edge of one board, spring it again, then re-test the joint. If you still feel the swivel, re-joint the other board.

Level the joints as you glue them up

A properly made butt joint will be stronger than the wood itself, eliminating the need to add biscuits or dowels for strength. As a matter of fact, biscuits and dowels can sometimes hinder you from

Vary the force. *While jointing each edge, bear down in the middle to create a very shallow hollow (left).*

No swinging allowed. *If the sprung joint has been cut correctly, the two boards will not move when placed edge to edge. If they pivot (above), then one or both boards need to be ripped and re-jointed.*

Glue up in sections

Don't spare the glue. *Van Dyke applies a generous bead of glue on one edge, spreading it out with his finger.*

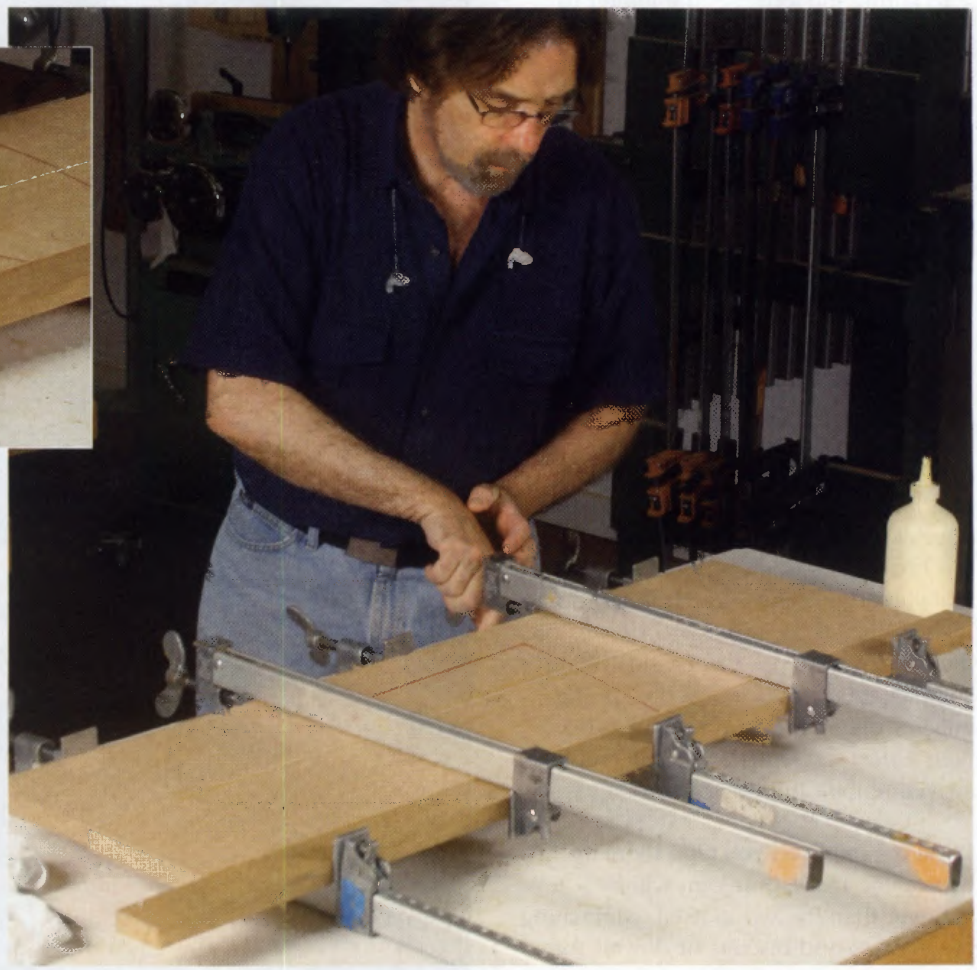
Press and rub. *Place the glued edge against its mating edge and slide the two surfaces back and forth to distribute the glue evenly.*

Align and clamp. *Apply light force, aligning the surfaces with your fingers. Use a caul on the face that will be glued to the other half.*

Easy cleanup. *Before putting on the top clamps, scrape off most of the surplus glue with a putty knife.*

aligning the boards during glue-up. A common problem is that the glued-up top will be wider than your planer. The simplest way to handle this is to divide the top into two or more subassemblies, each one sized to fit through the planer. Then glue the two subassemblies together, leaving very little flattening to do on the completed tabletop.

A level surface to clamp on is very important because you do not want any distortion. I use a flat sheet of melamine cut to the size of my benchtop, which also protects it from glue drips. I



More force applied. *Place clamps on top of the glue-up. Then tighten down all of them, applying firm, even pressure.*

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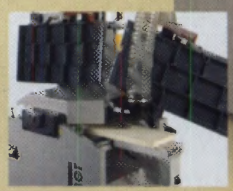

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Flattening for the final glue-up

Don't get lost. *You are about to plane away the large triangle that marked the sequence of all four boards (below). To keep the correct order, mark the adjacent ends of the boards (right).*

Final assembly. *Pay close attention to board alignment when clamping the two subassemblies to form the tabletop. Doing so will minimize the work needed to flatten the top later.*

typically will use an odd number of clamps, in this case three on the bottom and two on top. Placing clamps on the top and bottom helps equalize pressure and produces a flatter glue-up.

Space the bottom clamps evenly and lay out the boards on top of them, using the triangle you drew earlier as a guide.

After applying the glue, make sure the triangle lines are aligned, then tighten the middle clamp slightly, pushing down on the joints to align them. Work your way out to the ends, maintaining moderate clamp pressure and aligning the joints as you go. Remove any glue squeeze-out before putting on the top clamps.

Once all the clamps are in place, apply an even amount of pressure to each one. Turn over the assembly and remove the excess glue between the clamps. Place a straightedge across the boards in several places to make sure uneven clamping pressure hasn't bowed the workpiece. Adjust the clamp pressure if necessary.

After the subassemblies dry, run them through the planer to remove any misalignment between the boards. Then flip them end for end and plane the other side parallel. Plane them down to less than 1/32 in. over final thickness, taking light cuts near the end to minimize tearout. Now repeat the glue-up procedure, this time gluing the two subassemblies together. Take extra care to get a flush glue joint as you have very little surplus thickness to work with.

Once the glue dries, you're ready to flatten, dimension, and smooth the tabletop. I'll describe how to do that in the third and final part of this series (look for it in *FWW* #210). □

THEY'RE BACK

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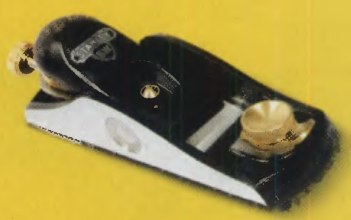
SMOOTHING PLANE

NO. 62
LOW ANGLE JACK PLANE

NO. 9 -1/2
BLOCK PLANE



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READER SERVICE NO. 1

Fine Drawers Without Dovetails

Pinned rabbets are attractive, durable, and much easier to make

BY HENDRIK VARJU

Beautiful and strong, hand-cut dovetails are the favorite drawer joint of many woodworkers. And because of the skill needed to cut them well, they are considered a hallmark of craftsmanship. But they take a lot of time to make and even more to master. If you're not a slave to tradition, there are other joints nearly as strong and beautiful that can be made in a fraction of the time.

In my experience, the best alternative is a drawer with pinned rabbets at the front, and dadoes to hold the back in place. All of the joinery is cut quickly and easily at the tablesaw. My customers—who aren't biased toward dovetails the way woodworkers are—have never complained. In fact, they find the clean, crisp lines attractive and comment that the drawer doesn't look mass-produced.

I'll show you how to make the drawer with a ¾-in.-thick front, ½-in.-thick sides and back, and ¼-in.-thick bottom, but the same techniques can be used to make smaller or larger drawers.

Making parts in the right order ensures tight joints

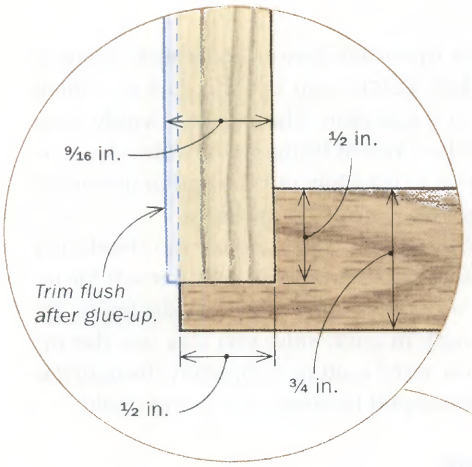
To make these joints strong and gap-free, cut the rabbets and dadoes first, and then mill the parts to fit them. If possible, make the parts from quartersawn lumber, which is more stable than flatsawn. The joints will be stronger and the drawer will fit better through the seasons because the parts will move less.

Plane the front to thickness and cut it to length, but keep it 1/16 in. over the final width (height). Cut the sides to final length and width, leaving them a bit thicker than needed; they will be trimmed to final thickness after the drawer has been glued together. You'll fit the back to the drawer as you make it, so leave it oversize for now.

Use a sacrificial fence to cut rabbets

I cut the rabbets on the drawer front with a dado set stacked wider than the rabbet, burying the extra width in a sacrificial fence. Dado cutters are designed so that the outer blade cuts slightly deeper than the chippers to help pre-

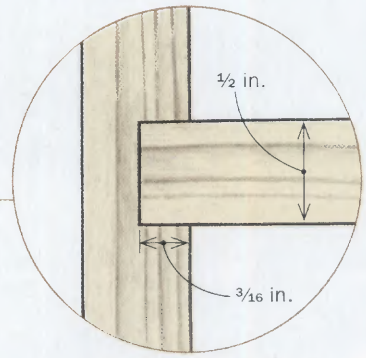
Pins add pop. *This joint looks best in contrasting woods. The pins match the drawer front but stand out against the light-colored sides.*



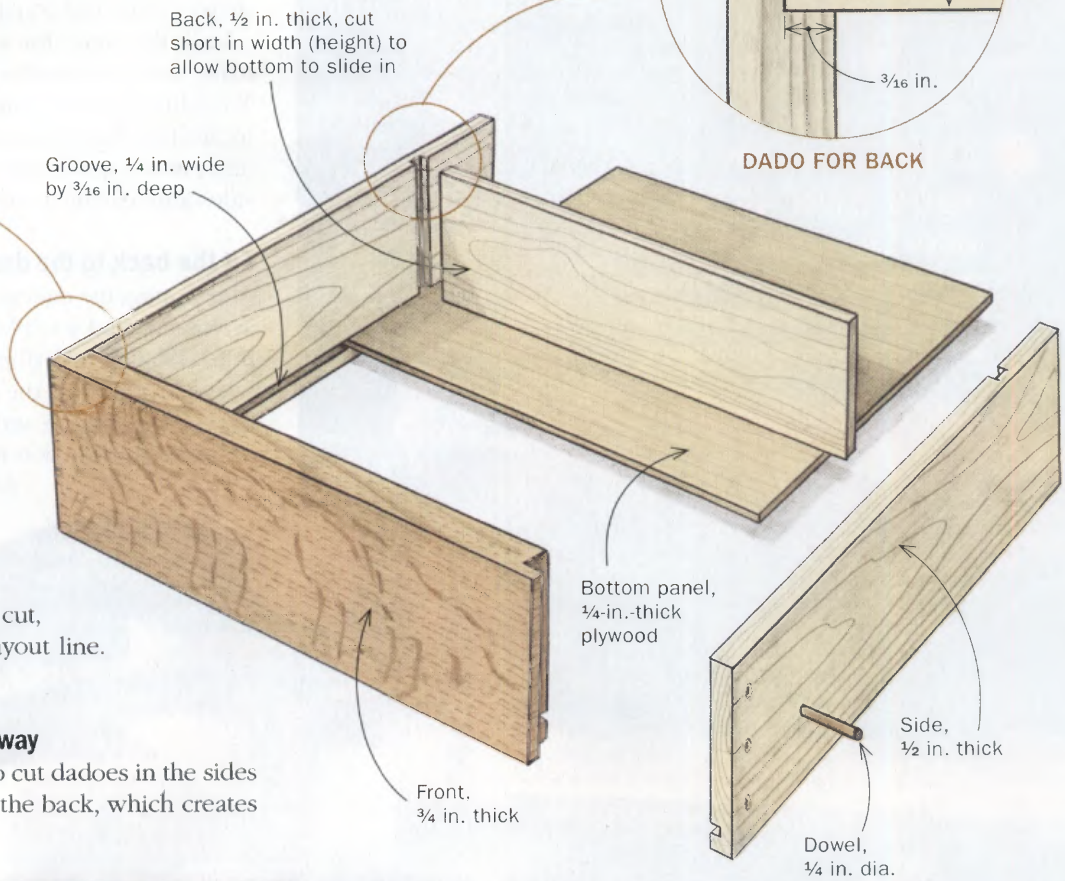
RABBET FOR SIDES

Simple anatomy

The front joint is a rabbet, the back is a dado, and the bottom rides in a groove. The pins go in after the drawer has been glued up.



DADO FOR BACK



vent tearout. It's barely noticeable on the inside of the rabbet but it creates a gap on the outside of the rabbet after the joint is glued. Burying the cutter in a sacrificial fence eliminates the gap.

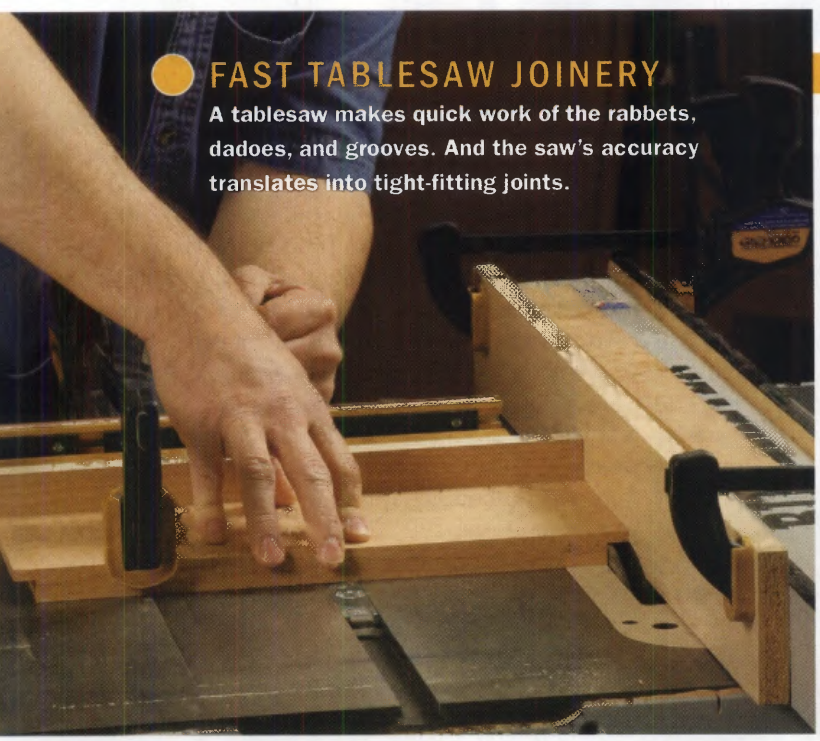
Mark the rabbet on one end of the front. Set the blade low, make a test cut, and raise the blade a bit. Make a second cut, and repeat until the cutter reaches the layout line. Then cut the rabbet on the opposite end.

Extralong sides let drawer open all the way

After the rabbets have been cut, it's time to cut dadoes in the sides to hold the back. I locate them 2 in. from the back, which creates

FAST TABLESAW JOINERY

A tablesaw makes quick work of the rabbets, dadoes, and grooves. And the saw's accuracy translates into tight-fitting joints.



Rabbet the front. *For clean results, bury the dado set in a sacrificial fence, and put another sacrificial fence on the miter gauge to back up the cut.*

Cut the dado for the back. *Restack the dado set to 1/2 in. wide and sneak up on the full depth. Clamp the workpiece to the miter gauge to keep it from drifting.*

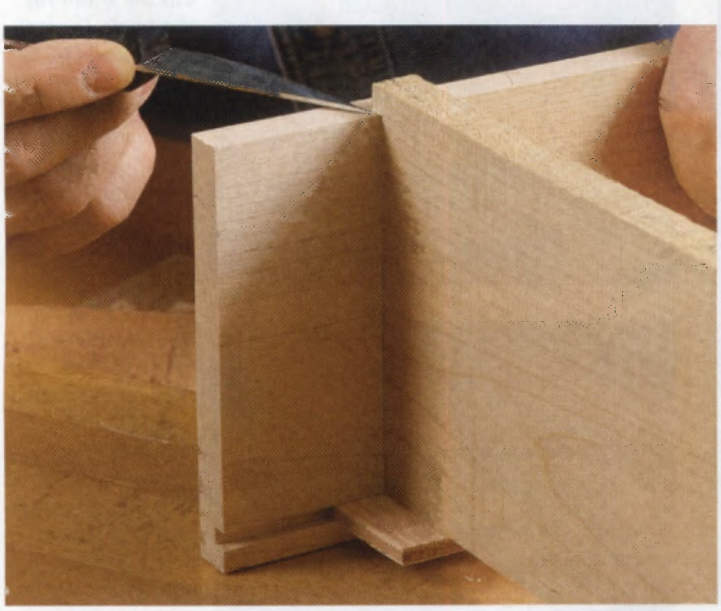
Use a standard blade for the groove. *Stacking a dado cutter to match the thickness of the plywood bottom is a fussy task; two passes over a combination blade cuts the groove quickly.*

Photos: Matt Kenney; drawings: John Tetreault

DADOED BACK ADDS STRENGTH

Mill the back and cut it to size after the dadoes and grooves have been cut. The snug fit strengthens the drawer and helps keep it square.

Don't trust your ruler. *The best way to know when the back is the right thickness is to test its fit in the dado after each pass through the planer.*



Find the height. *Place the back in its dadoes, supporting it with offcuts from the bottom. Now you can mark its height accurately.*

an extension that lets you open the drawer completely without it falling out of the pocket. Before you cut the dadoes, orient the grain in the sides so you can plane the outside cleanly from front to back. This way, when you're bringing the sides down to their finished thickness, you won't blow out the end grain on the drawer front and you'll get no tearout on the sides.

Stack the cutter for a ½-in.-wide dado. I adjust the depth as I make test cuts, just like I did with the rabbets, until I reach 3⁄16 in. To reduce tearout, I use a miter gauge with a backer fence. To locate the dadoes accurately in each side, you can use the rip fence as a stop because you aren't cutting completely through the sides and leaving a cutoff trapped between fence and blade.

Fit the back to the drawer

After cutting the dadoes, plane the back to thickness, testing its fit as you go. Had you planed it before, it might have ended up too thin, resulting in a sloppy fit. Before cutting the back to its final width (height), cut the grooves for the bottom. The back sits on the drawer bottom, and the groove shows where that will be.

I make drawer bottoms from ¼-in.-thick plywood and use a standard-kerf blade to cut a 3⁄16-in.-deep groove ¼ in. from the bottom of the sides and front. Set the rip fence to make the first cut, and groove the front, sides, and a test piece. Adjust the fence for the second cut. Run the test piece through and check to see if the drawer bottom will fit into it. The plywood should move in the groove, but without slop. Adjust the fence if needed, and finish grooving the front and sides.

TIP USE FRONT TO FIND LENGTH OF BACK

Clamp the front between the sides to ensure that they're spaced accurately. Then measure for the back.

For the drawer to end up square, the back must be precisely the right length. To get an accurate measurement, clamp the front—with the top edge of the sides in the rabbets—between the sides just in front of the dadoes. This ensures that the sides are the correct distance apart. Measure from the bottom of one dado to the bottom of the other. Cut the back to length. Then slide the back into its dadoes until it reaches the top of the groove; put some offcuts from the bottom into the groove to make this easier. Mark the back and cut it to its final height.

The front was left 1⁄16 in. oversize in height so that the drawer bottom groove could be cut in it and the sides at the same time. Trim that 1⁄16 in. off the bottom so that there's a consistent gap all the way around the front. Then drill holes for pulls or knobs. Sand the inside faces of the front and sides, and both faces of the back. The edges will be cleaned up after assembly.

Jointer trick perfects the rabbet joint

I glue the back into its dadoes first, because the joint will hold itself together as I work on the rabbets at the front. Spread glue on the rabbets, avoiding the groove for the bottom. Then slide the drawer front onto the sides. This forces any glue squeeze-out

GLUE UP, THEN TRIM DOWN

Varju lays out everything he needs, from clamps to cauls, before he begins. And his jointer trick makes it easy to fit the drawer to the cabinet.

Four clamps for the rabbet. *Two go side to side and two go front to back. Varju uses small cauls to get pressure on the joints without the clamp heads interfering with one another.*

toward the outside of the drawer, which makes for easier cleanup. Insert offcuts from the drawer bottom into the groove and align the front with the sides. Clamp the joint from side to side, then front to back. Pull out the offcuts and let the glue dry overnight.

The next day, take the drawer to the jointer and carefully plane the sides until they're just a few thousandths of an inch too thick. Take that last bit off with a handplane.

Pin rabbets for strength and a custom look

The pins are what make this simple drawer strong and stylish enough for fine furniture. With the sides planed flush, lay out the pins, making sure to locate the bottom pin above the drawer bottom. It looks best if the top and bottom pins are an equal distance from the edge and you use an odd number of pins. Also, I match the pins to the drawer front. As for the diameter of the pins, ¼ in. looks right if the drawer front is ¾ in. thick or thinner.

Bore the holes at the drill press. Go through the sides and ¾ in. into the front. Cut the pins 1½ in. long. Squeeze glue into the holes and spread it around the walls. Pound the pins into the

Jointer trims sides quickly. *After the glue has dried, it's safe to run the sides over the jointer, leaving just a thousandth or two of an inch for a handplane to remove—creating a perfect fit every time.*

PINS ADD STRENGTH AND BEAUTY

Hang the drawer on the drill-press table. *Set it over a corner and rotate the table to get the drawer under the bit. This is more stable than lowering the table and standing the drawer on it.*

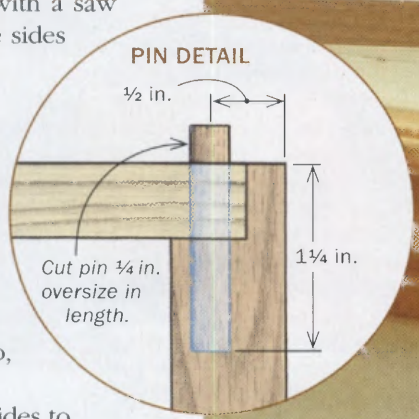
holes. After the glue has dried, cut them close with a saw and trim them flush with a block plane. Sand the sides and the front.

Cut the bottom and fit the drawer

Next, cut the drawer bottom to size and slide it in from the back. About 1/32 in. of clearance per side ensures it won't get wedged in. Two or three small screws hold the panel to the underside of the drawer back. For a solid-wood bottom, the clearance is the same at the sides, but align the grain so that wood movement occurs front to back. Also, elongate the screw holes at the back.

Finally, plane the top and bottom edges of the sides to fit the drawer into its pocket, but don't take too much off the bottom or the gap around the front will become uneven. □

Hendrik Varju is a furniture maker who operates Passion for Wood near Acton, Ont., Canada.



Leave pins proud, then trim them flush. *Cut them about ¼ in. longer than they need to be. This reduces the chance you'll strike the drawer sides with the hammer. A good flush-trimming saw will do the job without marring the drawer. Or you can saw the pins a bit proud, and bring them flush with a block plane.*

Resize store-bought dowels for the best fit

Store-bought dowels are rarely the stated diameter or actually round. On these drawers, where the pins are inserted near the end of the sides, a dowel that's slightly oversize could split the end grain. One that isn't round would leave gaps. At the store, I use calipers to find dowels that are just a bit oversize. Back at the shop, I size them to the right diameter using a dowel plate made from an inexpensive angle bracket. I redrill the holes to ensure they're the right diameter, and each hole remains sharp enough to treat about 30 ft. of dowel.

Easy to find. *Hardwood dowels in common species can be bought from most woodworking retailers.*

Quick-to-make dowel plate. *Use a twist drill to resize the holes in an angle bracket (above). Then use a handheld drill to spin the dowel through the holes (right).*

Shaping Wood By Hand

A few tools let you create any shape imaginable

BY ALFRED SHARP

Before the days of portable power tools—or any power tools for that matter—craftsmen were able to generate any shape they wished in any wood. Remarkably, the tools they used—the spokeshave, the rasp, the bench chisel, and the scraper—are still the best tools for a wide variety of shaping jobs. Indeed, some tasks can *only* be accomplished using these tools. And even when a power tool can do the job, the hand tools are often quicker to use, especially if only one or two pieces of wood are involved. A power tool may require considerable setup time, whereas you can just whip out these hand tools and start making shavings.

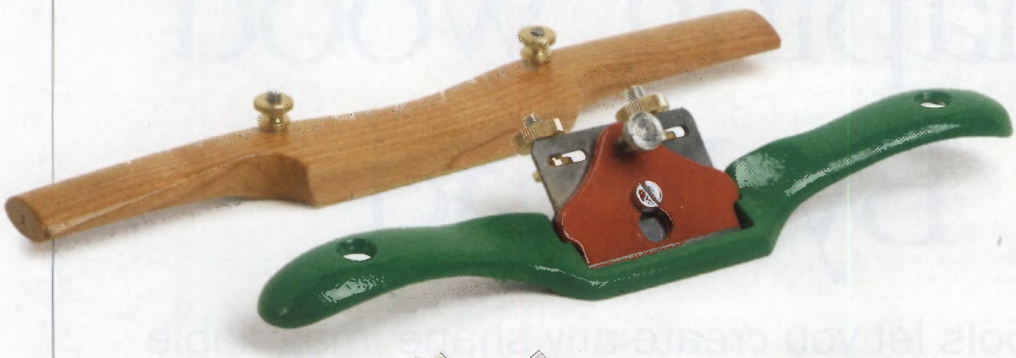
There are other benefits to mastering these tools. They are much safer than power tools, with minimal noise and no power-propelled chips and dust, so you're freed from earmuffs and eye protectors. And often little or no sanding is needed before starting the finish.

