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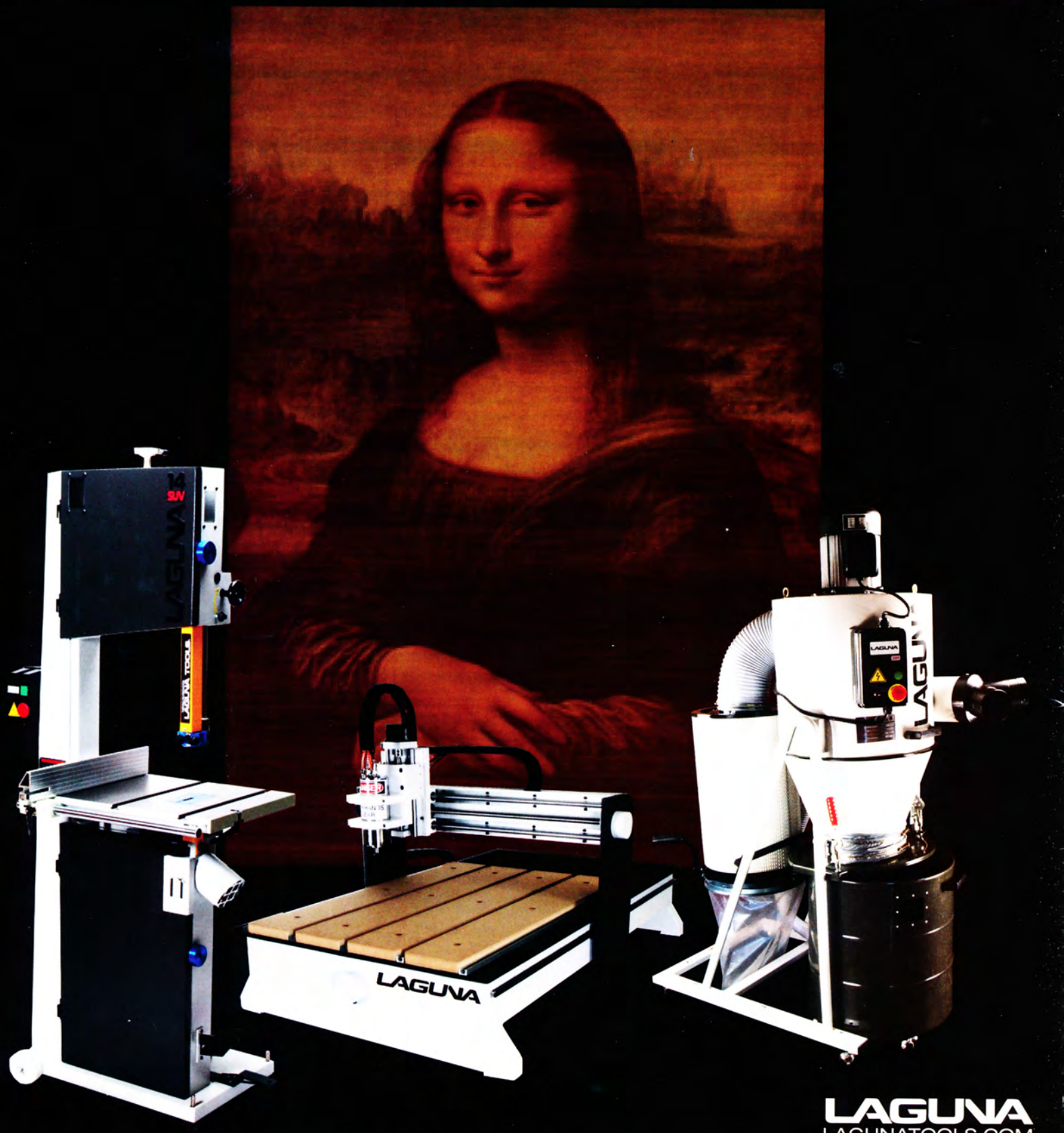
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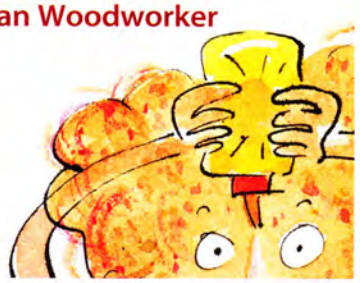
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#168, October/November 2013

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Terrific Tip!

Drill Press Wrench

THE LOCKING HANDLE on my drill press used to drive me crazy. Too short to offer any real leverage, it was difficult to tighten or loosen. And its swiveling handle always seemed to end up in a hard-to-reach position. Sound familiar?

To remedy this, I took out the old bolt and handle and replaced them with a hex head bolt, a ratcheting socket wrench and the appropriate socket. It's a cheap yard-sale wrench, so I just leave it on the drill press.

Now I have a much longer lever to pull on. The ratcheting action allows me to instantly adjust the wrench to a comfortable position.

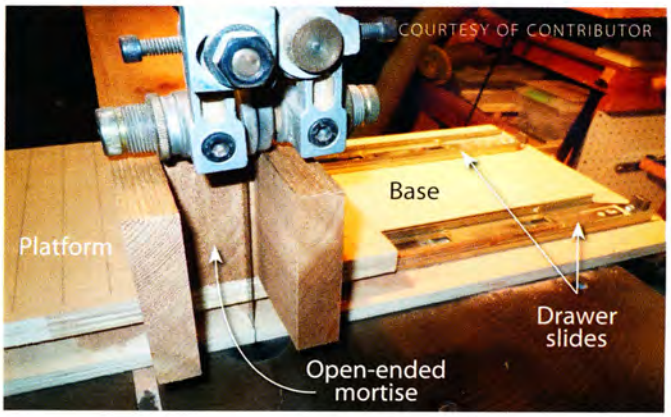
Rob Mousel



Sliding Bandsaw Fixture

A LARGE BRIDLE JOINT requires an open-ended mortise that may be too deep to cut with a 10" tablesaw. I encountered this problem when I used my saw to make bridle joints on an exterior door. I tried to finish the cuts on the bandsaw, but was unsatisfied with the results: Working freehand left mortises with uneven bottoms. I needed a better way to move the workpiece back and forth across the blade in order to nibble off the bottom of the mortise, so I made a fixture to guide the cut. It uses a pair of drawer slides to move a platform side to side on my bandsaw's table.

The fixture has two parts: a base that's clamped to the bandsaw's table and a moving platform. I mounted two drawer slides to the base; their mating pieces are mounted to the underside of the platform. A cleat mounted to the base's underside registers the fixture square to the blade. I marked parallel lines on the platform to make sure the workpiece was positioned square to the blade.



Removing only 1/64" at a time, I can deepen an open-ended mortise by moving the workpiece back and forth on the slides. After several passes I get the depth I need, and my mortise has square corners and a flat bottom.

Mark Thiel



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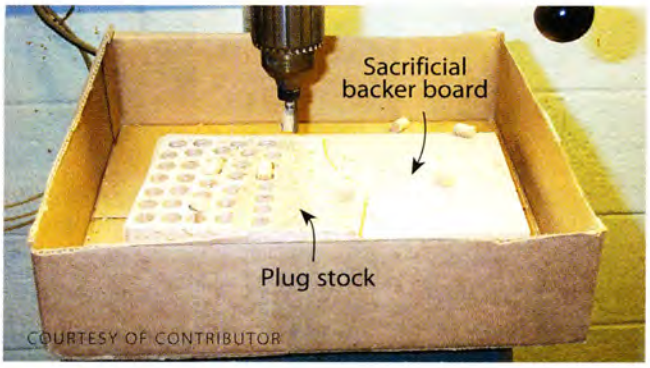
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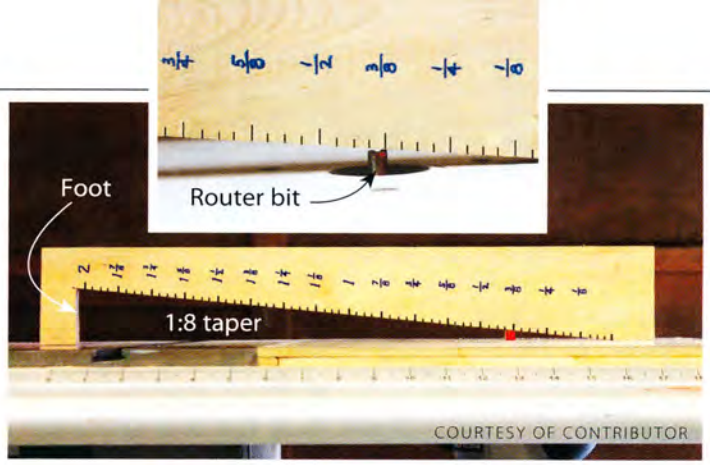


Plug Catcher

CUTTING WOODEN PLUGS used to be frustrating. I like to keep the bit going, but each time I would cut a new plug the previous one would be pushed out of the cutter and fly across the shop, landing who knows where. Too many times, I'd never see it again.

I solved the problem with a shallow cardboard box. I just set it on the table of my drill press and place scrap inside to act as a sacrificial backer board. Now when I cut plugs, they still fly out of the cutter but stay right in the box! As a bonus, all the chips stay in the box, too, for easy cleanup.

Fred Burne



Tapered Height Gauge

PRECISE HEIGHT ADJUSTMENTS on router bits and saw blades can be tricky because it's really hard to see or measure small changes. This 1:8 tapered gauge "magnifies" them. Each mark on the gauge is 1/4" apart, indicating a 1/32" change in height. The gauge goes from 0" to 2", is easy to read and accurate.

I made the gauge from a 3-1/2" x 20" piece of 3/4" maple. The key is making an accurate taper cut. I used my tablesaw and a tapering jig, stopping short of the board's end. Then I cut the foot by hand. Alternatively, the taper could be cut right through and the foot added later.

Mark the horizontal measurements along the top edge of the gauge and transfer them down to the tapered edge. I used a permanent fine-point marker to ink the measurement points.

Bill Wells

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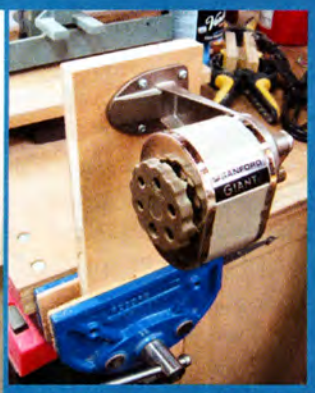
Traveling Pencil Sharpener

A SHARP PENCIL is a must for accurate work, but having a pencil sharpener permanently mounted in one place isn't always ideal. The further away I am from my pencil sharpener, the less likely I am to use it, until my pencil is really dull.

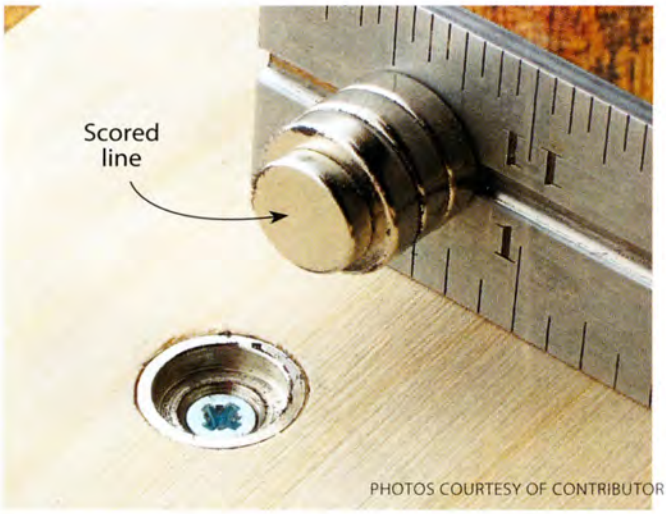
I removed my pencil sharpener from its permanent location on the wall and mounted it to a scrap of wood. Now I just bring it along to wherever I'm working and clamp it in place.

Serge Duclos





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Magnet Mover

RARE EARTH MAGNETS set in a steel cup are perfect for all sorts of uses around the shop, but have you ever had to remove one? Once they're in the cup, the magnets are practically impossible to get out. Here's a trick that works really well.

Stack larger-diameter magnets on a steel rule, file, or other thick piece of steel, making a "super magnet." Slide the stack over the magnet in the cup, and it'll jump right out.

Richard Helgeson

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Hand-Sanding Helper

CLOGGED SANDPAPER is really a pain, rendering useless your sandpaper and your effort. I was mindlessly sanding a project a while ago when I looked at my pile of discarded paper and had a "well, duh" moment. Why not clean the paper with the same cleaning stick I use on my disc sander? Works great!

Brad Holden

SOURCE

Rockler Woodworking and Hardware, rockler.com, 800-279-4441, Abrasive Cleaner Stick 8", #46987, $7.

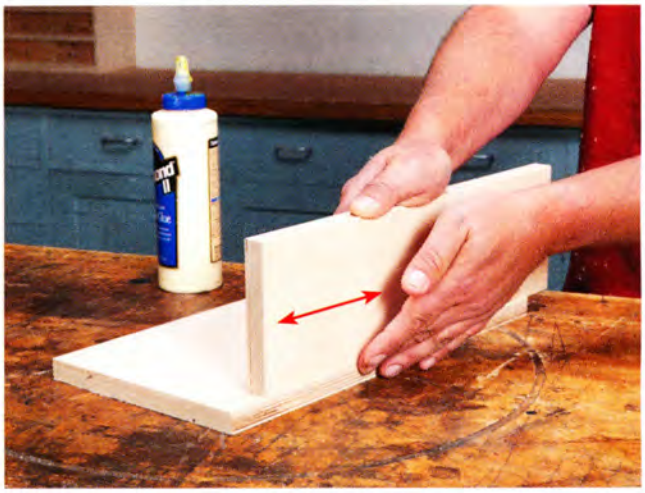


XXL Push Pad

A PUSH PAD is essential for jointing, routing or ripping because it keeps your fingers away from the danger zone. I'm always on the lookout for a pad that grips better than the standard model. I found one at a home center, of all places, but it's not sold as a push pad—it's a molded rubber grout float, used for tiling. It only cost five bucks.

A grout float has a large, comfortable handle. Its pad is 5/8" thick and has a surface area of 38 sq. in., twice as large as my other push pads. The larger the surface area, the better the grip and control I have on my workpiece.

John Cusimano



Glue Now, Fasten Later

INITIALLY LINING UP the edges of two boards for gluing up a jig is pretty easy. But when you add clamps or screws, one board often shifts out of place.

If that alignment is critical, I don't use clamps at all and divide the job into two steps. First, I apply glue and rub the pieces together, using firm pressure. When they're perfectly positioned, I walk away. About a half-hour later, I add the screws. Of course, nothing moves then!

Tom Caspar



Tablesaw Tray

A STORAGE TRAY is a useful addition to any stationary tool. After adding this one to my tablesaw, I don't know how I ever did without it. I made the tray about 3" deep—just deep enough to store the essentials lower than the surface of my saw, but shallow enough to keep items from getting buried. As a bonus, I found all the parts I needed to build it in my scrap bin.

I bolted the tray to the saw using the factory-drilled holes for adding extension tables. The tray's top edge is about 1/8" below the level of the saw, so it doesn't interfere with the fence.

Dana Atwood

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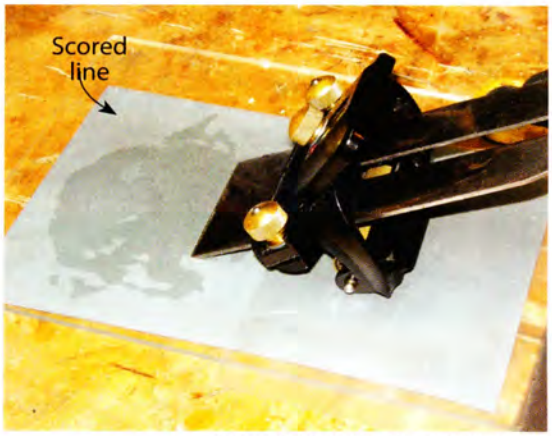
"SCARY SHARP"—sharpening on sandpaper adhered to glass—works really well, but changing paper after it has worn out has always bothered me. I've tried spray adhesives on ordinary sandpaper as well as pressure-sensitive-adhesive (PSA) backed sandpaper. In both cases, I've found that the sheets are very difficult to remove from the glass. So is the glue residue.

When I was a kid, I built kites using paste made by mixing flour and water. I've tried this method on my sandpaper, and the results were just what I wanted. The paper sticks to the glass very well; wetting it slightly makes it easy to remove.

To make the glue, mix flour and cold water to the consistency of paint. Use a brush to spread the glue on the sandpaper, then press the sandpaper firmly onto the glass. Place a sheet of wax paper on a flat surface, then place the glass on top, sandpaper side down. Let the glue dry for 10 to 15 minutes.

When you remove the sandpaper to apply a new sheet, you can easily clean off the paste residue with water. Or you can spray a little water on it, let it soak for a minute or so and re-use it.

Alejandro Balbis



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Precision Miter Saw Cuts

CUTTING PRECISELY to a line on a miter saw isn't easy. Usually, you have to make multiple cuts and sneak up to it. My solution is to use this universal gauge block; one cut is all that's required. The block works for cutting pieces of any length, as long as they're not shorter than the block itself.

To make a gauge block, you'll need a straight board that's long enough to clamp to your saw's fence. Trim the board's left end, then clamp the board to the fence. The left end should be about 3" from the blade, but the exact distance doesn't matter. Score a fine line on the fence precisely following the block's left end (**Photo 1**). Cut the board. Save the offcut—this is the gauge block.

To use the block, mark your workpiece where you want to cut it. Place the block on the workpiece and align one end with the mark. Make a second mark on the other end of the block (**Photo 2**). Remove the block. Place the workpiece against the fence and align the second mark with the line scored on the fence. Make your cut (**Photo 3**).

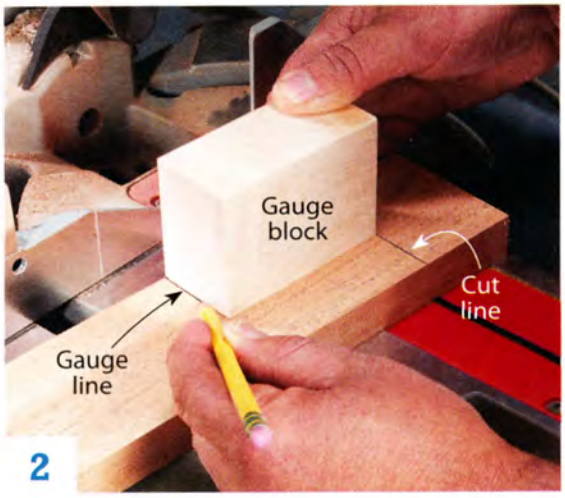
If you ever move the fence, you can use the block to put the fence back in its original location. Just lock the blade in the down position and slide the block up to the blade. Adjust the fence so the scored line is flush with the other end of the block.

Charles Mak



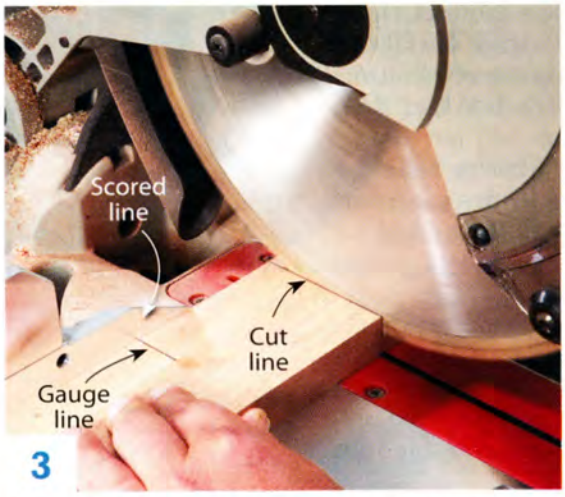
1

Clamp a board to the saw, then score a line on the fence next to the board's end. Cut the board; the offcut becomes a universal gauge block.



2

Place one end of the gauge block on the cut line of your workpiece. Draw a line along the opposite end of the block.



3

Align your mark with the line scored on the fence. The cut will be in exactly the right place!

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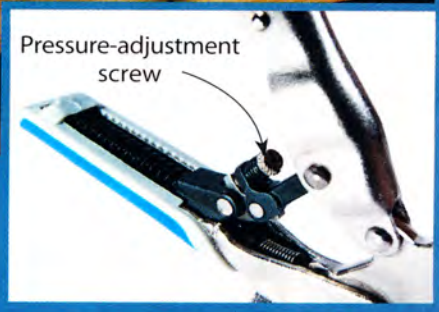
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No-Fuss Locking Clamps





ARE YOU A POCKET-SCREW FAN? If so, you know that locking clamps are extremely handy for holding parts together during assembly. In fact, they're almost indispensable. But they have one annoying feature: If you switch to material of a different thickness, you have to fiddle with the clamp's adjustment screw to change the clamp's capacity, then fiddle some more to get the right amount of pressure. No longer.

The new line of AutoMaxx clamps from Kreg—the company that revolutionized pocket-screw joinery—can clamp material of different thicknesses without any adjustment at all. You just set the amount of clamping pressure once and you're good to go. Seems impossible? Well, it really works.

Automaxx clamps come in two styles: the typical two-jaw variety and the Bench Klamp. The two-jaw clamps come in two sizes: A 3" version can hold material up to 2-7/8" thick, while a 6" version can hold material up to 4-1/4" thick. The Bench Klamp is essentially a high-tech hold-down that mounts on Kreg's Klamp Trak, Klamp Plate or a variety of other Kreg accessories. The Bench Klamp comes in 3" or 6" versions as well; they'll clamp up to 2-1/2" or 4-1/2" respectively.

SOURCE

Kreg, kregtool.com, 800-447-8638, Automaxx Face Clamp 3" reach, #KHC-1410, $30; 6" reach, #KHC-1420, $38; Automaxx Bench Klamp 3" reach, #KKS1120, $38; 6" reach, #KKS1140, $44; Automaxx Bench Klamp system incl. 3" Bench Klamp and Klamp Plate, #KKS1110, $50.

Extra-Wide Blades



SAW BLADES come in two basic varieties: thin kerf and standard kerf. For wider cuts, you use a dado set, right? Well, now you have another option—a thick-kerf blade. The folks at Infinity are manufacturing two of them: one cuts a 5/32" kerf, while the other cuts a 1/4" kerf. Both blades are 8" dia.

Unlike a typical dado set, which leaves behind a trail of scoring marks, both Infinity blades cut a kerf with a flat bottom. This feature makes them ideal for making box joints, rabbets, tenon shoulders, raised panels and more.

Infinity's Thick Kerf Flat-Top Saw Blades are made from cold-rolled steel and have micro-grain carbide tips. According to the manufacturer, they work well in all softwoods, hardwoods, laminates and veneered plywood. Both sizes have 24 teeth and are available with 5/8", 30mm or 1" arbor holes.

SOURCE

Infinity Cutting Tools, infinitytools.com, 877-872-2487, 8" 24-tooth 5/8" arbor .250 kerf Flat Top Blade, #080-250, $90.

EDITOR: TOM CASPAR | PHOTOGRAPHY: COURTESY OF MANUFACTURER UNLESS NOTED

User-Friendly Vacuum

DUST COLLECTION is a higher priority than ever before for most woodworkers. It's not just about keeping the shop clean, of course. It's about our health. We're looking for a machine that will minimize our exposure to the most hazardous dust particles—the finest ones.

Good filtration isn't enough, however. A machine that's awkward to use or maintain will get parked in a corner and ignored, so we're also looking for convenience. We want something that's easy to roll around and hook up to a router or sander—or whatever. We also want it to turn on automatically whenever the tool is operated. "Tool-actuated vacs" like these are growing in popularity, and we're pleased to see a new entry in the field from Makita: The XTract Vac.

Like most vacs in its class, the XTract employs pleated filters to collect and remove small dust particles. Of course, any vac's power is compromised when the filters clog up, so manufacturers have come up with various strategies to keep them clean. The XTract cleans its filters automatically. Every few minutes or so, the vac sends a reverse pulse of airflow through the filters. A rocker valve isolates the pulses to one filter at a time, so that suction isn't interrupted. The sound of this pulsing takes a little getting used to, however. The first few times, it made me jump!

Other features of the XTract are also user-friendly. It has variable suction, so you can dial down the vac's power when you need to. The XTract's capacity is pretty large (12 gallons), but its footprint is small, so it conserves floor space. It's relatively quiet (59 dBa), weighs only 27 lbs. and, oh yes, it will collect water, too. It has a 24' cord and a 16', 1-1/2" dia. hose, so you can travel a long ways without unplugging. I recommend buying an additional 1" hose for hooking up to a portable power tool, like a sander. It's more flexible and less bulky than the larger hose.



SOURCE

Makita Industrial Power Tools, makitatools.com, 800-462-5482, 12-Gallon Wet/Dry Vacuum, # VC4710, $560.

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Versatile Doweling Jig

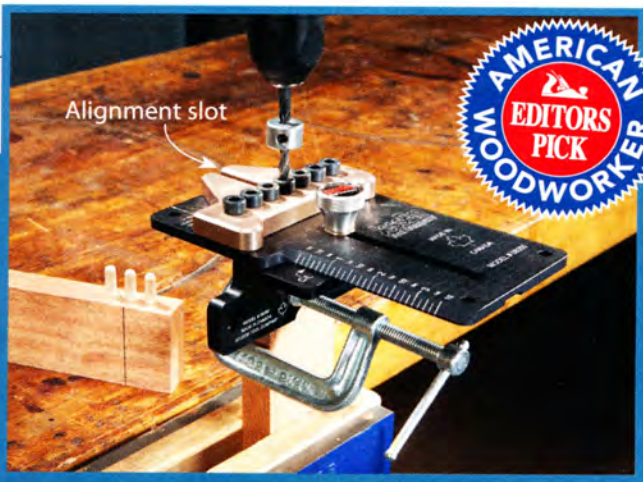


PHOTO BY JASON ZENTNER

JOINING PARTS with dowels is a strong, simple and low-cost method of building furniture. All you need is a jig and a drill. Decent jigs have been around for years, but most are so basic that they don't work well for many applications. Want to join a 3/4" rail and a 2" square leg? You might be out of luck.

A new dowelling jig from JessEm is much more versatile. Rail and leg joinery is no problem, for example, as the jig works with material of virtually any thickness.

Using the jig's unique alignment slot, you can breeze through such tricky situations as drilling alignment pins for table leaves or joining shelves to the sides of a bookcase.

Using the jig's sliding base and a series of detents, you can easily adjust the distance from the face of a workpiece to the dowel holes in precise 1/8" increments. (The jig's range is 3-1/2".) This feature is invaluable for making joints with setbacks or multiple rows of holes.

The JessEm 08350 Dowelling Jig comes with all you need for making 3/8" dowel holes. The 08350K Master Kit includes additional accessories for drilling 1/4" and 1/2" holes. To switch hole sizes, you swap out the plate holding the bushings that guide the drill bit. The spacing between the holes is different for each plate. The 1/4" plate has seven holes spaced 1/2" on center; the 3/8" plate has five holes spaced 3/4" on center; the 1/2" plate has three holes spaced 1" on center.

SOURCE

JessEm Tool Company, jessem.com, 866-272-7492, JessEm Dowelling Jig, #08350, $130; JessEm Dowelling Jig Master Kit, #08350K, $200.