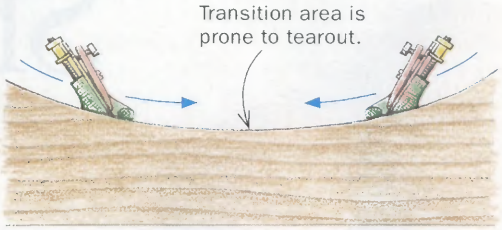
To demonstrate, I'll create parts for a Queen Anne chair. The varying curves and shapes of the legs, back splat, crest rail, and shoe are best shaped with hand tools.

The tools I'll discuss take up very little room, and the set costs only a few hundred dollars—less if you purchase used tools. With this relatively small outlay and some practice, you'll be capable of rendering the most complex and sinuous sculptural shapes imaginable for modern or traditional furniture.

Alfred Sharp is a professional woodworker who lives near Nashville, Tenn.

SPOKESHAVES REMOVE WOOD QUICKLY YET DELICATELY

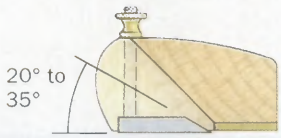




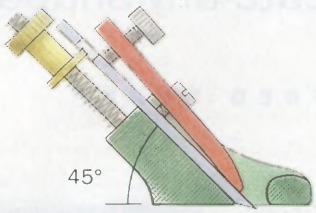
GO WITH THE GRAIN

The grain direction of a typical workpiece changes at about every 90° of arc. In this transition area, the grain will tear out and you'll have to come from the opposite direction. Learning to fair this area is one of the harder skills to master. A sharp blade, a tight throat, and a light touch help.

CHOOSE YOUR ANGLE



The wooden shave presents a low blade angle and is great for fine finishing cuts in straight-grained woods and for working end grain.



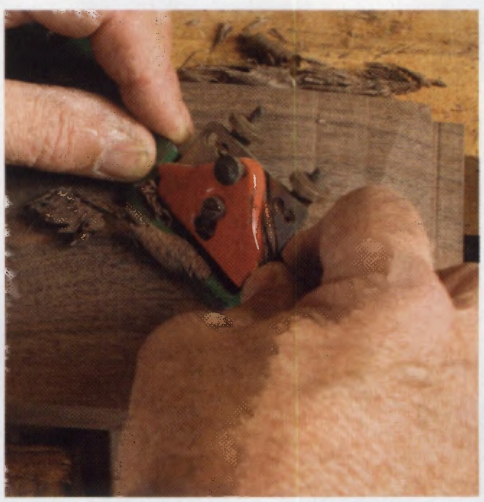
The metal shave presents a higher blade angle to the work surface, making it more suitable for figured woods and taking a heavier cut.

My favorite tool for shaping wood is the spokeshave. Spokeshaves are like handplanes for curved surfaces and, as their name implies, were originally used to fashion wagon-wheel spokes. They can be used to clean up bandsaw marks on any curved surface, to round over the sharp ridges between the curved planes of a cabriole leg, or to cut the tapered elliptical shape on the curved back legs and crest rails of Queen Anne and Chippendale chairs. Spokeshaves come in several shapes and configurations, but you can do 90% of your work with two flat-bottomed shaves: the metal type with a frog to position the blade, and the wooden shave with a very low-angle blade (see drawings, above).

The way I use them runs contrary to the practice of most woodworkers, who use wooden shaves for heavy stock removal and metal shaves for finishing the surface. While it is true that the wooden shave's lower angle can wedge deeply into the wood and take a big chip, there is also the potential tearout that results from that wedging action. When hogging off, I like the control and more self-limiting nature of the metal shave. For fine work, nothing beats the super crisp and "sparkly" surface that results from the really sharp wooden shave worked with a very tight throat, especially when using a skew angle of attack.

Second, the little thumb pads behind the blade suggest the tool can only be pushed. In reality, the shave can be pushed or pulled. Your thumbs or forefingers, placed directly behind or in front of the blade, provide the push or pull. Your other fingers rotate and revolve the shave to keep the edge engaged in the wood. It takes a little practice at first, but soon you'll be rhythmically making sweet curls. Often the shave is skewed at an angle to the direction of cut to make the going smoother. If chatter marks appear, shift the skew angle of approach so that you're cutting at an angle across them.

Smooth curves. *A flat-bottomed spokeshave can work a concave surface down to about 10 in. dia. To go with the grain, work downhill from both directions.*



Push or pull. *The spokeshave can be pushed or pulled, so you don't have to reverse and re-clamp the workpiece each time the grain pattern changes.*

Tight mouth, thin shavings. *After creating the basic profile with a metal spokeshave, Sharp uses a wooden shave with its low blade angle and tight mouth to work areas of tearout.*

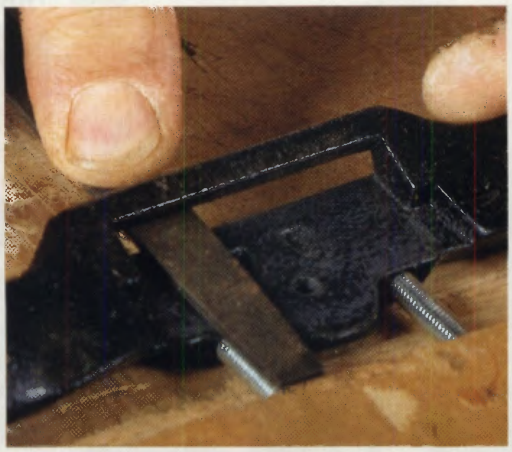
Photos: Mark Schofield; drawings: Vince Babak

Turn a cheap shave into a peak performer

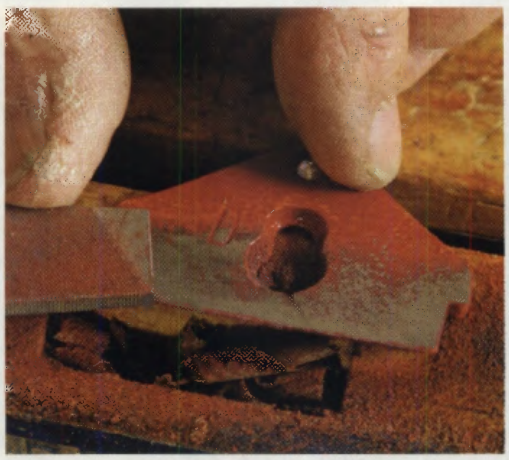
You'll never regret spending the money for a quality spokeshave. But if you already have an inexpensive one or you can't resist a flea-market bargain, there are a couple of ways to tune them up to perform like their costlier cousins. Start by buying a thicker, aftermarket blade in high-carbon steel, and spend some time sharpening it until both surfaces making the edge are fairly polished.

The typical lower-priced metal shave has a wide throat that looks ready to take a chunk worthy of a drawknife. To correct this, you'll need to make a shim that fits between the frog and blade and closes the throat. Use a dense wood like maple. If your shave has the two blade-adjusting screws, the shim shouldn't be so thick that the blade no longer engages these screws. I find that a maximum throat opening of 0.020 in. allows for a reasonably thick shaving while still cutting cleanly and without chatter. (I like a throat opening of 0.005 in. to 0.008 in. for a wooden-bodied shave.)

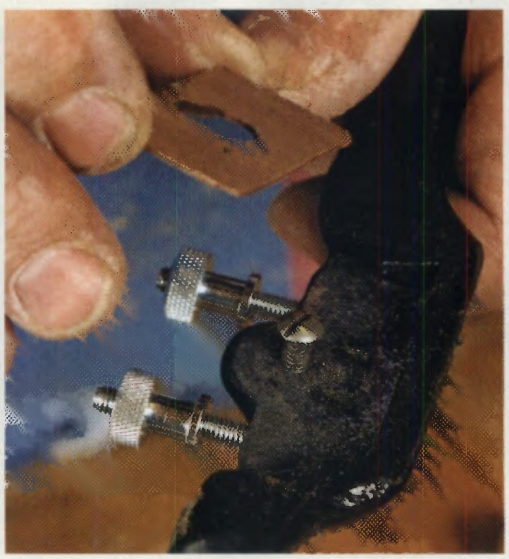
While you are working on the throat clearance, inspect the frog and correct any problems you find there. Often the paint used on the body of the shave has gotten onto the frog's surface, even collecting in a fat sag. Carefully scrape down to the metal and then check the surface for flatness. A little judicious filing may be in order. Careful: Don't nick the front edge of the throat or you'll be left with an irregular mouth opening. If the frog doesn't register the blade square to the sole, correct that too by filing. Then you can calculate the thickness of shim needed to create the proper throat.



Body and sole. *Scrape away any surplus paint and then check the surface for flatness and whether the blade registers square to the sole. A little judicious filing (left) will correct either problem, but be careful not to nick the front edge of the throat. Budget spokeshaves often come with coarse scratches on the sole. Use a file to remove these and flatten the sole at the same time (right).*



Smooth the chipbreaker. *Rough casting and paint prevent many chipbreakers from making good contact with the blade. File down to flat metal (left). Bevel the leading edge (right) to create a tight joint with the blade, which keeps shavings from getting caught under the chipbreaker.*



Close the throat. *Make a dense hardwood shim (left) that fits between the frog and blade. The shim shouldn't be so thick that the blade no longer engages the adjustment screws. The tighter throat (right) makes for much smoother cuts.*

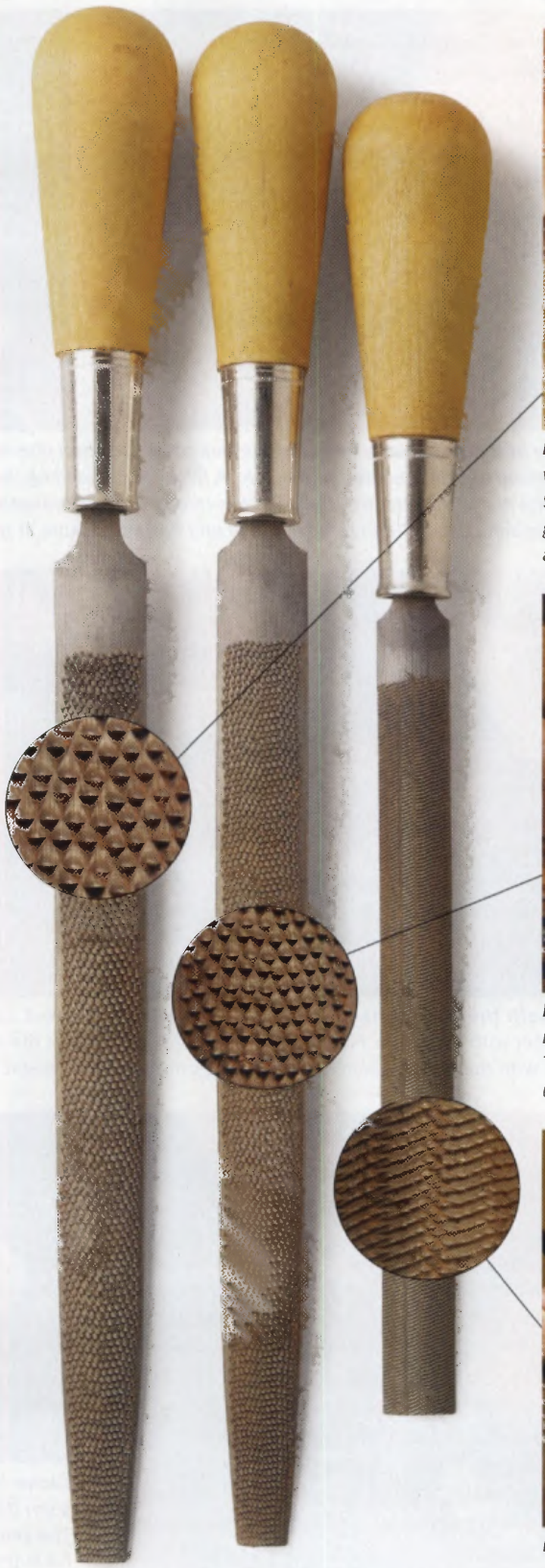
RASPS AND FILES HANDLE TOUGH GRAIN AND TIGHT CURVES

The rasp is one of the most elementary woodworking tools and is very versatile. Coarse rasps can remove a lot of wood quickly in tight situations, for example the ankle area of a cabriole leg. Rasps are especially helpful when trying to sculpt highly figured or difficult woods, or when the approach to the work is awkward for an edge tool such as a chisel or a shave. A finer-toothed rasp can help at that troublesome grain-shift point discussed with the spokeshave.

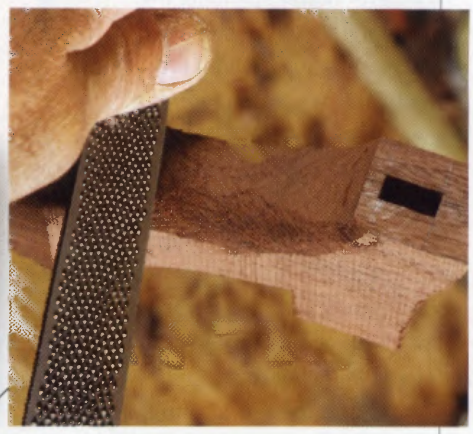
Rasps come in a variety of grades, but you can get by with two or three. They all should be tapered half-rounds and have random-cut teeth, which are almost always hand-cut. Most machine-cut tools have perfectly spaced teeth, which contribute to "railroading" (rows of grooves on the work surface) and chatter. The only machine-cut tools I know of that have random teeth are the Nicholson pattern-maker's rasps.

Unfortunately, there is no standard nomenclature for coarseness, and each brand varies significantly from the others. The best way I can describe my most useful rasps is by tooth height, which may be difficult to judge, especially when buying from a catalog. The coarsest rasp I normally use has teeth about 0.085 in. high, the next size down about 0.035 in., and the finest, often called a cabinet rasp, has teeth that look more like a very coarse file—which is a good substitute. Always put a wooden handle on the tang of a rasp or file to prevent a nasty wound.

There are a few tricks to using a rasp. A rasp will remove the most wood when worked approximately 90° to the grain direction, but the resulting surface will be rougher than if worked along the grain. Therefore when using the coarse rasp, stop a little short of your final desired shape and work through the finer rasps, finishing with the cabinet rasp and working along the grain direction if possible. From this point, a scraper usually will easily remove any remaining rasp marks.



THREE ARE ALL YOU NEED



Fast cutting. *A coarse rasp removes wood quickly, especially when used at 90° to the grain. To avoid creating deep grooves, look for a rasp with teeth that are not in a straight line, lengthwise.*

Less aggressive. *A medium rasp removes the lines left by the previous rasp. Tapered, half-round rasps are the most useful for shaping wood.*

File a smooth surface. *A coarse/medium file cleans up any remaining rasp marks and leaves the surface ready for scraping and sanding.*

CARVE WITH A **BENCH CHISEL** BEVEL-SIDE DOWN

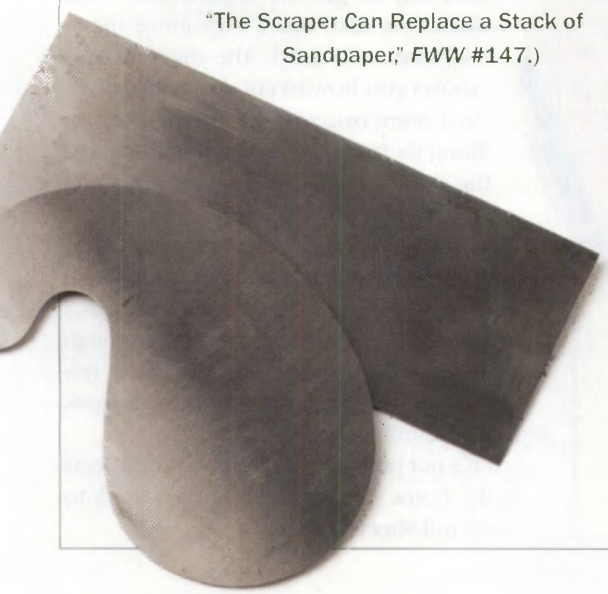
Bench chisels are often overlooked as carving tools, perhaps because some people haven't tried using them bevel down. Using a flat chisel this way positions the handle higher off the work, keeping it out of the way and leaving the chisel free to move around. Also, the chisel becomes like a spokeshave with a very short "sole" that allows you to work into remarkably tight curves. And you can use the heel of the bevel as a fulcrum, levering away chips, and keeping the edge from digging too far into the cut. I often use a chisel to carve the ankle of a cabriole leg. With it, I can get into the tight curve and then use the heel of the bevel as a fulcrum.

For this type of work, I recommend a shorter chisel like a butt chisel, approximately 5/32 in. thick with a beveled edge. The slight flexibility of thinner or longer chisels means they can "load up" and then spring forward in an undesirable burst. A bevel angle of 25° to 30° is best, higher if you find you are doing a lot of levering (which is tough on the edge). I use ¾-in., 1-in., and 1½-in. sizes.

How to control it. *Using the bevel of the chisel in the same way as the sole of a spokeshave allows you to get into tight spaces, such as the beveled edges of this chair splat, with perfect control.*

CLEAN UP WITH THE **CARD SCRAPER**

The best tool for final shaping and smoothing of both curved and flat surfaces is a card scraper. Even on curved surfaces, most of the time I reach for a straight scraper, only using the french-curved scraper if the profile exactly fits the piece. All the facets left by the spokeshave and the chisel, and the grooves left by the rasp, can be removed with a sharp scraper and a light touch. Almost any surface that's been carved freehand can be faired and refined with a properly sharpened scraper. (For more on tune-up, see Fundamentals: "Mastering the Card Scraper," *FWW* #201. For more on using a goose-neck scraper, see Rules of Thumb: "The Scraper Can Replace a Stack of Sandpaper," *FWW* #147.)



Scrape wide areas. *You can clean up wide curved surfaces such as this chair splat with a card scraper.*

Scrape long curves. *A scraper quickly removes the facets left by the spokeshave, fairing the surface into a smooth curve.*

Use a curved scraper. *The gooseneck scraper has varying curves that can be fitted precisely into a cove. This is the shoe molding on a chair back.*

SOURCES OF SUPPLY

Economical metal spokeshaves from Stanley and Kunz are widely available.

www.hocktools.com
Aftermarket spokeshave blades

www.leevalley.com
Wooden shave kit, Nicholson rasps, economical hand-cut rasps, and coarse and medium wood files

www.toolsforworkingwood.com
Hand-cut rasps from Pakistan and the Auriou brand from France

www.lie-nielsen.com
Auriou rasps

How to Handle Plywood

Take the backache out of sheet goods and make better cuts, too

BY GREGORY PAOLINI

Plywood, melamine, and other sheet goods are great for cabinets, shelves, racks, and more. These materials are large, flat, and stable; but they're also heavy, awkward to handle, and hard to transport. Being a solo woodworker, I've learned lots of tricks for buying and handling sheet goods safely and efficiently. It all starts at the lumberyard.

How to get the sheets to the shop

If you're buying hardwood-veneer plywood, it's worth paying a delivery charge to have the supplier bring those expensive sheets right to your shop door; there's less risk of having the veneer damaged in transit. Save your energy for transporting less-expensive plywood and medium-density fiberboard from the local home center.

TIP

CUT BEFORE YOU LOAD

Whenever possible, have the home center or lumberyard cut down sheet goods to manageable sizes before you haul them home.

Before you go to the lumberyard, make a cutting diagram for each sheet. It's the best way to get the most out of each sheet, so you won't buy more material than you need. The diagram also shows you how to cut down the sheets to a more manageable size before you bring them into the shop. Rough-cutting the sheets is especially important if you don't have a pickup truck or a van.

Most home centers and lumber retailers have a panel saw and will generally make one or two cuts for free or for a nominal fee. Before you have the sheet cut to rough size, mark the factory edges for later reference if they don't already have a mark from the mill.

If it's not possible to cut down the sheets at the home center, you'll need a truck to carry full sheets home.

Photos: David Heim

Keep it flat

If you didn't break down the sheets at the store, make the rough cuts when you unload them.

Waist level. *Slide the sheets from the store rack to a drywall cart (1). Then slide the sheets from the cart right into the truck bed (2). When you unload, support the sheets on sawhorses and a sacrificial layer of rigid foam insulation. Mark the factory edge (3) and use a drywall square or a chalkline to mark cut lines (4). Rather than make a crosscut in one pass, cut only about two-thirds of the width (5), then finish the cut from the other side of the sheet.*

The bed on a full-size pickup is wide enough to hold 4x8 sheets flat between the wheel wells; with a short-bed pickup, you'll have to fold down the tailgate. Compact pickups can't fit a 4x8 sheet between the wheel wells, but many have indentations in the bed sides for 2x lumber that will support a load above the wells. If you don't have a way to keep the sheets flat, slide them over the closed tailgate and tip them down so the edge butts against the front of the bed. Don't overload the tailgate. A tie-down near the tailgate secures the load. Use cardboard or a blanket to protect the sheets where they contact the truck. Flag any load that extends past the truck bed.

Handling sheets at the shop

If you rough-cut the sheets to size at the home center, getting them into your

Rip first

The factory edge is good as a reference only. Use it to get one clean edge, and then rip it away.

Get one clean edge. *With a factory edge against the rip fence, cut the piece slightly oversize.*

Rotate and rip again. *Spin the piece around, putting the freshly cut edge against the fence and keeping the good side up in case there is slight tearout (left). Reset the rip fence and trim the piece to final width (right).*

shop is simple. If not, you have a bit of work to do.

With a larger truck, you can rough-cut the sheets with a circular saw as you slide them out of the truck, using the tailgate as a makeshift sawhorse. Just be sure to leave a factory edge on each piece, marking it if necessary with chalk or pencil. In the shop, you'll use the factory edge to begin cutting the piece to final size.

As an alternative, position sawhorses near the back of the truck, with one or two sheets of rigid building insulation on top of them. Slide a sheet out of the truck, onto the insulation, and then make your cuts. Adjust the saw's depth of cut so it's only slightly deeper than the sheet you're cutting. If you have to carry a full sheet more than a few feet, use a panel-carrying handle that lets you support the weight with one hand and steer with the other. This is the best way to get through a door or around a corner.

How to make precise cuts

To prevent chipout on expensive veneer plywood, especially when crosscutting, I favor a blade with 60 to 80 teeth and a triple chip grind. Sometimes called laminate/melamine blades, they make flawless cuts in plywood and composite materials.

If a dedicated tablesaw blade isn't in the budget, then make a ⅛-in.-deep scoring cut on the bottom followed by a through-cut. Or run masking tape over the cut line on the bottom of the sheet to minimize chipping. Be sure to keep the good side up when you cut.

In my experience, factory edges and corners aren't true enough or clean enough to use in furniture. So I cut them away when I trim pieces to their final size. Begin

Clean crosscuts

Two techniques. *A sled ensures that you'll make safe, square crosscuts. To avoid tearout, either put tape over the cut line on the bottom of the piece (above left) or make a shallow scoring cut (above right) followed by a through cut.*

by ripping pieces ⅛ in. to ¼ in. oversize, with a factory edge against the rip fence. Rotate the piece end for end, reset the rip fence to the exact size, and rip the piece again. This yields two clean, parallel edges. There won't be much tearout when ripping along the grain lines.

Crosscuts, on the other hand, are prone to tearout, but you can prevent it (see photos, above). Don't use the rip fence to crosscut long pieces. It won't control the workpiece safely, nor will it ensure that your crosscuts are at a perfect 90°. Instead, if you have a large enough crosscut sled, use it. With mine, I can cut pieces up to about 32 in. long and 24 in. wide. Position one of the newly cut edges against the sled's fence and square one end. Flip the piece around and cut it to the desired length.

If the piece is too big for a sled, rough-cut it about ½ in. oversize with a circular saw, then square and smooth the edges with a router. To guide the router, I use a simple shopmade panel-cutting jig made to work with a ¾-in. straight bit (see tip at right). I can align the jig right to the layout line and make a perfect splinter-free cut. Make the first cut so the workpiece is square but still about ¼ in. oversize, then cut it to exact size when you run the router along the opposite edge.

I can use the same router jig to joint a long panel down its full length. If I forget to mark factory edges, I can use the router jig to cut a fresh jointed edge. □

Gregory Paolini is a professional furniture maker in Waynesville, N.C.

TIP

A ROUTER JIG FOR LARGE PIECES

First, use the router to trim the edge of the jig. Now that edge shows you exactly where the router will cut.

Display Cabinet,

An approach to seeing and building that launched a generation of furniture makers

BY JIM BUDLONG

James Krenov's writings, gifted eye, love of wood, impeccable craftsmanship, and philosophical approach to woodworking have made his work timeless and influential. Although he didn't invent the cabinet-on-stand form that he popularized, Krenov spent his career perfecting it. This cabinet has all the hallmarks of Krenov's philosophy. Its clean lines, perfect proportions, beautiful surfaces, and special details combine to create a piece that's inviting to touch.