Learn more about the JessEm Dowelling Jig at **AmericanWoodworker.com/WebExtras**

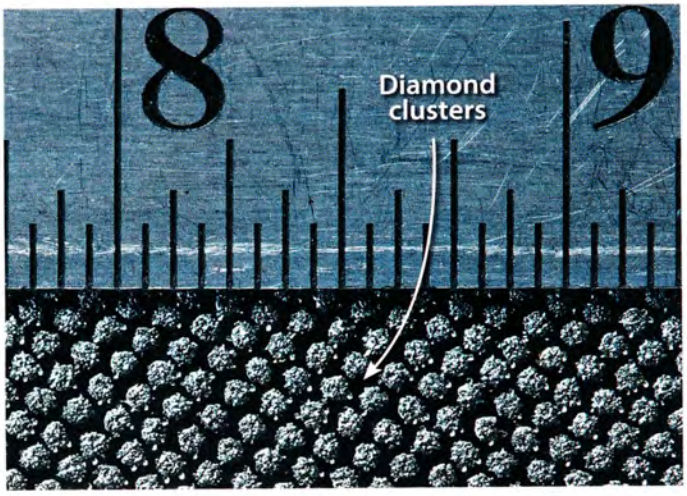
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Atoma Diamond Plates

DIAMOND SHARPENING STONES have enjoyed a steady increase in popularity because they cut fast, never need flattening and last a long time. Here's a new type from Atoma, a Japanese company, which may whet your interest.

Atoma plates are composed of monocrystalline diamonds electro-bonded to a thin sheet of stainless steel. That sheet is then mounted to a 10mm thick aluminum block, which is flat to within .0016". Unlike other stones, where the diamonds are evenly spread, Atoma diamonds are arranged in clusters. According to the manufacturer, this results in a more aggressive cutting action. The clusters are arranged in a pattern that allows steel residue, called swarf, to collect in channels. With this design, the swarf won't quickly clog the plate—a problem with all types of sharpening stones. Atoma recommends using either light oil or water to aid in swarf removal.

Atoma Diamond plates come in three grits: 140 for fast material removal, 400 for creating a primary bevel and 1200 for final honing. (The micron equivalents are 100, 45 and 15, respectively.) The plates are generously sized at 3" x 8-1/4", so they'll easily handle your largest plane blades.

I found these stones made fast work of the tedious chore of lapping the backs of chisels and plane irons. Sharpening was quick as well, and produced a razor edge. They're pricey, like all diamond plates, but when my shop time is limited, efficiency is worth quite a lot!

SOURCE

Lee Valley & Veritas, leevalley.com, 800-871-8158,
Atoma Diamond Plates, 140 grit, #60K82.30, $109; 400 grit, #60K82.32, $99; 1200 grit, #60K82.34, $99.

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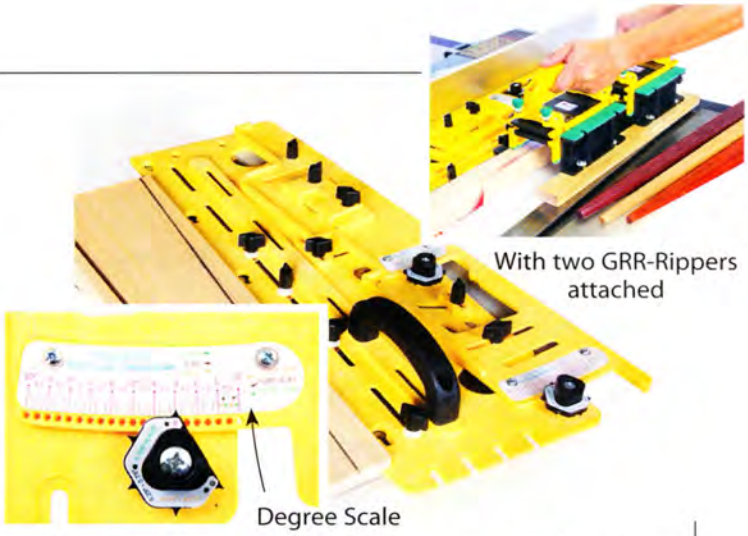
Precision Tapering Jig

SOME JIGS GET STUCK in a design rut—they never seem to change. Take a typical double-armed tapering jig, for example. It's awkward to adjust and a bit scary to use. Taking up the challenge, the folks at MicroJig have created a much more sophisticated device that solves both problems. Their Microdial Tapering Jig has precise, user-friendly adjustment scales and is quite safe to operate. Used in conjunction with MicroJig's GRR-Rippers, your workpiece is held securely and your fingers are a comfortable distance from the blade. Bravo!

With its storm of knobs, dials, gauges, holes and slots, the Microdial looks complex, but using the jig is pretty simple. (Detailed instructions as well as a video are included.) It will handle workpieces up to 32" long.

The Microdial jig is adjustable in three ways. First, using degrees, you can set the jig anywhere from 0° – 10°, with positive detents every 1/8th of a degree. Second, you can use the "rise and run" method of measuring tapers with detents for every 1/16" per foot from 0" – 2" per foot. Third, you can adjust the jig freehand and bypass the detents.

Detents make the jig's taper settings easy to repeat, however. You can effortlessly return to an earlier setting if you need to make a new set of similar parts or make one part over again.



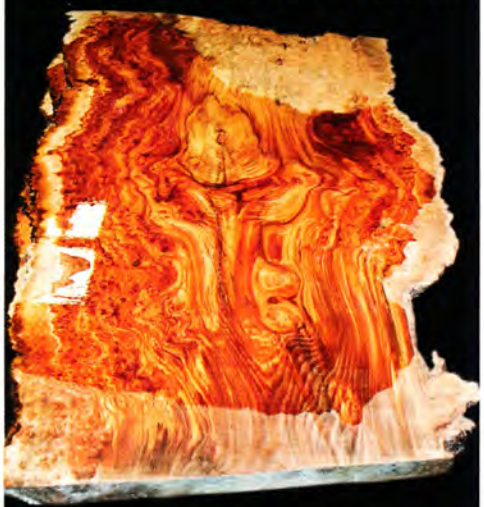
The detents are also invaluable in making legs that taper on four sides. Here's why: If your leg tapers at 2°, for example, you cut the first two sides at 2°. But when you cut the next two sides, you must double the angle to compensate for the wood you're removed. Setting the Microdial to 4°, or double any angle or rise and run, is a cinch.

SOURCE

MicroJig, microjig.com, 855-747-7233, Microdial Tapering Jig, #TJ-5000, $140; GRR-Ripper, #GR-100, $60; GRR-Ripper, #GR-200, $80.

Learn more about the Microdial Tapering Jig at **AmericanWoodworker.com/WebExtras**

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Bob Erickson

Seeking the perfect chair.

by Spike Carlsen

WHILE VISITING with chairmaker Bob Erickson (pictured above with his son, Tor), it seems appropriate to ask, "What chair are you sitting in right now?" Bob explains it's an unfinished Van Muyden chair, part of a dining room set he's building for a client in New York City. Bob's Van Muyden Chair—three-legged, crafted of quilted maple and walnut—is ensconced in the permanent collections of three museums (see photo opposite page, bottom right). Sculptural yet supremely comfortable, it's an extraordinary chair. Which is fitting, because Bob is an extraordinary chairmaker.

No sitting around

Bob's circuitous route to woodworking isn't an unusual one for a person of his vintage. "I started out 40 years ago with a 1949 pickup truck, a circular saw, a sharpened screwdriver for a chisel and no formal woodworking training or education," he explains.

While earning an English degree in Lincoln, Nebraska, Bob took a summer class at San Francisco State, where he rubbed elbows with a woodworker. "Woodworking looked like an interesting thing, so as my college career wound down I started looking around," Bob recalls. He familiarized himself with the work of early craft movement woodworkers, including Sam Maloof and George Nakashima, and began hunting for a woodworking shop where he could learn the craft. After looking in Nebraska, Bob headed back to California, where he met legendary woodworker Art Carpenter. Art introduced Bob to the two local woodworkers who became his mentors.

Along the way, Bob lived and worked in Norway for two summers, where his wife Liese has roots. Clearly, some of that clean Scandinavian design rubbed off. "Some woodworkers say they're not influenced by anything or anybody," Bob explains. "I'm influenced by everyone I meet and everything I see." Bob eventually settled on a plot of land near Nevada City, California, in the foothills of the Sierra Nevada Mountains.

He had early success building stools. "They were fun to make and they sold," Bob recalls. "They were also easy to haul around and ship.

"It was creative work," he continues. "Building stools

EDITOR: TIM JOHNSON | PHOTOGRAPHY: COURTESY OF BOB ERICKSON

required some sophistication and I wanted to make something unique and special. It also seemed to make sense to specialize rather than trying to do it all. All these things pushed me toward chairmaking."

Early in his woodworking journey, Bob met Elam Sharp, an 80-year-old wagon-wheel maker in Oklahoma who also made rocking chairs. "He was a character," Bob says, smiling. "Even at 80 he loved the ladies." Sharp introduced Bob to chairs with curved, flexible back slats that were mortised rather than glued into the headrest. These chairs were rustic but extremely comfortable. With Sharp's blessing, Bob took these ideas and developed them into the contoured, flexible-back chairs that have become his signature.

Today, along with his son Tor and one other woodworker, Bob meticulously hand-crafts about 75 pieces of furniture a year. Nearly 90% of their work is chairs. Tables or desks to go with the chairs comprise most of their remaining output.

Ergonomics of design

Bob has invested an enormous amount of energy refining the design and ergonomics of his chairs. "Owning a chair that's been custom-made to fit is one of life's great pleasures," he says.



Elrod Chair
Quilted maple, bubinga, leather
40" x 24" x 30"

Martinez Recliner
Narra
40" x 36" x 46"





St. Paul Settee
California walnut
38" x 56" x 28"



Van Muyden Chair
Maple, cherry, walnut
38" x 23" x 23"



Gillian Chair
Quilted big leaf maple
40" x 25" x 25"



South Yuba Rocker
Fiddleback maple
43" x 26" x 41"

According to Bob, the chairmaker's goal is to distribute a person's weight over the widest area possible—thighs, buttocks, legs and back—rather than allowing it to be concentrated on a few bones, which is what typically happens when a person sits. There are a variety of ways to do this, Bob says, noting that tractor seats, Adirondack chairs and horse saddles all perform ergonomically well in their own way.

"Each person's 'angle of repose' is unique—and very personal," Bob explains. That's why he prefers to fit each chair to its person, either in his shop or at one of the half-dozen craft exhibitions he attends per year. Although most people fit comfortably in Bob's standard-size chairs, he can make 12 different adjustments—leg height, seat depth and arm length to name a few—to create that ideal angle of repose. He pays particular attention to lumbar (lower back) support. "Sometimes a quarter-inch makes all the difference," he notes.

For simple dining, Bob recommends a fairly upright chair to provide back support, a comfortable hand position and better orientation to the top of the table. For those who prefer two-hour dinners—during which they'll kick back from the table, slouch a little and cross their legs—a different type of chair is better. "Part of building a chair is asking the customer the right questions," he says.

Bob encourages would-be chairmakers to think in terms of flares, curves and tapers. "The human body isn't shaped like a box," he says, "so chairmakers have to think 'outside the box.'"

"Start with something tangible; something real to sit on," he recommends. "Go to a thrift store and find a chair that appeals to you. Buy it, tear it apart and then play around to personalize it: Widen the seat. Shorten the back legs. Change the arm positions or the back."

From chainsaw to mirror finish

A sinfully smooth and luxuriously comfortable contoured seat is one hallmark of an Erickson chair. Once the seat's profile is marked on the top and front edge of a blank, Bob starts the shaping process with the least likely of tools—a chainsaw. Using a deft touch and 40 years of experience, he scores a series of tightly spaced kerfs. Then he rakes the saw back and forth to create the seat's rough depth and contour. He switches to an angle grinder to "get rid of the lumps" and

refine the shape and then finishes with a random-orbit sander.

"It sounds crude," Bob says, "but it works efficiently. In about 50 minutes I can have a seat that's pretty close to being done." Bob's trademark curved back slats are bent-laminated using custom-made bending jigs and boards resawn into 1/8" thick pieces.

Mirror-like finishes are another hallmark. Bob stresses it's the surface preparation before the finish is applied that makes the difference. Typically, a rocking chair receives eight to 10 hours of sanding before it's inspected in direct sunlight—by a different person. Then it's sanded some more. Finally, the surface is polished using a grinder with a random-orbit head and worn-out 400 grit paper. The actual finish consists of three or four coats of tung oil thinned with a citrus-based solvent.

An environmentalist, Bob dries most of his wood in a solar kiln. He loves using local hardwoods, specifically California walnut, Pacific madrone and California black oak. The power for Bob's shop—as well for four nearby houses and another wood shop—is supplied by an array of 37 3' x 5' solar panels. "It's a rare day we need to kick on the generators," he explains.

Passing the wooden baton

Bob's 34-year-old son Tor has been involved in the business to varying degrees since he was 12 years old. But over the past two years, he has begun to take the reins. One might anticipate a degree of discord between father and son, business founder and successor, a person dropping the reins and the one picking them up, but there appears to be none.

"There are some differences," Bob says. "For instance, my bench is a lot messier. But Tor has skills and interests that complement mine, and it makes things more exciting and creative. Everything is getting better, from the finishes to the joinery. These days I come into the shop and Tor tells me what to do. I like it—I get to do the woodworking without all the other responsibilities."

Though they've set their sights on upping production to 100 pieces per year, Tor stresses he and Bob will never lose sight of their primary goal—to learn from each piece to improve the product and the process while creating one of life's great pleasures, one chair at a time.

To see more of the Ericksons' chairs and other furniture, visit **ericksonwoodworking.com**.

Spike Carlsen is the author of *Woodworking FAQ, A Splintered History of Wood* and *Ridiculously Simple Furniture Projects*. For more information, visit **spikecarlsen.com** or **facebook.com/spikecarlsenbooks**.



Tashjian Chairs
Front chair: Bubinga, leather
Back chair: Maple, leather
40" x 25" x 29"



Westport (Adirondack) Chair
European elm
42" x 36" x 26"

by Mary Lacer

Perfume Pen

Carry a favorite fragrance in style.



HERE'S A SIMPLE TURNING PROJECT that makes a thoughtful gift. The process is similar to pen-turning—you drill holes through a pair of blanks, turn them using a mandrel and then insert brass tubes in the holes. But rather than installing a pen cartridge, you install a perfume applicator, which is available as a kit (see Sources, page 28).

In addition to basic turning tools, you'll need a mandrel, bushings sized to match the perfume applicator and a barrel trimmer (see Sources). Pen-turning blanks are available online and in woodworking specialty stores in an astonishing variety of woods and other materials (see "Beyond Solid Wood," page 29). You can also make your own blanks by milling stock to 7/8" x 7/8" and cutting it to length. You'll need two such blanks for this project, one 1" long and one 2-15/16" long.

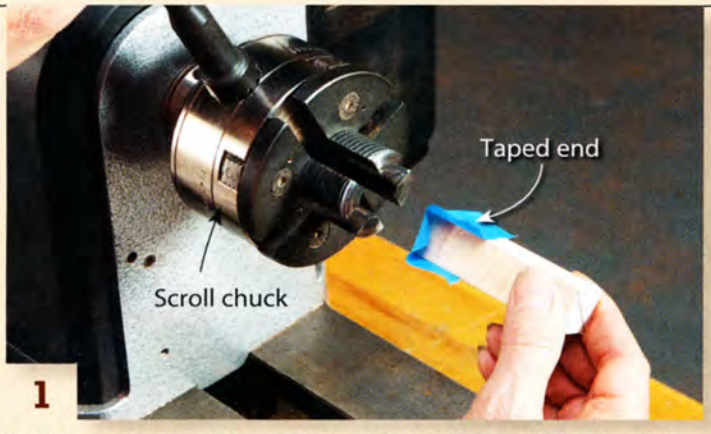
Drill centered holes

Drilling accurate holes through the center of the blanks is the most critical part of this project. You can drill these holes using a drill press and a centering vise, but I get the best results by drilling them on the lathe. The process is different from drilling on a drill press, because when you drill on the lathe, the bit doesn't spin. Instead, you slowly advance the bit into the spinning workpiece. You'll need a scroll chuck and a key chuck for this process (see Sources).

Start by marking an "X" on one end of each blank to locate its center. Cover the other end with tape to keep the bit from blowing it out. Center the blank in the scroll chuck by making sure all four of the jaws engage (**Photo 1**). Then turn on the lathe and mark the center on the end of the blank (**Photo 2**).

Mount the drill chuck in the tailstock and install a 5/16" Forstner bit. Seat the bit as far into the chuck as possible—make sure the chuck is securely seated as well. Then check the alignment (**Photo 3**). As the bit and

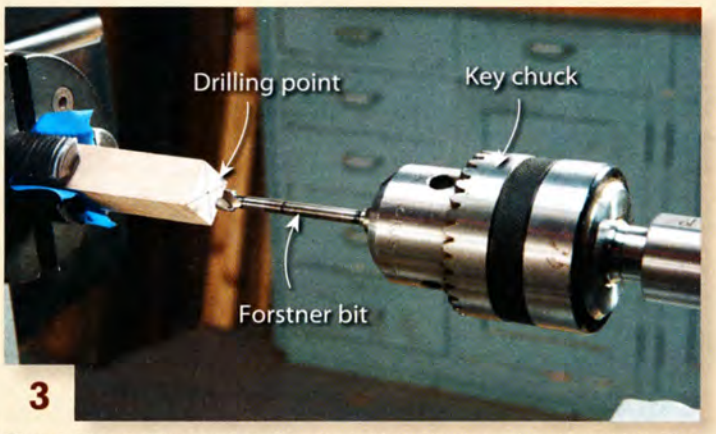
EDITOR: TIM JOHNSON | PHOTOGRAPHY: JASON ZENTNER



Center each blank when you mount it in the scroll chuck—this is critical for drilling perfectly centered holes. Tape helps prevent blowout when you drill through the blank.



Mark the blank's center as it spins. Lay a skew chisel flat on the tool rest and use its point to mark the end.



Check the drilling point after installing the key chuck and bit. The weight of the extended chuck is likely to cause misalignment that must be addressed to avoid ruining the blank.



Position the chuck by hand to align the bit with the center mark when you drill. To avoid overheating, drill through the blank in stages, stopping frequently to clear the chips.

chuck will extend about 6" beyond the tailstock, it's not unusual for the bit to sag. If the bit is even slightly below center, you'll have to lift the chuck to properly center the bit when you drill (**Photo 4**).

Pro Tip When you use a lathe to drill a hole, plan to stop drilling every 1/2" or so to clear out the chips and prevent overheating. Before restarting the lathe, insert the bit back into the hole so it doesn't catch the edge and ruin everything.

It's time to stop drilling when chips start to build up around the outside of the hole or if the lathe bogs down or starts to squeak. Be careful when you retract the bit, as pressure from chips trapped inside may also damage the hole.

When you drill the long blank, you'll also have to stop to remount the bit so it will extend far enough to drill all the way through. Slow down when the bit gets close to the end, so it doesn't cause blowout. It's a good idea to mark the lengths of both blanks on the shaft of the bit, so you'll know when to slow down. You can also avoid blowout by drilling halfway from each end—this method is especially useful for brittle or chalky materials.

Glue in brass tubes

Prepare the brass tubes for gluing by roughing them up with 220 grit sandpaper for better adhesion. Apply medium-viscosity CA glue or 5-minute epoxy to the tube and twist it into the hole—this helps to evenly spread the glue (**Photo 5**). Make sure the tube is housed inside the blank on both ends. When the glue has set, use a barrel trimmer to square both ends of each blank and remove any wood that extends beyond the tube (**Photo 6**). You can work the trimmer by hand, but it's faster and easier to install it in the scroll chuck.

Turn the blanks

Mount both blanks and the three perfume applicator bushings on a mandrel sized to fit your lathe's headstock (**Photo 7**). Insert the mandrel into the headstock and bring up the tailstock to support the other end.

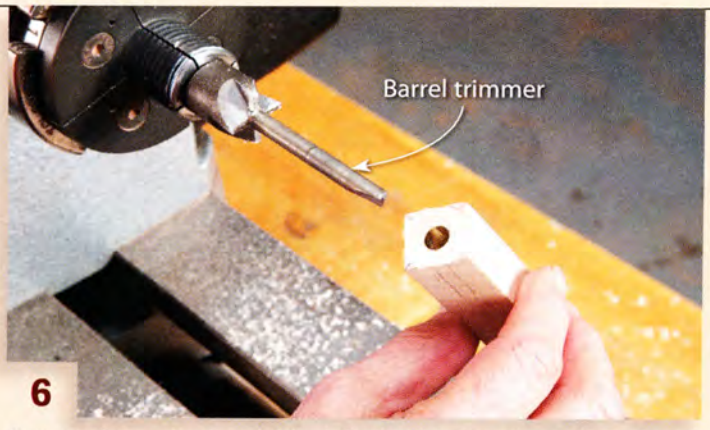
Use a roughing gouge to turn the blanks to a cylinder. Then switch to a detail/spindle gouge to create contours on both the barrel and cap that will make the pen attractive and comfortable to hold (**Photo 8**). Use the skew chisel to add a small embellishment or two. Finish the job by turning down the ends to meet the bushings, so the turned parts will match the caps that come with the pen applicator kit.

Sand and finish both parts while they're still on the



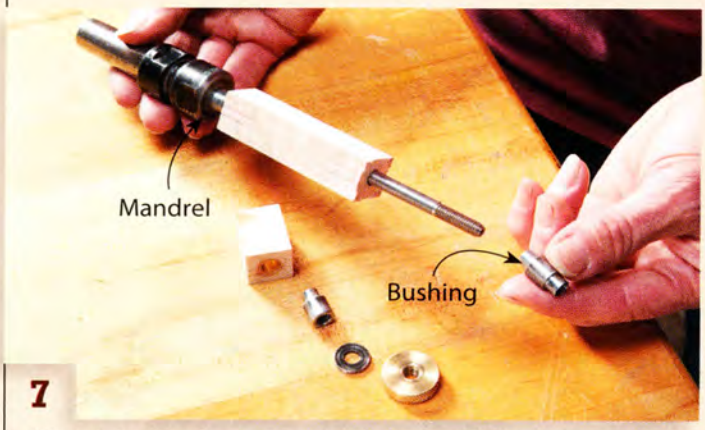
5

Install a brass tube in each blank using a twisting motion and CA glue. The brass tubes are part of the perfume applicator kit.



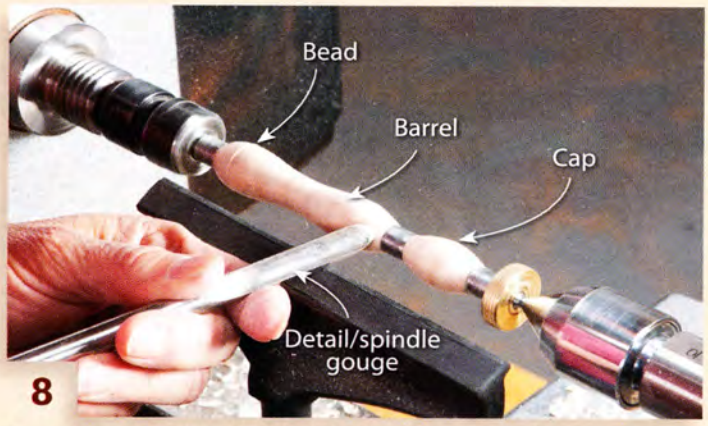
6

Square the ends of each blank flush with the tube, using a barrel trimmer installed in the scroll chuck.



7

Mount the blanks on a mandrel along with bushings on both ends and in between the blanks. The bushings are sized to match parts included in the perfume applicator kit.



8

Turn down the ends to meet the bushings after shaping the barrel and cap. A concave shape makes the barrel easy to grip. A delicate bead created with the skew adds a sophisticated touch.

lathe (**Photo 9**). Start with 180 grit sandpaper and work up to 600 grit. For non-oily woods such as the figured maple shown here, you can make a finish that's tough, durable, water resistant and easy to apply with a soft cloth: Thin two parts of Behlen Rockhard Table Top Varnish (see Sources) with one part mineral spirits. Three light coats of this finish, sanded between coats with 600 grit sandpaper, will provide sufficient protection. It's best to wait 12 hours between coats. Oily woods, such as cocobolo, bocote or ebony, require only wax.

Assemble the pen

Decide how to orient the two parts by studying the grain: Check each end of the cap against both ends of the barrel to find the best match. Then assemble the pen. The perfume applicator kit includes end caps, a threaded cap, a nib, a reservoir, a ceramic applicator and an O-ring. The nib and one of the end caps are threaded so the pen's barrel and cap will screw together. Make sure to install these parts to orient the cap and barrel with the best grain match.

Use a clamp or vise to press the metal parts onto the turned parts (**Photo 10**). Insert the reservoir in the barrel and press on its end cap and threaded nib. Then install the ceramic applicator and finish assembling the pen (**Photo 11**).

To fill the pen, simply dip the applicator into a bottle of your favorite perfume (**Photo 12**). Each time you refill the pen, clean the applicator tip by soaking it in rubbing alcohol.

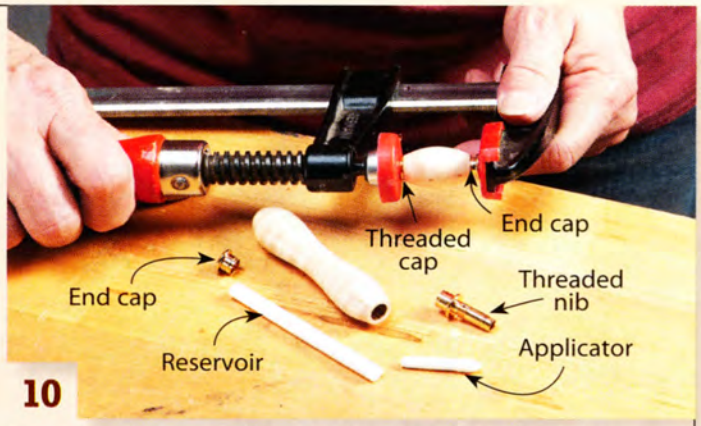
SOURCES

- Packard Woodworks, packardwoodworks.com, 800-683-8876, 24k Perfume Applicator Kit, 154903, $3.50 ea., Perfume Applicator Bushings, 154903B, $5.95; Adjustable Pen Mandrel, #2 MT, #154795, $19.95; Barrel Trimmer, 7mm, #154993, $16.95; Oneway Talon Scroll Chuck, #112670, $232; 1/2" Key Chuck, #2MT, #111012, $36.95.
- MSC Industrial Supply Company, mscdirect.com, 800-645-7270, Novus Plastic Polish, Fine Scratch Remover, #74766551, $9.93; Heavy Scratch Remover, #74766585, $11.45.
- Rockler Woodworking and Hardware, rockler.com, 800-279-4441, Behlen Rockhard Table Top Varnish, Qt, Gloss Finish,#44539, $24.49.

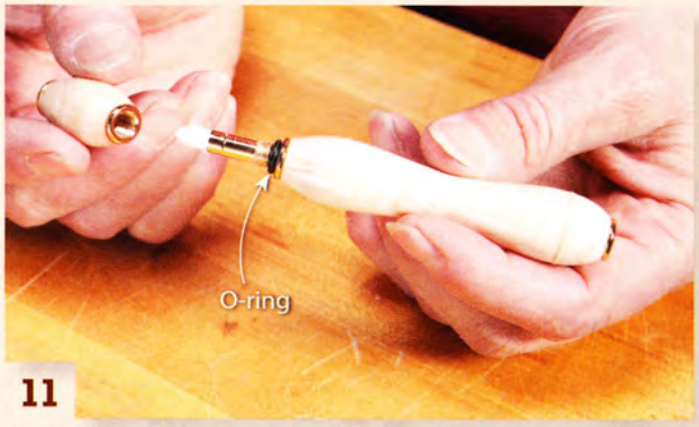
Mary Lacer has been turning wood for more than 30 years and has taught and demonstrated in a number of turning programs across the country. Mary lives near River Falls, Wis.



Apply the finish while the barrel and cap are still on the lathe. Varnish provides durable protection for non-oily woods. A buffed wax finish is sufficient for oily woods.



Assemble the cap and barrel using parts from the perfume applicator kit. Insert the reservoir in the barrel before installing its end cap and nib. Then press the applicator into the nib.



Mount the kit's O-ring on the nib. When the cap screws on, the O-ring creates an airtight seal so the perfume won't leak or evaporate.



Dip the applicator in perfume and let it wick up into the reservoir. It takes about a minute to fill the pen with perfume.

Beyond Solid Wood

Pen-turning blanks are available in an astounding variety of alternative materials, including laminated wood, resin-injected wood, black palm, corn cob, denim, acrylic, inlace acrylester, polyester, polymer clay, RhinoPlastic acrylic, artisan glass fiber, TruStone, carbon fiber, laser-cut inlay, antler, buffalo horn and even rattlesnake skin.

Most of these materials require working slowly and making very light cuts with very sharp tools. Aggressive cuts are likely to cause chip-out that can be difficult or impossible to repair. When I work in alternative materials I sometimes use a woodturning scraper for the last cuts to avoid chip-out that could ruin the piece. Some materials are a bit chalky—using CA glue before cutting helps firm up the surface.



Plan to sand alternative materials to 600 grit and then use two types of polish developed for plastics to remove the scratches—a heavy scratch remover and a fine scratch remover (see Sources).

Hot Times in Sun City



A thriving woodworking club contributes to the good life at this retirement community.

I LIVE IN SUN CITY, a retirement community of about 6,000 homes located north of Austin, Texas. It can seem as if we also have more than 6,000 golf carts, as residents are constantly on the go from one activity to another. My favorite is the Sun City Woodworkers Club. This club was included as part of the original plan when the community started 15 years ago and it has steadily grown with the community since then. We now have more than 500 members, including many women, and after its latest expansion, our clubhouse includes 4,400 square feet of floor space, with every type of woodworking tool you could ever want—stationary tools, power tools, hand tools, you name it.

We maintain a reserve fund to support the club, and members pay a small annual fee. Most of our machinery is acquired through our equipment committee, with the approval of the executive board. For convenience, we order lumber from a local yard and resell it to members. We also use this lumber for the projects that we sell at our fall craft fair. Members build the projects, and proceeds from the fair are used to support our local charities.

The camaraderie of working and learning with other members is one of the club's greatest attractions. New members (including many who are also new to woodworking) are required to take a safety and orientation class as well as a one-on-one session with a designated trainer/coach to insure proper, safe use of all tools and materials. A series of enhanced training classes are also available, including routing procedures, box making, picture-frame making and the like. A safety monitor is on duty at all times the shop is open to make sure the tools are used correctly. Many members are also willing and able to give helpful advice.

EDITOR: TIM JOHNSON | PHOTOGRAPHY: RICHARD TENDICK, UNLESS NOTED









BOB KELLSTRAND



The desire to help others has led the club into two outreach programs. Each year we make and donate between 700 and 800 wooden toys to several local charities through our Toys for Tots program, which started about 11 years ago. Club members organize into teams, so that experienced members can assist those who are new to toymaking and operating shop equipment.

Our club also partners with the American Cancer Society's Camp Discovery, a program that allows kids with cancer to meet other kids in the same situation and participate in activities designed to help them deal with their illnesses. Club members choose an item to make as kits for the kids to assemble and finish while attending the camp. Club members make the parts, package and deliver the kits and help the kids assemble them.

As the club's current president, I'm always telling other Sun City residents how interesting and rewarding retirement can be—when you're a woodworker!

Bob Kellstrand
Georgetown, Texas

Tell Us About Your Shop

Send us photos of your shop, a layout drawing and a description of what makes your shop interesting. Tell us what you make in it and what makes your shop important to you. If "My Shop" features your shop, you'll receive $100.

Email your entry to **myshop@americanwoodworker.com** with digital photos attached. Or mail your description with digital photos on a disk to My Shop, American Woodworker, 1285 Corporate Center Drive, Suite 180, Eagan, MN 55121. Please include your phone number. Submissions cannot be returned and become our property upon acceptance and payment. We may edit submissions and use them in all print and electronic media.

Enigma Cube

A perfect project for a rainy day.

by Tom Caspar



"HOW DOES IT COME APART?" You'll be asked this question each time you hand one of these cubes to a friend. You'll answer, "Well, you just hold it like this, then pull." Your ability to read wood grain will help you to quickly identify which sides to grab. Your friend will be mystified.

That's just one of the small pleasures in making these airy nothings. They really don't have a purpose other than to tickle your fancy.

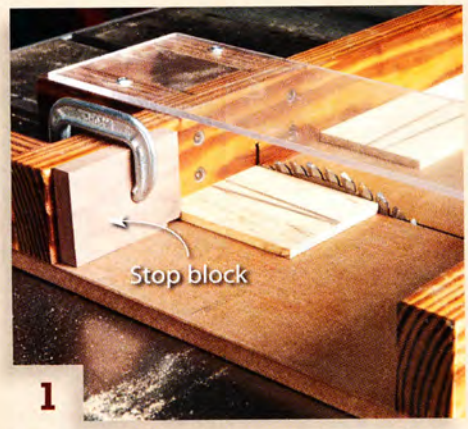
Start with a strip of wood that's 1/8" or 1/4" thick, 2-1/2" to 3" wide and 24" long. Its edges must be straight and parallel. I used spalted maple, but any wood will do. Although you can certainly mill the wood yourself, it's much easier to buy pieces that are pre-cut to these dimensions.

Draw a long triangle on the strip before cutting it into pieces. This mark will help you reassemble the pieces in the same order later on. Install a crosscut blade in your saw, then cut the strip into pieces that are precisely square (**Photos 1 and 2**).

Set up the saw for cutting miters around all four sides of each piece (**Photos 3, 4 and 5**). Switch to a general purpose or combination blade. This is a finicky operation—I found that riding the pieces on a stout support board worked best. My board is held in place with a locking bar borrowed from a featherboard (see Source).

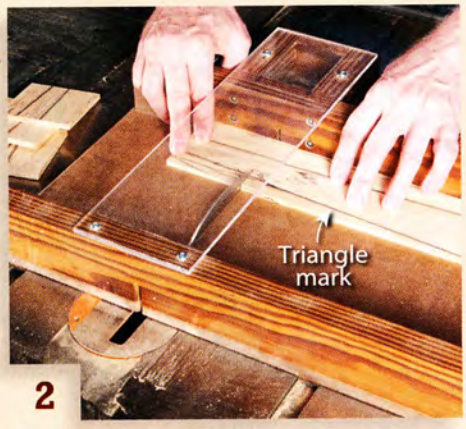
You might think that the pieces should have sharp edges when you're done, but that's not practical on pieces this small. As you push each piece past the blade, a sharp edge would dive right into the kerf in the sub-fence, ruining each cut. It's far better to leave a blunt edge, one that's only about 1/64" wide. Sneak up on this setting, moving the fence a little bit farther from the blade each time (this widens the cut). The best strategy is to remove half of the waste first on each piece, then gradually move the fence away from the blade, make a cut, and see how close you get to the goal.

PHOTOGRAPHY: JASON ZENTNER



1

Set up a stop block for cutting the cube's pieces from one long strip. Cut the first piece about 1/4" extra long, then turn it sideways to position the block.



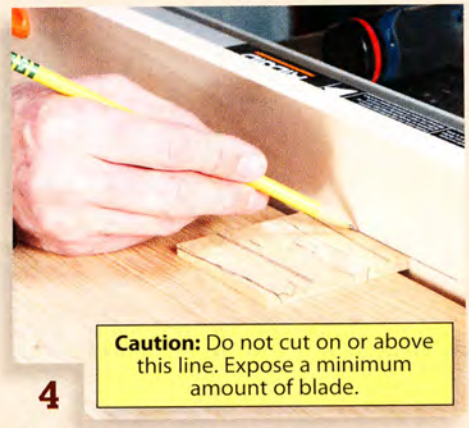
2

Cut the strip into six pieces. The strip is marked with a long, tapering triangle so you can reassemble the pieces in the correct order later on.



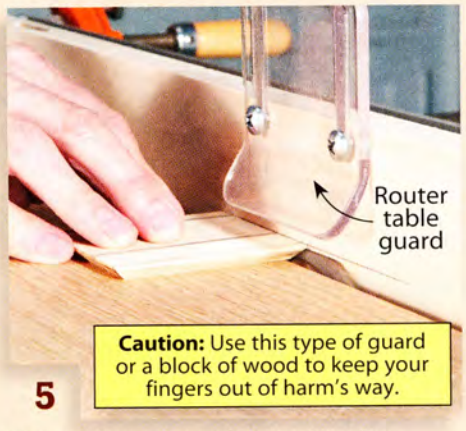
3

Set up the tablesaw for mitering each piece. You'll need a subfence and a support board. A locking bar that nests in the saw's miter slot prevents the support from sliding.



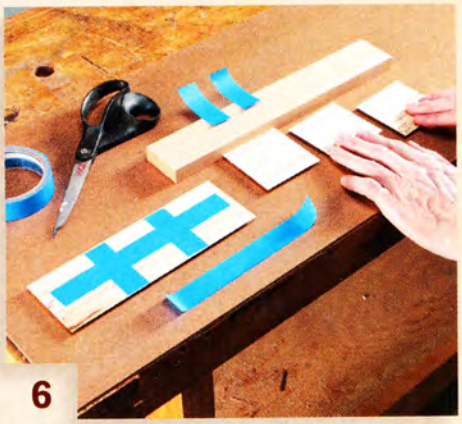
4

Mark the thickness of your stock on the subfence. Adjust the position of the fence so the blade, tilted to 45°, cuts a hair below this line.



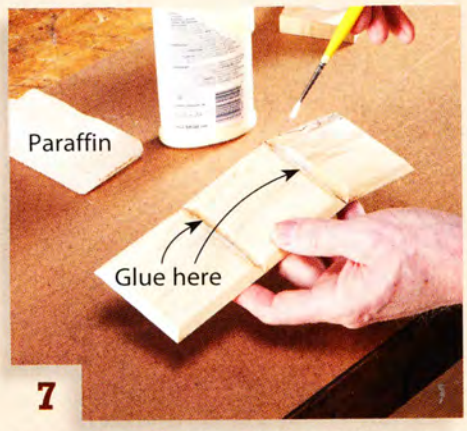
5

Saw all four edges of each piece. You don't want these miters to come to a sharp point—a very narrow, uncut edge should remain.



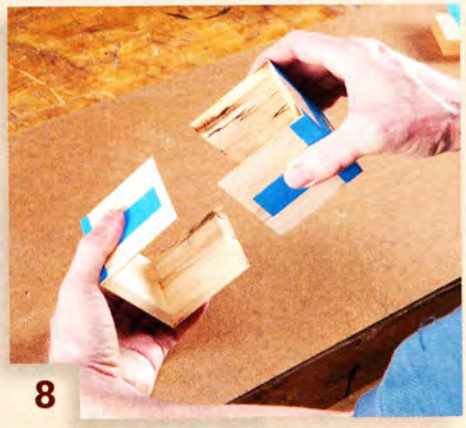
6

Arrange the pieces in the correct order, then divide them into two sets of three. Align the edges of each set against a block, then tape the pieces together.



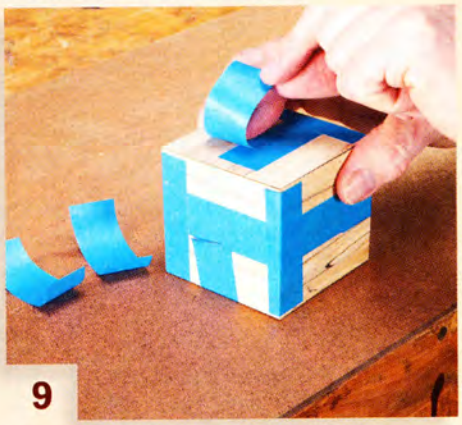
7

Turn over each set and rub paraffin wax on the inside faces and outer edges of the three pieces. Apply glue on the edges that are taped together.



8

Fold the two sets and slide them together.



9

Tape the cube shut, so all the joints are tight. Let the glue cure overnight, then see if you can figure out how it comes apart!

Arrange the pieces back in order, then tape them together (**Photo 6**). Wax the inside faces and outside miters—this makes removing glue squeeze-out much easier during assembly. Glue the inside miters, then slide the cube together and tape it shut (**Photos 7, 8 and 9**). Wait overnight, then remove the tape and sand the cube's corners and faces.

You'll probably have to make a few practice cubes to master the technique, but if all has gone well, the cube's joints will be invisible—and it will slide apart with a most satisfying sound.

SOURCE

JessEm, jessem.com, 866-272-7492,
Paralign Feather Boards, #04015, $25.

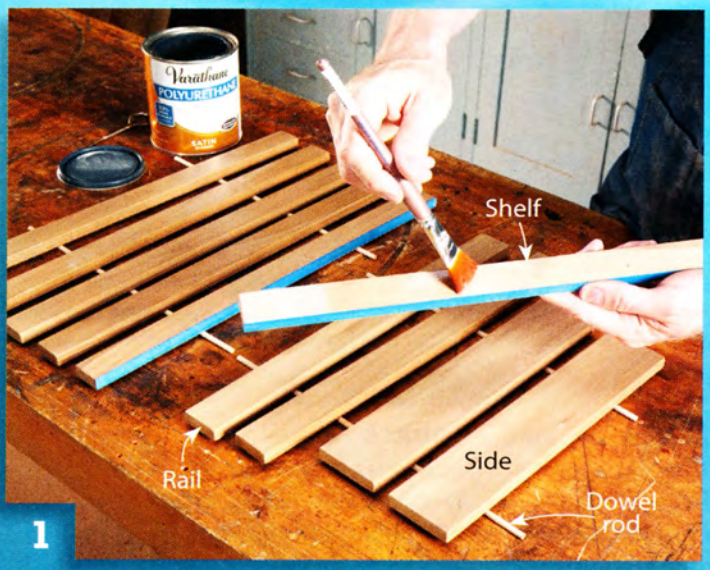
Watch all the steps in making this fun project at **AmericanWoodworker.com/WebExtras**

1-2-3 Wine Rack

It only has three parts!

by Redge Estell





1

Apply finish to all of the pieces after you cut them to final size. Tape the back edges of two shelf pieces; these surfaces will be glued to the rails later on.

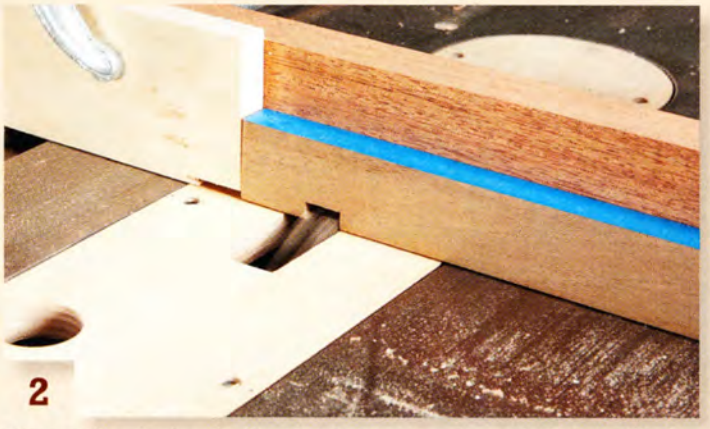
THIS QUICK PROJECT is finished before you start. How's that? Well, bear with me: You put finish on all of the parts before you actually cut any joints. It's as simple as 1-2-3.

This wine rack is designed to hang on a wall. It's sized to fit under a bank of kitchen cabinets, but you could easily make a taller version for holding more bottles by lengthening its sides and adding more shelves.

I built the rack from a few sapwood offcuts of kiln-dried walnut—wood that I usually throw away. Their pale gray color is perfectly suited for this project, however. Visually, the rack recedes to let the wine take center stage.

Start building the rack by cutting the sides (A), shelves (B) and rails (C) to final size. Put tape on the back edges of two shelf pieces. Trim the tape flush with a utility knife. Sand the surfaces and round the edges of every piece with 120 grit paper. Apply three coats of finish (**Photo 1**). I used a water-based poly because it didn't darken the wood—even the end grain stayed light. This

EDITOR: TOM CASPAR | PHOTOGRAPHY: JASON ZENTNER | ILLUSTRATION: FRANK ROHRBACH



Cut notches in the shelf and side pieces using a dado set. All of the notches are the same width and depth.

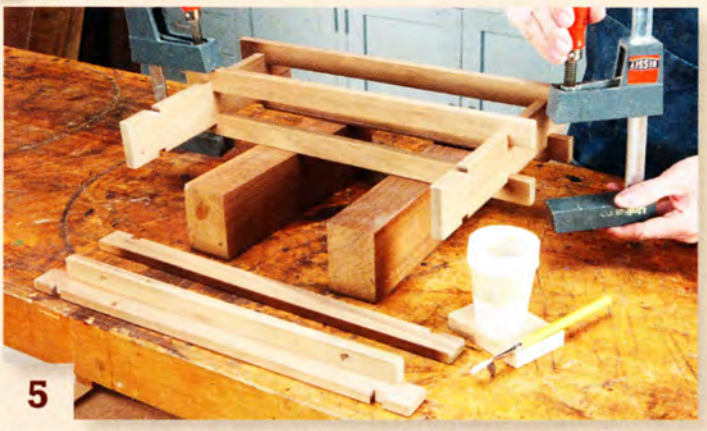


Rabbet the inside faces of the rails using a subfence.

Pro Tip: On this subfence, the clamp heads don't get in the way—they nest in holes between its four layers of 1/2" thick MDF.



Glue the two shelf pieces to the rails. Of course, you have to remove the tape from the shelf pieces first!



Glue all of the shelf pieces to the ends of the wine rack. It's very easy to clean up glue that squeezes out of the joints—it will pop right off the finish.

type of finish dries very fast; you can apply one coat to each surface in a single session.

Next, cut notches in the sides and shelf pieces (**Photo 2**; Figs. B and C). Adjust the width of your dado set to match the thickness of the wood. Raise the blade 1/4" high and use a stop block to cut each set of notches. Mark the bottom end of the side pieces. When you cut notches in the middle of these pieces, place the marked ends against the stop block.

Cut rabbets in the rails (**Photo 3**; Fig. D). The rabbets are the same width and depth as the notches, so you don't have to adjust the dado set. Drill holes in the rails for mounting the rack to a wall. Remove the tape from the two shelf pieces, then glue them to the rails using spring clamps (**Photo 4**). Reinforce these joints with small screws (Fig. A). Glue all the shelves in place (**Photo 5**). That's it!

Cutting List

Overall Dimensions: 11-1/2" H x 17-1/4" W x 3-3/4" D

Part	Name	Qty.	Th x W x L
A	Side	2	1/2" x 2-1/4" x 11-1/2"
B	Shelf	6	1/2" x 1-1/8" x 17-1/4"
C	Rail	2	1/2" x 1-3/8" x 15-1/4"

Fig. A Exploded View

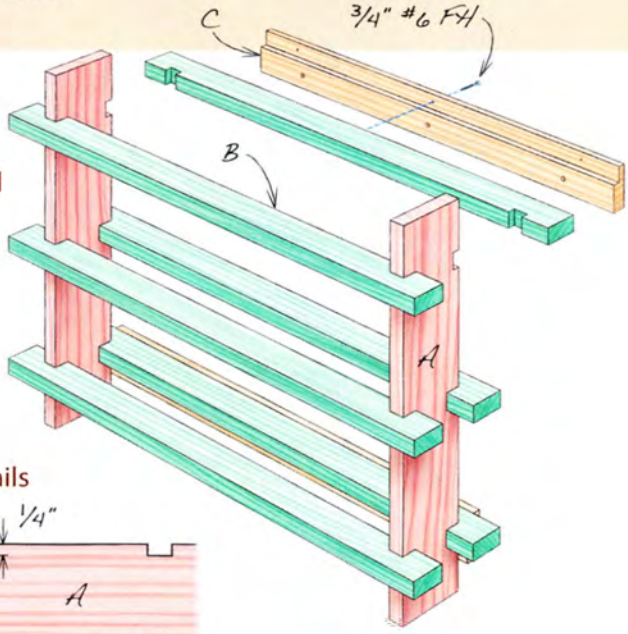


Fig. B Side Details

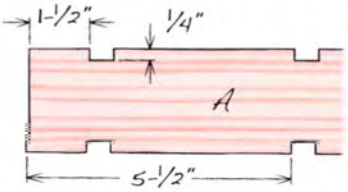


Fig. C Shelf Details

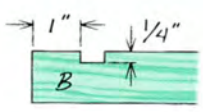
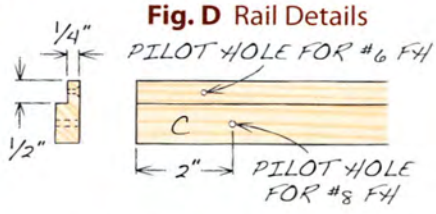


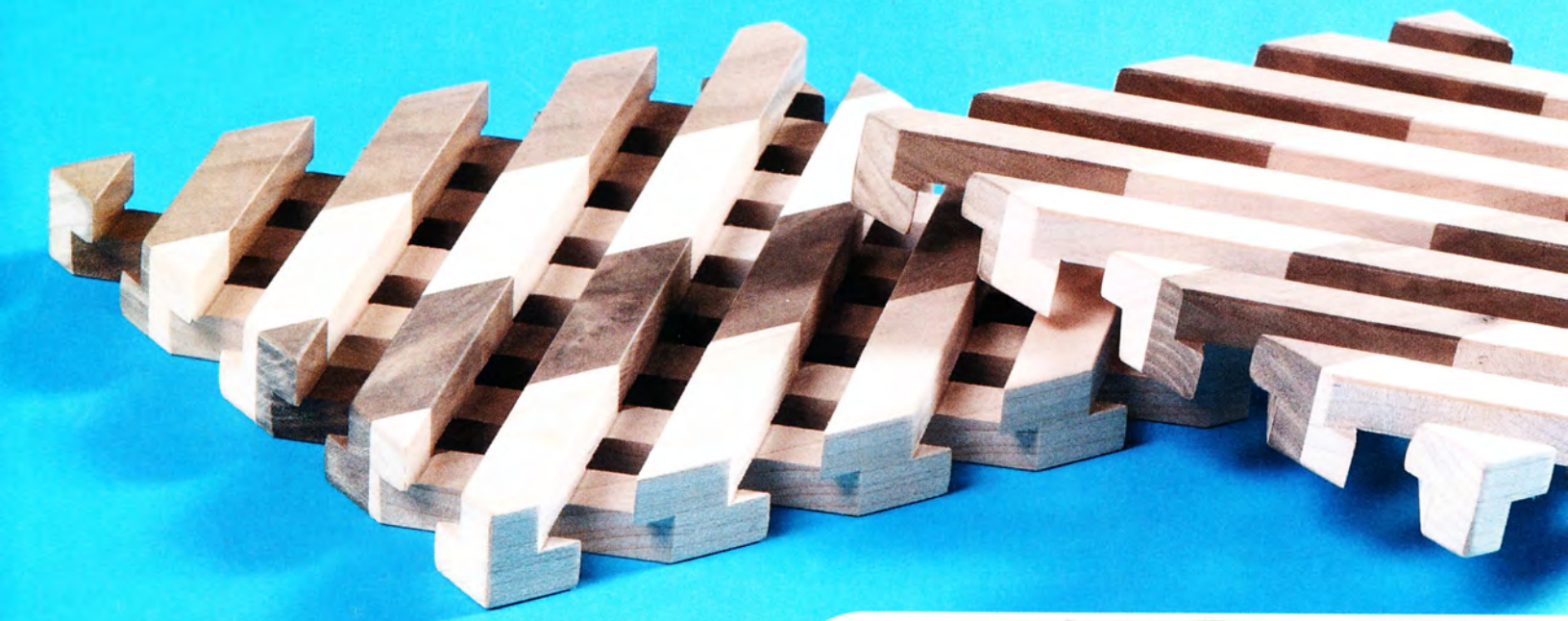
Fig. D Rail Details



Waffle Trivets

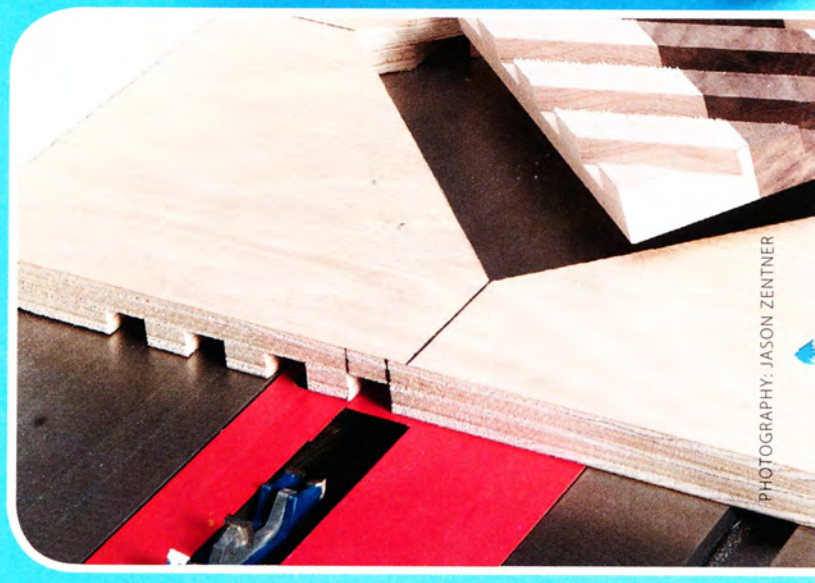
So easy you'll want to make one for everybody on your list!

by Brad Holden



PICTURE THIS: You've promised to make gifts for a dozen people. You've been busy with a hundred other things, and now time is running out. You don't even have a whole lot of wood to rummage through, but that scrap pile looks mighty tempting.

If this situation sounds familiar, check out my solution: waffle trivets. All you need to make them is a tablesaw, a dado set, a shop-made plywood frame and some random strips of wood.



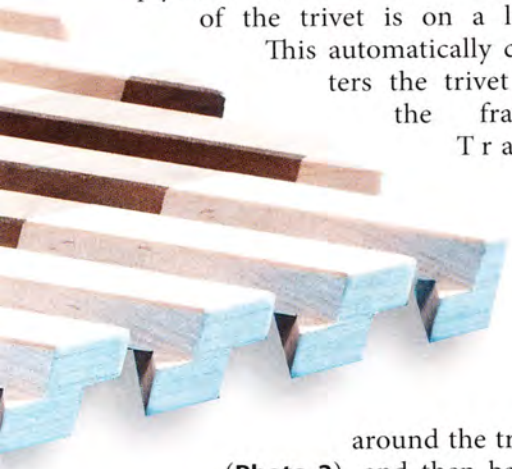
PHOTOGRAPHY: JASON ZENTNER

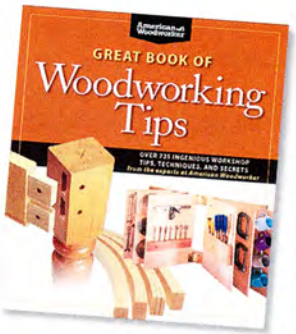
Guide all the dado cuts with this plywood frame. The angle and spacing of the cuts can easily be changed to make waffle patterns with different designs.