I was fortunate to study with him at the College of the Redwoods Fine Woodworking Program from 1983 to 1985. And in 1989, I began teaching in the same program. I spent 14 years alongside "JK" in the classroom, teaching and learning as much as I could. His method of working is far from the ways of mass-production furniture shops. It's personal, and

Words from the master

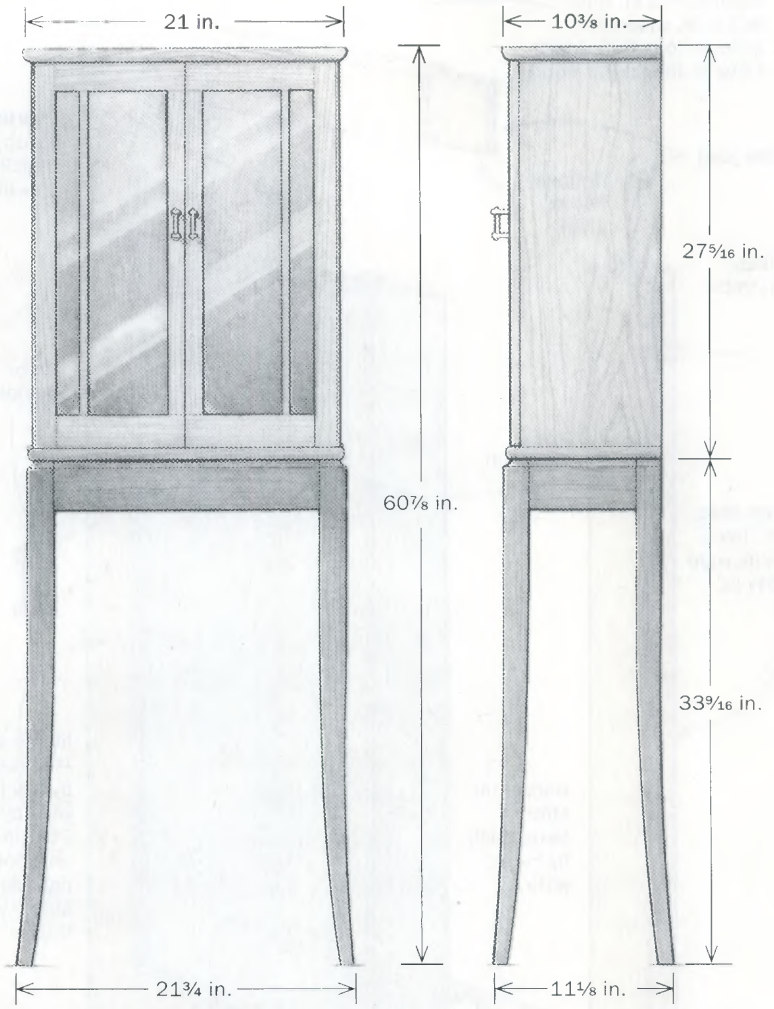
Editor's note: *As we went to press, we learned that James Krenov was very ill. Our thoughts and prayers go out to him and his family. We'll post updates at FineWoodworking.com.*

We recently visited Krenov in Fort Bragg, Calif., where he was still working in the shop every day. We asked specifically about the cabinet-on-stand form that he made famous. You'll find his answers at right.

For more Krenov-inspired work in this issue:
- Smart Sawhorses, p. 56
- Master Class on Krenovian details, p. 84

Photos, except where noted: Anissa Kapsales; this page (left): David Welter

the Krenov Way



that carries through in the finished product. As Krenov worked, he'd move from a sketch to a mock-up, and then to a final finished piece. He never worked from plans; rather, he'd watch a piece develop as he built it, always willing to give in to the needs of the piece instead of being stuck on one idea.

When I build, I incorporate all the lessons and details I learned in my years with Krenov. And this cabinet is a perfect example of that. It's not technically challenging: It uses familiar construction methods such as mortise-and-tenon joints, dowels, and bridle joints. I used ash, kwila, and spalted maple for this cabinet, but don't be limited by my choices. Finding the right combinations of wood can be as enjoyable and rewarding as building the piece. For more on Krenovian details, see the Master Class on pp. 84-86.

Begin with the doors

Taking on the most difficult challenges at the beginning is energizing and provides the motivation to see you through the project. The door work is a good starting point because it requires the most accuracy. A side benefit is that I can adjust the carcase to deal with any wind in the doors.

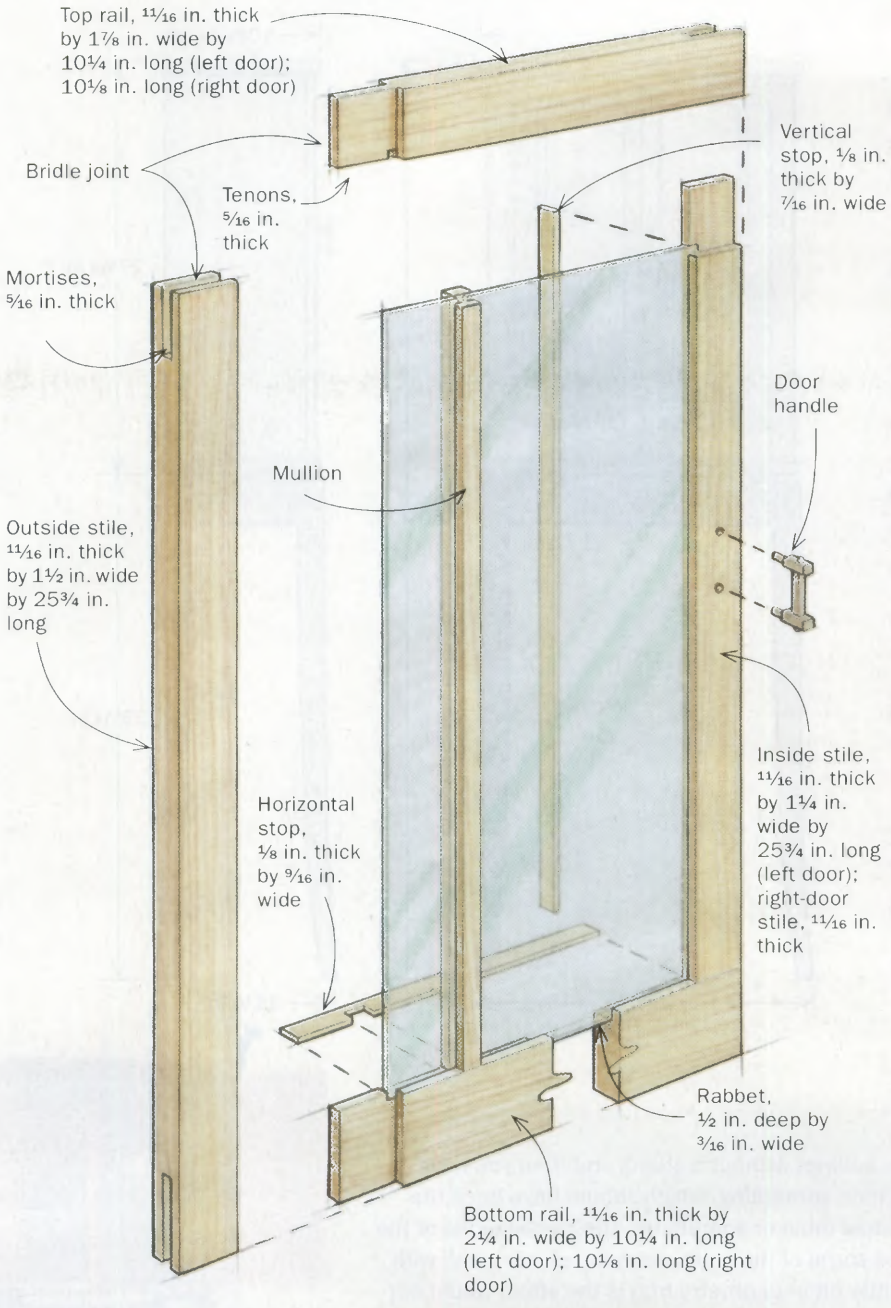
When I mocked up this cabinet and stand out of scrap, I was able to manipulate the look and feel of the cabinet by tweaking the door frame. By running all of the stiles through vertically, the cabinet felt taller, but when the rails ran all the way across, the cabinet

> You know, the alternative is a cabinet without a stand, and then you have a question of whether to put it on something, which should have been the stand, but happens to be the hall table or something. The convenience of the stand is not to be denied. And some of the cabinets that look very well with some air underneath and a little bit of geometry that is the stand would not necessarily look good as a continued cabinet all the way down to the floor. It would be too much of a good thing.
>
> There are a great deal of surprises in a stand, a lot of geometry, a lot of aesthetics, a lot of guessing and composing it. Should the legs flare out, go straight to the floor? It's not just putting [together] four legs and a crosspiece and calling it a stand. You've got to be lucky to get a stand to go properly with the piece. If you don't take it too casually, you learn about the cabinet itself from the stand. They talk to one another—they should anyway. They should be on a friendly basis.

Krenov method

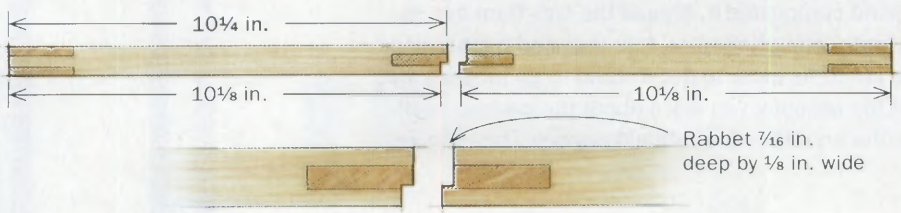
TACKLE DOORS FIRST

Knowing that doors seldom come out perfectly flat, Krenov built them first, fitting the front of the case to them later. Bridle joints are a strong, elegant joinery option, and mullions are a delicate way to break up the plainness of the glass.



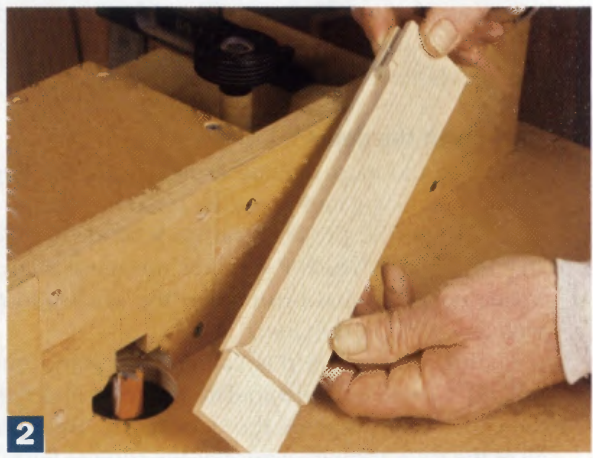
DOOR FRAMES NESTLE TOGETHER

The right door opens first, so there is a small 1/8-in. rabbet on the back of the door; the left door receives a mating rabbet on the front.



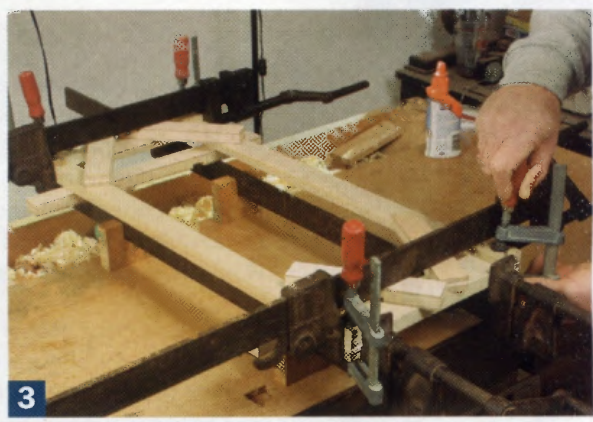
1

Cut bridle joints on the tablesaw. *Budlong crosscuts the tenon shoulders first. Then he uses a tenoning jig to cut the mortises and complete the tenons (shown).*



2

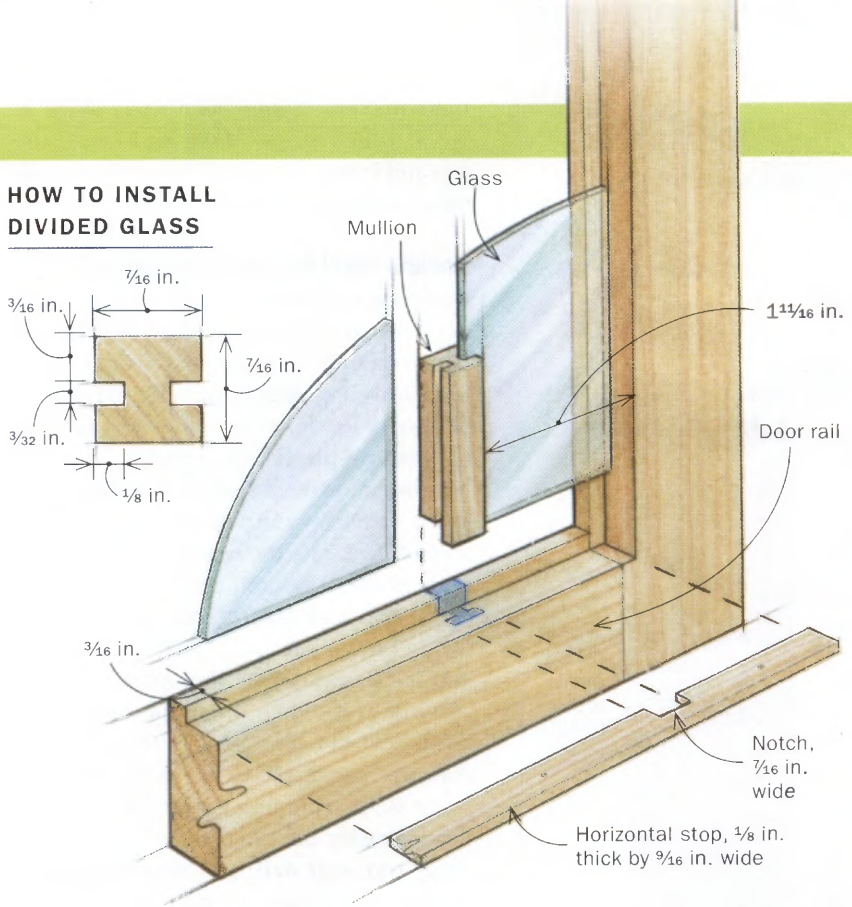
Rabbet the back of the door frames for glass. *With the inside faces down, rout the rabbets using a straight bit. Stop the cut before the stile and rail intersect, or it will show in the finished door. Chisel the round corners square after assembly.*



3

Glue and clamp the door frames. *Use bar clamps to bring home the shoulders, and cauls and hand clamps to pinch the corners together. Be careful not to set the cauls over the shoulder areas, because you need to be able to see that the joints are all the way home.*

Drawings: Bob La Pointe



Glass and mullion first. *Cut grooves on both sides of the mullion with a slot cutter on the router table. Use a push stick on narrow pieces. Trim the mullion stock to length and use a handsaw and chisel to notch the ends to fit inside the rabbet.*

Top and bottom stops go in next. *Notch these stops around the mullions. Budlong cuts the notches with a handsaw and pares them clean with chisels.*

Finish with vertical stops. *Use small brass brads, pre-drilling through all the stops and into the frames so that you could almost but not quite push the brads home with your finger. Angle the holes slightly toward the glass and countersink for the brad heads.*

felt wider. Running the outside stiles all the way and the inside stiles inside the rails gave the piece a nice balance. In addition, I arranged the individual frame widths with the bottom rail the heaviest, the top rail next, then the outer stiles, and finally the center stiles. The center stiles are the lightest because there are two together. The effect is subtle but powerful and is typical of Krenov-style work.

Make the frames—The bridle joint is attractive, strong, and fairly simple. All three steps (tenon shoulders, mortises, and cheeks) are cut on the tablesaw. First, saw the shoulders using a sled or miter gauge with a stop block to get the proper tenon lengths. There will be several lengths to accommodate the various frame-member widths. Move to the mortises and use an over-the-rip-fence tenoning jig. Save the tenon cheeks for last so you can creep up on a friction fit.

Move on to the glasswork

With the frame joinery cut, dry-fit the parts and make sure the inside faces are all flush with each other. These are the reference faces for cutting the rabbets for the glass.

Rabbets hold glass—With any kind of glasswork, it's best to use rabbets so you can access and replace broken panes. The glass is held in place with removable wood strips. When cutting the rabbets, don't try to remove all the material in one pass. Set the cutter to final height, but progressively move back the fence as you mill away the material.

Glue up door frames—Before I glue up the door frames, I apply finish to the inside edges. The trick to glue-ups is to do a dry run to make sure all the necessary items are at hand. Don't try to glue one corner at a time; put glue on all the joinery at once to prevent a corner from tacking up and getting stuck.

Rabbet door frames where they meet—After the glue-up, clean up the front and back faces of the doors, and flush the edges and the ends where the bridle joints meet. High-end work often has a pair of rabbets, cut on the router table, that spoon together when the doors are closed. Krenov taught us to take a ½-in. straight router bit and grind a slight radius on the tip of the cutting edge. Rabbets cut with this bit have a soft inside corner, a sweet detail.

Mullions and stops—Mullions break up the visual landscape of a plain door. The glass and

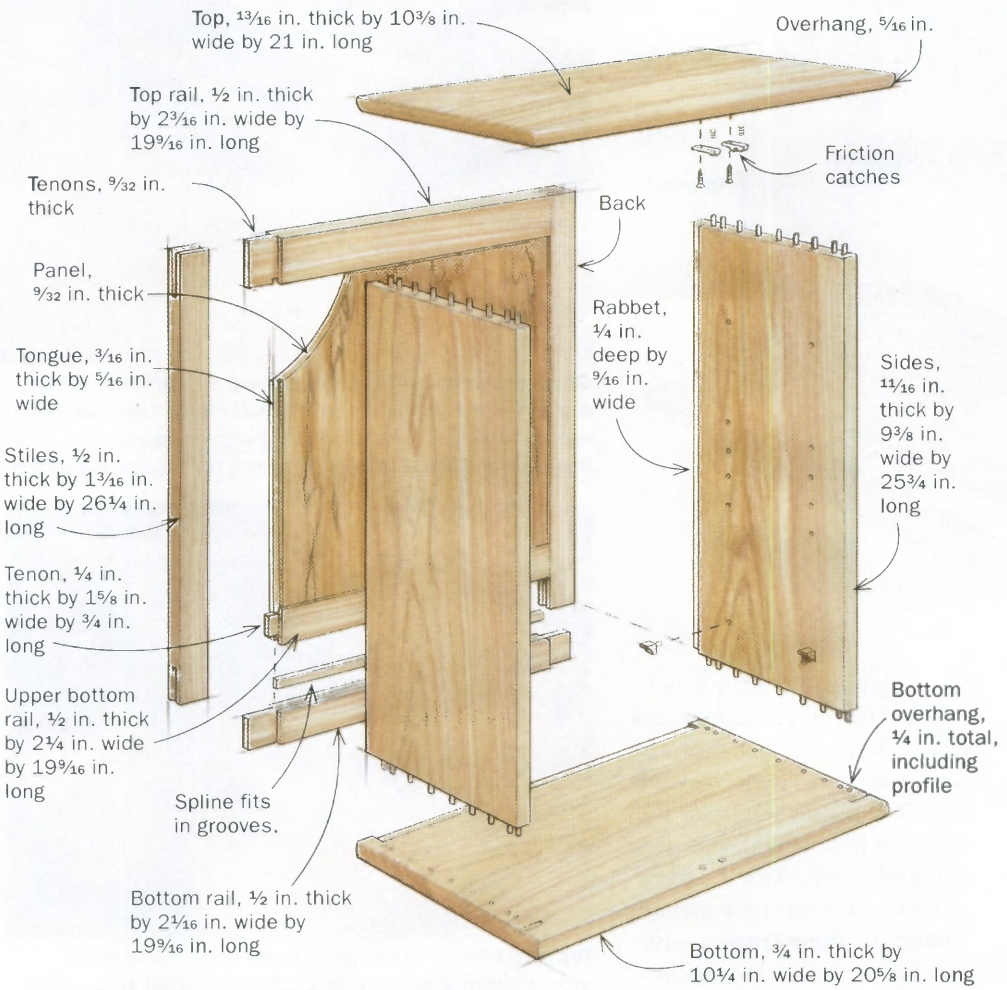
Online Extra

For the complete finishing recipe, plus tips on pre-finishing, go to **FineWoodworking.com/extras.**

Krenov method

DOWELED CARCASE IS BETTER FOR DRY-FITTING

The dowel joint has a number of advantages: It is easy to make and it allows for easy dry-fitting of the case (see facing page) when fitting the doors.



mullions are secured with small strips of wood called stops. Make and install the top and bottom stops first, and then move on to the vertical stops.

Dowels ideal for joining the carcase

Doweling is the easiest way to build a cabinet with an overhanging top and bottom, but it is critical to the process in other ways, too. Doweling allows the multiple dry-fits necessary for door-first construction, knife hinges, and pre-finishing parts.

To begin, make a simple doweling jig (a piece of hardwood with a heel glued to an end) to locate the holes precisely in the ends of the sides and on the inside faces of the top and bottom. Always reference the jig off the back edge of the workpiece and the inside face of the sides.

By the way, when fitting the case to the doors, cut the sides about 1/16 in. shorter than the height of the doors to allow for some door trimming if the cabinet gets glued slightly out of square.

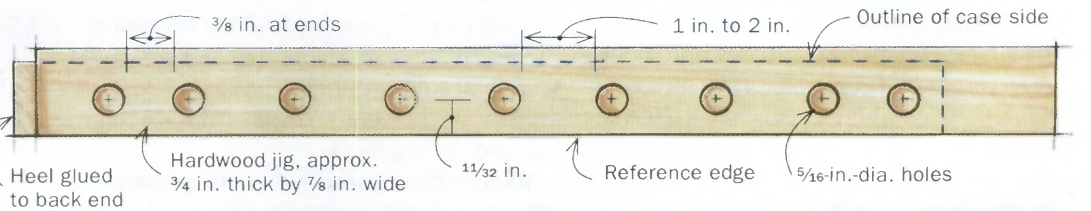
Lay out and drill the dowel holes— Bunch a few dowels on the ends, say 3/8 in. to 1/2 in. apart, and spread them out in the middle where the stresses aren't as great. Drilling is easy. The critical part is orienting the jig accurately at each joint.

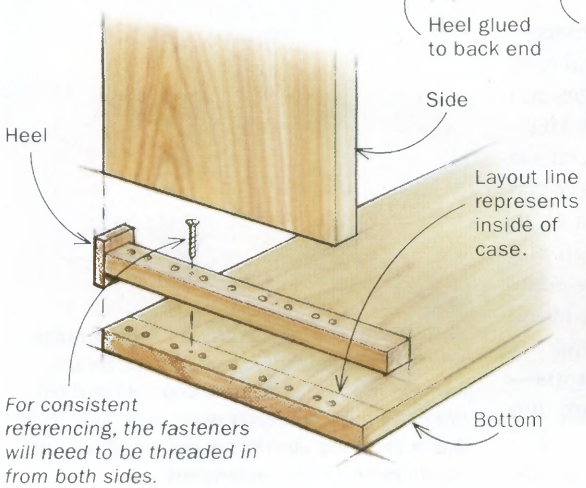
A few dry-fits before gluing up

At this point the cabinet is ready to be dry-assembled, using two or three temporary semi-loose-fitting dowels for each joint. Use the second hole from each edge for

SHOPMADE DOWEL JIG ENSURES MATING HOLES

Always orient the jig the same way on all workpieces. Reference off the back and the inside of the case.





For consistent referencing, the fasteners will need to be threaded in from both sides.

Drill holes in the top and bottom. *Screw the jig in place. On the drill press, create the holes in the jig at the same time you drill the first set of holes in the workpiece.*

Side pieces are next. *Clamp the sides in a vise to drill into the ends. Budlong uses a hand drill with a shopmade depth stop, taking care to keep it plumb.*

DRY-ASSEMBLE TO FIT THE CASE TO THE DOORS

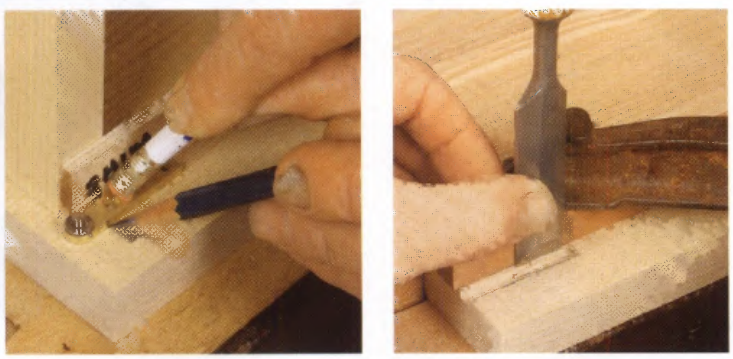
A few key steps—fitting the doors and mortising for hinges—need to happen before the carcase can be glued. You may have to dry-fit more than once, but patience here will make a difference in the end.

Set the doors in the carcase. *The doors are longer at this point than the case, so use shims to raise the top slightly (above). Flush the center stiles with each other (right), and make sure the outer stiles sit evenly against the front edges of the sides.*

Fine-tune the fit. *If the door does not meet the front edge of the side evenly, mark that amount on the side, take apart the case, and plane off any discrepancies.*

TIP CUT HINGE MORTISES BEFORE GLUE-UP

Knife hinges. *These narrow, well-made hinges are available at www.sandersonhardware.com for $33.50.*



Mortise the top and bottom pieces first. *A 1/16-in.-thick shim represents the space between the back of the door and the back of the hinge. Push the hinge against it, and mark the front of the hinge (above left). With the case apart, mark around the hinge and extend the lines out to the ends, rout close to the line, and chisel to the line (above right).*

dry-fitting, so you preserve the tight fit on the outermost dowels. The first dry-fit is for flushing up the back edges and cutting the rabbets for the back panel.

Rabbet for the back panel—Assemble the carcase and clamp it together, checking for square and flushing the back edges. To cut the rabbet in the carcase parts, the process is similar to cutting the rabbets on the door frames. You must stop the cuts on the top and bottom pieces before they intersect the side pieces. Remember not to chisel out the corners at the ends of the rabbet until after the glue-up; this eliminates the risk of going too far.

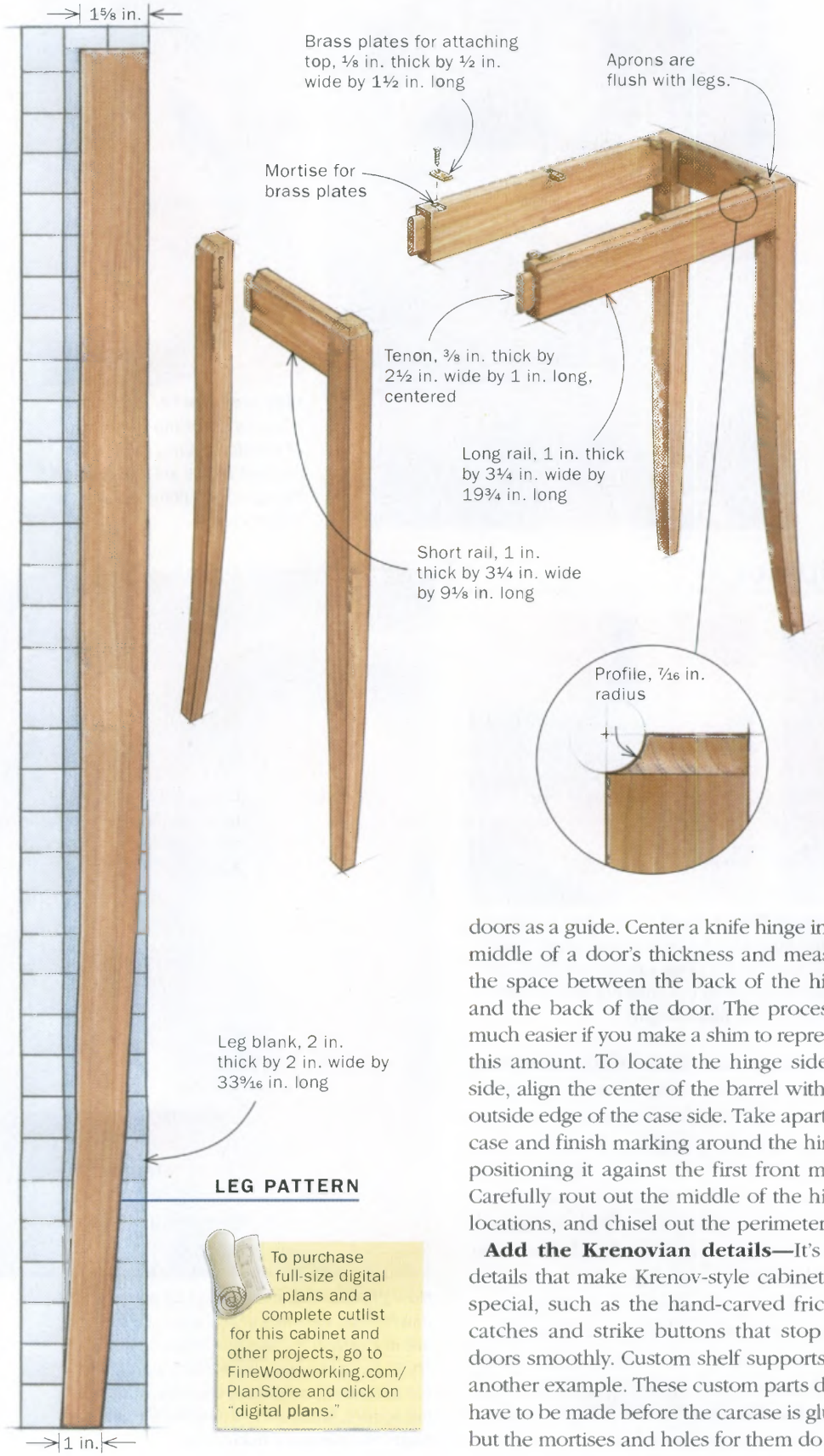
Fit the carcase to the doors and mortise for hinges—Time to pull the doors back out. Slip the doors against the cabinet sides where they belong. The doors are extra-tall for now, so shims between the sides and top allow the doors to fit. While holding the center stiles flush with each other, check to see how much the outer stiles have fallen out of parallel to the front edge of the side. Don't panic. This inevitable situation is called "wind." Just plane the front edges of the sides so the doors lie flat and match up at the rabbet.

Mortise the case for the hinges—Locate the hinge mortises in the carcase, using the

Now glue up the case. *Start by gluing all the dowels into the ends of the sides. Once they are dry, attach the top and bottom pieces. Try to keep the clamps perfectly parallel to the sides to increase the chances of clamping square. Measure the diagonals to be sure. Angle the clamps if necessary.*

CURVED LEGS ENLIVEN THE STAND

The base construction is straightforward. Mortises and tenons join the curved legs to the aprons, and a cove profile makes a nice transition from the stand to the cabinet.



To purchase full-size digital plans and a complete cutlist for this cabinet and other projects, go to FineWoodworking.com/PlanStore and click on "digital plans."

USE A LEG TEMPLATE

Trace, cut, and refine. *Use a template to trace the leg pattern onto the stock (right). Bandsaw as close to the lines as you dare (below). Finish the job with a block plane, spokeshave, and sandpaper.*

doors as a guide. Center a knife hinge in the middle of a door's thickness and measure the space between the back of the hinge and the back of the door. The process is much easier if you make a shim to represent this amount. To locate the hinge side-to-side, align the center of the barrel with the outside edge of the case side. Take apart the case and finish marking around the hinge, positioning it against the first front mark. Carefully rout out the middle of the hinge locations, and chisel out the perimeters.

Add the Krenovian details—It's the details that make Krenov-style cabinets so special, such as the hand-carved friction catches and strike buttons that stop the doors smoothly. Custom shelf supports are another example. These custom parts don't have to be made before the carcase is glued, but the mortises and holes for them do (for full instructions on these Krenovian details, go to the Master Class on pp. 84-86).

Glue up the carcase

You're nearly ready for the final glue-up, but first you have to profile the ends of the top and bottom, glue the dowels into the sides, do a final dry-fit, and pre-finish.

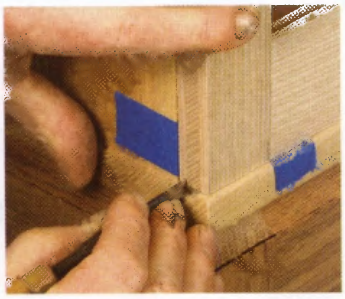
Trim back the ends of the top and bottom to about ¼ in. from the face of the sides, and do the same for the front edges of the top and bottom. The profiles (see p. 85) can be worked in with a plane or with a combination of a plane and router bits.

Glue all the dowels into the ends of the sides, and then cut them to length. Dry-clamp again and make sure everything goes home. Plane, sand (up to P320 grit), and pre-finish both sides of the sides, and the inside faces of the top and bottom.

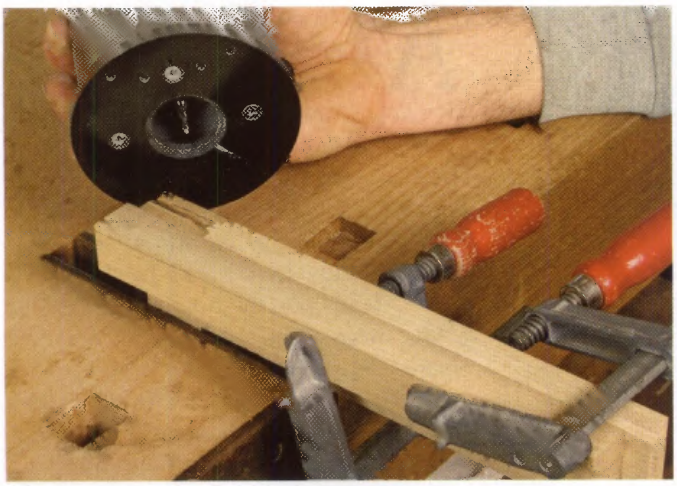
Photo, facing page (top right): David Welter

DOORS ARE EASY TO INSTALL

With the case glued up and the doors fit and resting in place, it's easy to transfer the hinge locations from the carcase to the doors.



Transfer the hinge location. *Use tape to shim the door slightly outward and upward and to mark the location of the hinge end (above left). Set the door in place and mark the mortise width and length (above right).*



Cut the hinge mortises in the doors. *Support the router by clamping a piece of wood flush to the edge of the door. Rout close to the line and chisel the rest.*

Attach the doors. *Screw the hinges into the case and the tops of the doors. Load the loose hinge piece onto the lower hinge, aiming it outward. Holding the door, thread the pin into the upper hinge and slide the lower hinge into its mortise at the bottom. Screw the bottom hinges in place.*

Now it's time to glue it all together. Load the dowels into the holes and coax things together with a mallet before clamping.

Showcase cabinets often have frame-and-panel backs, with the panels made from a lighter wood to give the inside of the cabinet the impression of illumination. For this cabinet I used spalted maple to complement the ash carcase.

Shape the legs

After the joinery is cut, cut the legs to shape on the bandsaw. Refine the surfaces with hand tools. Hold them up in a raking light and sight down the edges, feathering any lumps and bumps into clean, fluid lines. Pre-finish the inside faces of the legs, and start by gluing up the two short ends first. After the ends are glued up, add the long rails. Be sure to check for square.

Flush the legs to the rails, level off the tops of the posts and rails, and get the cabinet to rest cleanly on the top of the stand with the back panel in.

Now put aside the cabinet, invert the stand, and run the transitional cove around the top edge on the router table. Do the final sanding and finish. Finally, attach the cabinet to the stand with small brass mounting plates. They are easy to make out of ⅛-in. bar stock and mortise into the stand.

Fit the doors

With the carcase mounted and the back panel installed, it is time to fit the too-long doors and hang them. Mark the center of the cabinet where the doors will meet. Adjust the bottom edges with a plane so they sit cleanly on the bottom of the cabinet. Make sure the joints in the door frames stay in horizontal alignment with each other as adjustments are made (this is why you left extra height when cutting the doors to length). Plane the top door edges until the inside edges of the doors line up with the centerline and slip in under the top.

JK taught us to have the outer edges of the doors pulled in from the face of the sides about 1/16 in. This creates a shadow and makes the corner more interesting. If you didn't account for it before, you can handplane that little bit off now. Once the doors have been fitted, mark the location of the hinges on the doors, cut the mortises, and hang the doors. □

Woodworker Jim Budlong is a teacher at the College of the Redwoods.

Smart

Krenov's genius didn't stop at furniture

BY ANISSA KAPSALES

A few years ago, after moving into a small apartment, I needed a desk—and fast. I had a big slab of planed, live-edge walnut that would make a perfect top—but what to put it on? Then I spied the two sawhorses I made while studying at the College of the Redwoods, in the furniture-making program founded by James Krenov. Turns out, the horses balanced the mass of the slab perfectly. And their spare, elegant, and well-proportioned design actually made for a nice-looking desk that got tons of compliments from woodworkers and non-woodworkers alike.

But don't let the good looks fool you. These are real workhorses, designed to be versatile and durable—holding up

No one-trick pony

Tall and lean. *The vertical design lets you work close to bench height. It also lets the horses stand very close together without creating a gauntlet of splayed legs.*

Hold it up and hold it fast. *The design creates a convenient clamping surface, with the top stretcher acting as a caul.*

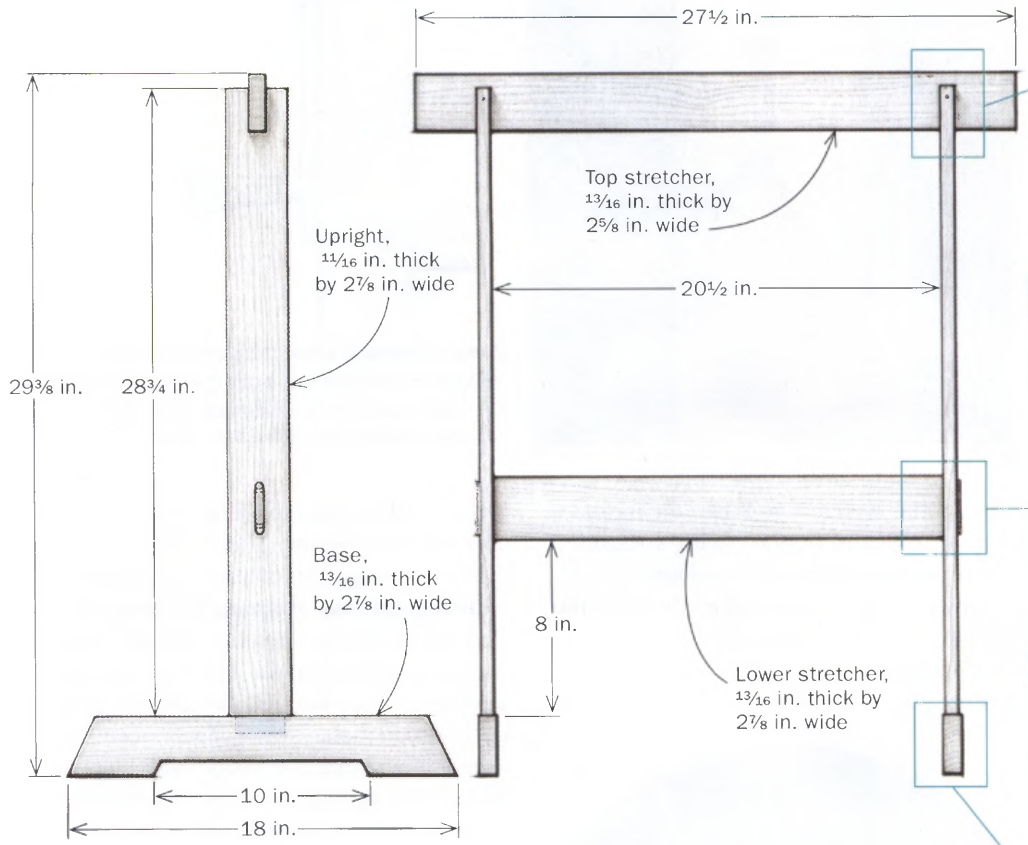
Beasts of burden. *The lower stretchers provide an additional rack for lumber storage either long-term or during work.*

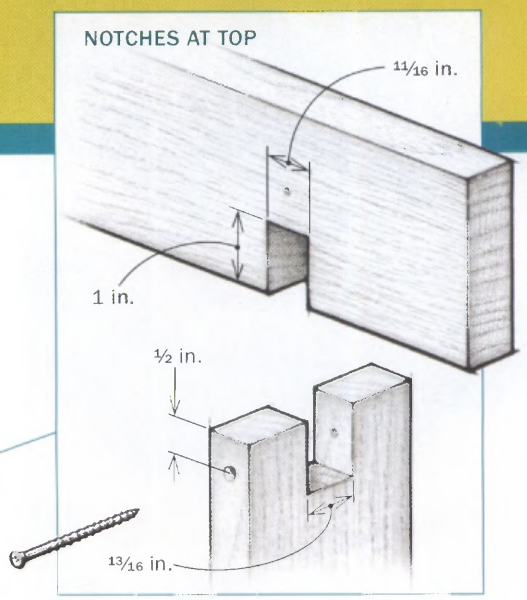
Photos: staff; drawings: Christopher Mills

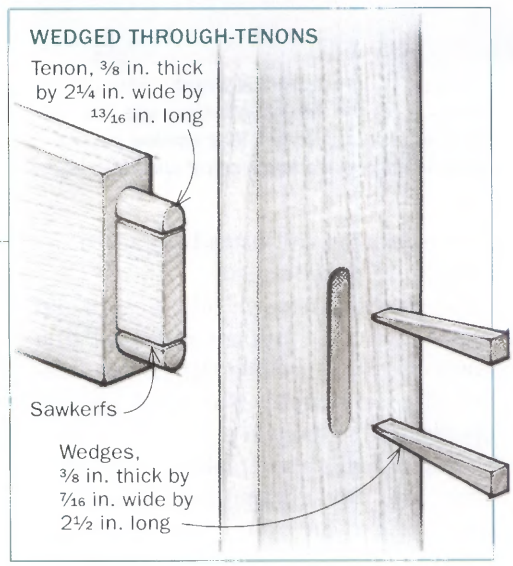
Sawhorses

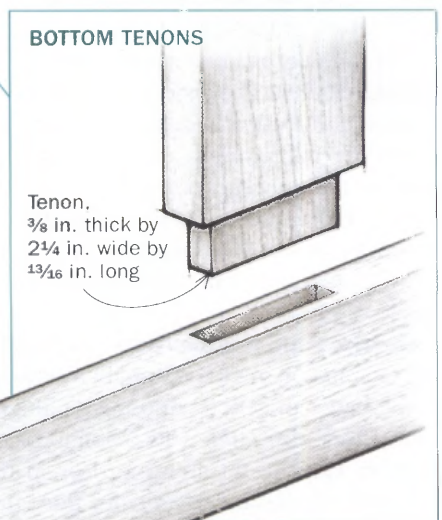
ELEGANTLY SIMPLE

Made popular by legendary teacher James Krenov, this horse is made from just six pieces of stock, simply joined. Choose an inexpensive but durable hardwood such as ash, hickory, or red oak.









that desk is probably the lightest duty my horses have seen yet. And with straightforward mortise-and-tenon joinery, the horses also are easy to build. The basic design was developed by Krenov, but students add their own flair, as I have to the feet and joinery. I encourage you to do the same.

Why these are better

Every woodworker needs a stout pair of sawhorses. They're great for rough-milling lumber and assembling projects—and can even be used as a sturdy base for a temporary worktable. But these horses are different from the standard types, made of 2x4s with splayed legs. Those clunky designs can be hard to use and don't store very easily.

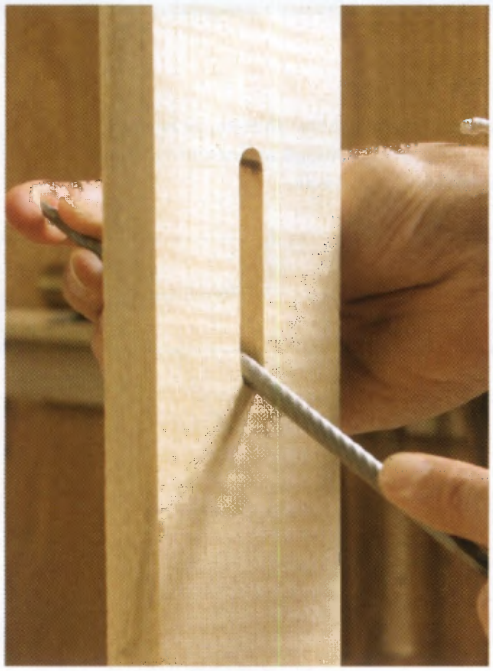
These horses are light and have a small footprint. They are easy to move and the long feet give the horses a wide stance that resists tipping. The upright design lets you position them close together for small glue-ups or veneer pressing jobs. Traditional sawhorses with splayed legs won't cozy up as easily. This nesting ability is also great for stowing the horses when you're done with them.

Despite their sleek profile, these horses can support hundreds of pounds. I often pile a big stack of lumber on top of them for storage or milling. I attribute this strength to the solid mortise-and-tenon joinery and an overall design that carries

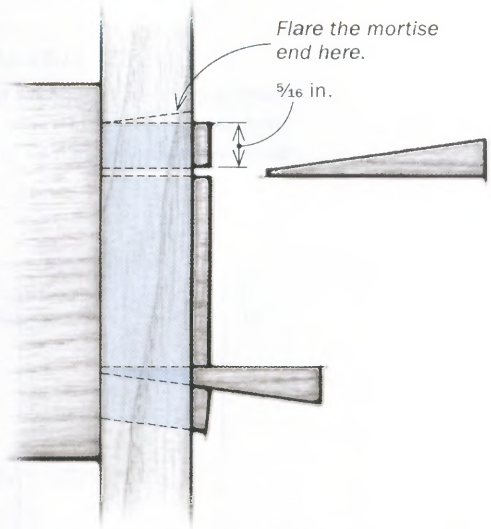
A plunge router makes it simple. *Rout all the mortises. For the through-mortises, use a backer board to prevent blowout. Take shallow passes using an edge guide and a spiral upcutting bit.*

How to make a wedged through-tenon

ROUT THE MORTISES



ADD SOME FLARE



Room to spread. *These through-tenons are wedged for strength and a decorative touch. Flare the mortise ends with a rounded file so the tenons can spread as you drive the wedges home.*

stresses downward instead of out so the joints aren't pushed apart.

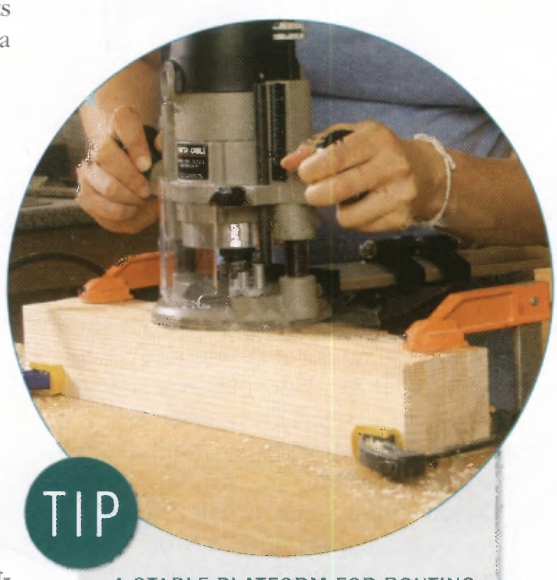
The stretchers not only add strength and stability, but they also are functional. The lower stretcher can hold clamps and lumber. The top stretcher is notched into the uprights and screwed in place without glue. It's easy to remove and replace when it gets worn. This top stretcher also can act as a caul during a glue-up.

Building a pair is a half-day's work

The beauty of these horses is their simplicity, and the materials and construction reflect that. They will get knocked around and loaded heavily, so choose materials accordingly. Avoid softer woods like poplar or pine. Hardwoods will last longer, but these are just workhorses, so consider your wallet, too. Ash, red oak, and hickory are low-cost options.

Mortises and tenons first—After milling the lumber, mark the upright mortises in the bases and cut them using a plunge router and edge guide with a spiral upcutting bit. Cut the through-mortises in the uprights for the lower stretcher the same way, but use a backer board underneath to prevent any blowout on the other side and to protect the surface you are routing on. This joint is wedged, so I flare the mortises slightly, top and bottom, with a rounded file to accommodate the wedges.

Now cut the tenons on the bottom of the uprights and the ends of the lower stretcher. Cut the shoulders on the tablesaw using a stop on the crosscut sled, and cut the cheeks with an over-the-fence tenoning jig, also on the tablesaw. Then chisel and file the tenons round to match the mortises.



TIP

A STABLE PLATFORM FOR ROUTING

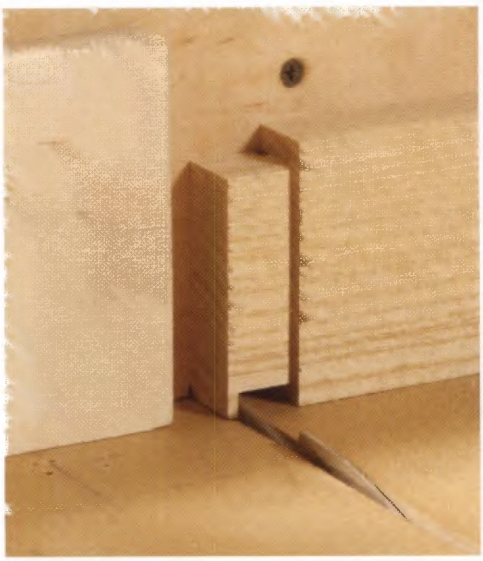
When routing the mortises in the base pieces, gang them together to prevent the router from tipping.

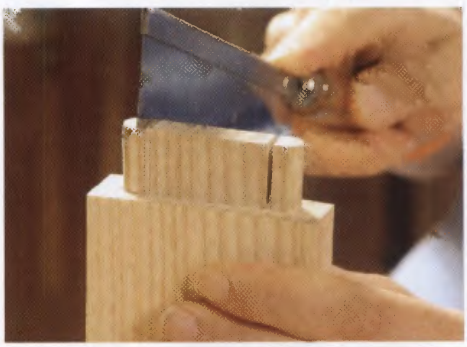
Fitting the top, shaping the bottom—The notched top stretcher sits in corresponding notches in the uprights and gets screwed in place through the uprights, making it easy to replace when it gets worn. The distance between the inside shoulders of the notches should match the length of the lower stretcher from shoulder to shoulder.

Cut the notches in the upper stretcher using a crosscut sled on the tablesaw. Because there are only four narrow notches, I don't bother with a dado blade; instead, I make a series of cuts between stops. I do the same for the uprights, using a tall fence on the sled. I hit the two outside edges of the notch first and move the fence incrementally to waste away the middle area.

The shaped base pieces are the design element that changes most from maker to maker, ranging from curves to angles or straight lumber. My bases have just an angled cut (done on the miter saw) on each end and a shallow cutout with the same angle on the bottom (cut freehand on the bandsaw and cleaned up with a scraper). Whatever the shape, this cutout on the bottom is important because it creates four feet instead of just two long planks that sit

SAW THE TENONS





Start tenons on the tablesaw. *Use a crosscut sled with a stop to cut the shoulders and nibble away the ends (above). A tenoning jig (right) makes quick work of the cheeks.*

Finish them at the bench. *Use a chisel and file (top) to shape the tenon ends to match the routed mortises. A pair of handsawn kerfs (above) will make room for the wedges.*

on the floor. Without the center area cut out, the horses are likely to wobble.

Final details—Before glue-up, use a file or block plane to break the sharp edges, and use a handsaw to cut kerfs in the tenons that will hold the wedges. Drill and counterbore the top of the upright for the screw that will secure the top stretcher. Now dry-fit the assembly. Mark and trim the through-tenons on the lower stretcher so they protrude about ⅛ in.

Glue-up is easy—Glue the uprights into the bases. Once they are dry, glue the lower stretcher into the two uprights. When this assembly is in clamps, glue and tap the wedges (I used cherry) into place before the glue sets up in the mortise. After the glue dries, trim and file the wedge flush on the end of the tenon. Screw the top stretcher in place, and you're ready to put the horses to work. □

Anissa Kapsales is an associate editor.