Although you can vary their sizes or shapes, I made my trivets 6" square, to keep everything simple. A single 6" wide board would work fine, but I opted to use up some odd scraps and glued up strips of maple and walnut (**Photo 1**). I like their contrasting colors and resulting visual interest. If you use glued-up strips, plane the blanks after the glue dries so that all of the surfaces are flush. Cut the blanks into 6" squares.

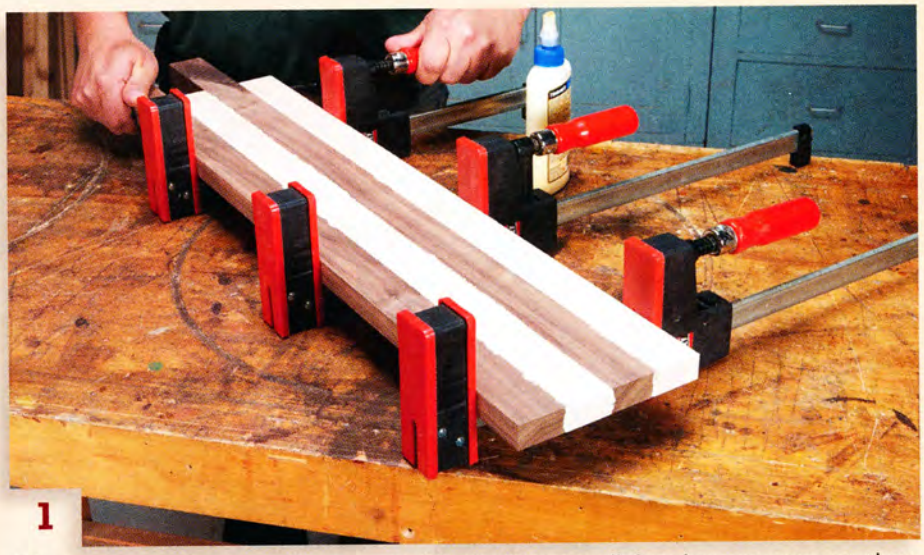
Using a plywood frame to house the blanks is the safest and easiest way to cut dadoes in a small part like this—especially when you're cutting at a 45° angle. For 6" trivets, cut a 12" plywood square, using plywood that's the same thickness as your trivets.

Mark centerlines on the plywood. Position the blank on the plywood so that each corner of the trivet is on a line. This automatically centers the trivet on the frame. Trace around the trivet (**Photo 2**), and then bandsaw the trivet's outline (**Photo 3**). Test the trivet's fit in the cutout, and adjust the frame as necessary.



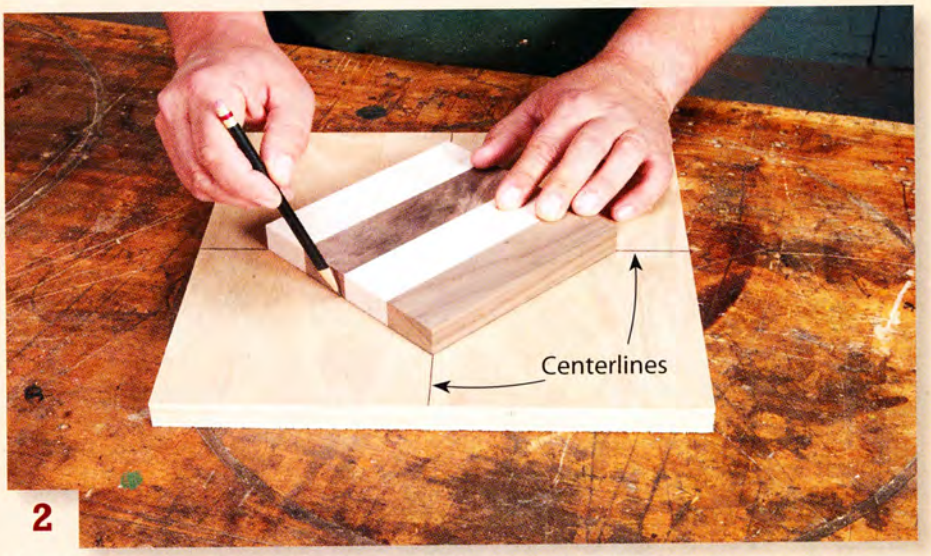


Find 650 ingenious tips, tricks and techniques in the 330 pages of this handy reference book. It's available at **awbookstore.com**



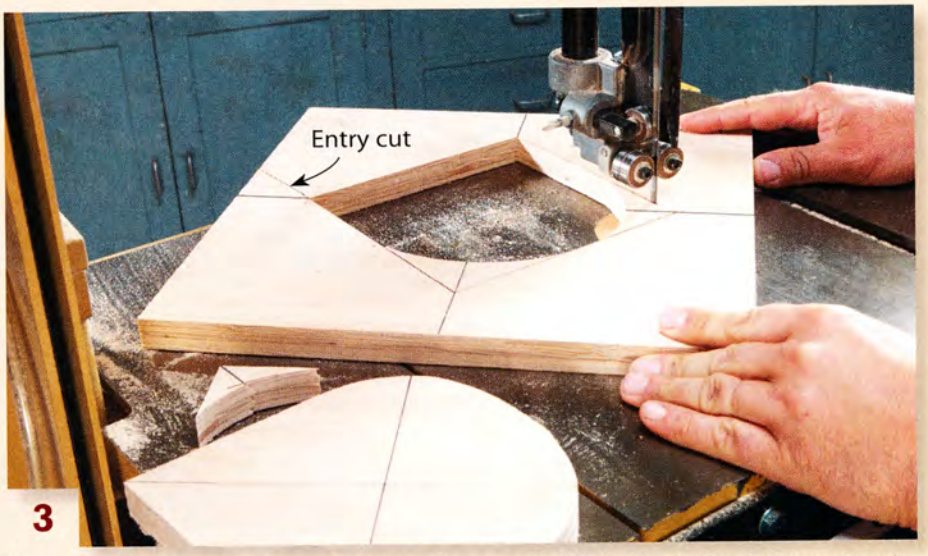
1

Glue up long strips for making square blanks. Remove all the glue squeeze-out, then flatten one face on a jointer or by sanding. Run the other side through a planer.



2

Trace one blank on a square piece of plywood. Align the blank with centerlines marked on the plywood.

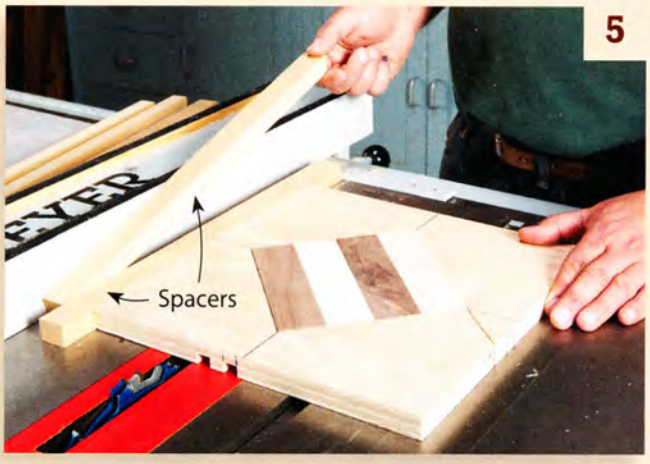


3

Bandsaw the blank's outline, forming a frame to hold the blanks for dadoing. Check your blank's fit in the opening and adjust the frame as needed.



Cut the first dado. Use push pads to firmly hold the blank down on the saw's table.



Insert a spacer after cutting each dado. Cut one half of the blank, then rotate the blank 180° to cut the other half.



Flip the trivet, rotate it 90°, and then dado the other side.



Ease all the edges using a block plane or sandpaper.

Initially, I tried cutting the waffle patterns on my router table. (I prefer using the router table whenever possible because it doesn't tie up my tablesaw.) Dadoing the trivet's first side with a straight bit worked fine,

A plywood frame and spacers make dadoing fast, safe and precise.

but when I dadoed the flip-side the tearout was awful. So much for the router table scheme! I switched to the tablesaw.

If you, too, use your saw, here's the plan: Install a 1/2" dado set, then raise it to make a dado that's half the trivet's thickness plus 1/64". Decide what spacing you want. (My dadoes are spaced 1/2" apart.)

Mark the first dado's location on the frame's leading edge, and line these marks up with your dado set. I wanted full corners on my trivets, so I made the first dado 1/4" off the centerline (**Photo 4**). That way, I'd have a 1/2" wide strip running corner to corner on both sides of my trivets.

Use spacers to simplify the cutting process (**Photo 5**). (My spacers are 1" wide and made from MDF. I cut four.) After cutting each dado, insert a spacer between the frame and the saw's fence. Using this method, you'll only have to set the fence once. When you've cut dadoes all the way across one half of the trivet, turn off the saw and lift the trivet out of the frame. Rotate the trivet 180°, but don't flip it. Cut the dadoes in the other half of the trivet by removing spacers one at a time.

When the dadoes are all cut on the trivet's first side, take the trivet out of the frame, flip it over, and rotate it 180° (**Photo 6**). Cut all the dadoes on the second side, using the same method you used on the first side.

After all the dadoes are cut, ease their edges using a block plane or sanding block (**Photo 7**). Trivets are meant to hold hot pans right out of the oven, so I didn't apply a finish.

Contemporary Cutting Board

Contrasting splines turn an end-grain cutting board into a work of art.

by Brad Holden



IF YOU LIKE MAKING gifts that actually get used, a cutting board is the perfect choice. Here's one that's sure to please. Made from maple and walnut, it has a distinctive, contemporary look.

A project with so many pieces may look like a giant puzzle, but this cutting board isn't all that hard to make. The walnut pieces are actually splines that align everything when you glue up each row of the cutting board. Read on to find out how that works!

PHOTOGRAPHY: JASON ZENTNER



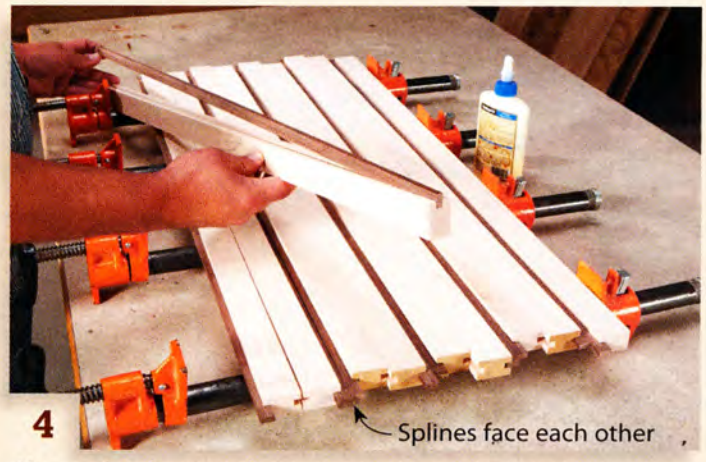
Cut grooves on both edges of a number of maple boards. Riding the boards on piece of melamine ensures an even cut.



Cut walnut splines and test their fit. The splines should fit snugly alongside two pieces of paper placed in a groove.



Check the splines' width using two grooved boards. There should be no visible gap at the spline's edges.



Glue each spline in only one grooved board. Clamp the boards with the splines facing each other to press them into place.

You'll need enough maple to make 10 to 12 boards that are 7/8" thick x 1-1/2" wide x 3' long. This will make a cutting board that's about 1-1/8" x 10" x 20". Rip the pieces oversize and let them rest for a few days. Once they've had a chance to twist and bend, square them up and bring them to final dimension. While the precise dimensions of these boards isn't critical, they must be absolutely straight.

Mark one face of each board. Cut a 1/4" x 1/4" groove down the center of one edge of each board, making sure that the marked side goes against the saw's fence. Set aside two of the boards (they'll be the outer pieces in the glue-up ahead, so they don't need a second groove). Cut grooves in the other side of the remaining boards, again making sure that the marked side is against the fence.

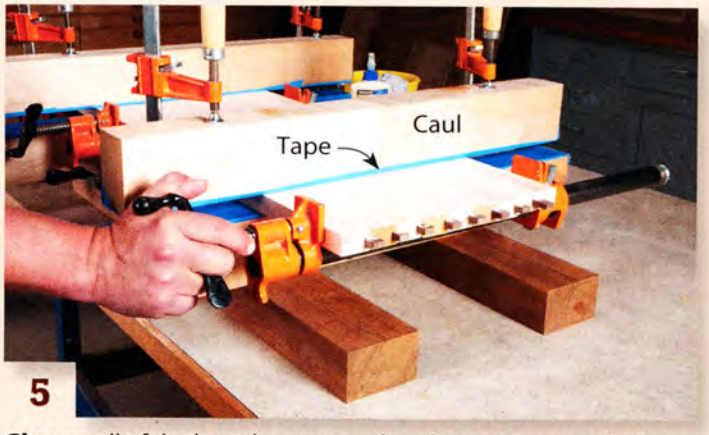
Pro Tip If your saw's throat plate isn't absolutely rigid or perfectly flush with your saw's top, the grooves' depth won't be consistent. That's really important for this project. My throat plate had both problems, so I bypassed it by placing a large piece of 3/4" melamine on top of the saw. The melamine is held in place by a featherboard that locks into the saw's miter slot (**Photo 1**).

Drill holes in the melamine for the featherboard's bolts. Make the holes oversize so they don't need to be perfectly placed. Lower your saw's blade and tighten the featherboard's knobs to hold everything in place. Start up your saw and raise the blade to the correct height. Also, if you don't have a zero-clearance insert, the walnut splines that fit into the grooves will slip down alongside the blade when you rip them. This setup remedies that, too.

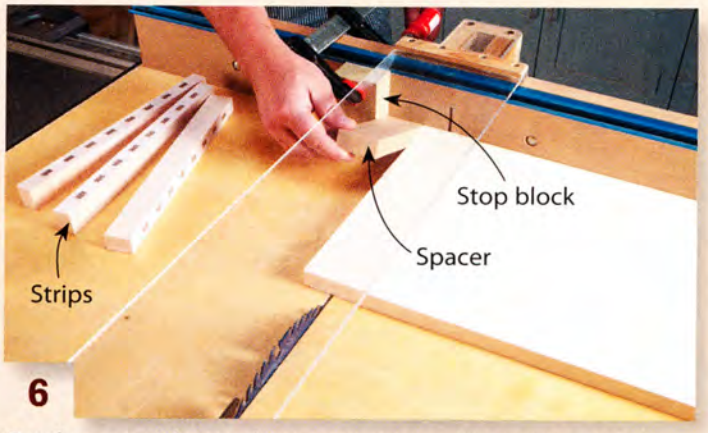
Plane your spline stock down to just more than 1/2" thick. Rip 5/16" thick splines from this stock. Make a couple extras, just in case. Rip the splines to final thickness—just under 1/4", to fit into the grooves. The exact dimension is critical. I made the fit too snug on my first attempt, and the glue-up turned into a disaster. The correct fit is about .006" less than the actual width of the grooves—the thickness of two pieces of paper (**Photo 2**).

Next, rip the splines' width so that when you assemble two grooved boards and one spline there's no visible gap at the spline's edges (**Photo 3**).

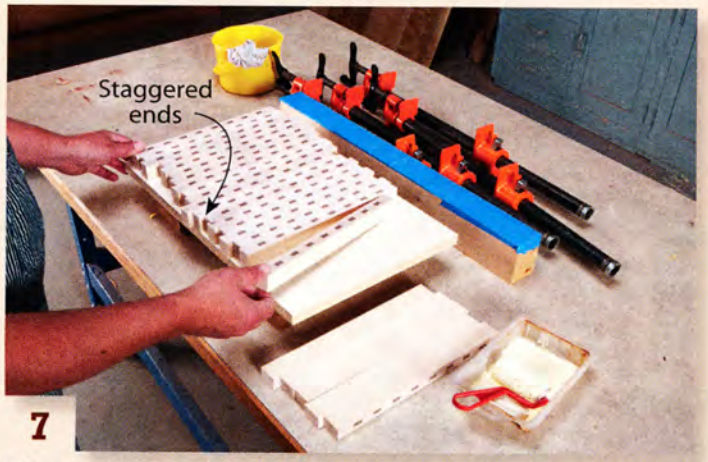
Glue up the boards and splines. Hang on a sec, though: A big glue-up like this is best done in stages. Start by gluing each spline into just one groove. (Note that one outside board shouldn't receive a spline at this time.) Clamp the boards together with their splines facing each other to press them all the way into the grooves (**Photo 4**). Use a flat-bladed screwdriver to clean out all the excess glue. If you need to wipe off any glue, use a rag that's dry or just slightly damp. Too much



Glue up all of the boards, using cauls to keep the assembly flat. Apply tape to the cauls, so glue won't stick.



Cut the assembly into short-grain strips using a crosscut sled. Remove the spacer before each cut to prevent kickback.



Glue the strips together on a sheet of melamine, staggering their ends. Use cauls again to keep the cutting board flat.



Sand with coarse paper until the surfaces are even, then finish-sand. Trim the sides to make a cutting board any shape you wish.

moisture could cause the splines to swell.

After the glue dries, it's on to stage two. You'll need to move fast, so try a dry run first, without glue, to avoid any surprises. Be sure that all of the boards are properly aligned—face marks go up. If all is well, apply glue in the grooves and on the edges of each board, clamp the assembly, then let it dry overnight (**Photo 5**). Remove the assembly from the clamps and plane it just enough to even all the surfaces.

Using a crosscut sled on your tablesaw, trim one of the assembly's ends square. Then, starting from the squared end, cut the whole assembly into 1-1/8" wide strips. To do this safely, use a spacer between your stop block and the workpiece. Slide the assembly against the spacer, then remove the spacer before making the cut. Removing the spacer creates a gap between the offcut and the stop block. Without that gap, the offcut could bind between the blade and stop block, causing a kickback. Hold the assembly in place, then make your cut (**Photo 6**). Crosscut the whole assembly into short-grain strips using this method.

For stage three, turn all the strips on edge. Set them on a sheet of melamine and arrange them however you like (**Photo 7**). I randomly staggered my strips so there would be no noticeable pattern to the spline ends.

I use melamine for glue-ups like this because it's flat, and glue doesn't stick to it. Again, have all your clamps and cauls ready to go, and glue up the cutting board. The more effort you put into getting it flat now, the less time you'll spend sanding later. Let the cutting board dry for 24 hours.

Remove the clamps, and scrape off any excess glue. Use your crosscut sled or circular saw with a guide to straighten the edges. Alternatively, you could bandsaw the cutting board into whatever shape you wish, or just leave the staggered ends.

To flatten and even up the cutting board's surface, start with the coarsest sandpaper you can find (**Photo 8**). If you have a drum sander, now's the perfect time to put it to use. I started with 60 grit sandpaper and finished with 180 grit. Round over or chamfer all the edges.

I used two different finishing methods for my cutting boards (page 39). For the rectangular cutting board, I rubbed on paste wax using extra-fine steel wool, and then buffed it with a soft cloth after the wax started to feel tacky.

On the two-piece cutting board with curved edges, I first melted beeswax in a double boiler. While the wax was hot, I poured it on the cutting board and spread it around with a credit card. After the wax hardened, I used the credit card to scrape off the excess wax, and then buffed it with a soft cloth.

The paste wax method emphasizes the maple's end grain, while the beeswax method obscures the maple's end grain a bit and emphasizes the walnut splines.

Uncle Bob's Table

Elegant, because it's simple.

by Spike Carlsen



MY UNCLE BOB was a butcher—not the woodworking kind people joke about, but the real thing. In his off hours, he used to switch blades and put his meat-cutting bandsaw to work as a woodworking tool. You won't find any of his stuff in the Museum of Modern Art, but you will find one of the side tables he built more than 40 years ago perched next to my favorite chair, still going strong.

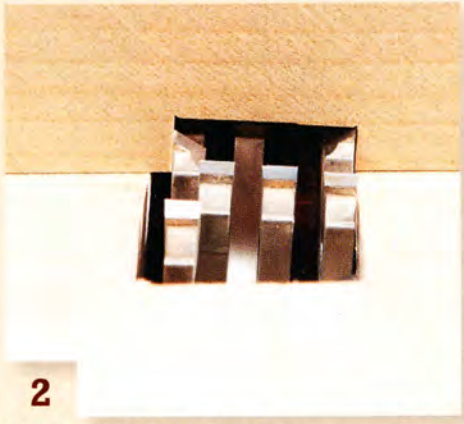
Uncle Bob built his original version using plywood and basic "glue and screw" joinery. This version kicks things up a notch, but incorporates the same dimensions, simplicity and timelessness as the original.

Before we get into how to build the table, let's talk about wood. Prepare to be surprised!

EDITOR: TOM CASPAR | PHOTOGRAPHY: JASON ZENTNER | ILLUSTRATION: FRANK ROHRBACH



Begin by making the legs. First, cut notches in them using a dado set. These notches will receive the shelf.



Tilt the dado set 3-1/2° when you cut the notches. Cut similar notches on the upper end of the legs to receive the table's subtop.



Drill pilot holes through the notches for fastening the legs to the shelf and subtop. Unlike the notches, these holes don't have to be angled.



Saw the leg's tapers freehand, starting at the skinny end of the waste piece. Smooth the sawn surfaces using a jointer, or plane them by hand.



Place the legs on the square piece of wood that will become the shelf. Drill pilot holes into the shelf, then countersink the holes and run in the screws.

Red alder is ideal

Any wood that holds screws reasonably well is OK for this project, but I dug deep into my lumber pile in order to find something special: clear red alder. Red alder is very easy to work. Planing it by hand is a breeze, and it sands like a dream. I really appreciated those user-friendly qualities when I made the table's round parts, which are glued up from narrower boards. Evening them up and smoothing their bandsawn edges took very little time and effort.

"Clear" is a special grade of alder that doesn't have any knots. Most other alder boards have plenty! Clear alder is much less expensive than clear cherry and walnut, but it's quite easy to finish alder to look like those two premium woods. I used a simple technique that turns alder into cherry—I'll bet you were fooled! More on that later.

All of the table's parts are made from 3/4" thick solid wood, but you could save time by making the subtop from plywood (part C; see Fig. A, page 44). Once the table is assembled, you really can't see the edge of this piece—no one will know that it's plywood. If you do use plywood, be sure to fasten the top in the manner shown in Fig. A, which allows the top to expand and contract. If you make the subtop from solid wood, skip the oversized holes and washers.

Build the table

Mill the legs (A) to final thickness and width. Cut them about 1" extra-long, then trim both ends at 3-1/2° (Fig. B). Note that this angle leans in the same direction on both ends.

Next, make blanks for the shelf (B), subtop (C) and top (D). Trim the shelf to its final square size (Fig. C), but leave the subtop and top oversize.

Cut notches in the legs to receive the table's shelf and subtop (**Photos 1 and 2**). These notches should fit tightly around the shelf—you may have to add shims to your dado set to achieve this. Tilt the dado set 3-1/2°, then raise it to cut 1/4" deep. Use a stop block to ensure that all the notches are in the same position. Lay out and drill holes for the screws that will fasten the legs to the shelf and subtop (**Photo 3**; Fig. B).

Pro Tip Taper the legs by cutting them on the bandsaw (**Photo 4**). I've always found it best to start at the thin end of this type of cut, using the back edge of the blade as a fulcrum. If you start at the wide end instead, the blade may pop out as you approach the end of the cut and form a bump that's a pain to remove later on.

Fig. A Exploded View

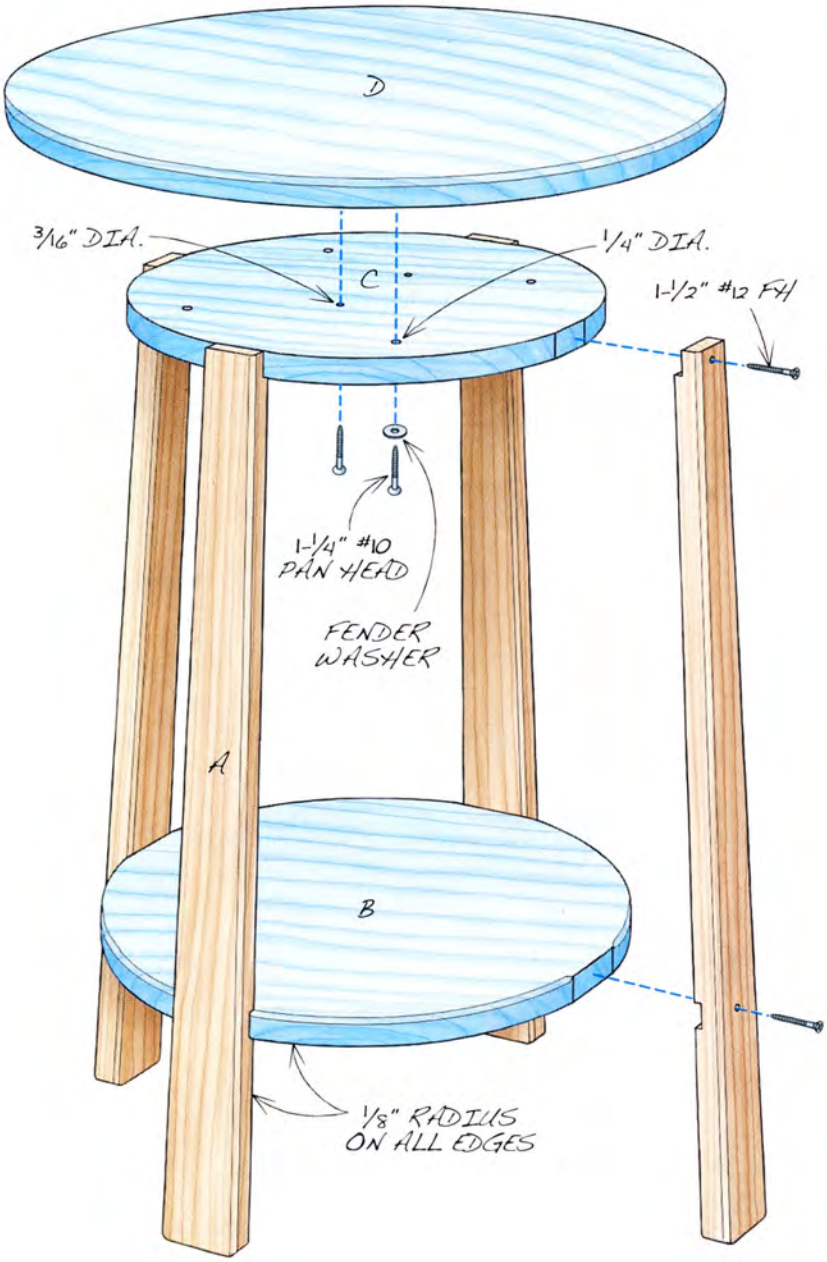


Fig. B Leg Details

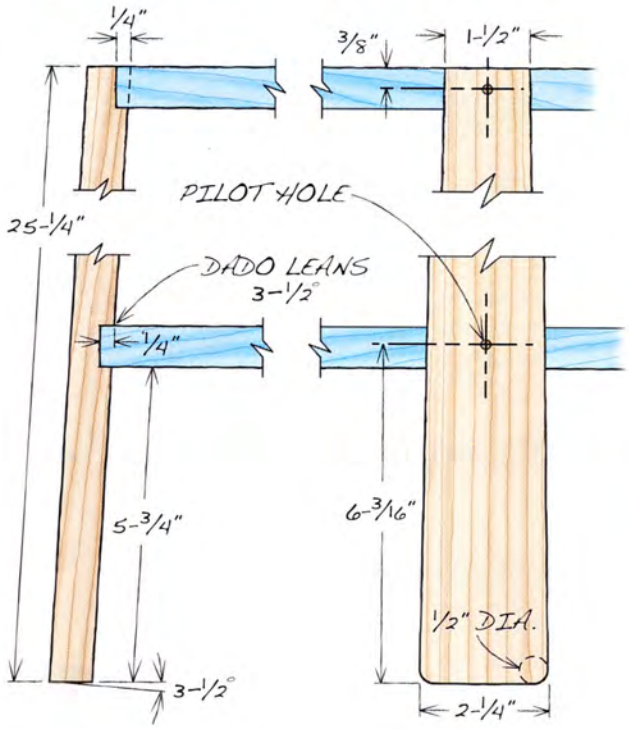


Fig. C Plan View of Shelf

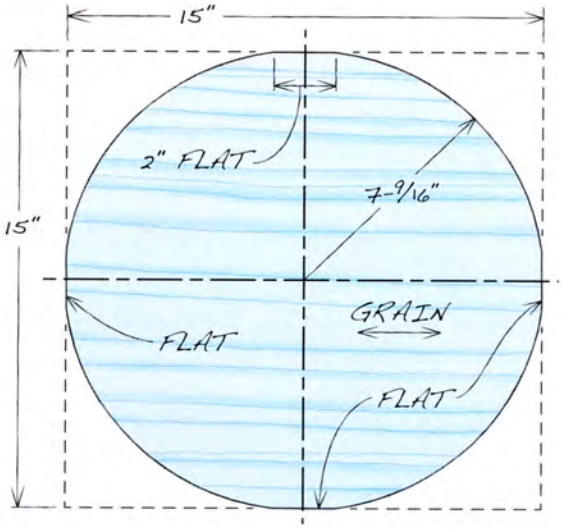
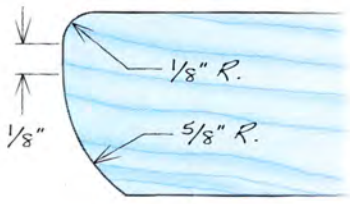


Fig. D Profile of Top



Cutting List

Overall Dimensions: 26" H x 20" Dia.