Wedges complete the glue-up. *The wedges' taper should roughly match the flare you filed into the mortises. Put a dab of glue on the wedges and be sure to drive them completely home in the kerf.*

A Vacuum Press Makes Veneering Easy

How to get started creating beautiful panels

BY J. SPEETJENS

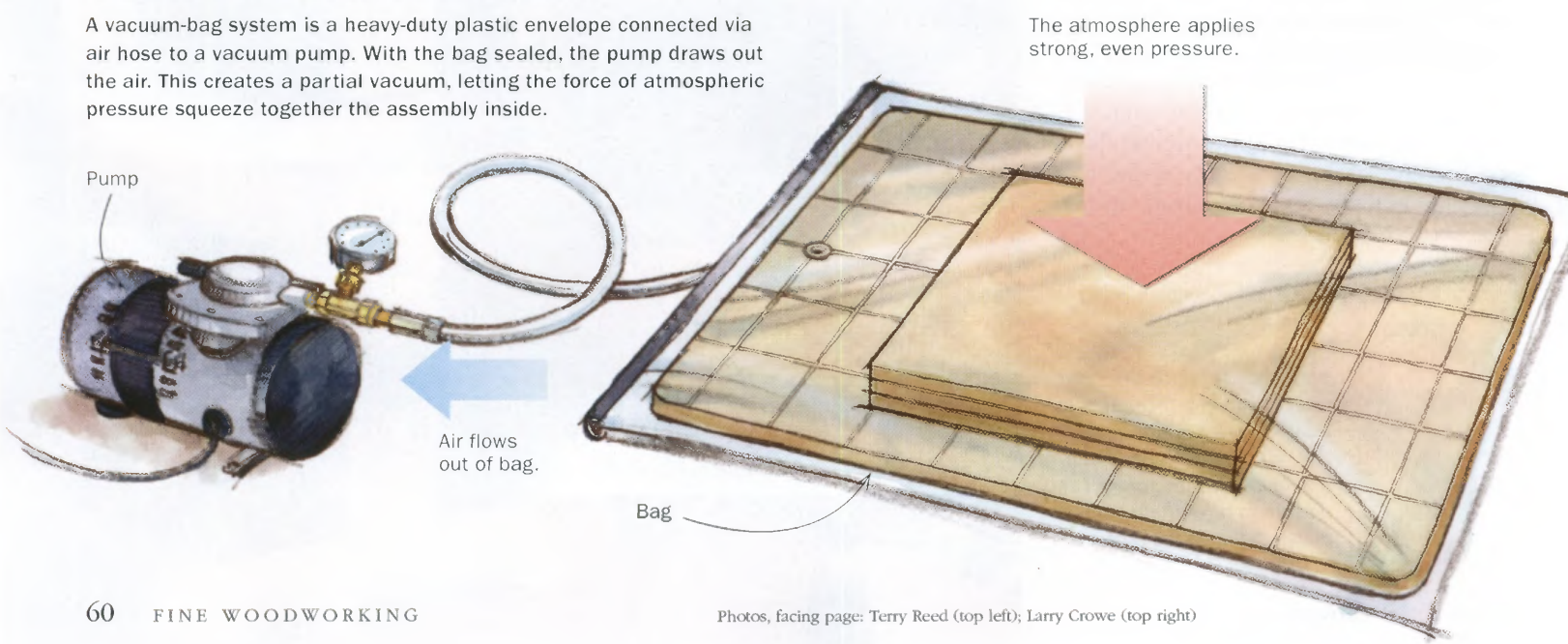
Veneering is a great way to grow creatively as a woodworker. The process lets you work with beautiful woods that are too rare, too highly figured, or too temperamental to be used as solid stock. It also allows much greater control over wood grain and figure as elements of design and decoration.

This creative freedom is more accessible than ever thanks to the wide availability of the vacuum-bag pressing system. The vacuum system eliminates the need for bulky mechanical presses or armies of clamps. It can be used to veneer flat panels small and large—from cabinet doors and drawer fronts to case sides and tabletops. The system also can handle more advanced applications like curved work, marquetry, and more.

If you plan to work only on small panels (under 4 ft.) with occasional curved pieces, it's possible to fully enjoy vacuum veneering with a small system that costs around $400. If you have larger projects in mind, though, you can bring home a system that will

THE MAGIC OF ATMOSPHERIC PRESSURE

A vacuum-bag system is a heavy-duty plastic envelope connected via air hose to a vacuum pump. With the bag sealed, the pump draws out the air. This creates a partial vacuum, letting the force of atmospheric pressure squeeze together the assembly inside.



Photos, facing page: Terry Reed (top left); Larry Crowe (top right)

Use veneer as an accent. *It mixes beautifully with solid wood, as shown in this maple cabinet with curly veneer door panels by Washington state woodworker Hugh Montgomery.*

serve any veneering need for $1,000 or a little more. This article will help you sort out the options and get started.

Choose a bag to fit your work

You'll find it most logical to start by choosing a bag that's big enough for the work you plan to do. Simply put, you can't veneer what you can't fit in the bag.

Bags come in a huge range of sizes. Don't let that confuse you. Instead, think about the scale and nature of your work. Choose a bag that's at least 6 in. longer and wider than the largest flat panel you anticipate veneering. Curved work requires even more room—a foot at each end and at least a foot beyond the assembly on the sides. This added space helps ensure that the collapsing bag will conform to the workpiece without excessive stretching. Think, too, about where your work may be headed in the future. If you seriously expect to tackle larger veneering jobs down the road, you might want to buy a larger bag.

The next big question on bags has to do with material. At the grocery store, the bagger asks "paper or plastic?" When you're shopping for a vacuum system, the question is "vinyl or poly?"

If you plan to do a lot of veneering, the simplest answer is to buy a polyurethane bag if you can afford it. Poly is generally more puncture-resistant and more flexible, better at returning to its original shape after being stretched. You'll spend less time patching pinholes and it will be a long time before you need to replace it (I've had mine for 18 years). There's no need to be afraid of vinyl, however, and it's much less expensive. For example, a 49-in. by 49-in. poly bag from Vacuum Pressing Systems costs $243,

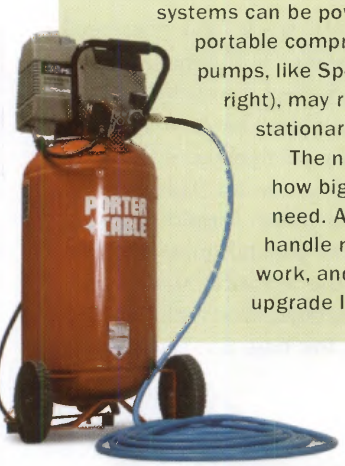
Or tap its full potential. *On this Federal-style sideboard, New Hampshire furniture maker Loran Smith used a pattern of veneers and stringing on the matched doors and the drawer fronts, both curved and flat.*

Two good systems

Most vacuum-veneering dealers offer packaged systems or will let you build your own by mixing and matching from an array of components.

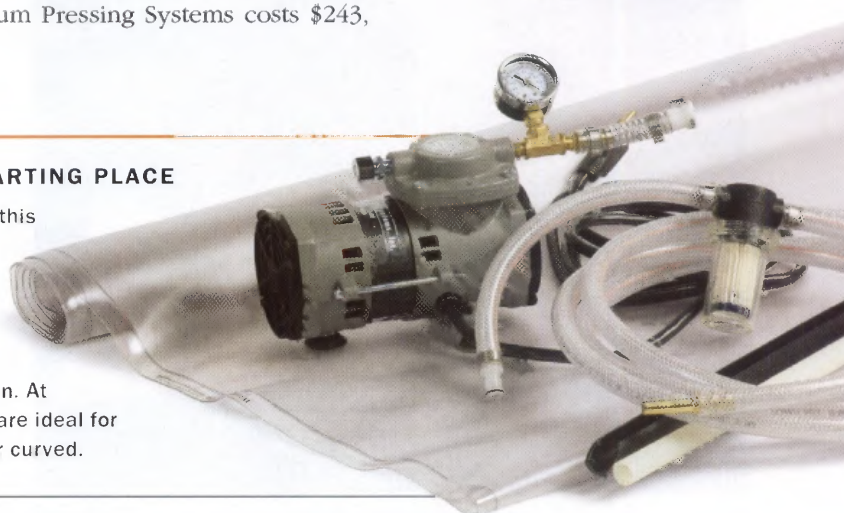
The first step is to decide what type of pump will drive your system. An electric vacuum pump is compact and easy to plug in anywhere. But if you have a compressor, you can save money on a vacuum system by buying a compressor-driven unit. Many systems can be powered by midsize portable compressors, but larger pumps, like Speetjens's (bottom right), may require a large stationary compressor.

The next decision is how big a bag you will need. A 4X4 bag will handle most flat-panel work, and you can always upgrade later.



A POPULAR STARTING PLACE

Small systems like this one from Vacuum Pressing Systems combine an electric 1-cfm pump with a bag about 48 in. by 48 in. At around $400, they are ideal for small panels, flat or curved.



READY FOR ANYTHING

Speetjens's system is a 5-cfm, compressor-driven pump and a 4x8 bag. Priced at $1,000 to $1,200, systems like this one from Quality Vakuum Products are capable of handling larger panels and curved work. Such systems also typically feature automatic shutoff and an adjustable vacuum level.

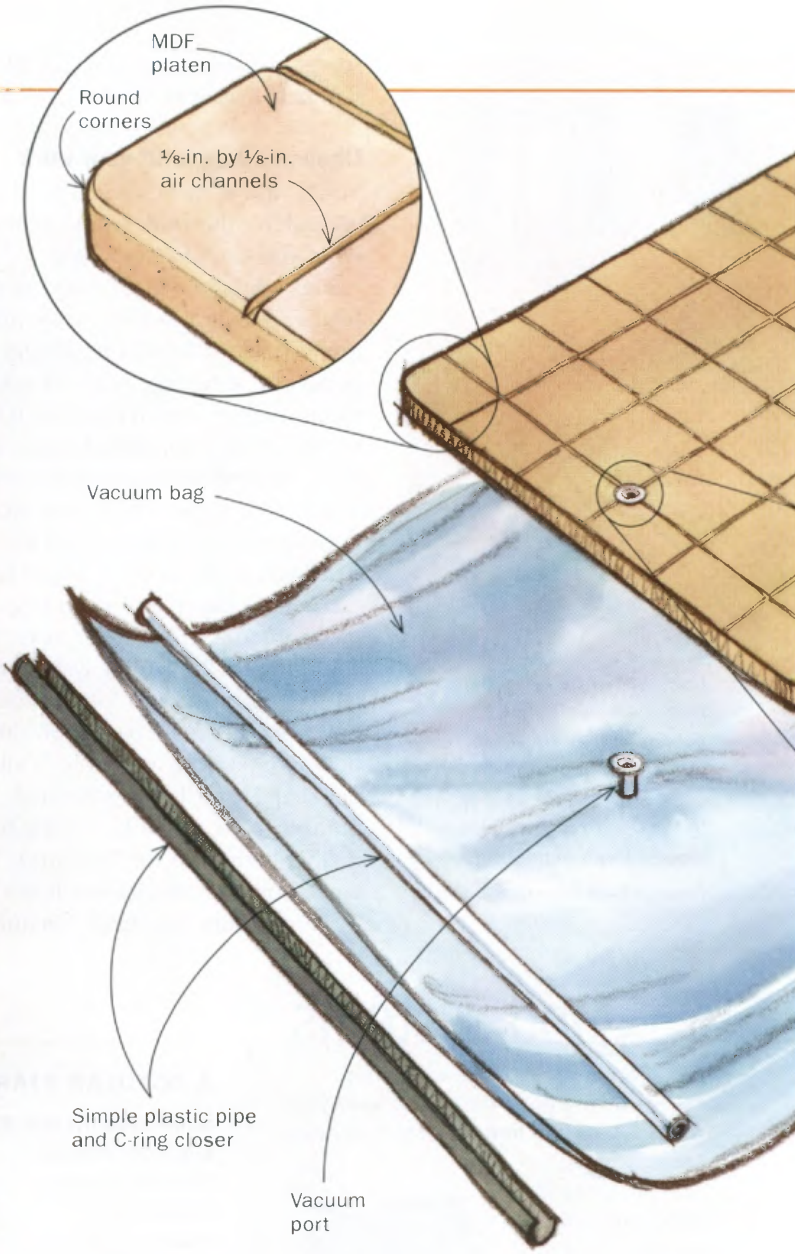
A bit of DIY

When you buy a veneer-pressing system, you get everything you need for flat work except the platen, which is a piece of grooved MDF or melamine that ensures a flat work surface and good airflow.

MAKE A PLATEN

The air needs an exit hole. *This system by Vacuum Pressing Systems calls for installing a plastic sleeve that will hold the brass coupler at the end of the vacuum hose. The sleeve is positioned directly over the built-in port on the underside of the bag.*

Grooves carry the airflow everywhere. *Use the tablesaw or a router to cut a grid of channels, approximately ⅛ in. wide by ⅛ in. deep and 6 in. to 10 in. apart. The evacuation port (above) should sit at the intersection of two channels. Get rid of sharp corners (right) to avoid damaging the bag.*



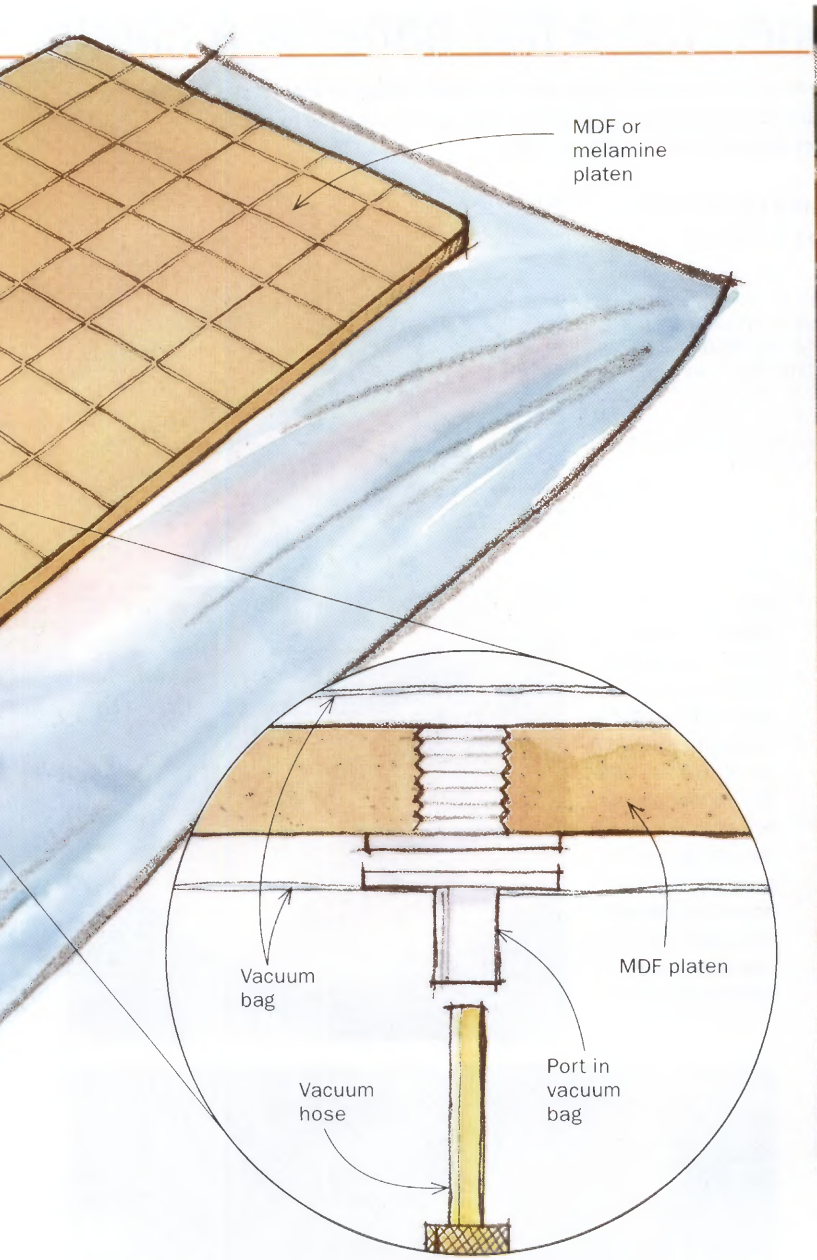
compared with $110 for the same bag in vinyl. I know of pros who've babied a vinyl bag and gotten many years of service.

Regardless of material, bags typically can be found in either 20-mil or 30-mil thicknesses. Either will work, but buy the thickest you can afford for greater durability.

Match the pump to the bag

Having carefully chosen a bag to fit your work, you now need a pump sized to match the bag. A good match depends on how quickly the pump can remove all of the air from the enclosure. The task is fairly easy when the workpiece and bag are flat, but more pumping is required when a bulky or curved workpiece turns the bag into a tent holding large pockets of excess air. There are no hard-and-fast rules for how quickly the pump should evacuate the bag, but one minute or so is a good general guideline. The pump should be fast enough to bring the assembly under pressure comfortably within your glue's open time, even with complex assemblies that take longer to get into the bag. But the process

Drawings: Stephen Hutchings



Attach the vacuum hose. *In this system, the fitting on the end of the hose fits snugly into the nozzle on the bag and the hole in the platen.*

shouldn't be so rapid that it prevents last-minute adjustments to the assembly, or the bag itself, as the bag is drawing down.

A pump's performance is a function of its airflow, measured in cubic feet per minute (cfm). The smallest commonly available pumps typically generate 1 cfm. These are fine for a bag of about 4 ft. by 4 ft. This combination, in fact, is the basis for a highly popular class of starter systems that cost around $400. For those who are certain they will veneer only pieces like door panels, small tabletops, or curved lids for jewelry boxes, they can be ideal.

It's important to note that buying a small pump doesn't mean you'll sacrifice pressing power. Most commercially available pumps generate a vacuum pressure of around 25 in. of mercury, which translates to something like 12 psi. That's plenty of pressure for veneering applications. But if the scope of your work—now or in the future—demands a larger bag, you'll need a stronger pump. For a 4x6 or 4x8 bag, a 5-cfm pump can handle almost any task, allowing work on large flat panels as well as generously sized curved work. A system like mine costs $1,000 to $1,200.

In addition to greater airflow, the larger pumps offer important choices and features not available on smaller units. First, larger pumps come in two basic types, those driven by an internal electric motor and those that connect to an air compressor to generate airflow. In general, the motor-driven type is slightly more efficient. Practically speaking, though, choosing between the two is largely a matter of convenience and expense. If you already have a compressor, you could save a couple hundred dollars.

When gauging whether your compressor will drive the pump you want, don't cut it too close. To yield 5 cfm at the bag, for example, a pump may need more than 6 cfm from the compressor. Some smaller systems work well with a midsize compressor, or even a small, pancake model. Larger systems like mine may require a large, stationary compressor. If you don't want a compressor, consider an all-in-one vacuum system. You can operate one just about anyplace that has an electrical outlet.

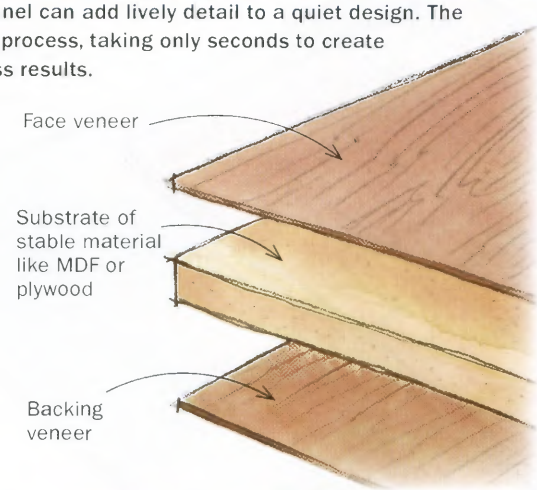
On most larger systems (both electric and compressor-driven), the pump shuts down when it reaches proper vacuum pressure

Veneering a flat panel is a cinch

A handsomely veneered panel can add lively detail to a quiet design. The vacuum bag simplifies the process, taking only seconds to create perfect pressure for flawless results.

ALWAYS VENEER BOTH FACES

Even with a stable MDF or plywood base, a veneered panel can warp if the construction isn't balanced. Apply the same veneer species and thickness to each face.



and restarts when the pressure drops. These pumps also let the user reduce the maximum pressure, which helps when you're worried about crushing a form or oversaturating veneers with glue.

Vacuum-veneering a flat panel

The most basic task in veneering is laminating a flat panel that consists of two veneers and a stable core like medium-density fiberboard (MDF) or plywood. This two-sided construction prevents warping and is a cardinal rule of veneering.

To limit the variables in your first efforts, use a glue that's familiar to you. Yellow glue's relatively short open time—5 minutes or so—means you must work efficiently. Cold-press glue, which is marketed for veneering, offers an open time of up to 15 minutes. It's also thicker, which helps to prevent glue from bleeding through porous veneers.

Standard yellow glue retains some flexibility after it sets, which in theory means it can "creep" and allow shifting between laminated layers. Some woodworkers avoid veneering with it for this reason, but I've never had a problem using it for flat panels.

For curved or complicated work, consider an epoxy or urea resin glue, both of which resist creep and have longer open times.

Glue-up is fairly straightforward, but be sure to walk through the process before spreading any glue. Start by spreading out the bag on a clean, flat surface and placing the platen inside, sawkerfs up (see photos, p. 62). Set the pump on a nearby surface and connect it to the bag. Now set your substrate on a suitably sized work surface near the bag's mouth. Your prepared veneer, glue, and spreaders should be ready nearby, along with a pair of cauls made from ¼-in.-thick melamine or waxed hardboard to protect the veneer, distribute pressure, and contain glue squeeze-through.

Apply glue to the back face of the substrate with a glue spreader or a short-nap paint roller. Aim for a generous, even coat that isn't

Make a sandwich. *After applying a generous bead of yellow glue all around the substrate, spread it evenly with a roller. The veneer should be cut to overhang the edges by ⅛ in. or so. Align a corner of the veneer first, then lower the rest of the sheet. Now do the same on the other side.*

Photos, except where noted: staff; this page (top left): Terry Reed

Bag it. *Depending on the size of your work (top), you might want a helper for this step. When the work is in place, close the bag by wrapping the end around the plastic tube (above). Clamp it in place with the C-ring for a reliable seal.*

Turn on the pump. *The vacuum pulls the bag tight to the work. The top caul is sized to match the lamination. The bottom caul can be up to 6 in. larger without harming vacuum performance.*

VACUUM VENEERING 102

Pick up the January/February issue (*FWW* #210) to learn how to veneer and edge a curved panel.

too heavy. Too much glue will cause some veneers to swell and buckle, and could bleed through the veneer, especially with a porous veneer like burl. A dry joint, on the other hand, will leave the veneer with air bubbles or cause the face to delaminate. When the glue is spread, lay the veneer in place, then flip the assembly onto one of the cauls. Now spread glue on the opposite face of the substrate, position the veneer, and add the second caul. Place the assembly in the bag. Seal the bag and turn on the pump.

I find that about two hours in the bag is plenty of time when working with yellow glue. When you pull the panel from the bag, scrape away any excess glue and trim the panel on the tablesaw. I also like to set aside the panel overnight on a flat surface, where it won't be disturbed, to allow the glue to cure completely. □

J. Speetjens is a custom furniture maker in Greensboro, N.C.

HOW TO TRIM A PANEL

Trim the waste, then cut to size. *Speetjens uses a handplane to trim the excess veneer at the edges. This panel will go into a frame and so does not need to be edged. Then he cuts it to final size on the tablesaw.*

Finish While You Build

Pre-finish parts and then control squeeze-out for a fast, flawless finish

BY CHARLES NEIL

For most woodworkers, finishing is a chore to be put off as long as possible. So they wait until after a piece is assembled to figure it out. Instead, finishing should be one of the first things on your agenda; if it isn't, you will work yourself into a corner—literally.

At age 13, I ran across a guy who painted cars. I really enjoyed watching him work, and later learned to do painting and finishing myself. I worked for years in that industry, and along the way I learned a lesson that has become invaluable in my woodworking: Look at each piece as a collection of parts. Just as a vehicle breaks down into the hood, the trunk lid, the doors, etc., a piece of furniture can be broken down into components.

This step-back cupboard, for example, consists of the doors, the face frame, the shelves, the crown molding, and other distinct parts. Not only is it much easier to sand and pre-finish these parts before they are assembled, but I also have a number of ways to modify the design of the components slightly to simplify finishing.

On this cupboard, the upper cabinet interior is spray-painted and the rest of the piece is finished with Waterlox wiping varnish, but you can use my techniques with any type of finish.

Photos: Mark Schofield

Pre-finish interiors

You dado the sides of the case before assembly, so why not finish them too? A few minutes spent prepping the components for finish saves hours trying to finish the assembled interior.

Sand before you assemble. *Scrape or sand boards while they can be laid flat. Once a piece is glued together, it is much harder to reach into corners either by hand or with a machine.*

Mask off glue surfaces. *Clear finish or paint will interfere with glue's ability to bond wood, so use masking tape to seal off surfaces that will be glued.*

Temporary handles. *Screw blocks of scrapwood to each end of the shelves. You'll be able to handle the shelves cleanly while finishing them, the glue surfaces are protected, and both sides can dry at once.*

Think finish before you cut and glue

Few woodworkers are handy enough with dyes to be able to harmonize boards of different colors. Therefore, spend some time at the lumberyard sorting through the boards for matching color and grain.

Once you get the wood home and begin to lay out the parts on the boards, it often pays to alter the dimensions of your piece slightly. Unless you're building an exact replica, the design usually has a little flexibility. Say you have two beautifully matched boards that are ideal for the tabletop but are ¼ in. narrower than your planned width. It is much better to compromise on the design and use the best matching boards for the premier surface. No amount of skilled wood coloring will make up for an ill-matched top.

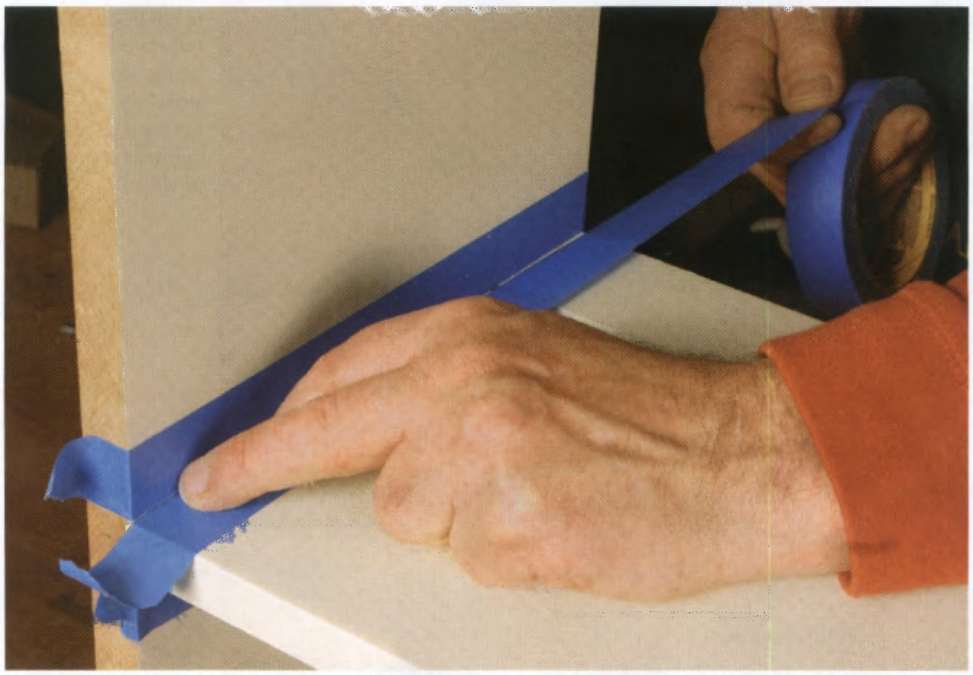
Pre-finish the interiors and anticipate squeeze-out—After finding the best match between the boards and the individual parts of the project but before you do any assembly, think about the finish. For example, on this step-back cupboard, if you assemble the top case and glue in the shelves, sanding or scraping and finishing will be very difficult where the parts meet at 90°. Instead, finish the entire interior of both upper and lower cases now. You may have some touch-up to do later, but finishing these panels while you can lay them flat is much easier than

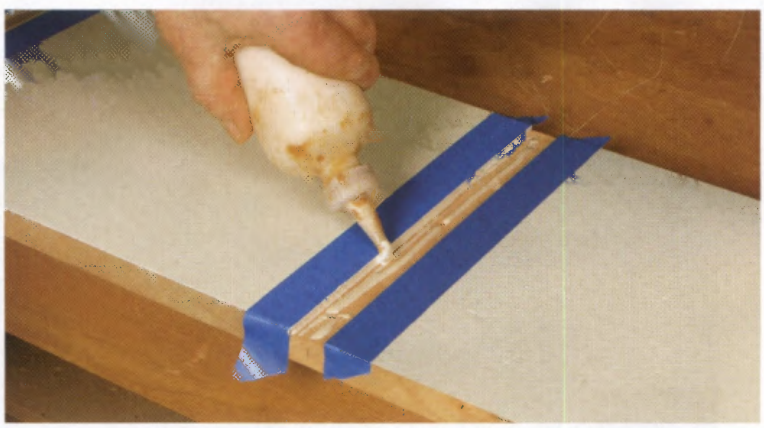
Finish the inside. *Whether you use a brush or spray gun, it is much easier to finish the interior of the upper cabinet before the cabinet is assembled.*

Protect from squeeze-out

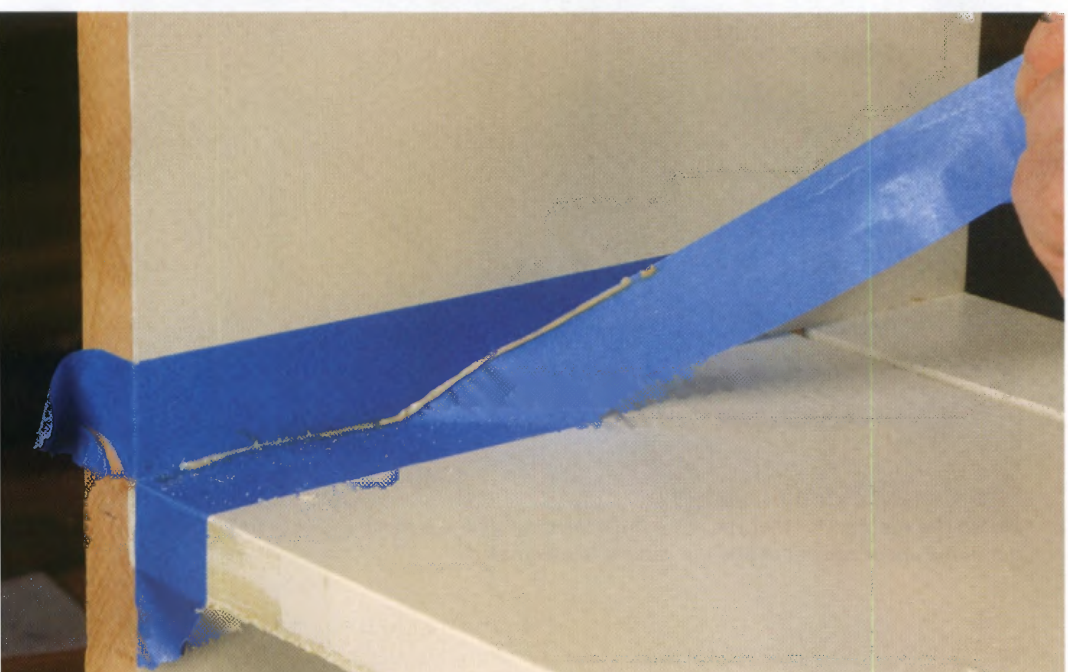
You don't want to scrape dried glue off the pre-finished interior, so position some blue masking tape to catch any glue that squeezes out.

INTERIOR SHELVES





Tape and peel. *When you dry-assemble the piece, place masking tape adjacent to glue surfaces (above). Disassemble and apply the glue (right). When the parts are glued up, any squeeze-out goes onto the tape and is easily peeled away (below).*



wrestling with the whole case. You also will get much better results.

Mask off areas that will be glued. On shelves that are finished on both sides, screw on end caps sized to cover the entire area on the shelf ends that will fit into the dado in the cabinet sides. In this way, you can turn over the shelves without marring the finish, both sides can dry at once, and the area to receive glue remains unfinished. I find that ⅛-in.-deep dadoes give ample shear strength, are easier and cleaner to cut, and leave plenty of material in the shelf sides for adding the screws and antique-looking square plugs I used in this piece (see bottom photos, facing page).

After applying the finish, remove the masking tape from the glue surfaces and dry-fit everything. Now apply masking tape to the areas adjacent to glue surfaces. When you glue the cabinet together, any squeeze-out will collect on the tape and be easy to remove. The alternative is trying to remove squeeze-out in hard-to-reach areas that are already finished.

Make and install the face frames— Here again, some pre-finishing and masking tape can spare you a lot of agony. Apply finish to the inside edges of the face frame. Before gluing the face frame to the carcase, place tape on the adjacent surface of the carcase to protect it from squeeze-out. Don't worry about the exterior, because those surfaces will remain accessible and you'll be scraping or sanding them after the piece is assembled. No matter how particular you are, you may still get some glue on the wood. Don't try to wipe it off with a damp cloth; instead, let the glue set until it's semi-firm like chewing gum, then use a chisel or scraper to peel it off the surface. Now clean the wood with acetone; it removes the glue better than water and works with PVA, polyurethane, epoxy, and hide glues.

A neat trick for attaching moldings

With the two carcases glued up, it's time to focus on the smaller parts, starting with the base and crown moldings. Any time you have a cross-grain application, such as where these moldings contact the sides of the cabinet, two issues come into play. First, the expansion and contraction issue

FACE FRAMES

Pre-finish adjacent parts. *The face frame will be next to the already painted shelves, so pre-finish the edge before attaching it.*

Tape the cabinet edges. *Apply tape to the interior cabinet adjacent to the face frame (above) to make removing excess glue much easier (left).*

prevents gluing on the pieces all the way across—an inch or two at the front is as far as you dare go. Second, there is risk of cross-grain sanding scratches.

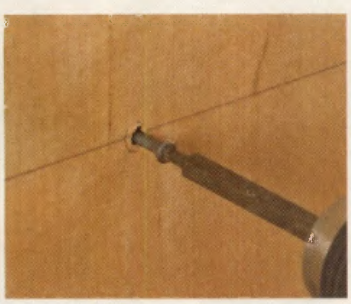
However, there's a nice, simple trick that solves both problems at once. For the base molding, rather than using a narrow strip of wood that must be nailed to the cabinet with the subsequent nail holes to fill, make the molding a couple of inches wider and then notch it to fit under the lower case. This allows the base to be screwed to the underside of the cabinet using slotted holes in the sides of the molding that allow for movement. The horizontal top section of crown molding is attached to the top in the

TIP

If you get surplus glue on the wood while the glue is curing, remove any residue with acetone.

A novel way to hide screw holes

Neil reinforces shelf-to-side panel joints with screws, but matching filler to the finished wood is problematic. Sink trim-head screws ¼ in. below the surface. Tap in a square peg with diagonals slightly greater than the hole's diameter. Once dry, saw and sand the peg flush, apply a finish, and it will resemble an antique square peg.



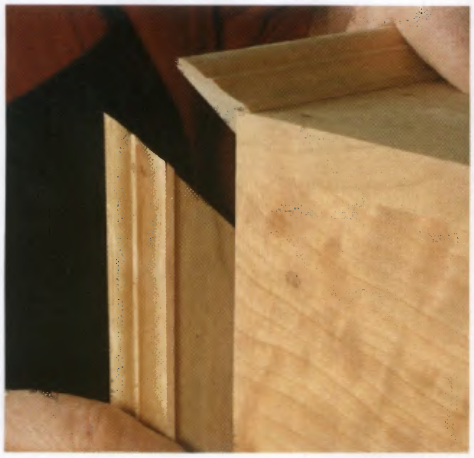
Drive the screws. *As well as the hole for the shaft, drill ¼-in.-dia. holes to receive the head.*

Square peg, round hole. *Taper the tip of a square peg and then glue and tap it into the screw hole.*

Meant to show. *When finish is applied, the square pegs stand out.*

Pre-assemble moldings

Instead of nailing on pieces of molding at the last minute, make them into a robust separate unit, pre-finish them, and attach them to the cabinet with hidden screws.



Notched molding. *The base molding fits under the cabinet instead of being nailed to the front and sides. This means it can be pre-assembled and screwed on.*

Drill a hole. *Use a Forstner bit just smaller than the corner area to drill a little more than halfway through the wood. Keep the point just to one side of the joint to avoid splitting it.*

Shopmade circle. *On a piece of wood slightly thinner than the depth of the hole in the miter joint, just start to drill a hole with the same bit and then cut out the circle on the bandsaw.*

same way using slotted screw holes. The base and the crown can now be prepped and finished independently of the rest of the cabinet. The sides of the cabinet can be worked unobstructed, removing the risk of cross-grain scratches.

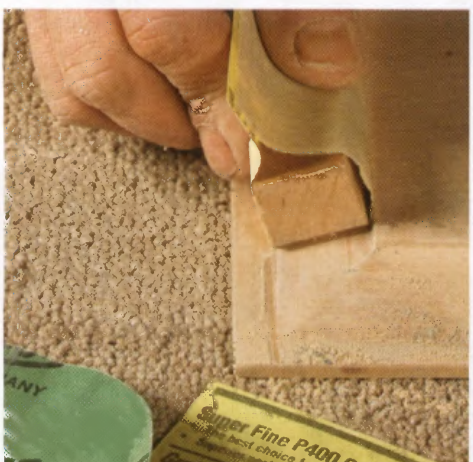
I have a novel way to reinforce the relatively weak miter joint at the front corners of the molding. After the miter is glued and dried, take as large a Forstner bit as will fit into the notched section of the molding and drill halfway through. Now bandsaw a piece of wood slightly smaller than the diameter and depth of the hole. Glue the circle into the hole with the grain running perpendicular to the miter joint.

Prep and finish a frame and panel before assembly

Solid-wood panels are designed to move within the frame. While this is a neat solution to the problem of wood movement from a woodworker's perspective, it presents a number of problems to a finisher. When the frame and panel are finished after glue-up, an unfinished area that sits in the grooves becomes exposed if the panel contracts later. On the other hand, if finish

Frame-and-panel tips

It is almost impossible to finish an assembled frame-and-panel neatly. Plan ahead!



Finer grits for end grain. *To prevent the end grain on a raised panel from absorbing too much finish and turning dark, sand it successively with P320-, P400-, and P600-grit paper.*

Don't forget the frame. *Sand the inside edges of the frame parts before the panel is inserted and the frame is glued together.*

A stiffer joint. *Glue the circle into the hole with its grain perpendicular to the line of the joint.*

Divide and conquer. *It is much easier to prep and finish the molding and the case sides before joining them.*

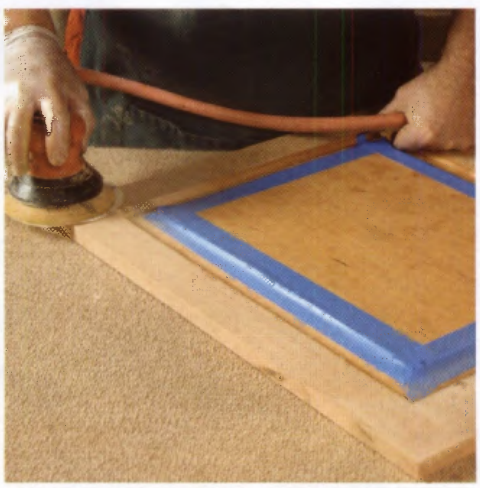
"glues" the panel into the frame, either the panel will split as it tries to contract, or it will break the frame as it tries to expand.

Second, it is nearly impossible to scrape or sand the sides or back of a raised panel and the inner edges of the frame after the frame has been glued together. It is much easier to prep these areas while they are still individual parts.

On a raised panel, the end-grain beveled area will absorb more finish and appear darker than the rest of the panel. To avoid this, it is necessary to sand this area with much finer sandpaper or use some other form of absorption control. You can either finish just the profiled part of the panel or, if you prefer, the entire surface. With the components done, check to see if any finish needs touching up before assembling the cabinet. Screw on the moldings and feet, nail or screw on the pre-finished backs, and attach the doors. By taking the time and making the effort to plan ahead, you'll be rewarded with a finish worthy of your masterpiece and a lot less hassle. □

Charles Neil is a woodworker and finisher in New Market, Va.

Finish the parts. *Apply finish to the panel (above) and the inside edges of the frame (left) before glue-up.*



Protect the finish. *After the frame has been glued together, you probably will need to flush-sand the joints. To avoid damage from the sander, tape off the nearby sections of panel.*

Home stretch. *By finishing individual parts separately and controlling glue squeeze-out, Neil ensures a flawless finish.*

Scrapers:
The Turner's Best Friend

Reach for this simple tool when others reach their limit

BY ERNIE CONOVER

A variety of profiles, but all work the same way

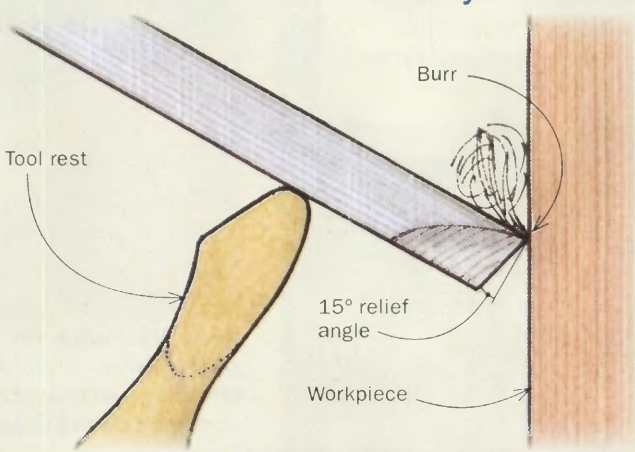
DOME

BOAT-TAIL

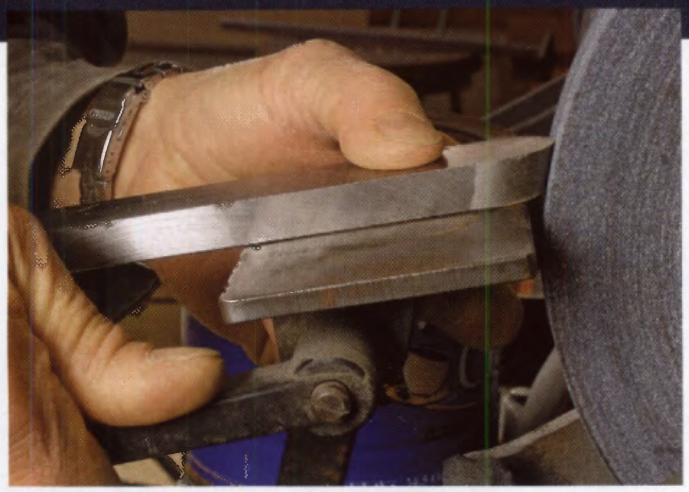
BEAD

V-SCRAPER

Scrapers remove small amounts of wood at a time, in a very controlled fashion, making them easy to use. And they can be ground to almost any profile for a wide variety of tasks. Like a card scraper, a turning scraper cuts with a burr and needs to be angled correctly to cut properly.



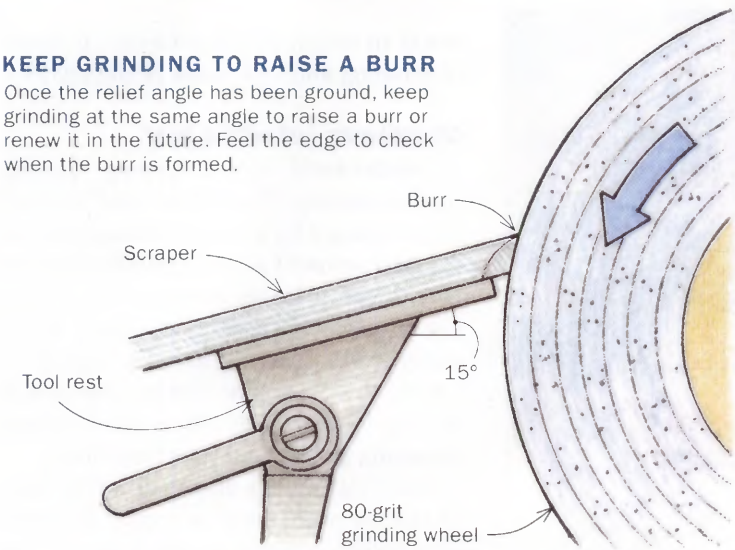
HOW TO PREPARE A SCRAPER



Scrapers need some relief. *To achieve a more favorable burr angle, turning scrapers have a relief angle ground to about 15°. When the 15° bevel reaches the tip of the tool, the burr starts to form.*

KEEP GRINDING TO RAISE A BURR

Once the relief angle has been ground, keep grinding at the same angle to raise a burr or renew it in the future. Feel the edge to check when the burr is formed.



Make a dome scraper. *Swing the tool in an arc of about 150°, maintaining contact with the wheel at all times. With the burr raised, you are ready to put the scraper to work.*

While much turning instruction is devoted to gouge and chisel technique, the scraper is given short shrift—some turners even think there is shame in scraping. This is a pity, because the lowly scraper is a highly useful tool that can get jobs done when gouges and chisels can't.

In faceplate work, for example, it takes a lot of practice before you can fair a perfect curve with a bowl gouge. But even in the hands of a novice, a scraper can smooth both the interior and exterior surfaces of vessels. If fairing a perfect curve is hard, turning a tabletop perfectly flat with a bowl gouge is even harder. Here again, a simple scraper will leave a flat surface every time. Finally, a scraper is the only tool that can cut to the very close tolerances needed when fitting jam chucks or fitting the lid to a turned box.

Scrapers are inherently more forgiving than gouges and chisels because they cut differently. Spindle gouges will cut a bit more or less aggressively in harder and softer parts of a blank. Bowl gouges suffer greatly from this phenomenon, as there is a large difference in the tool's ability to attack end-grain and face-grain areas as the bowl spins. In part, this is because the bevel of the gouge often rides against the surface being turned. On a scraper, the only point in contact with the wood is the burr doing the cutting, so in effect a scraper will *machine* wood to perfect concentricity. Also, because they are held at a downward angle, scrapers are far less prone to catching and marring the

TIP USE A BURNISHER FOR HIGH-SPEED STEEL

Clever jig. *On high-speed steel, it is hard to raise a large burr on the grinder. Instead, use a jig with a carbide cone, levering the scraper against a steel pin. If the scraper is thicker than the height of the cone, as shown, place the tool upside down.*

USE A LARGE DOME SCRAPER FOR BOWLS

Smooth cuts in changing grain. *It is very difficult to get a smooth surface using a bowl gouge. But a scraper, taking light cuts, can leave the surface of a bowl so smooth that it needs very little sanding.*

Another angle. *Near the lip of the bowl, instead of using the tip of the scraper and angling the tool nearly parallel to the tool rest, you can tilt the scraper on the tool rest until you find the optimum angle for the burr on the side of the scraper.*

wood. In this article, I'll share the mysteries of scraping and bust some of the myths.

All scrapers cut with a burr

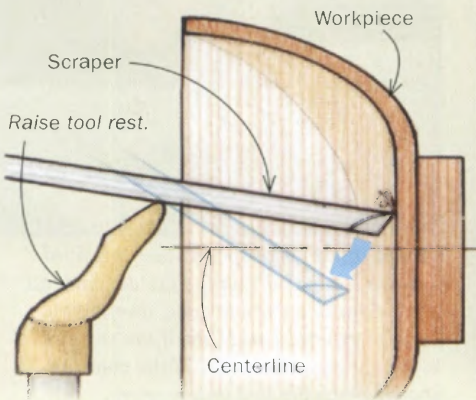
To understand how a turning scraper works, examine the simple card scraper. After raising a burr by burnishing, you tilt the card scraper forward until the burr begins to cut. It leaves pronounced, wispy-thin shavings but does not remove much material with each pass, so it is easy to control. The downside is that scrapers dull quickly, for they have to be softer than other cutting tools to facilitate burnishing.

A turning scraper also uses a tiny burr to cut the wood and is angled forward (downward, actually, on the lathe) to cut successfully. However, there are notable differences with the card scraper: To thin the edge so that a burr can be more easily raised, a 15° relief angle is ground under the cutting edge. This increases its usefulness, particularly on the outside of bowls or at a shoulder in spindle turning.

Another difference is that forming the burr on a turning scraper is mostly done with a grinder. About an 80-grit wheel does the task nicely; a good-sized adjustable tool rest on your grinder is a big help. The trick is to start moving the scraper as you touch the wheel and to keep it flat on the rest throughout the process. This gives a nicely faired curve on the edge. Once you've ground the relief angle (in the process also raising a burr), if you keep the tool rest at that angle, resharpening and creating a fresh burr take only seconds.

TIP STAY ABOVE CENTERLINE INSIDE BOWLS

The scraper needs to be angled downhill for the burr to cut wood. Inside bowls, it must also be used above the centerline so that if it catches, it is knocked into a void and not into the lower part of the bowl.



Photos: Mark Schofield; drawings: Vince Babak

Grinding forms a burr at both the top and the bottom edges of the scraper, but only the top edge is used.

Like the card scraper, turning scrapers also can be burnished. First, you grind the scraper to the desired shape and then use a sharpening stone to smooth the top edge—what will be the burred edge—and the relief bevel. The idea is to make the top and bevel form a smooth, uniform corner. Because most scrapers are made from high-speed steel, using a regular burnisher will require a lot of force and quite a few passes. A faster method is to use the shaft of a solid carbide router bit, wrapping the cutting surfaces of the bit with duct tape for safety.

You also can buy a dedicated carbide burnisher from Lee Valley, which has a steel-pin fulcrum point used to lever the edge of the scraper against a carbide cone with sufficient force to roll a burr (see photo, p. 73). The tool is designed to be used with the burr facing up, but if your scraper is thicker than the height of the cone, you can use it with the burr face-down. Make sure to keep the tip of the scraper off the base of the fixture. The size of the burr depends on the pressure applied, but in general it is larger and steeper than that made on a grinder, so the tool must be used at a steeper downhill angle. I burnish my large high-speed-steel scrapers for bowl work, and grind all of my small scrapers for more delicate work.

Hold it gently and take a light cut

Your first scraper should be a large dome scraper, at least 1 in. wide, the thicker and heavier the better. They are great for faceplate work, especially bowls. I like a dome shape that is a perfect radius, and I increase and decrease this radius to meet the needs of the bowl I am turning.

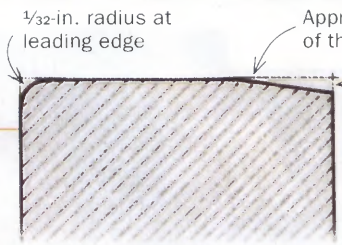
Because the scraper is pointed downhill so that the burr drags, the tool rest needs to be raised slightly from the height used for most gouge work. All scrapers have a sweet downhill angle at which the burr cuts best, and finding this angle is the key to success. How much you raise the tool rest depends on the diameter of the piece and how the burr was formed. The trick is to have the scraper contact the work on the centerline at the sweet angle, where it will always be kicked away from the work by problematic spots such as knots.

On inside bowl work, the rest has to be raised so that you can slope and cant the

CREATE PERFECTLY FLAT SURFACES

HOW TO MAKE A BOAT-TAIL SCRAPER

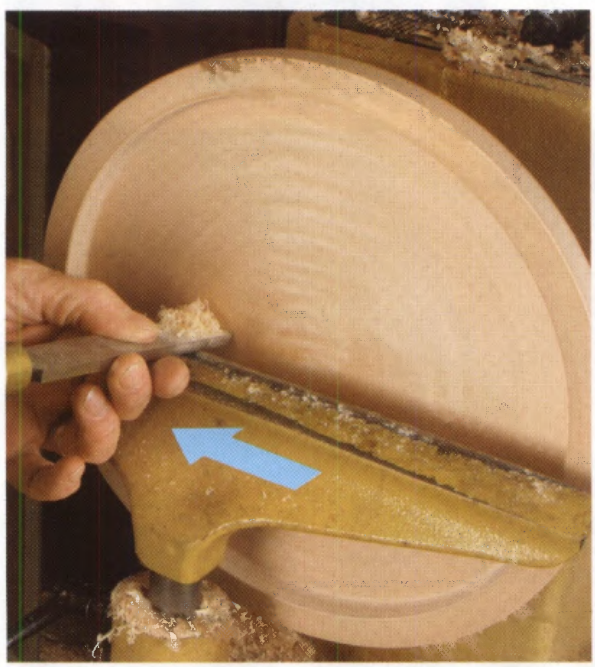
Start with a square profile, round one corner, and relieve the other.