Part	Name	Qty.	Th x W x L
A	Leg	4	3/4" x 2-1/4" x 25-1/4" (a)
B	Shelf	1	3/4" x 15" x 15"
C	Subtop	1	3/4" x 13" x 13" (b)
D	Top	1	3/4" x 20" Dia.

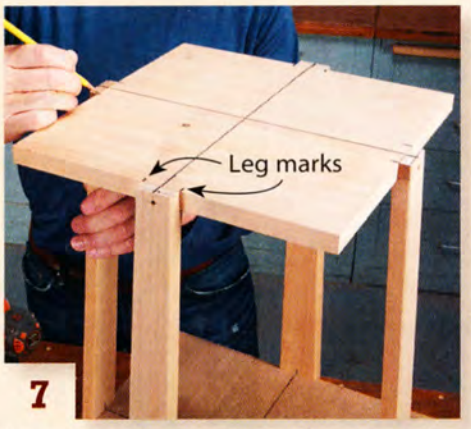
Notes:
a) See Fig. B to see how length is measured.
b) Approximate size. Cut to fit.



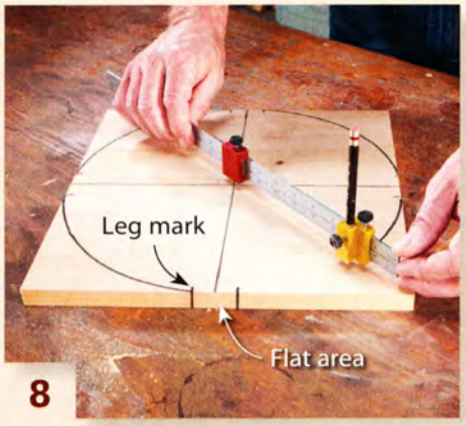
See the best method for brushing shellac —the secret of this table's finish—at **AmericanWoodworker.com/WebExtras**



Measure the distance between the upper leg notches. Cut another square piece of wood—the subtop—to fit inside the notches.



Draw centerlines on the subtop. Align the middle of each leg with these lines. Mark the outer edges of each leg on the subtop and the shelf.



Draw the outlines of the subtop and shelf using a trammel. Note that the circle starts and stops at each leg mark, leaving flat areas opposite the leg notches.



Saw the subtop and shelf. Sand all the table's parts and cover the flat areas and notches with tape. Apply finish to each part, then remove the tape.



Glue and screw the table together, adding one leg at a time.

Round the bottom ends of the legs (Fig. B), then use a 1/8" roundover router bit to soften all the leg's edges.

Draw centerlines on top of the shelf and above the leg notches. Place the legs on the shelf and align these marks. Temporarily fasten the legs to the shelf (**Photo 5**). Measure the distance between the notches for the subtop (**Photo 6**), then trim the subtop to fit.

Draw centerlines on the subtop and upper ends of the legs (**Photo 7**). Align these marks, then draw additional marks on the subtop opposite the edges of each leg. These marks indicate the leg's width. Mark the width of the legs on the shelf, too. Drill pilot holes into the subtop, then disassemble the table.

Use a trammel to lay out the circular shapes of the shelf and subtop (**Photo 8**), then cut them on the bandsaw (**Photo 9**). Smooth the sides of these pieces, then soften the edges with the roundover bit. You don't have to start and stop the roundovers at the flat areas by the legs—it's OK to go right through.

Make the table's top. I routed a large radius along its bottom edge to make the top appear thinner (Fig. D). Drill holes in the subtop and top for fastening them together.

Sand every part of the table, then put tape over the surfaces that will be glued together (the flat areas on the edges of the top and subtop, and inside all the notches).

Finish all the parts. To imitate the color of cherry, I first applied a coat of clear shellac, thinned 1:1 with denatured alcohol. I then applied two coats of amber shellac, also thinned 1:1. I followed up with three coats of water-based poly. Once the table is finished, remove the tape and glue and screw it together (**Photo 10**).



Spike Carlsen is a veteran carpenter, woodworker and writer. He lives in Stillwater, Minn. with the original "Uncle Bob's Table," shown here.

Micro-Lam Serving Tray

Create a striking look using Baltic birch plywood.



by Tim Johnson

ACCORDING TO CONVENTIONAL WISDOM, plywood has something to hide: its unsightly edges. But as you can see, this handsome tray turns that convention on its ear.

The key to its cool "micro-lam" appearance is Baltic birch plywood, which has uniformly thick plies that are virtually free of knots. As a result, its edges have a clean, linear look that's distinctively modern.

Building the tray's micro-lam panels requires several cutting and gluing steps (Fig. A). You'll also have to build a jig and use a router to surface the panels. This makes the project more challenging than just using a piece of ordinary hardwood plywood for the bottom—but what's the fun in using ordinary plywood?

Create the micro-lam panels

Transforming plainsawn Baltic birch into micro-lam panels doesn't require magic, just careful cutting and gluing. Start by cutting a 12" wide x 60" length of 1/2" Baltic birch into twelve 3-1/4" wide x 12-3/4" long pieces. Mark the front face and top edge of each piece so you can keep them oriented as they were cut from the sheet.

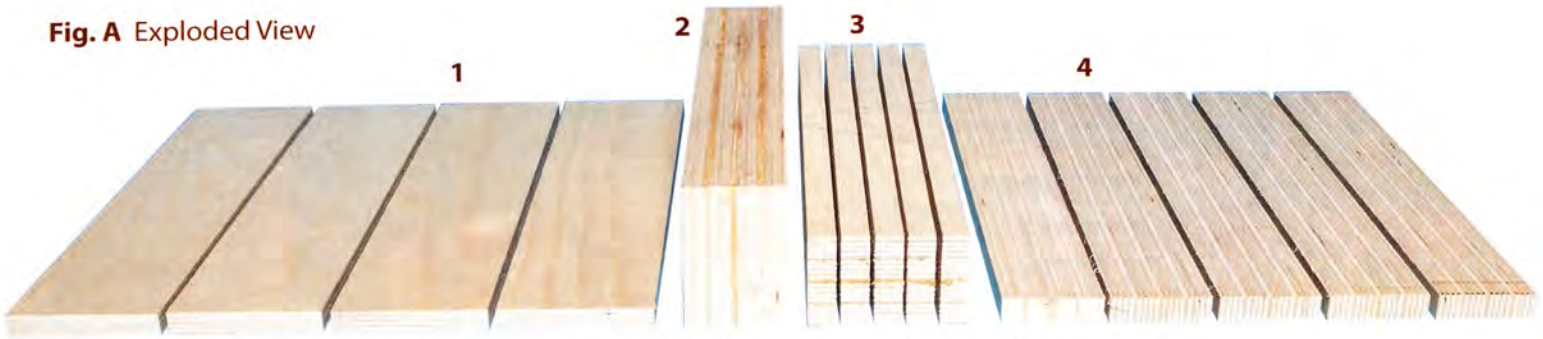
Stack and glue the pieces into blocks, using cauls (**Photo 1**). Make sure all the pieces in each block are oriented the same way and take care to keep their ends and edges aligned. Use waterproof glue, such as Titebond III and rub paraffin on the cauls so they don't stick to the squeeze-out. Glue up three four-piece blocks.

After removing the clamps, scrape off the squeeze-out on one edge of each block so it will rest flat against the tablesaw's rip fence. Raise the blade, set the fence and make a pass to clean and flatten the block's opposite edge, while removing as little material from the block as possible. Mark one plainsawn face on each block so you can reassemble it. Then resaw each block into five 9/16" thick micro-lam sections (**Photo 2**). After sawing each section, position the block's resawn face against the fence and go again.

Edge-glue the five sections from each block to create three micro-lam panels (**Photo 3**). As before, use cauls to keep the sections flush—and the panel flat. Use a chisel to

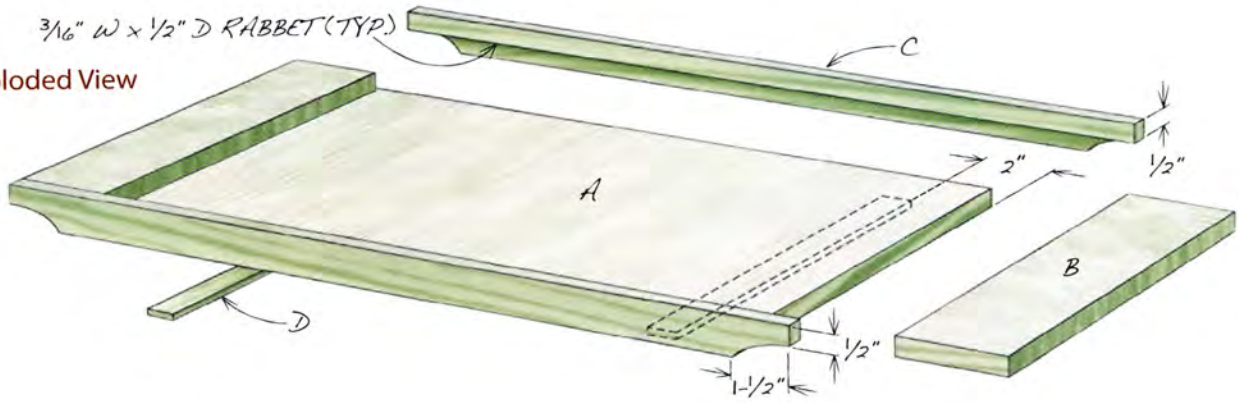
PHOTOGRAPHY: JASON ZENTNER | ILLUSTRATION: FRANK ROHRBACH

Fig. A Exploded View



Make micro-lam panels by gluing Baltic birch plywood pieces (1) into a block (2). Turn the block on its face and resaw it into micro-lam sections (3). Then edge-glue the sections (4).

Fig. B Exploded View



remove the squeeze-out on both sides of each panel after it sets up, but before it completely hardens.

Do not use water to remove squeezed-out glue. If an unfinished micro-lam panel gets wet, it will bow.

Due to their cross-laminated plies, the micro-lam sections actually have grain direction, which can cause unsightly light/dark color discrepancies (called "barberpoling") if the sections aren't oriented the same way. To avoid barberpoling and achieve a consistent appearance, simply view the assembled panel under a raking light before gluing and reposition the sections as necessary by flipping them over or by rotating them end-for-end. It's a good idea to mark the grain direction on each section.

Glue together two of the micro-lam panels to create the tray's bottom (A, Fig. B). Use cauls to ensure this long assembly stays flat. In fact, plan to keep this assembly clamped between cauls whenever possible until you glue up the tray. Do the same thing with the third micro-lam panel, which will be used to make the tray's handles (B).

Build a surfacing jig

One simple routing jig allows smoothing the micro-lam tray bottom and the third panel and milling them to consistent thickness (**Photo 4**). The jig consists of a platform to hold the workpiece and a gantry to hold the router. To make the platform, screw two 3/4" x 2" wide MDF rails on an 18" x 28" piece of MDF. To make the gantry, mount the router dead-center on a 6" x 32-1/2" piece of 3/4" MDF after drilling a hole for the bit. Then attach stops to both bottom edges. The stops keep the bit from cutting into the rails, so their width depends on the bit you use. The 3/4" dia. hinge mortising bit I used (available from rockler.com, #90814, $18.99) required 1-1/4" wide stops.

Center each micro-lam workpiece between the rails and adhere it to the platform using hot-melt glue. Place the gantry on the rails and adjust the bit to make a very light cut. Then slide the router over the workpiece.

For the best results, rout in line with the micro-lams and move the bit from left to right, as if routing an edge. (Routing back and forth or across the mirco-lams is more likely to cause significant tearout.)

Slightly lower the bit and make successive passes until the surface is flat. Then use a random orbit sander to remove any tear-out and smooth the surface. Flip over the workpiece and repeat the process to surface the other side. The final thicknesses of the tray bottom and handle micro-lams isn't critical, as you can adjust the tray's rails to fit.

Cutting List

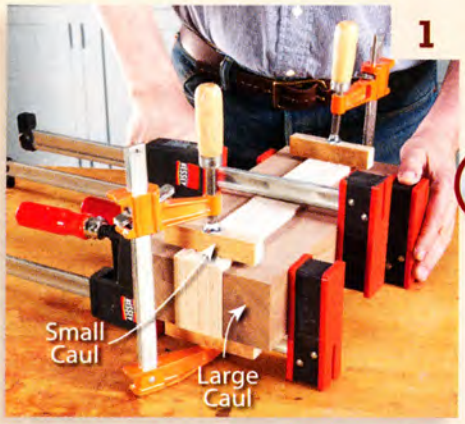
Overall Dimensions: 1-5/32" Th x 13" W x 22" L

Part	Name	Qty.	Material	Th x W x L
A	Bottom	1	Baltic birch plywood	1/2" x 12-3/8" x 19" (a)
B	Handle	2	Baltic birch plywood	1/2" x 2-1/2" x 12" (a)
C	Rail	2	Baltic birch plywood	1/2" x 1" x 22" (a)
D	Foot	2	Baltic birch plywood	5/32" x 3/4" x 11-3/8"

Notes:
a) Plywood thickness is nominal.

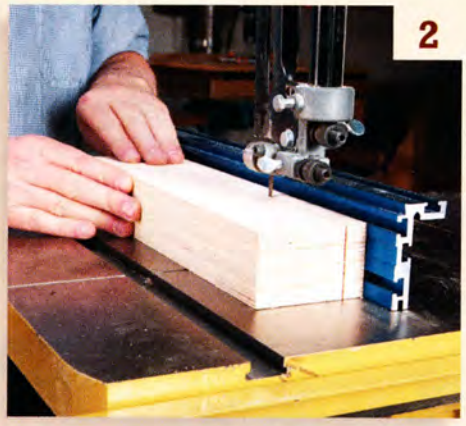
Process the parts

After surfacing the tray bottom, cut it to final dimensions.

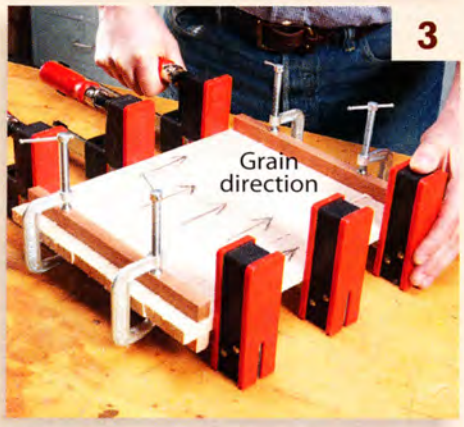


Glue pieces of Baltic birch plywood into blocks.

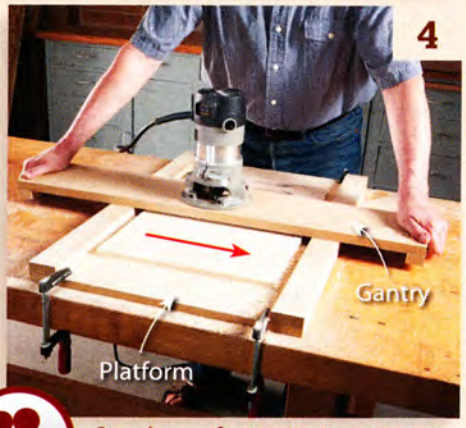
Pro Tip: Use large cauls to evenly spread clamping pressure and small cauls to keep edges aligned.



Saw each plywood block into micro-lam sections. Every cut must be straight, square and flat, so install a new blade and make sure the saw and fence are properly tuned.



Glue the micro-lam sections into panels after orienting their grain in the same direction. Glue together two of these panels to create the tray's bottom. Glue up a third panel to make the tray's handles.



Surface the panels using a two-part routing jig. Use hot-melt glue to fasten the panel to the platform and adjust the bit to make a light cut. Then slide the gantry over the panel.

See the surfacing jig in action at **AmericanWoodworker.com/WebExtras**



Cut the third micro-lam panel into narrow pieces. Glue two of these pieces end-to-end to make a blank for each handle.



Glue on the handles after gluing the base into rabbets cut in the rails. The width of the rails matches the combined thickness of the tray's handle and bottom.

Start by using a carpenter's square to mark a square line on one of its long uneven ends. Carefully cut the line using the bandsaw. Then move to the tablesaw. Place the bandsawn edge against the fence and crosscut the opposite uneven edge. Then turn the bottom around and make a second pass to cut it to final width (and true the bandsawn edge). Finish by squaring the bottom's short ends and cutting it to final length.

Surface the handle blank and square one end. Then cut this blank into four 2-3/4" wide strips (**Photo 5**). Use the tablesaw as before to trim the strips to final width. Then square their ends and glue two strips end-to-end to create each handle blank.

Make the rails

Make the rails (C) from a squarely cut 5" x 22" piece of 1/2" Baltic birch. Cut 3/16" deep rabbets on both long edges sized to fully house the tray's 1/2" thick micro-lam bottom. Then cut the rails to width—the same dimension as the combined thickness of the micro-lam bottom and handle. To play it safe, cut the rails about 1/32" oversize in width.

Mark and cut the curves on the ends of the rails. Use a #20 biscuit to draw the shape. Make sure the curve and the rabbet are the same height, so they meet at the end of the rail to form a 1/2" square.

Assemble the tray

Mark centerlines on both rails and the micro-lam bottom. Then glue the bottom to the rails, using cauls to firmly press the bottom against both shoulders of each rabbet. Take your time: It's best to glue the bottom to one rail at a time.

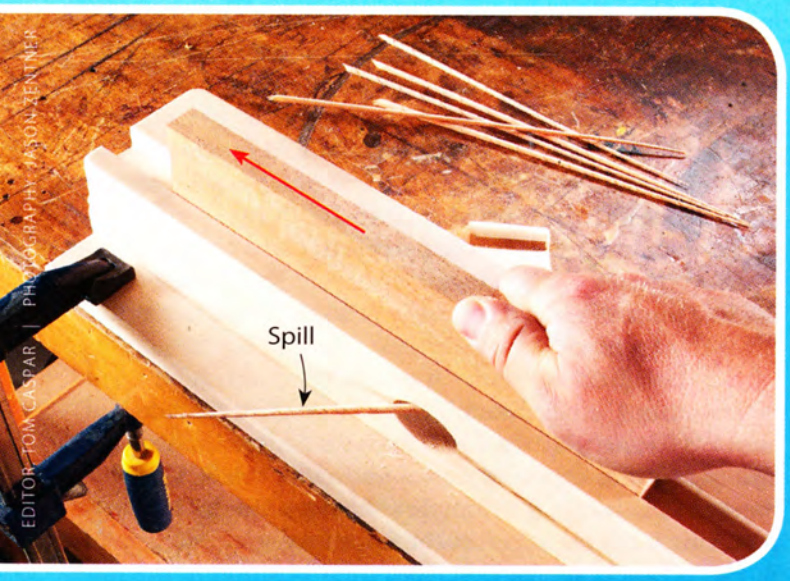
Glue on the handles after cutting them to fit between the rails (**Photo 6**). Then cut and glue on the feet (D). Use a sanding block as necessary to level the rails with the handles. Then finish-sand the tray to 120 grit and brush three coats of oil-based polyurethane on every surface—top, bottom, ends and edges. Sand with 240 grit between coats.

Spill Plane

Its spiral shavings are perfect for lighting holiday candles.

by Brad Holden

ILLUSTRATION: FRANK ROHRBACH



EDITOR: TOM CASTAR | PHOTOGRAPHY: JASON ZENTNER

WHAT'S A SPILL PLANE? Well, it's a little-known specialty plane that creates a shaving—called a spill—that's tightly curled and tapered to a point. In the days before matches and lighters, a spill was used to take a flame from the fireplace to light candles, lamps and pipes. (A typical spill will burn for more than a minute.) Shaving spills is mesmerizing; before you know it, you'll have made a huge pile! For an attractive holiday decoration, bundle them together.

Fig. A Exploded View

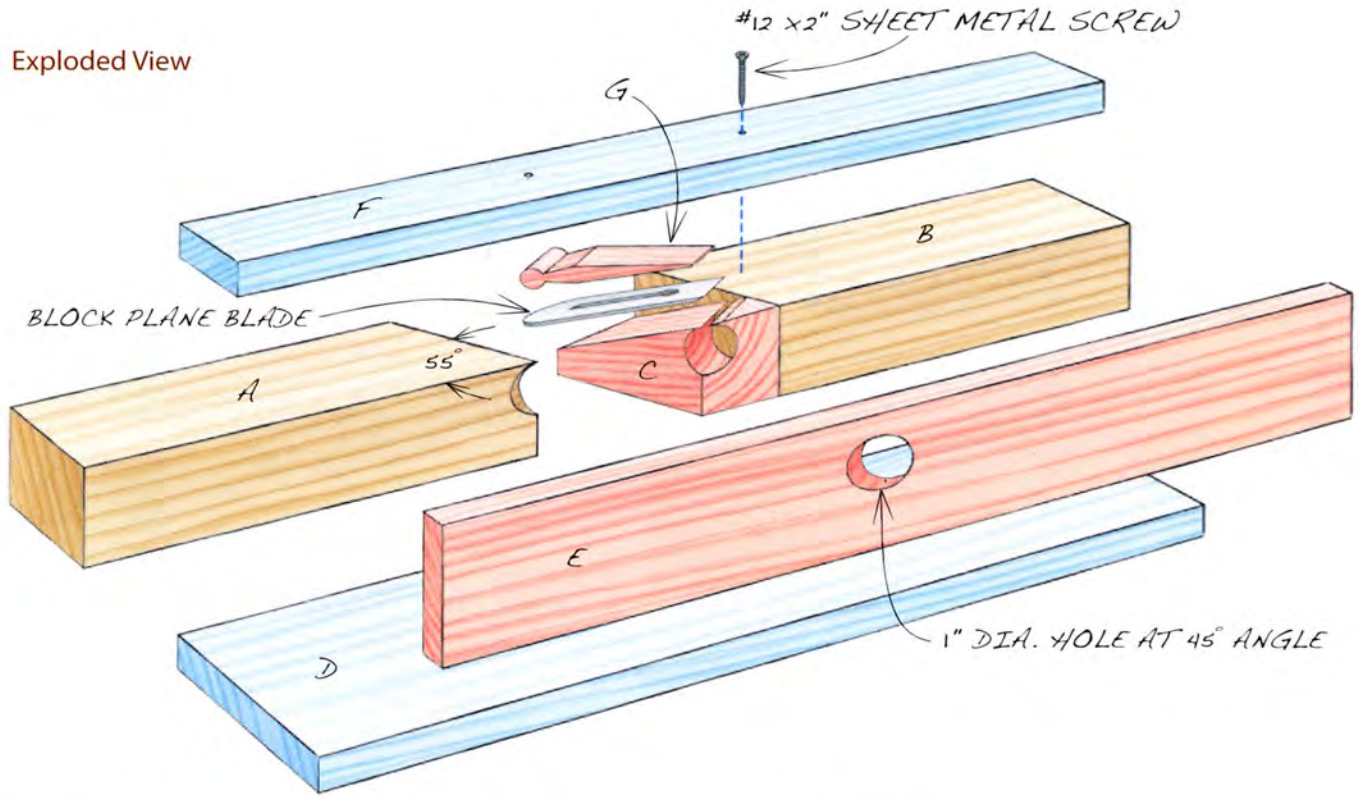


Fig. B Frog Details

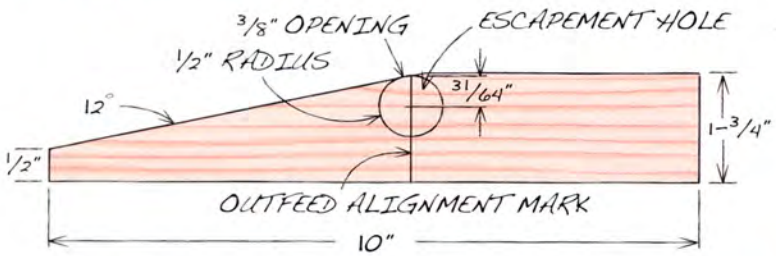
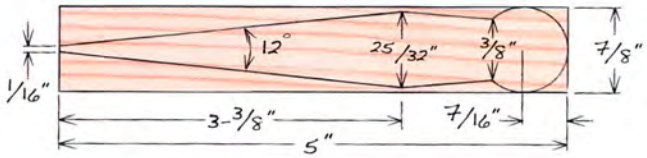


Fig. C Wedge Details



Cutting List

Overall Dimensions: 3" H x 5" W x 20" L

Part	Name	Qty.	Material	Th x W x L
A	Outfeed	1	Maple	1-3/4" x 3" x 10" (a)
B	Infeed	1	Maple	1-3/4" x 3" x 10" (a)
C	Frog	1	Maple	1-3/4" x 1-5/8" x 20" (b)
D	Base	1	Maple	5/8" x 5" x 20"
E	Fence	1	Maple	5/8" x 2-3/8" x 20" (c)
F	Top	1	Maple	5/8" x 2-1/4" x 20" (d)
G	Wedge	1	Maple	7/8" x 1-5/8" x 5" (e)

Notes:
a) Cut from a single 18"-20" long block.
b) Make 1/64" wider than your plane iron. Rip to thickness after tapering and cut to length after gluing.
c) Trim bottom edge to line up the frog's escapement hole, and the top edge so the fence is 5/8" taller than the infeed/outfeed assembly.
d) Adjust width to create 13/16" wide slot for sliding spill stock.
e) See Fig. C

Why do bench planes come in so many sizes? Find out what each one is used for at **AmericanWoodworker.com/WebExtras**

Materials

Don't be put off by the idea of making a wooden plane from scratch. This plane's sandwich-style construction makes it an attainable project for any woodworker who's experienced in using a jointer, planer and bandsaw.