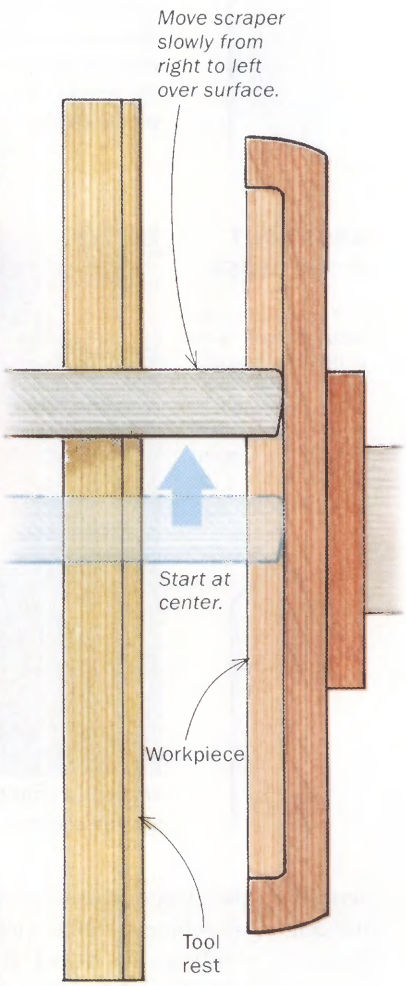
HOW TO USE IT

The scraper is designed to cut from right to left, taking light cuts until the surface of the workpiece is flat. With care, it can also be used from left to right.

Use a light touch. *The scraper removes very little wood at a time, so hold it lightly.*



Tool rest is your guide. *Make sure the rest is an even distance from the workpiece, and run your knuckle against it to produce a flat surface.*



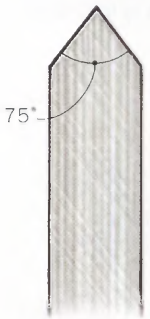
TOP VIEW

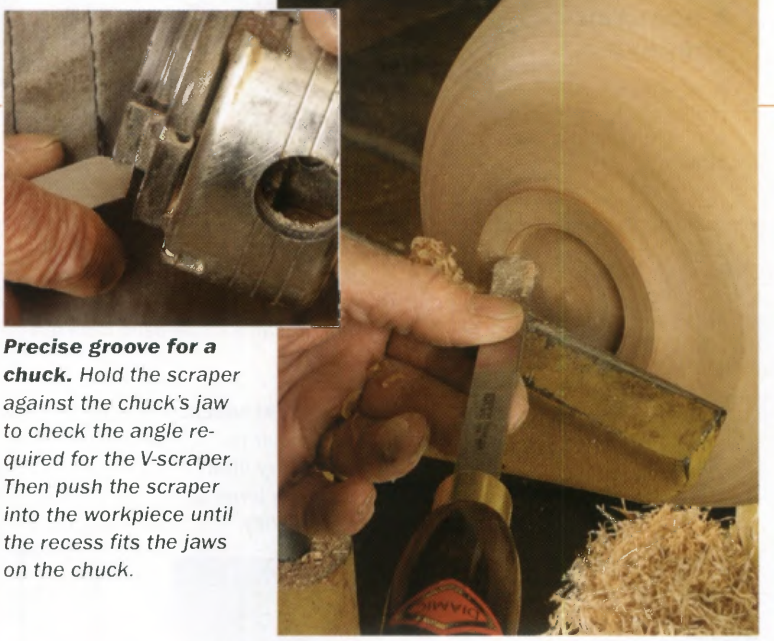
Check your work. *Use a straightedge to check if the surface is flat. If the rim interferes with using a rule, improvise with a piece of wood.*

V-SCRAPER IS VERSATILE

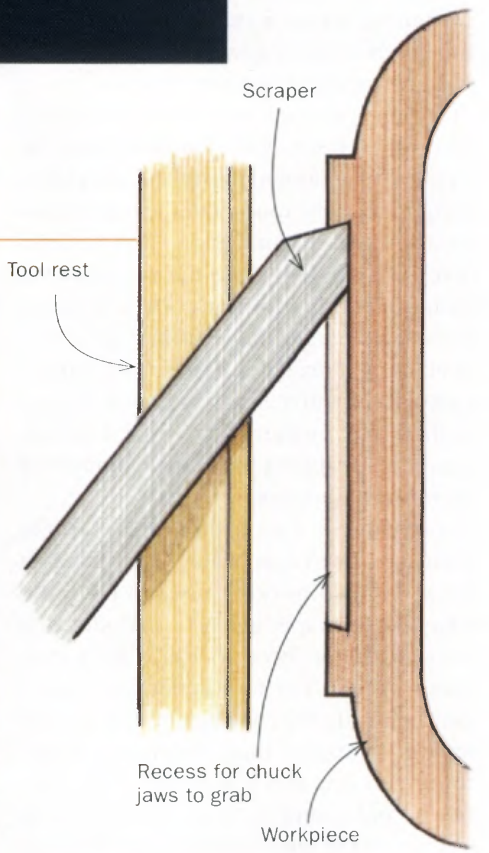
MAKE A RECESS FOR A CHUCK

The V-scraper can be ground to match the jaws of a four-jaw chuck and then used to scrape a recess in the base of the workpiece.



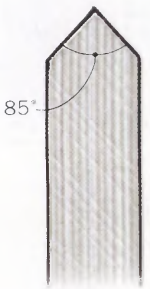


Precise groove for a chuck. *Hold the scraper against the chuck's jaw to check the angle required for the V-scraper. Then push the scraper into the workpiece until the recess fits the jaws on the chuck.*

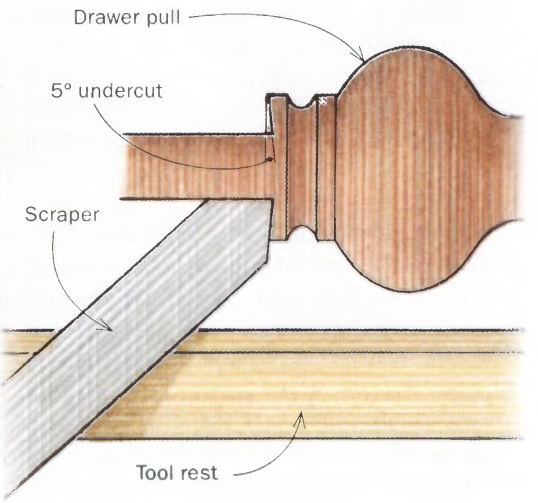


UNDERCUT A SHOULDER

The V-scraper can also be used to put a slight undercut on the shoulder of a turned pull, ensuring a gap-free fit with the drawer or door when it is installed.



Undercut shoulder. *By grinding the V-scraper to less than 90°, you can slightly undercut the shoulder of a pull for a better fit on the workpiece.*



scraper to the sweet angle slightly above the centerline, where it will be kicked safely into air if it hits a hard spot. If you are below the centerline, the scraper will plow deeper into the wood, with nasty results.

Because the scraper removes so little wood, there is no need to grasp it as firmly as other turning tools. A scraper should be held like a captive bird—firmly enough that it can't fly away, but gently enough that you never ruffle a feather. Because of the pronounced downward angle necessary for the interiors of bowls, I often hold the handle in my right hand like a pencil with my left hand on the top of the shaft. This gives me a comfortable grip with a great feel for what is happening and control over the cutting action.

You also don't want the tool rest too close to the work, because the scraper needs room to move down in the event of a mishap. Third, while small scrapers often use the entire edge by design, large scrapers can overwhelm the turner if the entire edge is engaged. A dome shape is very useful for bowl work, but the radius of the scraper should be less than the radius of the bowl or the entire edge will engage, with startling results.

One way to avoid catching the whole edge is to cant the scraper at an angle so that only a small part of it is cutting. Take care not to engage the elevated tip of the scraper against the bottom of the vessel or the scraper will be slammed flat on the rest, resulting in a nasty catch.

Add these scrapers next

While you don't need to start with an arsenal of scrapers, after mastering the dome scraper, aim for the following collection, gradually adding custom-ground models.

A boat-tail scraper for flat surfaces—If you are tired of clouds of dust when trying to sand the surface of a platter flat, you need what I call a boat-tail scraper. It can also be used for fairing long, straight sections in spindle turning, such as tapered legs.

Starting with a 1-in.- to 1½-in.-wide square-end scraper, grind a ⅛-in. radius at the left corner and taper the right-hand third of the tip by about ⅛ in. The tool is designed to cut from right to left, but can also make very light cuts from left to right. The rounded corner allows the scraper to remove a good amount of material when cutting to the left, while the curved boat tail gets the trailing edge out of the way so it won't leave a line in the work.

As with the dome scraper, the heavier the boat-tail scraper, the better: If you are going to be in a head-on collision it is better to be in a very heavy vehicle. Likewise, a hard knot will affect a heavy scraper much less than a light one.

A V-scraper makes chucks, shoulders, and grooves—Take any ½-in.-wide scraper and grind a roughly 90° V-tip on it. Like all scrapers, the profile of the tip is ever-changing, based on the needs of the project or even the latest stage of the project.

Make custom scrapers for beads and coves—You also can use a variety of old tools as shopmade scrapers. These include old files, screwdrivers, and chisels. Generally used to cut beads or coves and known as form scrapers, these small scrapers are the epitome of perishable tooling: They are ground to a shape and reground to another to meet the needs of the job. Simply grind them to the desired shape, making sure that you don't overheat them if they are not made from high-speed steel.

If you use an old file, you can reduce the slight risk of it breaking by tempering the steel. Grind the area near the tip bright, and then place it in a household oven at 475°F. Watch carefully, and when the ground area turns bright blue (in about an hour), turn off the oven and allow the file to cool slowly. You can now grind and file a custom profile on the end. □

Ernie Conover runs Conover Workshops in Parkman, Ohio.

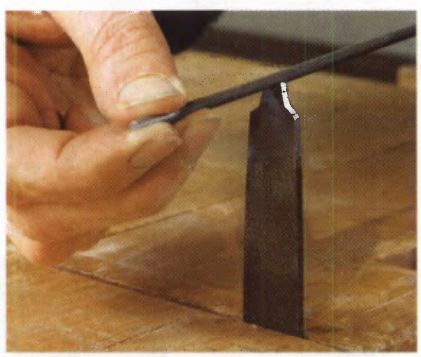
EASIEST WAY TO FORM BEADS AND COVES

You can purchase scrapers designed to cut beads and coves, or you can custom-make your own from old screwdrivers and files.

QUICK COVES

Screwdriver scraper. *Grind a round-nose profile on the tip of a screwdriver (above), and use it to scrape a small cove on spindle turnings such as these drawer pulls (right).*

CLEAN BEADS



New use for an old file. *After grinding away the teeth (top), temper the file in your oven. Now you can use another file to fine-tune the shape (bottom).*

One plunge and done. *The improvised scraper can create small beads far more quickly and easily than a spindle gouge.*

readers gallery

EDDIE AUSTIN
Hamlin, W.Va.

Austin built this Queen Anne Pennsylvania secretary as his senior project at the University of Rio Grande, in Ohio. The walnut and walnut burl veneer piece is 21 in. deep by 38 in. wide by 93 in. tall, and the finish is tung oil and orange shellac.

CLARK KELLOGG
Houston, Texas

These white oak and Danish cord chairs (18 in. deep by 21 in. wide by 33 in. tall) are reproductions of Swedish furniture maker Vidar Malmsten's design. Accustomed to tackling joinery first and shaping afterward, Kellogg had to switch gears and shape first during the complicated construction of these chairs. The finish is Liberon wiping varnish.

PHOTO: DAVID WELTER

JAMES WILLIAM SCHUYLER III
Bloomington, Ill.

When Schuyler made this mahogany and holly sideboard as a wedding gift, he sized it so that most types of liquor bottle would fit inside. He used floating tenons to attach the bent-laminated side panels to the carcase. Standing 34 in. tall, the sideboard is 18 in. deep by 70 in. wide, and is finished with TransTint dye and water-based lacquer.

NEIL KNECHT
Monroe, Conn.

This Greene-and-Greene-inspired piece may look like a free-standing cabinet, but it's actually a built-in. Knecht needed the depth to store stereo components, so he recessed the back of the case 8 in. into the wall. He reconfigured a closet on the other side of the wall to allow extra room for the built-in portion and access to the electronics. The mahogany cabinet is 21 in. deep by 28 in. wide by 44 in. tall and is finished with an oil-based stain, garnet shellac, and wax.

PHOTO: SUSAN KNECHT

GEORGE GAINES
Fort Bragg, Calif.

The rich architecture of Chicago, especially the pointed gothic archways, served as Gaines's design inspiration for this end table, 14¾ in. deep by 14¾ in. wide by 26¾ in. tall. Gaines said the doweled joint where the arches meet was the most difficult part of the construction. The table is made of bubinga and shop-sawn curly bubinga veneer and is finished with an oil-varnish mix.

readers gallery continued

FRED TAYLOR
Sudbury, Mass.

Taylor made these mahogany reproductions of a Massachusetts shelf clock for three avid clock collectors: his mother, his brother, and himself. While keeping with the time period (pre-1820), he made sure there were variations in each, including the scrollwork, banding, bonnets, finials, and feet. Finished with shellac, the clocks are 6 in. deep by 12½ in. wide by 38 in. tall.

MARTIN MILKOVITZ
Mason, N.H.

This cherry writing desk, 22 in. deep (when closed) by 43 in. wide by 46 in. tall, has 11 interior drawers and two exterior ones. It also has six secret compartments and a locking interior door and top. The finish is lacquer.

KIPLEY MEYER
Madison, Ga.

Meyer created the scooped-out pattern of this sideboard (16 in. deep by 48 in. wide by 38 in. tall) with a cove bit and a handheld router. The birch carcase is finished with an opaque orange lacquer, brown glaze, and clear lacquer. The oak base is finished with alternating coats of two ebonizing solutions (iron shavings and soaked walnuts) and topcoated with lacquer.

The San Diego Fine Woodworkers Association is host to one of the largest juried shows in the country. Since 1998, *Fine Woodworking* magazine editors have attended and chosen the Best of Show winner. Here are just a few of our favorites from the 28th annual show.

BILL CHURCHILL

Anaheim, Calif.

BEST OF SHOW, FINE WOODWORKING

FIRST PLACE, WOOD CARVING–OPEN

Churchill's inspiration for this carving came from an article about Crazy Horse, who had a vision of himself riding a fast horse and wearing a red-tailed hawk feather. While doing so, he could not be hit by enemy arrows or bullets. The vision gave the Lakota leader courage to lead his people to many victories. Finished with boiled linseed oil and beeswax, the poplar carving is 9 in. deep by 38 in. wide by 14 in. tall. PHOTO: ANDREW E. PATTERSON

KEN COWELL

Yorba Linda, Calif.

FIRST PLACE, WOOD TURNING–LAMINATED/SEGMENTED

THIRD PLACE, SDFWA PRESIDENT'S AWARD–ADVANCED

This segmented vessel is the largest piece Cowell has done. The 14-in.-dia. piece stands 17 in. tall, but more impressive than its size is the amount of pieces it took to make it. There are 2,977 pieces of curly maple, ebony, bloodwood, and cherry burl in the vessel. The finish is Waterlox original. PHOTO: ANDREW E. PATTERSON

DEL COVER

San Diego, Calif.

SECOND PLACE, ART FURNITURE

EXCELLENCE IN DESIGN–*WOODCRAFT* MAGAZINE

This bench (28 in. deep by 84 in. wide by 50 in. tall) is part of a series of pieces incorporating architectural elements. It depicts different parts of Balboa Park, home of the San Diego Zoo. Along with mirrored glass, Cover used cherry, alder, walnut, wenge, and African mahogany. The finish is an oil urethane. PHOTO: SANDY SMALL

THOMAS NORDSTROM

Encinitas, Calif.

FIRST PLACE, EXCELLENCE IN FINISHING, APOLLO SPRAYERS, INC.

EXCELLENCE IN WORKMANSHIP, *WOOD* MAGAZINE

HONORABLE MENTION, CONTEMPORARY WOODWORKING–FURNITURE

Nordstrom combined a wenge top and base with a Gonçalo alves carcase in this contemporary chest of drawers (12 in. deep by 21 in. wide by 38 in. tall). While the design is modern, he stuck with traditional dovetail and mortise-and-tenon joinery and hand-forged iron pulls. The finish is hand-rubbed polyurethane and wax. PHOTO: ANDREW E. PATTERSON

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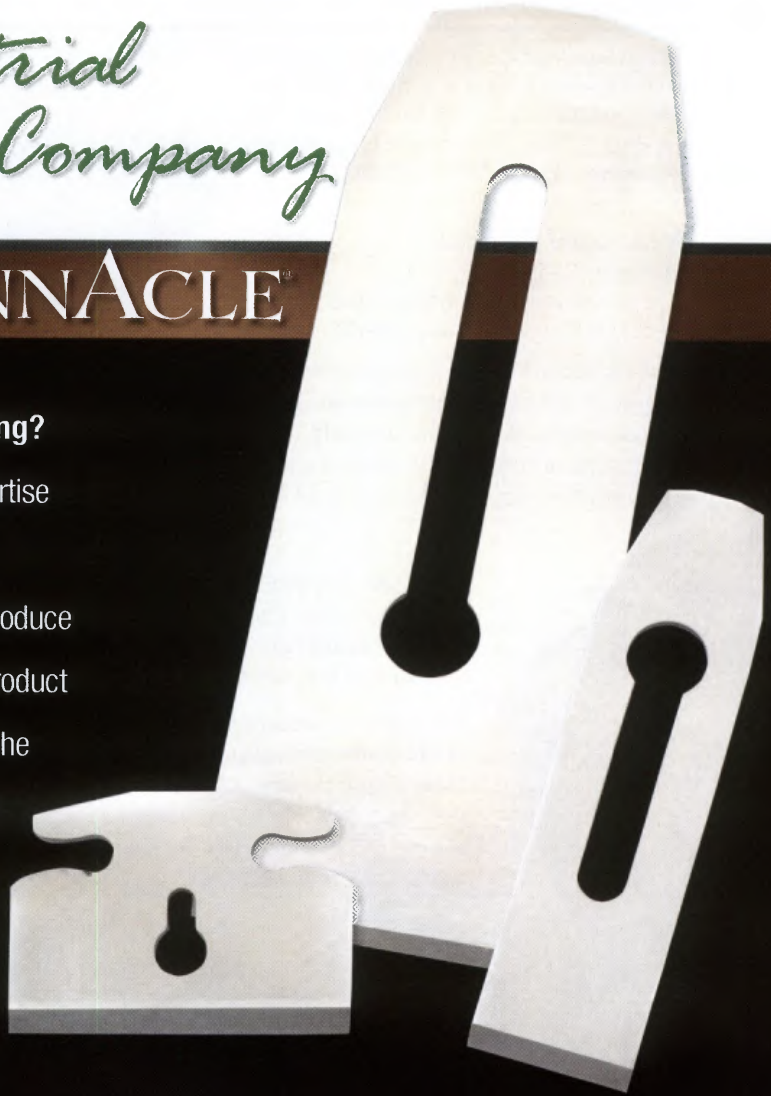

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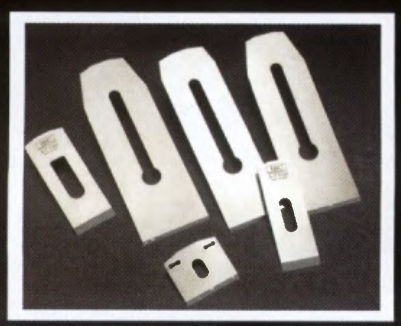

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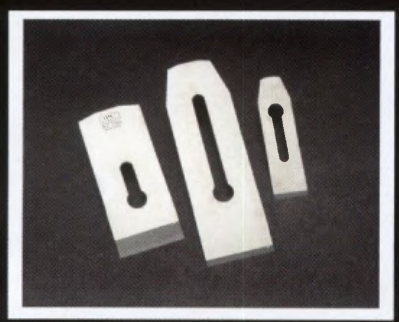

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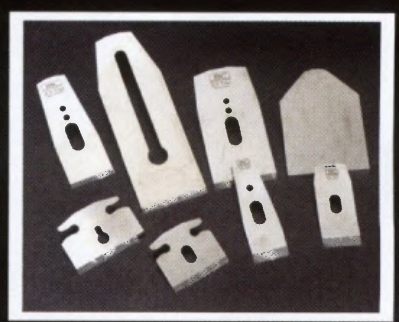

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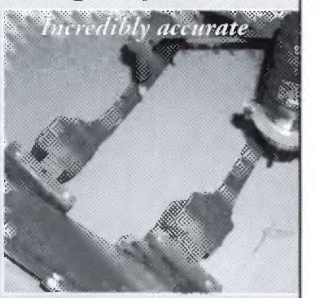

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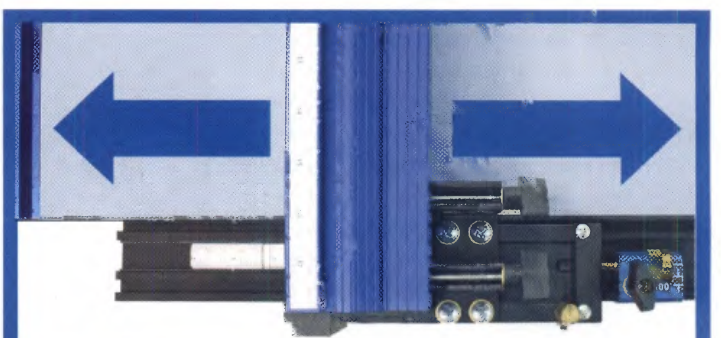

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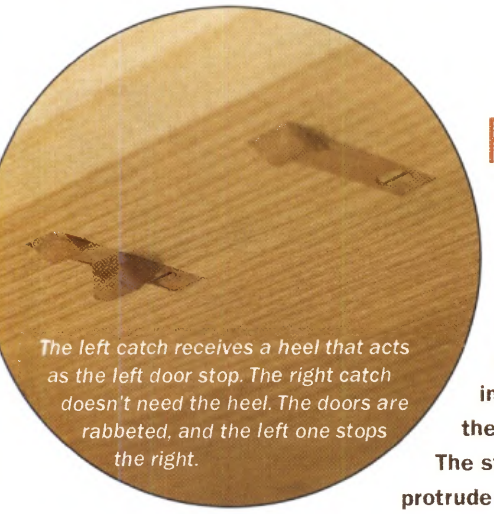
Krenovian details make a big difference

BY JIM BUDLONG

One of the features that make Krenov-style cabinets so friendly and special is all of the cool little details. As those familiar with the work of James Krenov know, he had a fondness for shaping small bits of wood with his homemade knives.

On this cabinet-on-stand project (see pp. 48-55), I added a number of these special details, including Krenov's hand-carved friction catches paired with strike-plate buttons—far more personal than manufactured door latches or hidden magnets. He also likes handles that are playful to the eye, friendly to the touch, and comfortable to use. Even the shelf supports are done by hand, with care and attention to form as well as function. And like Krenov, I left behind subtle tool marks to remind people that not everything in this crazy world is stamped out of a mold.

Try just one or all of these handmade touches. I think you'll find that Krenov was on to something. As he often said, "It's the little things that count."

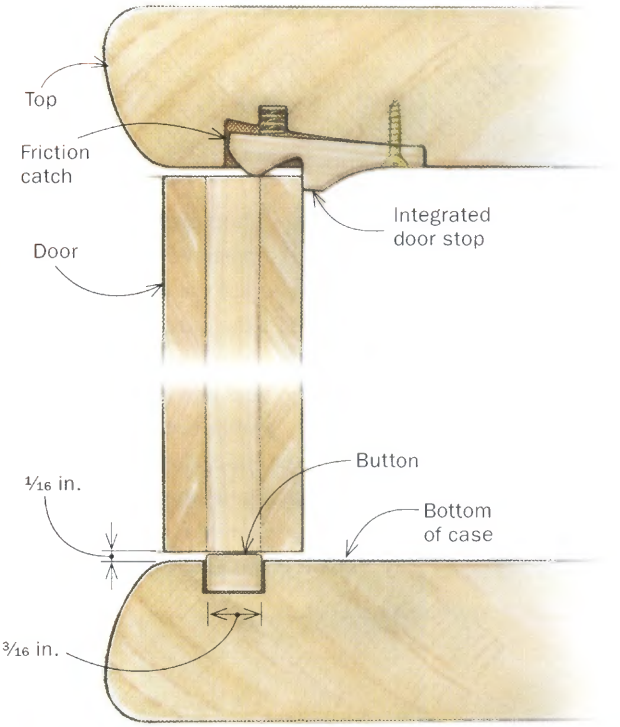


The left catch receives a heel that acts as the left door stop. The right catch doesn't need the heel. The doors are rabbeted, and the left one stops the right.