The first thing you'll need is a blade, as that's what determines the frog's width. (The frog is the angled part of the plane that the blade sits on.) I used an extra block plane blade that I had saved for I don't know what reason. To make this plane, I guess! If you don't have any extra blades lying around, used blades are plentiful and inexpensive at flea markets and auctions—or you can purchase a new one. The thickness of the blade doesn't matter.

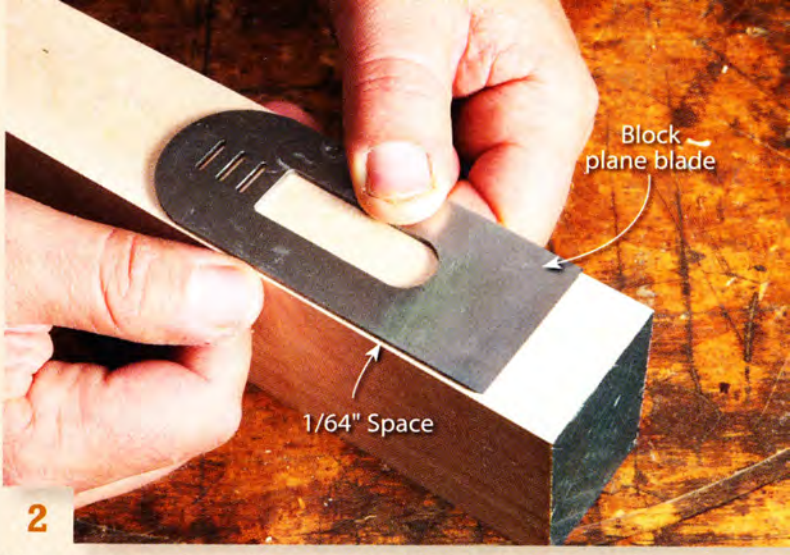
For your spill plane's wooden parts, use a tough, hard-wearing species, such as maple or beech. You'll need some 8/4 (2") thick stock and some 4/4 (1") thick wood as well.

Mill the parts

Start with a 2" thick block a little more than 6" wide and about 20" long. Rip the block in half, square both pieces and plane one of them down to 1-3/4" thick. Cut this piece into halves at a 55° angle (**Photo 1**). For lack of better terms, I call these pieces the infeed and outfeed (A and B, Fig. A) because that describes their position in the fin-



Make the two main body parts—the infeed and outfeed—from a single block by cutting it in half at a 55° angle.



Plane the piece that will support the blade—the frog—so it's about 1/64" wider than the blade itself.



Bandsaw the frog's 12° bedding angle.



Flatten the frog's bed on the jointer.

Caution: Use a push pad and push stick as shown.

ished plane. (Their role is similar to the infeed and outfeed tables of a jointer.)

Plane the other piece about 1/64" thicker than your blade's width (**Photo 2**). This will be the frog (C). Plane the base, fence and top (D, E and F) to their final thickness.

Bandsaw the frog's bedding angle (**Photo 3**, Fig. B), and save the offcut to make the plane's wedge (G). Flatten the frog's bed on the jointer (**Photo 4**). Alternatively, you could plane it by hand or use coarse sandpaper taped to a flat surface, like your tablesaw. Once the bed is dead flat, rip the frog so that its height matches the thickness of the infeed and outfeed pieces.

A flea market blade will work fine.

To locate the frog in relation to the infeed and outfeed, position the frog against the outfeed's angled end and set the blade on the bed, bevel down. Position the frog and blade so that the outer corner of the blade and the outfeed's top outer corner meet perfectly (**Photo 5**). Trace the end of the outfeed on the side of the frog. You'll use this mark to align the frog and outfeed later on.

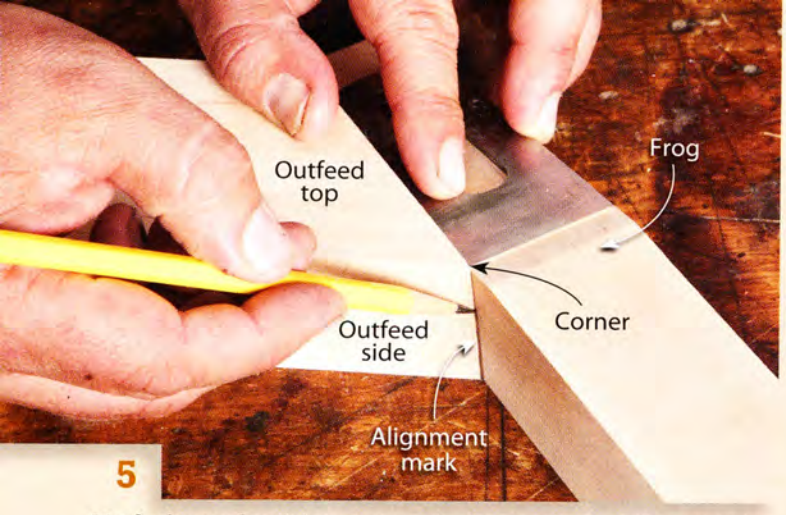
When you shave each spill, it must pass through a hole in the frog—an "escapement hole." (There's also a corresponding hole in the plane's fence.) Mark the escapement hole's center on the alignment mark you just made (**Photo 6**; Fig. B). Drill the escapement hole using a Forstner bit (**Photo 7**).

Assemble the plane

Because of their angled ends, the infeed and outfeed are difficult to clamp to the frog, so I used a rubbing technique instead; you just glue the parts and rub them together until they feel like they're sticking, and then let them dry. A rubbed joint isn't always as strong as a clamped joint, but strength isn't important here. This assembly will be glued between the plane's base and top, forming a very strong sandwich.

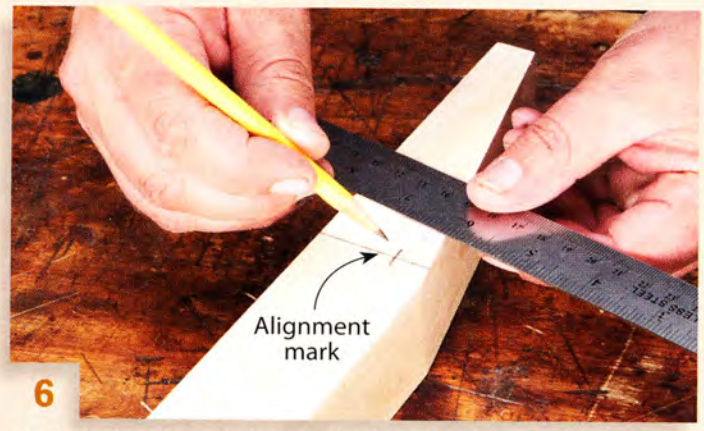
Start by gluing the frog to the outfeed, making sure the outfeed is on the alignment mark. When that assembly is dry, use a round file and sandpaper to extend the frog's escapement hole through the outfeed.

Use a straightedge to align the infeed and outfeed's edges, then glue the infeed to the frog (**Photo 8**). When the glue is dry, trim the frog's ends flush with the body (**Photo 9**). True up the assembly's bottom face and edges on the jointer. Don't joint the top, though—that would mess up the blade's projection.



5

Mark the outfeed's location on the frog's side. Find the correct spot by sliding the blade on the frog until the blade's cutting edge is level with the outfeed's top. Next, slide the frog and blade in tandem until the blade's corner aligns with the outfeed's side.



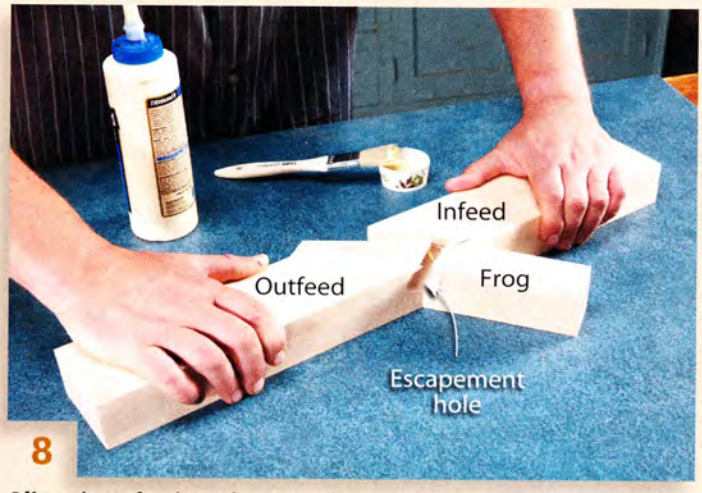
6

Mark the location of a hole in the frog that will allow the spills to escape.



7

Drill the escapement hole using a Forstner bit. The top edge of the hole must create a 3/8" wide opening on the frog.



8

Align the infeed, outfeed and frog, and then glue them together in stages. You don't have to clamp; hand pressure is enough.

Tilt the table of your drill press to make the escapement hole in the fence (**Photo 10**). Drilling a precisely located hole at a steep angle is difficult, so start with an oversize 4" wide x 24" long board and drill the hole in the center. (You'll trim the board's ends and edges to line up with the frog's escapement hole later on.) The correct drilling angle is 55°, but most drill presses only tilt to 45°, which is fine for this purpose.

Next, glue the body and frog assembly to the base. The base is wider than the plane's body, creating a ledge for clamping the spill plane to your bench or to any sturdy table.

While the glue is drying, make the wedge (Fig. C). To flatten its faces, use a block plane or sandpaper placed on a flat surface. To prevent chatter, the wedge should only contact the top of the plane immediately above the blade's cutting edge (**Photo 11**). You'll probably need to slightly refine the wedge's angle to achieve this.

Poplar makes the perfect spill.

Before you trim the fence's edges, make sure that its angled hole points in the right direction; it should be a continuation of the frog's escapement hole. Trim the bottom edge of the fence until the two escapement holes line up. Trim the fence's top edge so that the fence is 5/8" taller than the body, and then glue the fence in place.

Glue and screw the top to the body (**Photo 12**). Unlike most wooden planes, this wedge is oriented in the same direction as the body's grain; if pounded hard enough, it could split the plane apart. I added a beefy screw on either side of the frog to prevent this. Screws may be overkill, but they're good insurance. A wedge exerts a tremendous amount of force when it's tapped in place.

Give your plane whatever edge treatment and finish you wish. I chamfered all the edges, and used a wax and oil finish.

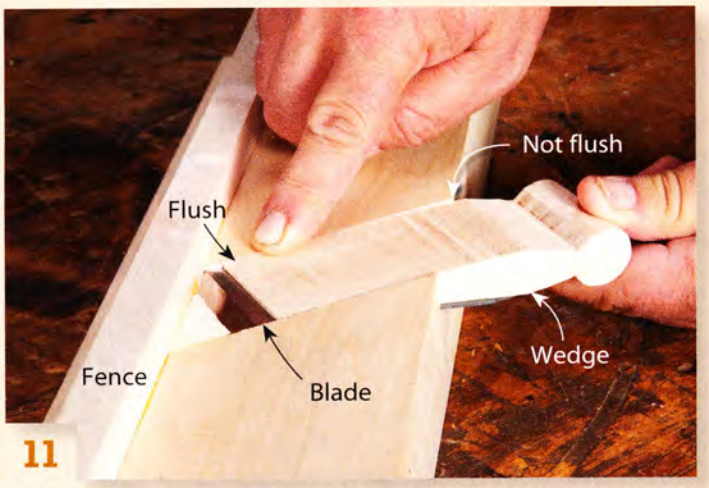
Build a classic English-style wooden smooth plane at **AmericanWoodworker.com/WebExtras**



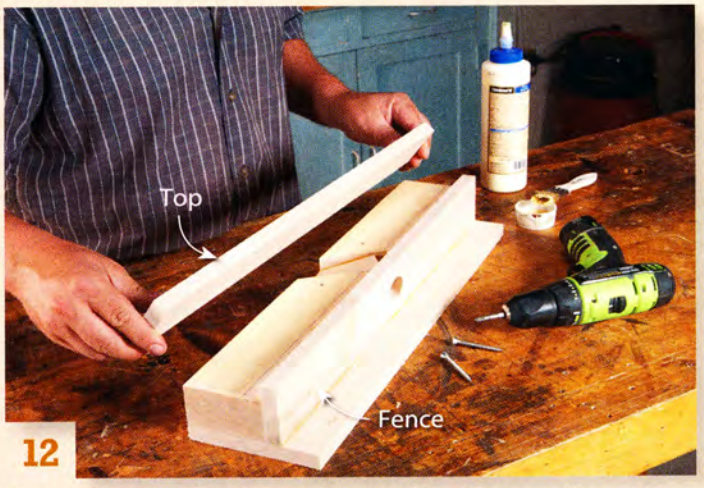
Bandsaw the frog's ends flush with the infeed and outfeed.



Tilt the table of your drill press to make an angled escapement hole in the plane's fence. Glue the fence to the plane's body.



Check the wedge's fit with the blade in place. The thin end should be flush with the body; the thick end should be not quite flush.



Fasten the top using glue and screws. The top traps the wedge and forms a channel for guiding the piece you'll be planing.

Making spills

When you install the blade and wedge, you'll notice that one of the wedge's corners is visible in the track where you slide your spill stock. This corner must be flush with the sole (the surfaces of the infeed and outfeed pieces that support the spill stock). If the wedge's visible corner is too high, it'll prevent the blade from cutting. To fix this, retract the blade and tap the wedge back in place. Then sand the wedge's corner flush with the sole using a sanding block.

Setting the plane's depth of cut requires experimentation, particularly if you're not used to using a wedge-style plane. As a starting point, slide the blade in until it almost touches the fence, and then tap in the wedge—but not too hard. If your plane isn't cutting, advance the blade by tapping its end until it takes a shaving. When the spill is the correct thickness, give the wedge one more tap to lock it in place.

If you advance the blade too far, remove it and start over. Of course, you'll have to loosen the wedge first. Try wiggling it out by hand; if that doesn't work, tap the wedge's rounded grip with a small mallet or hammer.

You may be tempted to make spills out of any old scraps, but you'll get the best results by being picky about your wood. Spill stock should be free of knots, relatively straight-grained and about 8" to 12" long. (It must also be 3/4" thick or less for this plane.) The edge that you'll plane should also be straightened ahead of time. Poplar works great, but you may find other woods that are equally suitable. Position the board so that its grain is rising away from you. A razor-sharp blade will make a perfect, tapered spill.



Brad Holden is a Minneapolis-based woodworker with a deep interest in making, restoring and using traditional tools. "There's nothing like creating fine work with tools that you have brought to life, or brought out of retirement." Brad works part time as a woodworker and carpenter, specializing in one-of-a-kind custom pieces and small remodeling jobs.

Watch Brad set up the plane and make spills at **AmericanWoodworker.com/WebExtras**

Mitered Jewelry Box

Build an heirloom using simple jigs and basic techniques.

by David Munkittrick





CLEAN LINES and graceful curves are just the beginning. This distinctive jewelry box also features mitered corners, decorative keys, a textured panel and a distinctive brass handle. Inside, sliding trays with multiple compartments help effectively use the space and keep things organized.

The joinery is straightforward—if you can cut and fit miter joints you can build this box. I'll show you how to build a simple sled to cut the slots for the keys, how to texture the fir panel and how to make the brass handle.

I used walnut, poplar and straight-grained fir left over from other projects to build the box shown here. If you're a scrap hoarder like I am, you can probably build this box for next to nothing with stock you have on hand. Keep in mind that building the box from a single board ensures a pleasant flow of grain and color.

EDITOR: TIM JOHNSON | PHOTOGRAPHY: JASON ZENTNER | ILLUSTRATION: FRANK ROHRBACH

Glue up the box and lid

Start by milling the box sides and ends (A, B, Fig. A and Cutting List, page 56). Cut each part slightly long and trim it to final length when cutting the miters. Cut the miters on the tablesaw using a miter gauge with a fence (**Photo 1**). Tilt the blade to 45° and miter one end of each piece. Then clamp a stop block on the fence to miter the other end and establish the final length. Cut both side pieces from the same setting to ensure they're identical in length. Then reposition the stop block and cut both end pieces.

Glue the box together (**Photo 2**). I like to quickly tack the corners with one or two 23-gauge pin nails to keep the parts together while I position the band clamps. This is one of a thousand reasons I consider a 23-gauge pin nailer a shop essential—if you don't own one already, consider buying one.

Build the frame-and-panel lid while the glued-up box dries. Start by milling the panel (C) to thickness and cutting it to final dimensions. I used straight-grained fir, which has very hard latewood and very soft earlywood, so I decided create an interesting texture by wire brushing it (**Photo 3**). Apply light pressure and keep the brush moving back and forth with the grain; pausing in one spot could ruin the panel.

Mill the lid's sides and ends (D, E) oversize in length. Then use the tablesaw to cut grooves for the panel on the inside edge of each piece (**Photo 4**). To center the grooves, set the rip fence to offset the blade a tiny bit from center; then make two passes with each piece, one with each face against the fence. Adjust the fence as necessary to dial in the width to match the panel's thickness.

Cut the lid's sides and ends 1/8" long when you miter them, so the lid will be slightly larger than the box.

Pro Tip When the edges of a box and its lid are flush, as on this box, plan to build the lid oversize so you can trim it to fit.

Next, make a pair of templates for routing the arcs on the inside edges of the lid frame (Fig. B). Cut and miter one piece of 1/4" MDF to match the sides and another piece to match the ends. Then draw the arc on each piece of MDF by following the curve made by bending a thin strip of wood around a nail pinned at the arc's high point. Cut the arc and sand it smooth to complete each template. Attach the template to the back face of the frame piece. Then use a flush-trim bit to rout the arc (**Photo 5**).

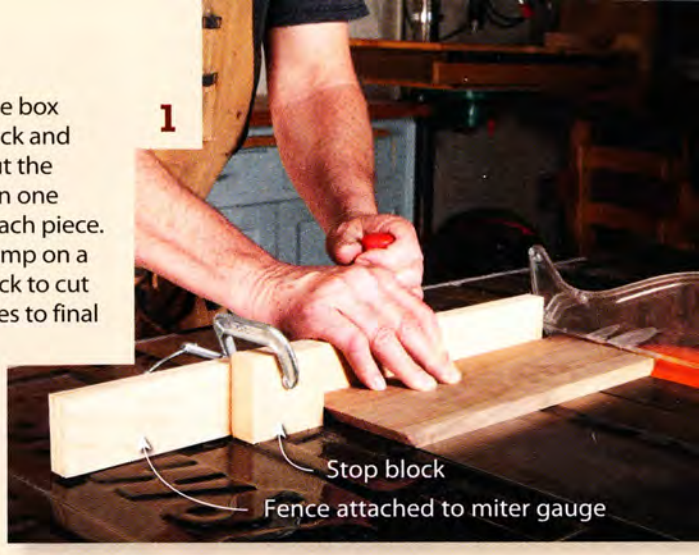
Dry fit the lid to make sure the panel fits and the miters are tight. Then glue together the lid by gluing only the miter joints; leave the panel free to expand and contract inside the slots.

Cut slots for keys

Decorative keys (F) glued in slots cut across the corners reinforce the miter joints in both the box and the lid. Build a sled to cut the slots (**Photo 6**). Glue together a pair of 2x6s and mill them into a block. Then bandsaw a 90° V-slot in the block, leaving an inch of stock at the bottom. Attach the block to a backboard made of 1/4" MDF and you're ready to cut the slots.

Learn how to cut and fit miter joints at **AmericanWoodworker.com/WebExtras**

Miter the box front, back and sides. Cut the miters on one end of each piece. Then clamp on a stop block to cut the pieces to final length.



Glue the box together using band clamps.

Pro Tip Band clamps pull miter joints tight because they apply even pressure on all four corners.



Texture the lid's fir panel to add interest. Wire-brushing grinds away the fir's soft earlywood, but leaves its hard latewood standing proud.



Cut grooves for the center panel in the lid side and end pieces. The grooves are wider than the blade, so you'll have to make two passes.

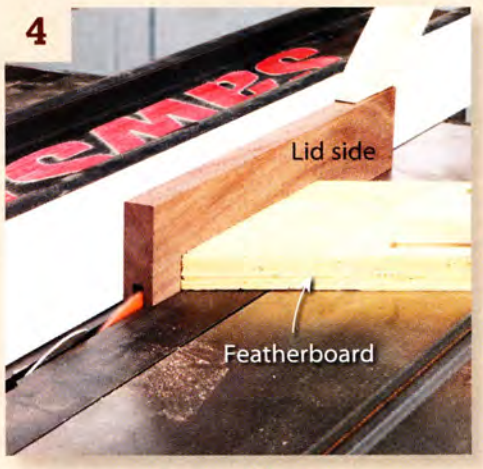
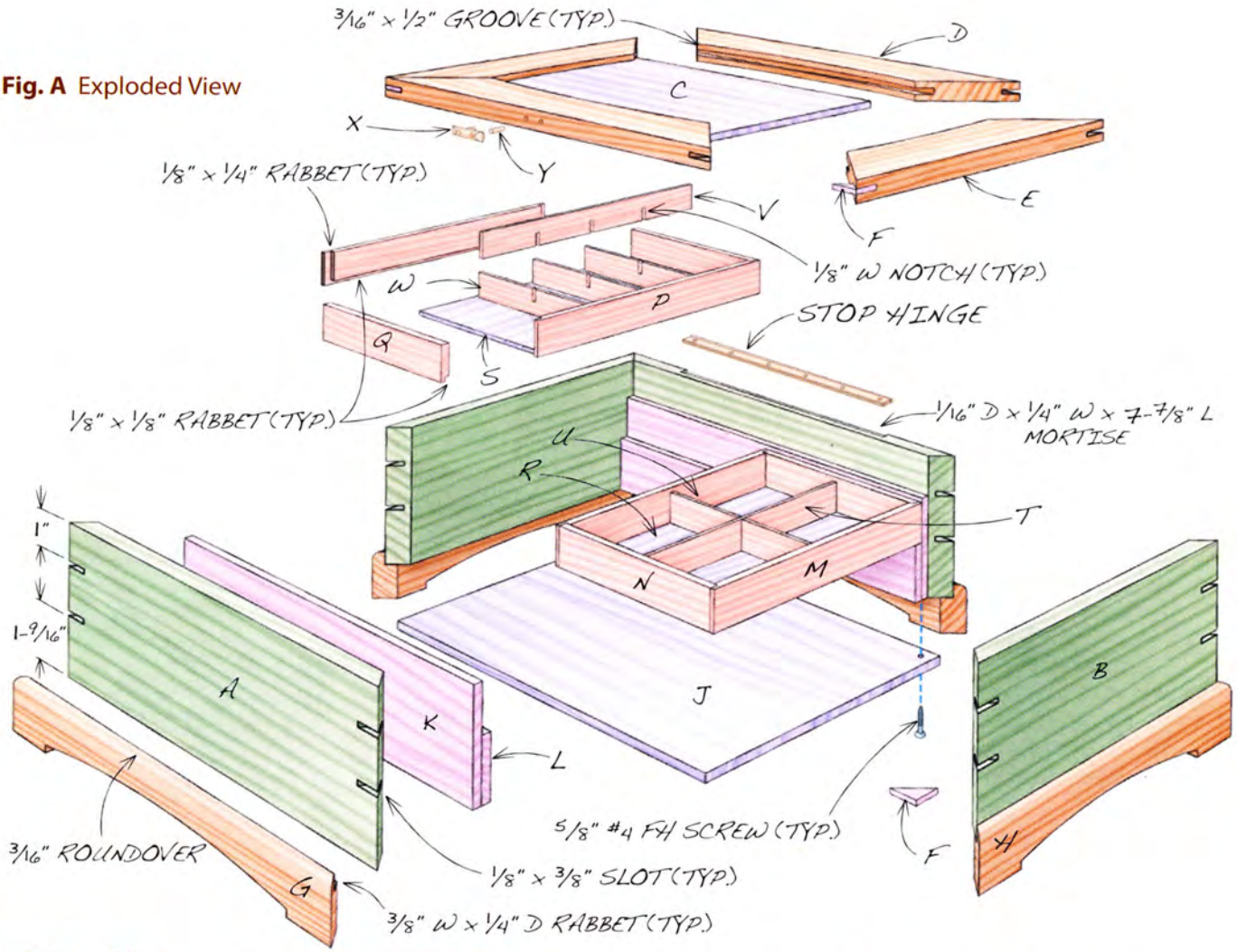


Fig. A Exploded View



Cutting List

Overall Dimensions: 5-9/16" H x 10" W x 13" L

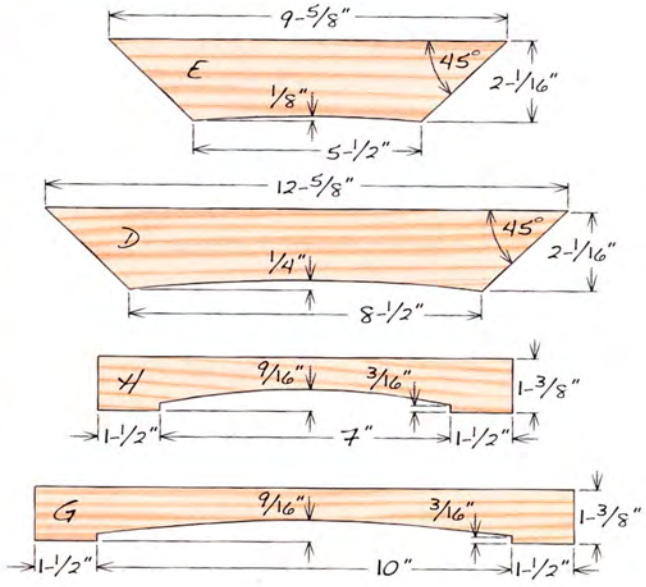
Part	Name	Qty.	Material	Th x W x L
A	Box side	2	Walnut	1/2" x 4" x 12-1/2" (a)
B	Box end	2	Walnut	1/2" x 4" x 9-1/2" (a)
C	Lid panel	1	Fir	3/16" x 6-7/16" x 9-7/16"
D	Lid side	2	Walnut	9/16" x 2-1/16" x 12-5/8" (a, b)
E	Lid end	2	Walnut	9/16" x 2-1/16" x 9-5/8" (a, b)
F	Key	12	Fir	1/8" x 1/2" x 1"
G	Base side	2	Walnut	1/2" x 1-3/8" x 13" (a)
H	Base end	2	Walnut	1/2" x 1-3/8" x 10" (a)
J	Box bottom	1	Plywood	1/4" x 9" x 12"
K	Upper tray support	2	Poplar	1/4" x 2-7/8" x 11-1/2"
L	Lower tray support	2	Poplar	1/4" x 1-5/8" x 11-1/2"
M	Lower tray side	2	Poplar	1/4" x 1-1/8" x 8"
N	Lower tray end	2	Poplar	1/4" x 1-1/8" x 5-1/2"
P	Upper tray side	2	Poplar	1/4" x 1" x 8-1/2"
Q	Upper tray end	2	Poplar	1/4" x 1" x 5"
R	Lower tray bottom	1	Poplar	1/8" x 5-1/2" x 7-3/4"
S	Upper tray bottom	1	Poplar	1/8" x 5" x 8-1/4"
T	Lower tray center divider	1	Poplar	1/8" x 7/8" x 7-1/2" (c)
U	Lower tray divider	1	Poplar	1/8" x 7/8" x 5-1/4" (c)
V	Upper tray center divider	1	Poplar	1/8" x 3/4" x 8" (c)
W	Upper tray divider	3	Poplar	1/8" x 3/4" x 4-3/4" (c)
X	Handle bar	1	Brass rod	1/4" x 1"
Y	Handle stem	2	Brass rod	1/8" x 3/4"

Notes:
a) Both ends mitered.
b) Oversize in width and length. Trim the lid to match the box after assembly.
c) Cut 1/8" wide x half-width notches to assemble dividers.

SketchUp

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Fig. B Templates



To create even spacing between the three slots on each corner, start with the box. Raise the blade to cut a 3/8" deep slot. Then set the fence to cut slots 1" from the top of the box. (Make sure to include the thickness of the sled's backboard when you set the fence; make test cuts using scrap that's the same width as the box.) Position the box in the sled with its top edge against the backboard. Cut the first slot and then rotate the box to cut slots across the other three corners.

Next, turn the box around so its bottom edge is against the sled's backboard. Reposition the fence and cut another series of slots 1-9/16" from the bottom of the box.

Set the fence to center the slots on the edge of the lid. Then follow the same procedure to cut the slots in the lid.

Glue strips of 1/8" fir into the slots to make the keys. After the glue has dried, cut off the excess and sand the keys flush.

Make base molding and trays

Cut the base sides and ends (G, H) from a pair of long blanks. Start by routing a 3/16" roundover and a 3/8" wide x 1/4" deep rabbet on the top edge of each blank. Then cut the molding pieces a little long and miter them to fit the box.

Make templates to rout the arcs (Fig. B). These templates are different from the lid templates, because the base has feet. After routing, you'll have to square the corner between the arc and each foot with a chisel. Glue the base molding onto the box. Then cut the box bottom (J) to fit inside the molding and bear against the bottom of the box. Set the box bottom aside; it will be installed later, after the finish and felt have been applied.

Mill stock for the upper and lower tray supports (K, L) and install them in the box, flush with the bottom. Then mill stock (or use 1/4" plywood; see Source, page 58) for the tray sides and ends (M-Q). Cut rabbets in all the bottom edges and on both ends of each side piece (**Photo 7**). Then assemble the trays with glue and 23-gauge pin nails. Mill stock (or use 1/8" plywood, see Source) for the tray bottoms (R, S) and cut them to fit. Then cut and fit the tray dividers (T-W). To create individual compartments in each tray, cut saw-kerf notches to lock the dividers together (**Photo 8**). It's easy to vary the compartments—simply adjust the notch locations and add or eliminate dividers.

Note: The assembled trays are sized to fit tightly between the tray supports. To make them slide easily, simply sand their ends to make them slightly shorter.

Rout hinge mortises

The lid mounts on the box with a single stop hinge (see Source). Use a straight bit and a router table with a fence to rout the hinge mortises. Adjust the bit's height to set the depth of the mortise; position the fence to set its width. Install stop blocks on the fence to define the ends of the mortise—cut the slot a little short on both ends and use a chisel for final fitting.

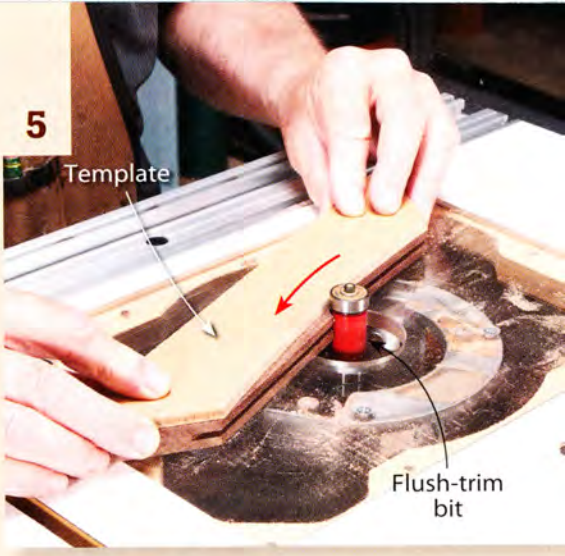
To rout the mortise in the box, turn it upside down and orient its back against the fence. To rout the mortise in the lid, lay it on the router table top-face up, with its back edge against the fence.

Install the hinge and check the top's alignment with the box. Then use a block plane to trim the edges flush. It's best to use a sanding block at the lid's corners, as planing can chip out the keys.

Rout arcs on the lid sides and ends using a template and a flush-trim bit.

Pro Tip: Fasten templates with 23-gauge pin nails. The tiny holes left by the nails are easy to hide with putty or a wax pencil.

5



Use a V-block sled to cut slots for keys across each corner of the box. Keep your hands away from the back end of the sled, where the blade exits.

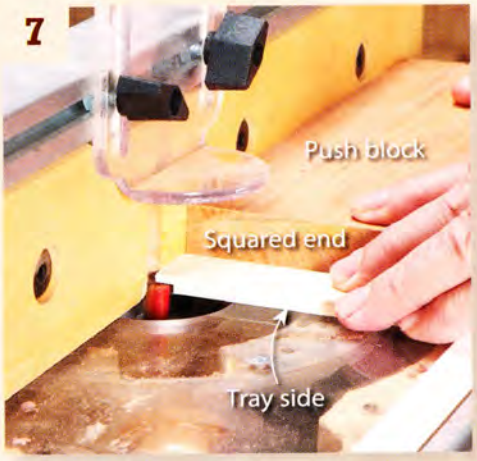
6



Rout rabbets on each tray side to house the tray ends.

Pro Tip: Use a long, wide push block with a squared end to keep the workpiece square against the fence and prevent tearout.

7



Notch the tray dividers so you can assemble them into grids that divide the trays into smaller compartments.

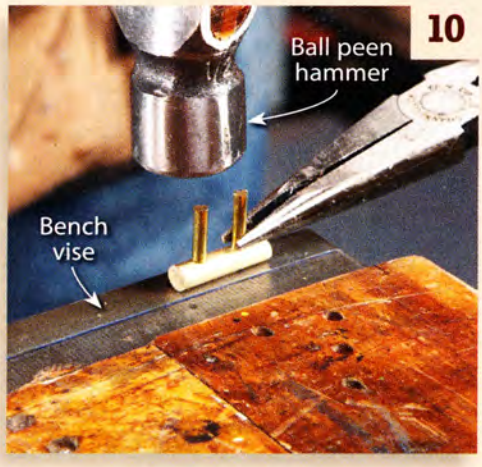
8





9 **Fashion** a distinctive handle from brass rod. First, drill two holes through 1/4" rod to make the handle's bar.

Pro Tip: Use a V-block and a clamp to stabilize round stock for drilling.



10 **Tap** 1/8" brass rod stems through the handle and secure them by peening (mushrooming) their ends on a hard surface such as a bench vise.



11 **Bevel** the ends of the handle after installing it in a scrap piece with holes drilled in the end. Grinding 30° bevels on the scrap's corners makes it easy to position the handle for grinding.



12 **Press** adhesive-backed felt onto the box and tray bottoms. Position the felt carefully—when the adhesive makes contact, there's no turning back.

Fashion the handle

Rather than buying a generic handle for the lid, why not make a great-looking one from brass rod? Brass rod is available at home centers and hardware stores and it's easy to work. You can cut it with a hacksaw, sand it, file it, drill it and polish it.

Start with the handle's bar (X). Drill a pair of 1/8" dia. holes through the 1/4" rod (**Photo 9**). Use a V-block clamping jig to keep the holes aligned. Drill at slow speed (600 rpm), use light pressure and frequently back out of the cut to clear the shavings. Make sure your bit is sharp. In fact, just buy a new one. It's cheap insurance.

Remove the drilled rod from the clamping jig and sand it smooth with 320 grit, then 600 grit and finally 1500 grit. Stop at 600 grit if you like the brushed satin look or go past 1500 grit for an even higher polish. Then cut the bar to length.

Cut the handle's stems (Y) from 1/8" brass rod and get them started into the holes in the bar. Then position the assembly on a hard metal surface, such as an anvil or the edge of a bench vise, and tap the stems through the bar until they bottom out (**Photo 10**). Then give each stem a couple sharp blows (called "peening") to mushroom the end of each stem and lock it in the hole. Note: Easy does it. Don't peen so hard that you bend the stem.

Complete the handle by beveling both ends of the bar. I made a simple jig from a piece of 5/16" thick scrap to hold the handle on the grinder (**Photo 11**). After grinding, polish the handle as necessary and set it aside.

Finish with a flourish

Sand all the parts to 220-grit and then apply your favorite finish. I used garnet shellac to enhance the walnut's color and the fir's rough texture.

Drill 1/8" dia. holes in the lid and insert the handle. A couple light taps with a block of wood should securely seat it, but you can also use a bit of epoxy.

Apply adhesive-backed felt lining to the box and tray bottoms (see Sources). It's easy to apply. Just be sure to carefully position the felt before you press it in place, as the adhesive is very strong. Cut the felt slightly oversize, peel off the first inch or so of backing and position the felt over the bottom. Press down the felt and pull away the protective sheet as you continue to adhere the felt across the entire bottom (**Photo 12**).

Pro Tip: If you misalign adhesive-backed felt while adhering it to the box and tray bottoms, use mineral spirits to soften the bond and remove any adhesive residue. Let the spirits evaporate and try again.

Turn each bottom piece felt-face down on a suitable cutting surface and use a utility knife with a sharp blade to cut the felt flush. Use 5/8" x #4 screws to fasten the box bottom and glue or 3/8" x #1 screws to fasten the tray bottoms.

SOURCE

Rockler Woodworking and Hardware, rockler.com, 800-279-4441, 8" Jewelry Box Stop Hinge, brass plated, #49819, $5.39; Baltic Birch Plywood, 1/4" x 12" x 60", #24724, $11.99; 1/8" x 12" x 60", #24617, $10.99; Pressure-Sensitive-Adhesive Felt Sheet, 1/16" x 12" x 24", #22814; $10.59.

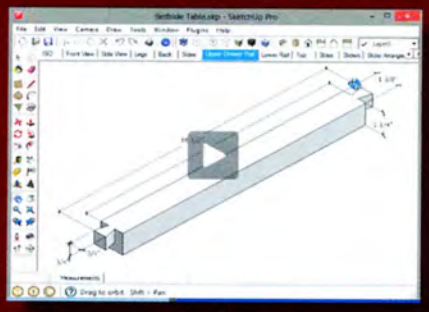
David Munkittrick is a professional woodworker and author living in River Falls, Wisc.

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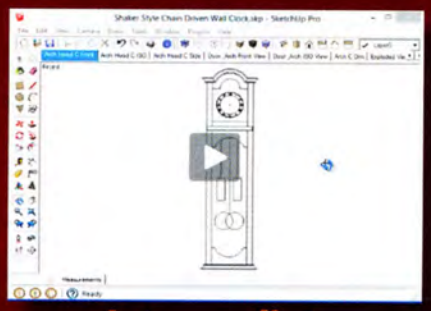
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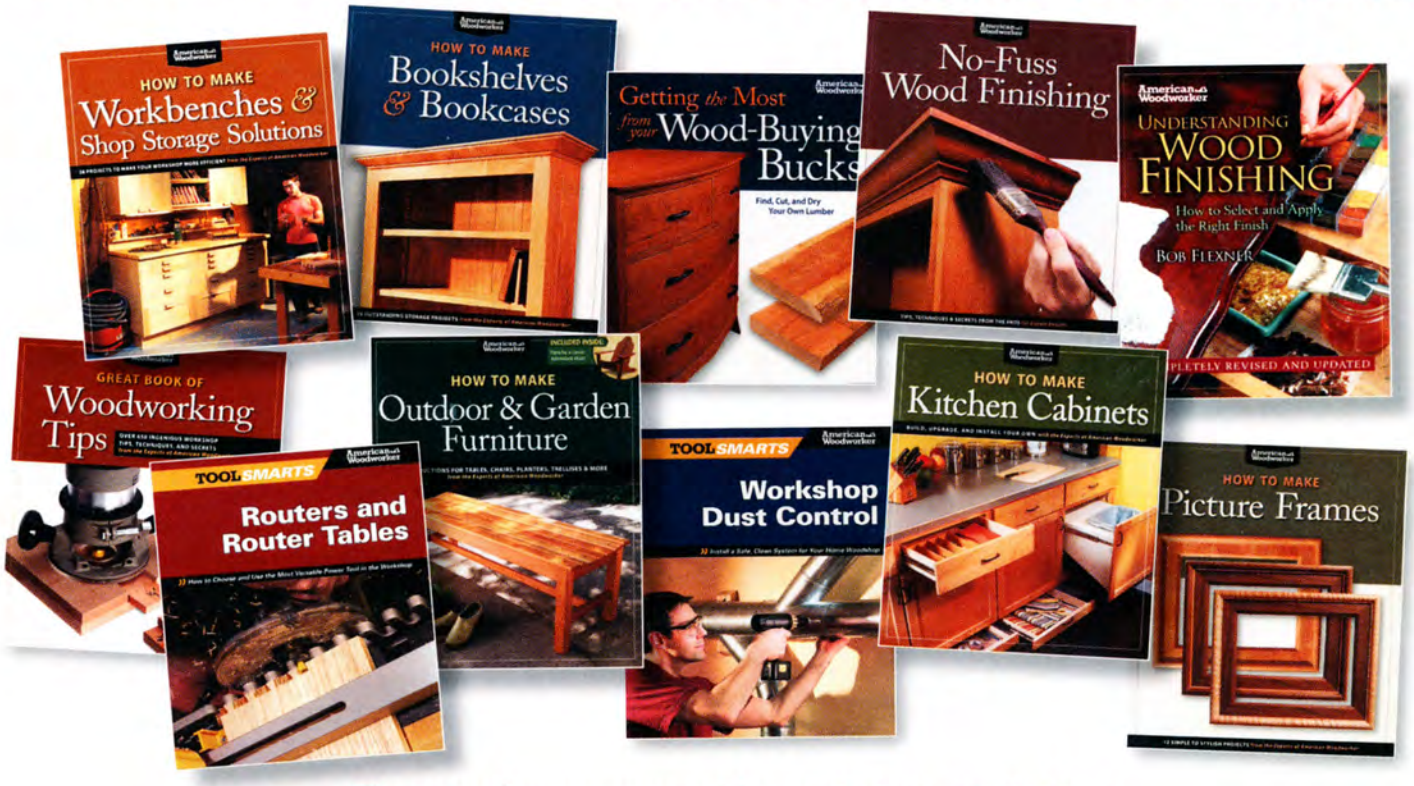
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Stickley-Style Plate Rack

Beautify your bungalow with an American classic.

by Garrett Glaser



WHETHER IT DISPLAYS everyday china or an heirloom collection, this handsome plate rack does the job with Arts and Crafts style. Like original pieces of that era, this rack features mortise and tenon construction, stepped joints and other subtle design elements that create visual interest and are hallmarks of good craftsmanship.

Building this piece will test your skills—a notion that fits perfectly with basic principles of the Arts and Crafts movement: to make your best effort and do your best work. Gustav Stickley himself marked his furniture (and his warranty) with the phrase "Als ik kan," which translates to "As best I can."

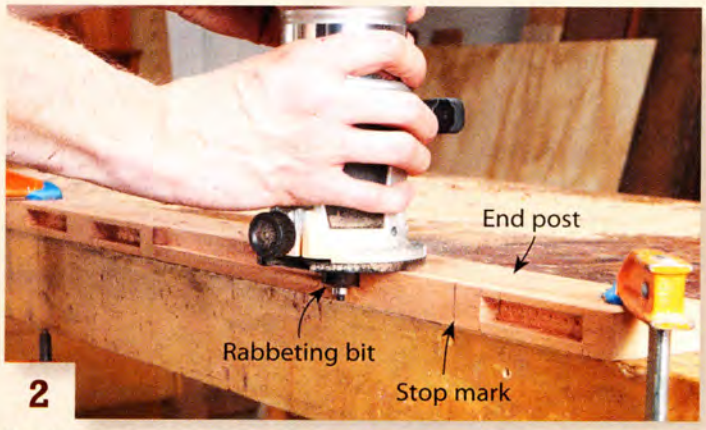
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EDITOR: TIM JOHNSON | PHOTOGRAPHY: JASON ZENTNER | ILLUSTRATION: FRANK ROHRBACH



Cut mortises in the end posts for the rails. Drill overlapping holes and then square the cheeks and shoulders by hand.



Rout a stopped rabbet on the inside edge of each end post to house the back slats.



Rabbet both faces on the ends of each rail to establish the tenons. On the top rail (shown here), wait to cut the tenon shoulders until after you cut the arc (see Photo 4).



Use an adjustable bow to lay out large arcs. To make the bow, stretch a string with evenly spaced knots between slots cut in the ends of a thin hardwood stick. Then use the knots to adjust the bow's arc.

Although the Stickley name usually evokes images of deeply fumed quartersawn oak, this homage is crafted from mahogany, another wood favored by Stickley and his contemporaries. Mahogany's rich tone and attractive figure make this rack worthy of display—with or without plates!

Make the end posts

Mill and cut the end posts to final dimension (A, Fig. A, page 62 and Cutting List, page 64). Then carefully locate, mark and cut the three mortises on each post (Fig. B). If you don't have a mortiser or a mortising attachment for your drill press, install a Forstner bit and rough out each mortise by cutting overlapping, stopped holes along its centerline. Then clean up the shoulders and square the ends with chisels (**Photo 1**). African mahogany is a very soft, almost spongy wood, so using a sharp chisel is a must.

Next, cut a 3/8" wide x 9/16" deep rabbet on the back inside edge of each post, using a router with a rabbeting bit (**Photo 2**).

When you rout stopped rabbets, use the base of the router to mark both end points on the face of the workpiece, so you can easily see where to start and stop.

Locate the hanging hole on each post and mark the curves on its top end. Drill the hole and use a bandsaw or jigsaw to shape the end. Then smooth the curves, using a disc sander or a belt sander clamped to a workbench.

Assemble the frame

Mill the top and bottom rails (B, C) to final dimensions. African mahogany boards over 12" wide are fairly common, but you can also glue up narrower boards to make the top rail. Establish the tenons on the ends of both rails (**Photo 3**). Then lay out and cut the arc on the top rail.

Mark the top rail's centerpoint and the beginning of the arc at the tenon shoulder on each end (3" down from the top). Then use a shop-made bow to draw the arc (**Photo 4**).

To make the bow, rip a 1/8" x 3/4" x 48" strip from a piece of straight-grained hardwood. Then cut 1/16" wide x 1/2" long notches in both ends of this piece. Next, cut a length of kite string or nylon mason's line somewhat longer than the bow. Tie a knot at one end and a series of evenly spaced knots at the other end. Then install the string, using the knots to bend the bow.

Find (or tie) a knot that creates a bow that matches the three marks you've laid out on the rail. Then position the bow on the rail and draw the arc. This bow probably won't

Fig. A Exploded View/End View

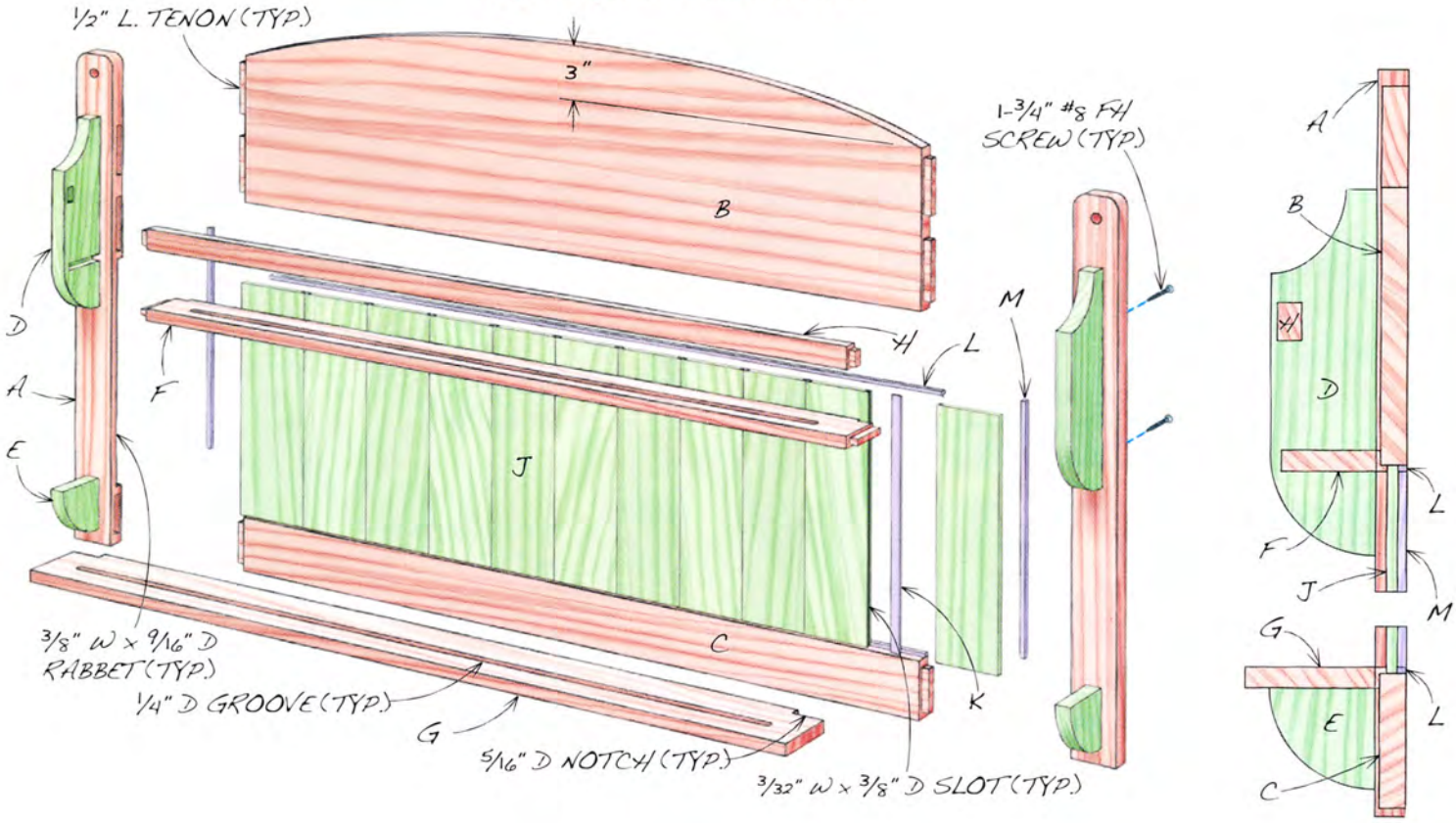


Fig. B
Post and Rail Joinery

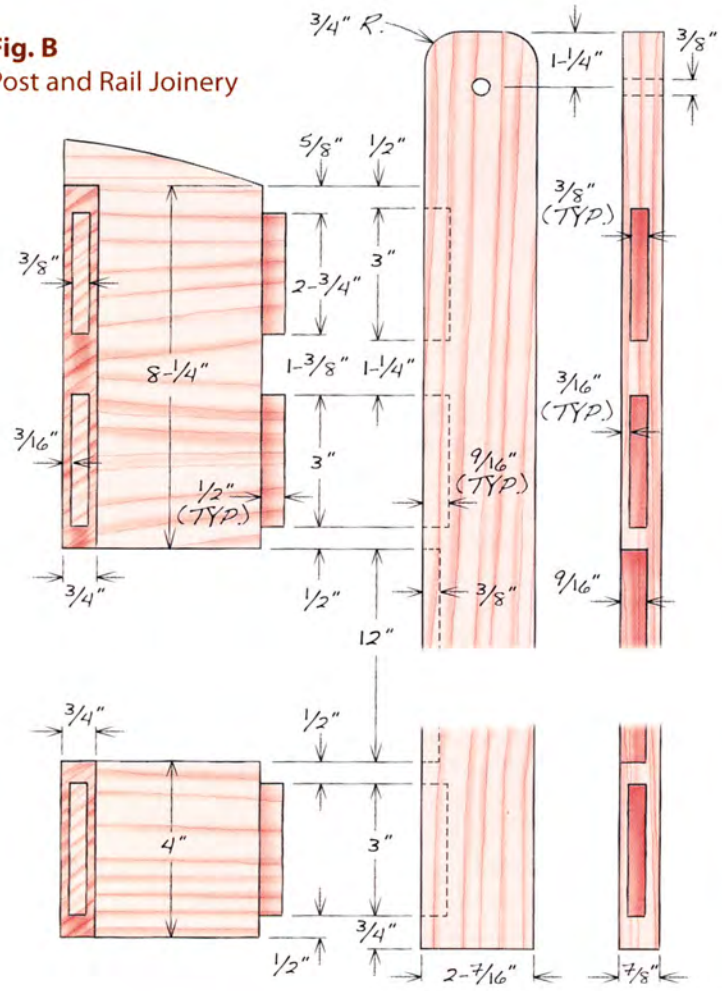
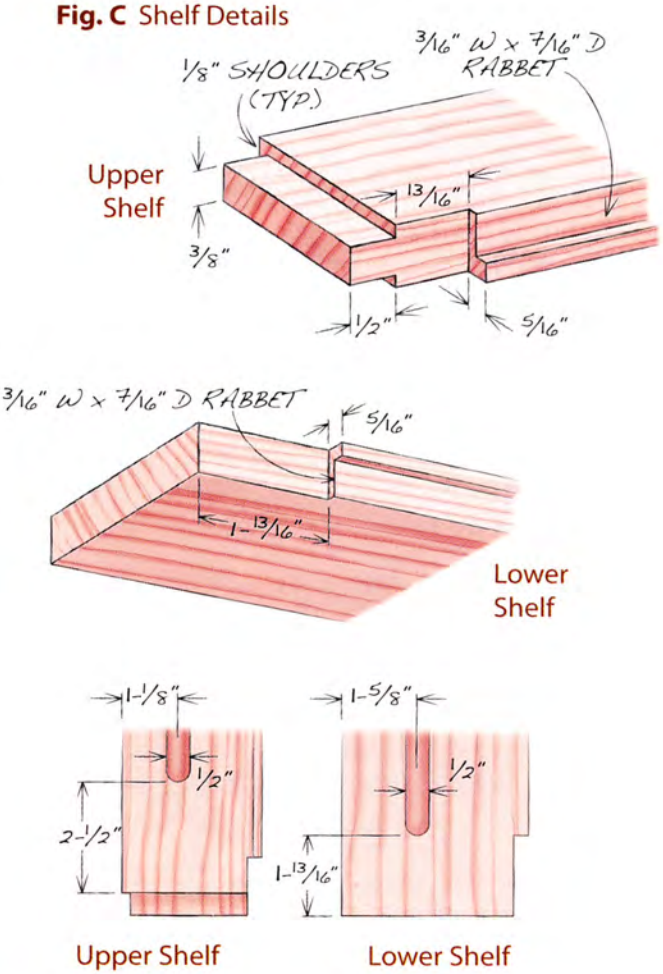


Fig. C Shelf Details





5

Measure diagonally in both directions to make sure a frame is square. If the measurements are identical, you're good to go.