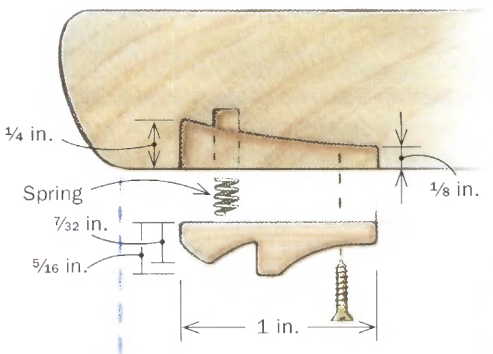
Friction catches and strike-plate buttons

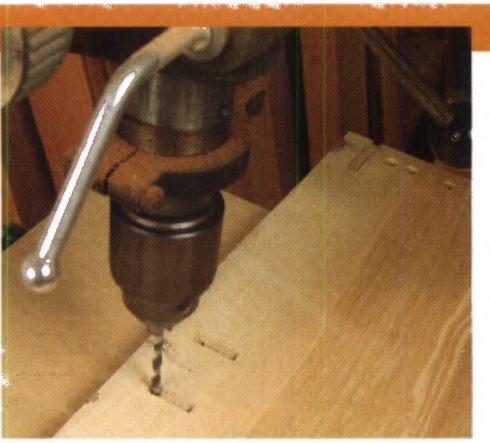
Friction catches are small pieces of wood (with a cam shaped on the front end) let into ramped mortises on the underside of the cabinet top with a spring behind them. The strike-plate buttons are round, and barely protrude from the inside surface of the bottom. The pressure felt from the springs and catches at the top of the doors coupled with the small button-like strike plates underneath the doors provides the user with a unique sensation as the door is operated. The friction catches and buttons don't need to be made as part of the cabinet-building process, but the mortises for them should be cut before the glue-up.

The friction catches are installed perpendicular to the front of the cabinet above the doors, about ¾ in. from each side of center.

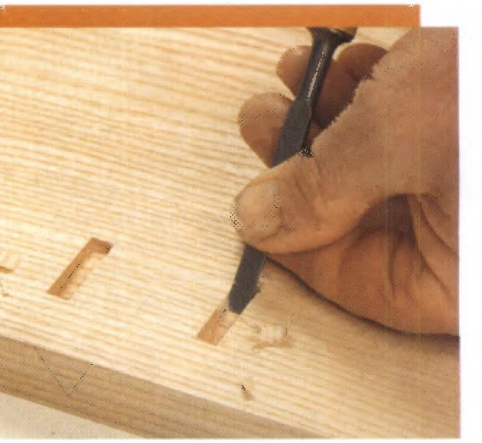


INSTALL THE CATCHES





A place for the spring. *On the drill press, create a small hole in the front of the mortise for a piece of spring (available at auto-supply stores).*



Chisel the mortise into a ramp. *This gives the end of the friction catch somewhere to go as the door hits against it.*

Long strips make it easy to manage small parts. *Draw the profile on the stick, cut the shape on the bandsaw, and refine it with a chisel, keeping the extra length as long as possible.*

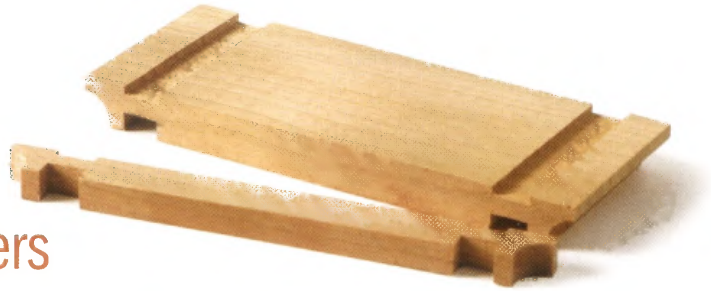
Use a knife to chamfer all the sharp edges. *After using a handsaw to cut the catch free from the long stick, detail all the edges and corners as desired.*

ADD THE BUTTONS

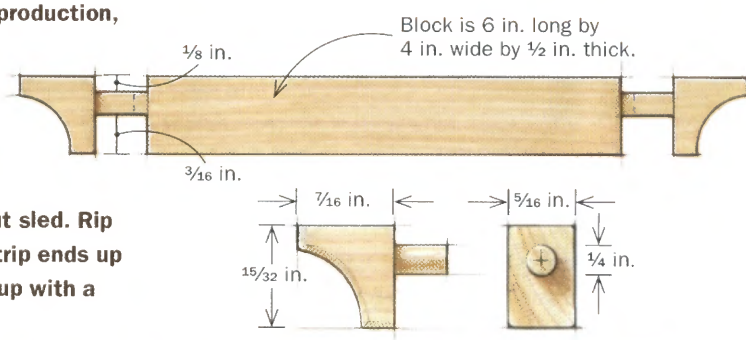
Drill for the buttons. *The buttons are made from hardwood dowel stock. Round the tips slightly and glue them in.*

Photos: Anissa Kapsales; drawings: Bob La Pointe

Hand-carved supports make elegant shelf holders

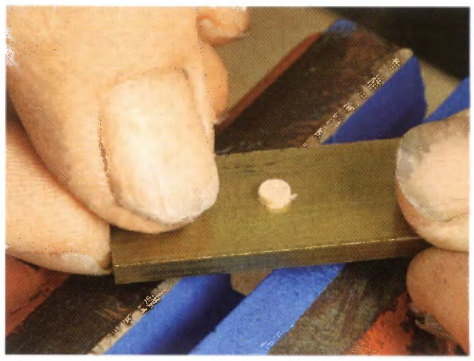


Like the friction catches, these small carved shelf supports don't have to be made during carcase production, but the holes need to be drilled before the carcase is glued up. To make the supports, start with a block of accent wood and use the tip of a Roman ogee bit to profile both ends. Then run the shoulders on the tablesaw using a stop block on a crosscut sled. Rip this chunk on the bandsaw into thin strips (each strip ends up with a roughed-out support on each end), clean them up with a block plane, and refine them by hand.



Double-sided stick is easy to hold. *Use a small knife to detail the edges and corners, and use a chisel or tablesaw to cut the slight shoulders on the sides.*

Cut the supports free and size the tenon. *Carefully clamp the support into a small vise and round out the tenons using a sharp knife and small files.*

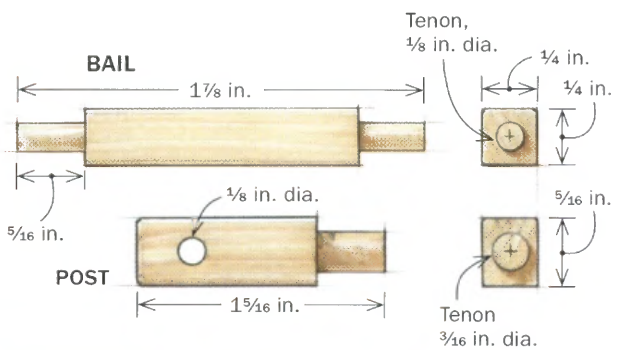


Perfect the size and shape of tenons. *Having a 5/32-in.-dia. test hole in a scrap of hardwood or brass can be helpful during this process.*

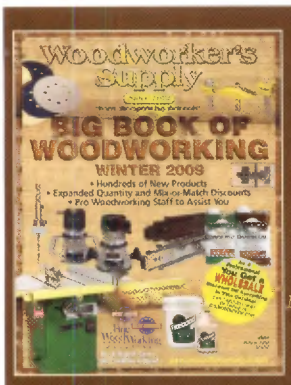
Two posts and a bail combine to make a subtle pull. *Start by making the posts, and then create a bail to fit them. Pillow the ends of the bail tenons so they have a nice appearance and feel as they protrude through the holes in the posts.*

Pulls are the final touch

The pulls may be one of the last items you tackle in this project, but they are definitely one of the most important visual points. A successful pull should complement the general feel of an object. The color should be harmonious with the rest of the tones used, not so contrasting as to draw attention away from the items on display. The pulls should be comfortable and easy to use, located in a position that adds balance to the piece as a whole. They are made using some of the same techniques employed for the friction catches and consoles. Keep your workpieces over length for as long as you can, cut shoulders on the tablesaw, chisel and file tenons to size using a test hole to perfect them, and detail the edges and corners with a knife.



Install the pull as one unit. *Glue the bail to the posts, and, before the glue sets, glue the whole pull assembly into the door stile.*



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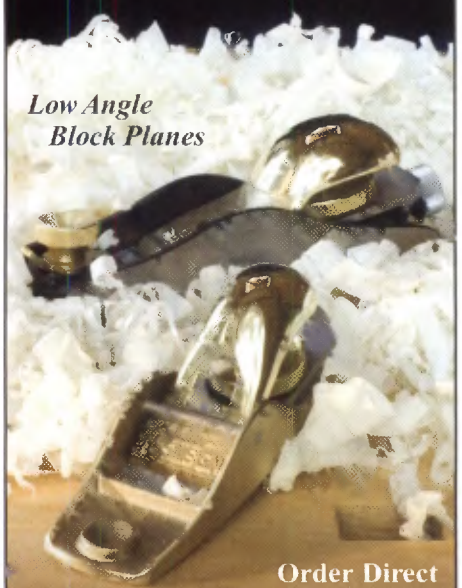

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Q&A

Trouble with table design

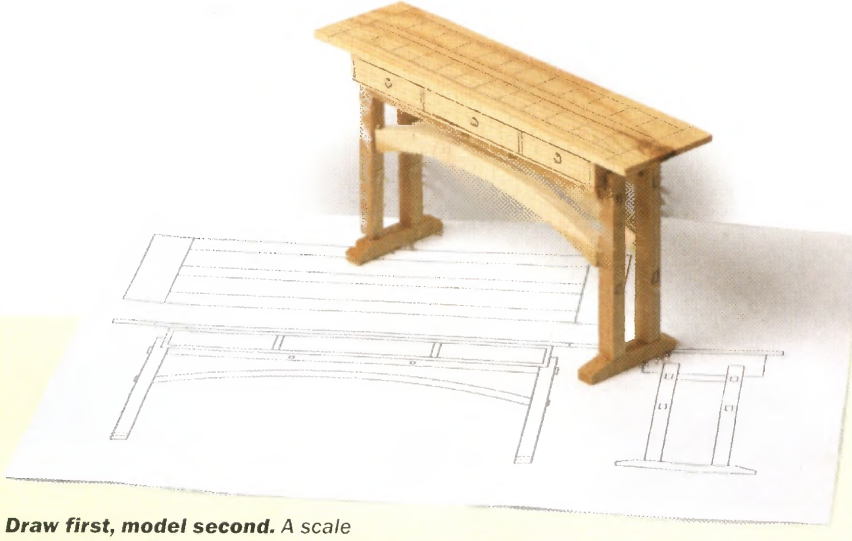
Q: I recently made a table that didn't turn out how I planned. The legs looked thin in my drawing, but now that it's made, they look much thicker. What happened?

—ANDREW JENNINGS, San Diego, Calif.

A: WHEN BUILDING FURNITURE FROM A DRAWING, it's not uncommon to end up with a piece that doesn't look exactly like you envisioned. The main problem is that a front- or side-view drawing only shows you one face of the piece at a time. After the piece is built, you almost always see it at an angle. Viewed straight on from the front, the legs might look slender, but as you move around to the side and see more than one face, the perceived width becomes much greater.

Don't give up on drawings. Just add one more step to your building process: Make a mock-up of important components or even of the entire piece. Mock-ups give you a sense of how things will look and the chance to alter dimensions before committing your vision to expensive wood. For single components, full-size models are a good idea, but for entire pieces, a scale model is fine and quicker to make.

—Michael Pekovich is Fine Woodworking*'s art director.*



Draw first, model second. *A scale model lets you see a piece the way it will really look. Note how the legs look thicker when viewed at an angle.*

Full-scale success. *Pekovich built this entry table only after developing his design through drawings and scale models.*

Basic chisel set for furniture making?

Q: I've just started making furniture and am about to buy my first chisels. What types and sizes should I start with?

—CHUCK MORGAN, Seattle, Wash.

A: BENCH CHISELS ARE the most versatile type, and a set of five or six will handle most of the tasks you face.

Most bench chisel sets include chisels between ¼ in. and 1 in. wide, which is a good range. But buy a ⅛-in.-wide chisel to supplement them, so you can get into tight spaces, like between dovetails.

—Chris Gochnour is a professional woodworker in Murray, Utah.

Starter set. *Bench chisels are a good choice for your first chisels. Small chisels get into tight spaces, and wider ones are great for paring joints to fit.*

Ask a question

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

Photos, except where noted: staff

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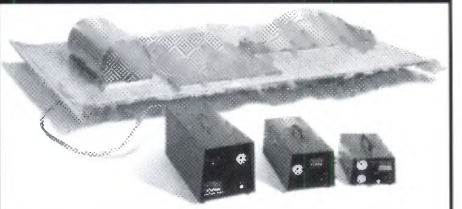

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Sharpening a Forstner bit

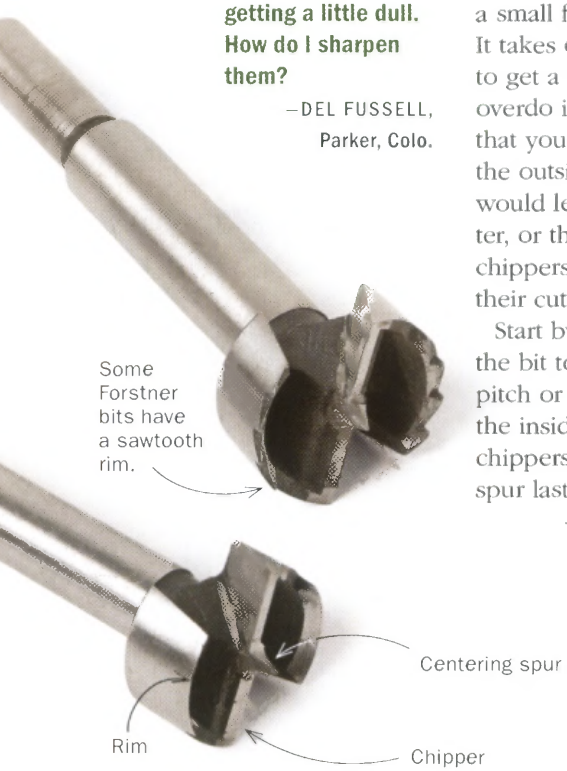
Q: Some of my Forstner bits are getting a little dull. How do I sharpen them?

—DEL FUSSELL, Parker, Colo.

A: SHARPENING A FORSTNER BIT isn't difficult. All you need is a small file and a slip stone. It takes only a few strokes to get a sharp edge, so don't overdo it. It is also critical that you never hone or file the outside of the rim, which would lessen the bit's diameter, or the beveled side of the chippers, which could change their cutting angle.

Start by thoroughly cleaning the bit to remove any built-up pitch or other debris. Sharpen the inside of the rim, then the chippers, and the centering spur last.

—Roland Johnson is a contributing editor.



Hone the rim first. *Use a slip stone with a rounded edge and sharpen the inside of the rim only.*

File the back of teeth. *Some Forstner bits have sawlike teeth. A few strokes with a small triangular file will sharpen them.*

Hone the front side of the chippers. *Make sure the chipper and rim meet at a crisp 90° corner. A rounded corner won't shear the grain cleanly.*

Right on point. *Lightly file the centering spur to a sharp point, but keep the point centered. Johnson uses an index card to protect the chippers from the file.*

Red oak is never gray

Q: I recently bought some kiln-dried red oak, but when I jointed and planed it, the underlying wood was gray rather than red. What would cause this, and will it ever turn red?

—STEVE PATE, Madison, Wis.

A: YOUR RED OAK, I BELIEVE, ISN'T RED OAK AT ALL, but white oak. The color you see after jointing and planing is the true color of the wood. Any oak that has a gray cast to it is white oak.

It's easy to get confused about red and white oak. Neither is a specific species of tree, but a name that applies to a group of species. There are about nine species in the white-oak group, and eleven in the red-oak group.

Within each group, the species cannot be accurately distinguished from one another, which is why they are grouped together. So, you will find variation within each group. While some red oaks are a deep red, others have an orange hue. But they all have a warmer tone than the cooler browns and grays of white oak.

—David H. Jones is a wood technologist at Virginia Tech.

Mistaken identity. *All four boards were found in a stack of red oak, but the light-brown board at the bottom is actually white oak.*

Bit-sharpening photos: Roland Johnson

How to match an antique finish

Q: I want to stain a mahogany table to match some antiques. How do I match that deep brown color of older mahogany?

—ELMER KREISEL, Towson, Md.

A: MORE IMPORTANT THAN THE EXACT COLORS and products you use is the process you follow. First, use a dye stain that matches the color between the dark grain lines of the antique. Test the dye on a scrap piece, and strengthen or weaken it until it's just right. After it has dried, seal the dye with a 2-lb. cut of dewaxed shellac. Let it dry for two hours, sand with P400-grit sandpaper, and remove the dust. Next, apply an oil-based grain filler that matches the grain lines on the antique. Let it dry for two days and then apply another coat of dewaxed shellac (2-lb. cut). After the shellac has dried, you can use a gel stain to alter the color. Finally, apply a clear finish. Shellac is a good choice.

—Jeff Jewitt writes about finishing for FWW.

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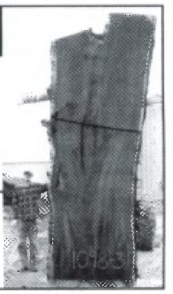

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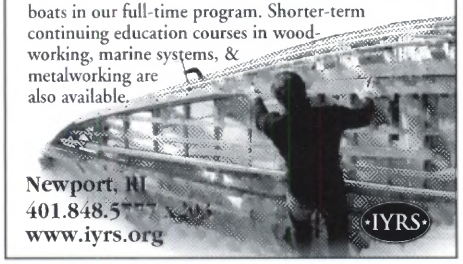

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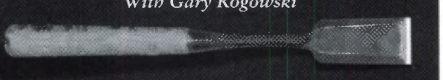

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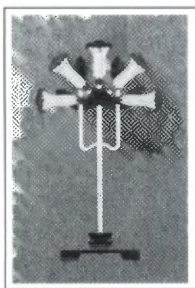

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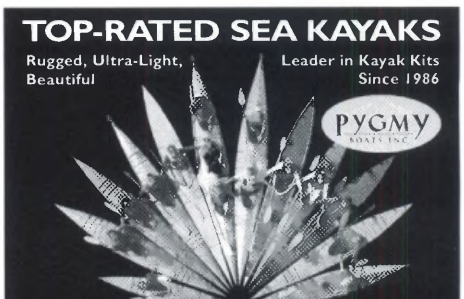

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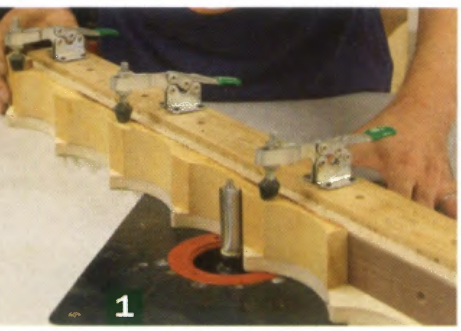
Grilled to perfection

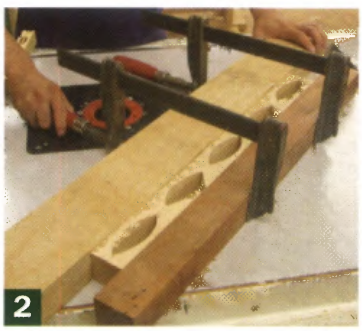
BY JONATHAN BINZEN

Despite its delicate appearance, the ¾-in.-thick grillwork door on Michael Hurwitz's display cabinet (see the back cover) is rigid and quite strong. But that airy delicacy required exacting craftsmanship. Hurwitz's assistant, Atsushi Hanano, who built the piece, started by creating rows of pointed ellipses linked end to end—which Hurwitz calls "strings of sausage." These were half-lapped and joined on the diagonal to give the illusion of continuous circles. To preserve the illusion and ensure strong glue joints, Hanano had to be extremely precise at every step to keep the curves aligned and the fit perfect.

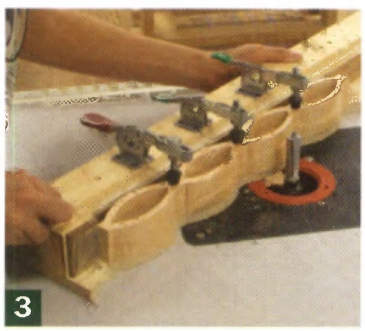
Make the rows



Creating the concaves. *After bandsawing the rough shape, Hanano uses a jig to flush-trim the concave curves. To avoid tearout, he routs downhill from each side.*



Sausage sandwich. *To make the "strings of sausage," he glues together pairs of workpieces, using long cauls to distribute pressure.*



The outer curves. *After bandsawing, Hanano flush-trims the convex curves with a second jig. He shims out the workpiece to fine-tune the final results.*

Split sausage. *Having shaped two "sausages" at once, Hanano rips them in two. To better control the workpiece, he uses a customized push stick that fits the curve.*

Build the grid

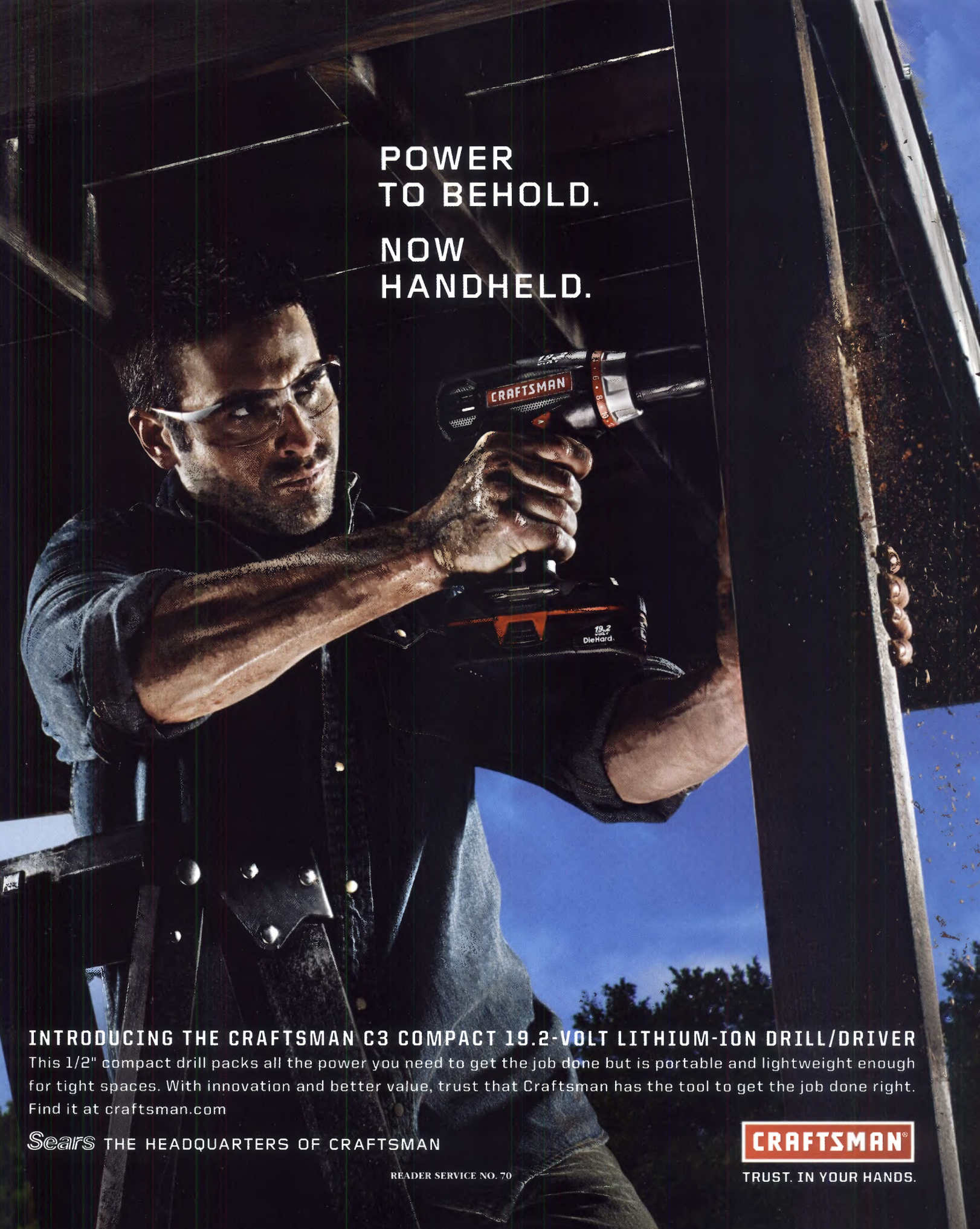
Angled half-lap. *Like a finger-joint jig, Hanano's miter-gauge jig for cutting the half-laps includes a registration stick to space the joints. A shaped piece of wood is glued to the jig to prevent tearout.*

Gluing in stages. *Hanano dry-assembles the entire grille on a flat surface and then glues one "string of sausage" at a time.*

Rounding the curves. *A top-bearing router bit with a gentle sweep shapes the edges of the grille. After routing the whole grille on one side, Hanano turns it over and routs the other side.*

A chisel goes where the router can't. *Hanano uses a chisel to feather the router's curves into the corners. Then it's on to sandpaper to blend the curves and obtain the final surface.*

Photos: John Carlano (top right); Jonathan Binzen (all others)



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The Grillwork Grabbed Him

Philadelphia furniture maker Michael Hurwitz was poking around a flea market in New Jersey one day when he found, sticking out of a pile of assorted junk, a few pieces of exquisite antique latticework with a pattern of overlapping circles. Hurwitz, whose wife is Japanese, recognized them as kumiko, the sort of lacy wooden screens he'd seen over doorways and in lanterns in Japan. As he handled the screens, he wondered how Japanese craftsmen might have made them a century or more ago. Soon afterward, commissioned to build a piece of furniture to display a collection of family photographs, Hurwitz designed this cabinet, made of pau amarillo with kumiko-style grillwork. To make the door, Hurwitz's assistant, Atsushi Hanano, began by creating long, narrow workpieces shaped like a row of pointed ellipses connected end to end—strings of sausage, Hurwitz calls them. Then he half-lapped these together on the diagonal to form the screen. To see the strings of ellipses clearly, view this photo from the bottom-right corner and at a low angle. Designing the grillwork was considerably easier than making it. It took Hanano more than 20 weeks to complete the door.

—Jonathan Binzen

How They Did It To learn more about how Atsushi Hanano made the grillwork for this cabinet, turn to p. 98.

Pro Portfolio To watch an audio slide show featuring an array of pieces by Michael Hurwitz, go to FineWoodworking.com/extras.