6

Notch each shelf to fit the opening in the frame, using a miter gauge with a fence and a stop block. Only the upper shelf has tenons.



7

Rout plate grooves in each shelf using a plunge router with a fence and a core box bit.



8

Install the brackets and plate rail after gluing on the shelves. Gluing these mortise and tenon joints is optional, because both brackets will be securely fastened to the frame with screws.

create a geometrically perfect arc, so the best procedure is to position it, draw the arc from one end to the center and then flip the bow end-for-end to finish drawing the arc.

Cut the arc using a bandsaw or jigsaw. Then use a disc sander or a sanding block to fair the curve.

Complete the tenons on the top and bottom rails by using a pull saw to cut their shoulders. Use a coping saw and a chisel to remove the waste between the two tenons on each end of the top rail.

To keep a frame with one or more wide rails from splitting due to seasonal movement, cut two tenons on the ends of the rails rather than one long tenon. Cut the bottom tenons to fit their mortises full-width, but cut the top tenons narrower, so they're free to move up and down inside their mortises as the wood expands and contracts.

Assemble the rails and end posts without glue to test-fit the joints. Then glue up the frame (**Photo 5**). Yellow wood glue has enough elasticity to allow the top rail's seasonal movement.

Add the shelves and brackets

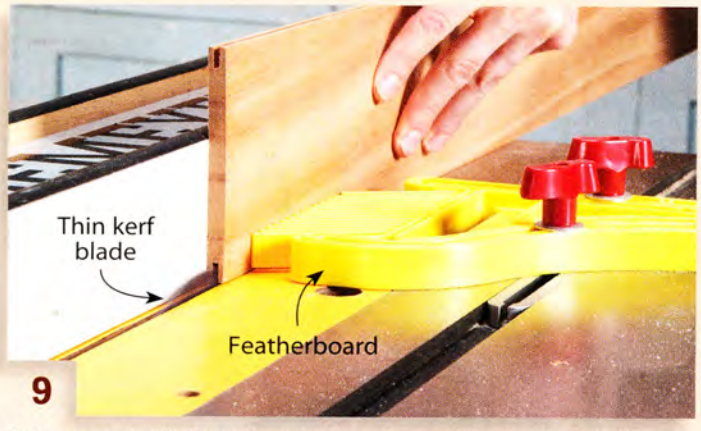
Mill and shape the upper and lower brackets (D, E; Fig. C). Cut the mortises in the upper brackets using the same method as for the end posts.

Next, mill the upper and lower shelves (F, G) and the plate rail (H) to final dimensions. Then cut the tenons on the upper shelf and plate rail to snugly fit the mortises in the upper brackets. (Note: At this point, the shelf will protrude beyond the bracket's back edge.)

Cut a 3/16" wide x 7/16" deep rabbet in the back edge of each shelf (Fig. C). Make sure to rabbet the top edge of the upper shelf and the bottom edge of the lower shelf. Then notch each shelf so it fits flush against the end posts when its rabbet is registered against the rail (**Photo 6**).

Plunge-rout 1/4" deep plate grooves in both shelves using a 1/2" core box bit (**Photo 7**). As before, use the router's base to mark the start and stop points.

Finish-sand the frame, shelves, brackets and plate rail. Then glue and clamp each shelf with its rabbet registered against the edge of the appropriate rail on the assembled frame. Next, install the plate rail as you slide the upper brackets onto the shelf's tenons (**Photo 8**). Clamp the brackets to the shelf and to the frame. Make sure the assembly is square and the brackets and end posts are parallel. Then drill countersunk pilot holes through the back of the end posts and fasten the brackets with screws.



9

Cut narrow kerfs for splines in the edges of the back slats. Use a featherboard to keep the slat pressed against the fence so the slots are consistently located.



10

Install the slats working from the center to the ends. Allow for seasonal movement when you cut the end slats to fit. Install retainer strips to hold the slats in place.

Glue the lower brackets to the end posts and lower shelf. To avoid cross-grain gluing (and allow seasonal movement), orient the grain on these brackets vertically.

Examine the assembled rack and finish-sand as necessary. Then apply your favorite finish. I wiped on three coats of gel urethane.

Install the back slats

Mill long blanks for the back slats (J), preferably by resawing thick stock rather than planing away more than half of a board. Rip the blanks to width and then use a sanding block to lightly chamfer the edges. Next, install a thin kerf blade and cut 3/32" wide x 3/8" deep slots for splines on both edges of each blank (**Photo 9**). It isn't necessary to perfectly center the slots; just keep the same face of the blank against the fence to cut both slots.

Install a zero-clearance insert in your tablesaw, set the fence and use a sacrificial push block to rip the splines (K) from a board milled to 9/16" thickness. Cut the slats and splines to length. Finish-sand the slats, apply the finish and let it dry. Then install one spline in the same edge of each slat. Don't use glue.

Lay the rack front-face down on your bench to install the slats, which rest on the rabbeted edges of the upper and lower shelves (**Photo 10**). Press the slats together, so the splines don't show. Secure the slats by fastening retainers (L, M) to the shelves and end posts, using 23-gauge pin nails.



Garrett Glaser is a furniture maker who lives and works in St. Paul, Minnesota. To see more of Garrett's work, visit **garrettglaser.carbonmade.com**.

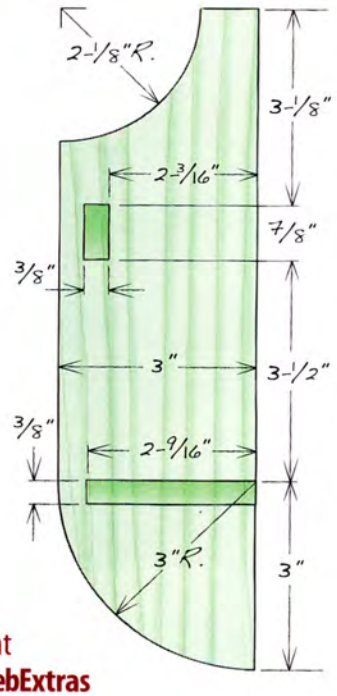


Fig. D Upper Bracket

Build a Stickly-style sideboard at **AmericanWoodworker.com/WebExtras**

Cutting List

Overall Dimensions: 28" H x 47" L x 4-9/16" D

Part	Name	Qty.	Material	Th x W x L
A	End post	2	African mahogany	7/8" x 2-7/16" x 28"
B	Top rail	1	African mahogany	3/4" x 11-1/4" x 43-1/8" (a)
C	Bottom rail	1	African mahogany	3/4" x 4" x 43-1/8" (a)
D	Upper bracket	2	African mahogany	7/8" x 3" x 10-1/2"
E	Lower bracket	2	African mahogany	7/8" x 3" x 3"
F	Upper shelf	1	African mahogany	5/8" x 3" x 44-11/16" (a)
G	Lower shelf	1	African mahogany	5/8" x 4" x 45-3/4"
H	Plate rail	1	African mahogany	5/8" x 1-1/8" x 44-11/16" (a)
J	Slat	11	African mahogany	5/16" x 4" x 11-15/16" (b)
K	Spline	10	African mahogany	3/32" x 5/8" x 11-15/16"
L	Horizontal retainer	2	African mahogany	3/16" x 1/4" x 42-7/8"
M	Vertical retainer	2	African mahogany	1/4" x 3/8" x 11-5/8"

Notes:
a) Length includes 1/2" long tenons on both ends.
b) Cut end slats to fit; allow 3/8" overall for seasonal movement.

The OctaBox

Eight sides are as easy as four.

by Jock Holmen



IS AN EIGHT-SIDED BOX twice as complicated as one with four sides? Not this one. As far as measuring goes, the OctaBox is easier to build than a rectangular box. On the OctaBox, every side is the same length and the top and bottom are identical—in fact, there are only two different parts to make for the whole project.

Making the two halves of the box fit perfectly together isn't complicated, either. I used a really clever system (see "The Easy Way to Make a Lipped Box," page 66). It worked great, but my execution was flawed: I made the box upside down! Granted, the top and bottom look alike, so what's the difference between them? Not asking that question while building the box is how I got into trouble.

I wanted the box to have a deep lid, so you could use it as a receptacle for discarded shells or candy wrappers. I also wanted the lid to be narrower than the base, so when assembled the box didn't look top-heavy. So far, so good.

I goofed somewhere else: The lips are reversed. On the vast majority of boxes with lipped edges, the lip on the lower half sticks up. Mine doesn't—it's recessed. You didn't notice? Neither did I, until someone pointed it out just before this article went to print. I'm not sure that it really matters, so I didn't get upset; I just laughed. I was tripped up by the project's simplicity—not complexity—and built it so fast that I overlooked a subtle detail. The plans given here are for the box just as I made it, but I've included alternate plans for making the box the "right" way (page 68).

I did learn one important lesson: Flying by the seat of your pants can be dangerous. When making a box, draw a cross section before you begin and keep track of which side is which!

Choosing wood

You don't need much wood to make an OctaBox, so you won't have to spend a lot to buy something special. I used cocobolo, a brightly colored exotic wood that's relatively easy to work. I looked for boards with straight grain so all the pieces of the box would look pretty much the same.

You'll need 1/2" material for the sides of the box (A) and 1/4" material for the box's top and bottom (B). The most convenient way to obtain this wood is by ordering it over

EDITOR: TOM CASPAR | PHOTOGRAPHY: JASON ZENTNER | ILLUSTRATION: FRANK ROHRBACH

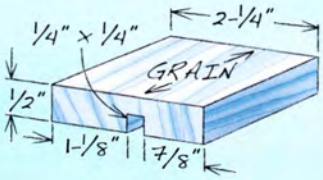


The Easy Way to Make a Lipped Box

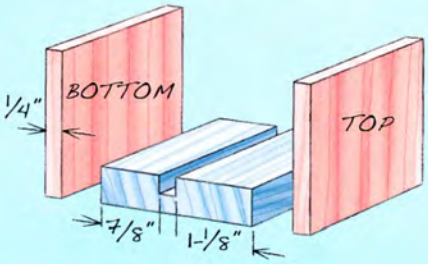
First—what is a lipped box? It's one that has a stepped rim all the way around the lid or the base, enabling the two pieces to nest together. The lip provides a tight seal and aligns the two pieces. If the box isn't hinged, a lip is essential.

There are many ways to make upper and lower lips—here's an easy method that automatically results in a good fit. The directions below are for the box I actually made, but if I had to do it over again, I'd reverse the positions of the two lips and make a thinner lid. See Fig. E, page 68, for a better design.

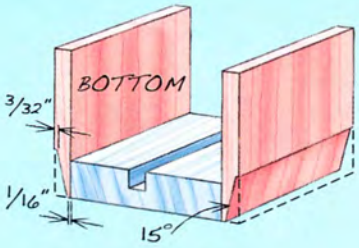
1) Cut a groove in a blank long enough to make all of the box's side pieces (**Photo 1**).



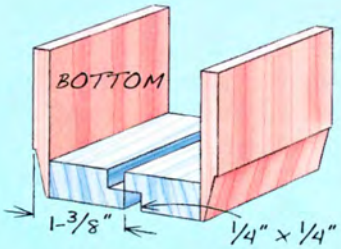
2) Miter the side pieces and glue them together, then add the box's top and bottom pieces (**Photos 3 - 11**).



3) Bevel the top and bottom (**Photo 12**).



4) Cut a second groove all the way around the box, almost touching the first groove (**Photos 13 - 15**).



5) Separate the two halves of the box with a knife, then nest them together.

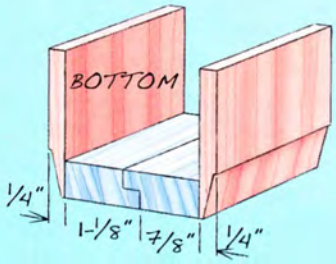


Fig. A
Exploded View

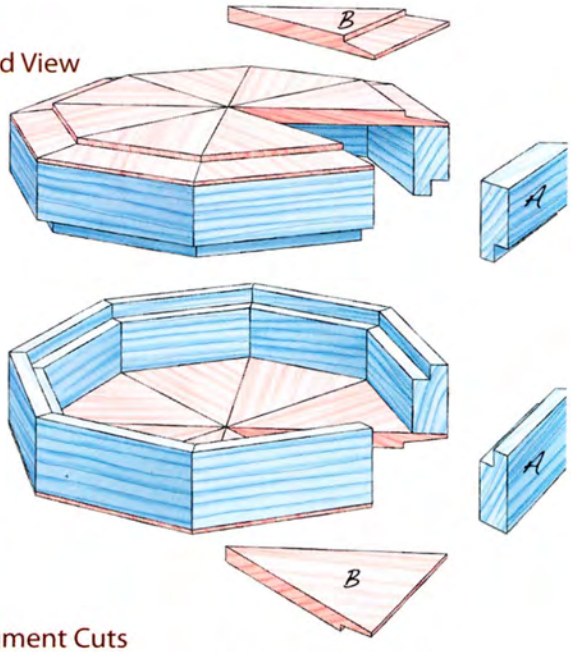


Fig. B
Side Segment Cuts

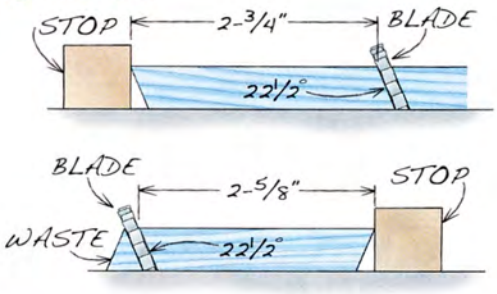


Fig. C
Top and Bottom Segment Cuts

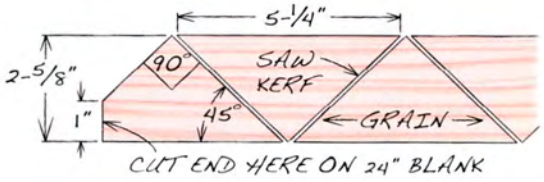
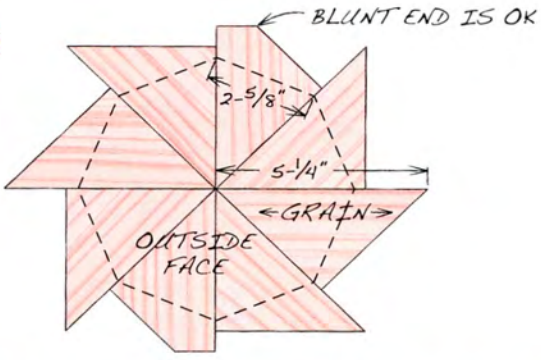


Fig. D
Pinwheel



Cutting List

Overall Dimensions: 2-1/2" H x 6-3/8" W octagon

Part	Name	Qty.	Th x W x L
A	Side segment	8	1/2" x 2-1/4" x 2-5/8" (a)
B	Top and bottom segment	16	1/4" x 2-5/8" x 5-1/4" (b)

Notes:
a) Width of side before cutting grooves to separate top half of box from bottom. Cut side pieces from a 1/2" x 2-1/4" x 24" blank.
b) Overall size of segment before gluing together (Fig. C). Cut segments from two 1/4" x 2-5/8" x 24" blanks.



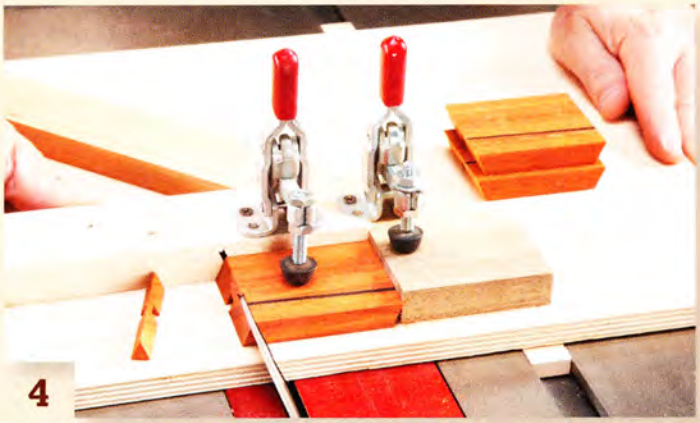
Start by milling one board to make all of the box's side pieces. Cut a groove halfway deep; its position determines where the box separates into two halves.



Spray finish on the grooved side of the board—this is its inside face. Finishing this side now will help you clean up dried glue later on.



Cut the board into eight equal pieces. The grooved side is down. A slanted line on the other side will enable you to reassemble the pieces in the correct order.



Turn all of the pieces around, reposition the stop block and recut one end of each piece. Both ends of the blocks now lean the correct way.



Place all of the pieces along a straightedge, outside face up, and tape them together. Turn over the assembly and apply glue to the joints.

the Internet. It usually comes in pieces that are 3" wide and 24" long. I've dimensioned the box so you can get all of the side pieces from one 24" board and all of the top and bottom pieces from two 24" boards. However, I strongly recommend that you make or order at least one additional piece of each thickness for testing your setups. (This wood could be any species, of course.)

I milled my own lumber for the box and cut the pieces 30" long. This additional length helped quite a bit when cutting the side pieces (Fig. C) because I had more support for the last cut. Bottom line: 24" will work, 30" is better.

Make the sides first

Before we get on the road, let's look at a map ("The Easy Way to Make a Lipped Box," page 66; you'll also find dimensions here for various cuts). You'll be making the box as a single unit, then sawing it apart into two pieces. You'll be making lips on these pieces so they nest together, and that's where you'll start—with the lips.

Rip the 1/2" thick piece 2-5/16" wide, then joint both edges to yield a piece that's 2-1/4" wide. Install a 1/4" dado set in your saw and cut a groove the length of the board (**Photo 1**). Cut the same groove in one of your test pieces. Ideally, you'd make these grooves with a special set of blades or a single blade that cuts a flat bottom (see Source, page 69, and "Extra-Wide Blades," page 16), but a standard dado set will be OK. (It will leave some unobtrusive scoring marks that you can't easily remove—flat-topped blades won't.) Turn over the piece and apply a finish to it (**Photo 2**). In addition, draw a slanted line down the full length of the side without the groove. This orientation line will enable you to reassemble the pieces in the correct order after they're cut apart in the next steps.

Cutting the 1/2" piece into segments is a two-step process (**Photos 3 and 4**; Fig. B). The bevel cuts must be right on the money, so it's worth the time to make test cuts first. (You can use any wood for this. The angle is correct when eight pieces form a tight-fitting octagonal frame.)

Pro Tip Make a dedicated sled for cutting the small parts that make up the box's sides and top and bottom. While you could simply use a miter gauge and a fence, a sled has a number of advantages. First, there's no tearout, because there's zero clearance around the blade. Second, you can easily mount toggle clamps on the sled to prevent the parts from moving—and to keep your hands out of harm's way. Third, the cuts are absolutely straight because the sled runs true, without any wiggle.



Pull the two ends of the assembly together with more tape. No clamps are necessary.



Mark the position of the groove on the outside of the box.



Begin making the top and bottom of the box. First, saw a long board into triangles.



Tape four triangles together, making half of a pinwheel. Open the joints and apply glue. Glue the two halves together, making a complete pinwheel.



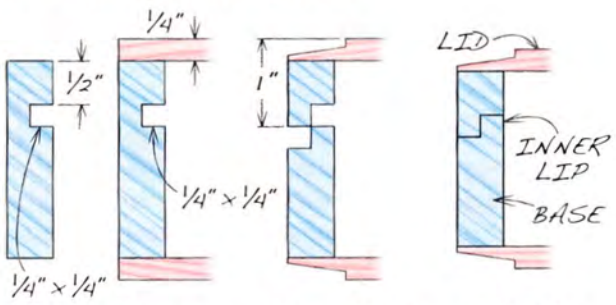
Align the sides of the box with the top and bottom pinwheels. Trace around the box. Saw off the waste, then glue the pinwheels to the sides.



Even up the edges of the top and bottom with a bearing-guided flush-trim bit.

Tape the segments together in the correct order and glue them together (**Photos 5 and 6**). Level the top and bottom edges of the box with a jack plane or by rubbing the box on a full sheet of sandpaper taped to the top of your tablesaw. Before moving on, mark the location of the groove on the outside of the box (**Photo 7**). This is very important. Once you've glued on the top and bottom of the box, the groove will be hidden. You'll need to know exactly where it is when you saw the box apart.

Fig. E Alternate Lip Arrangement



This plan uses side segments that are the same width as the original OctaBox, but the lips are reversed. Here, the lower lip is proud and the upper lip is recessed. Both ways work!

Add top and bottom

To save time, you could make the box's top and bottom from single pieces of wood. It's risky, though: They might crack. Gluing the pieces all around the box restrains them from expanding and contracting in width with changes in humidity. My solution is to minimize this movement by making the top and bottom from triangular segments, forming a "pinwheel" (Fig. D). The pinwheel's grain doesn't run in a single direction—it rotates with each segment.

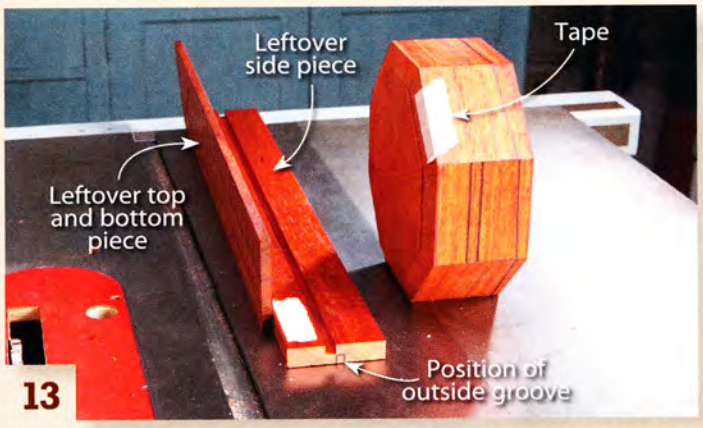
Sawing these segments is exacting work (**Photo 8**). The 45° cuts must be precise. As with the side segments, the best strategy is to make test cuts, adjusting the fence until you can make a complete pinwheel with tight joints, right off the saw. I had to reposition the fence on my sled a few times to accomplish this. Even so, I had to shim the last piece of the pinwheel before cutting it in order to tweak its angle just a smidge.

Once you're set, rip and joint the 1/2" material so it's 2-5/8" wide. If your wood is only 24" long, leave a blunt end on the first segment in order to obtain all eight pieces (Fig. C). The last segment will have a blunt end, too—but it won't matter (Fig. D). Tape and glue the segments into two halves (**Photo 9**), then tape and glue the halves together. Sand both surfaces of the pinwheels until they're flat and even.



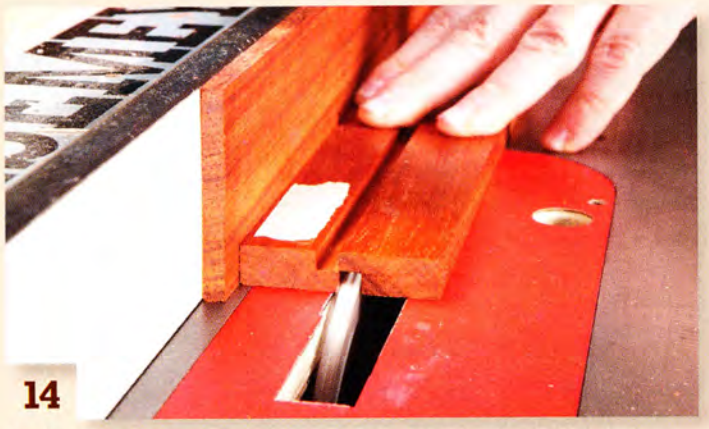
12

Saw bevels all the way around the top and bottom. Clamp a long board to the box to prevent it from tipping.



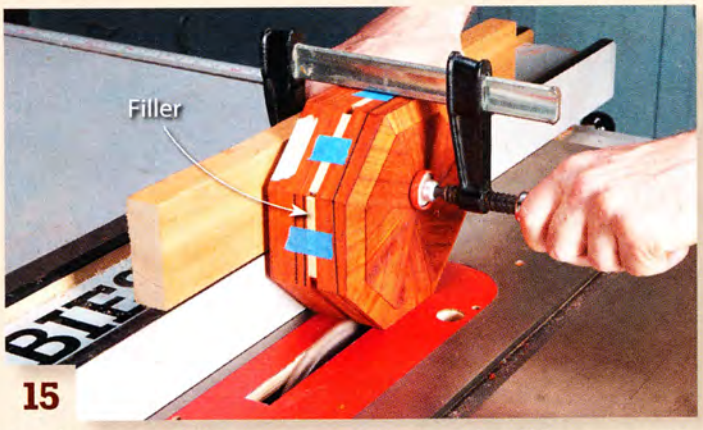
13

Prepare to separate the box into two halves. To avoid cutting in the wrong place, set up the saw using two leftover pieces. Tape identifies the box's bottom.



14

Make a short test cut. This groove should also be halfway deep and leave just a whisker of wood separating it from the other groove.



15

Cut the groove all the way around the box. Tape filler pieces into the grooves as you cut. Separate the two halves with a knife.

Place the box's sides on both pinwheels and trace around them (**Photo 10**). Be sure that the pinwheel "spins" the same way for both top and bottom—it's easy to get mixed up here. Remove the waste using a bandsaw, staying about 1/8" away from the line. Glue the top and bottom onto the box. You don't have to use clamps, just weight. (A gallon can of paint works well.) Trim the top and bottom flush with a router (**Photo 11**).

Bevel the top and bottom (**Photo 12**). This cut is fussy, too—you don't want to take too much or too little. It's best to make the first round of cuts a bit shy of the goal, then adjust the blade and fence in small increments.

Separation time

The next step is to cut the box apart. To succeed, you'll need to know the exact location of the groove you cut in the first step. Of course, it's hidden inside the box now—but you marked it on the outside of the box, right? It's not easy to set up the saw from this mark alone, however—you're much better off using the pieces you made for test cuts (**Photo 13**).

Mark the location of the new, outside groove on the 1/2" thick piece. Cut a short test groove in this piece (**Photo 14**). Ideally, the top of this groove should exactly line up with the bottom of the inside groove. However, this might result in a fit that's too tight. (The box's lid must fit in eight different positions!) It's better to cut the outside groove an additional 1/64" deep, which will result in a slightly looser fit. Adjust the fence so the grooves are separated by a whisker of wood.

Saw all the way around the box (**Photo 15**). Put tight-fitting filler pieces into each groove as you cut—they're essential for keeping the box intact as you cut it apart. Tape the pieces in place. When you're done, separate the two halves by scoring the outside groove with a thin knife. Bevel the lips by planing or sanding, then test the lid's fit all eight ways. If it's too tight, use a rabbet plane or sandpaper to adjust the fit. Sand and finish.

SOURCE

Freud, freudtools.com, 800-334-4107, Box Joint Cutter Set, #SBOX8, $90.



Jock Holmen is a carver from Burnsville, Minn.

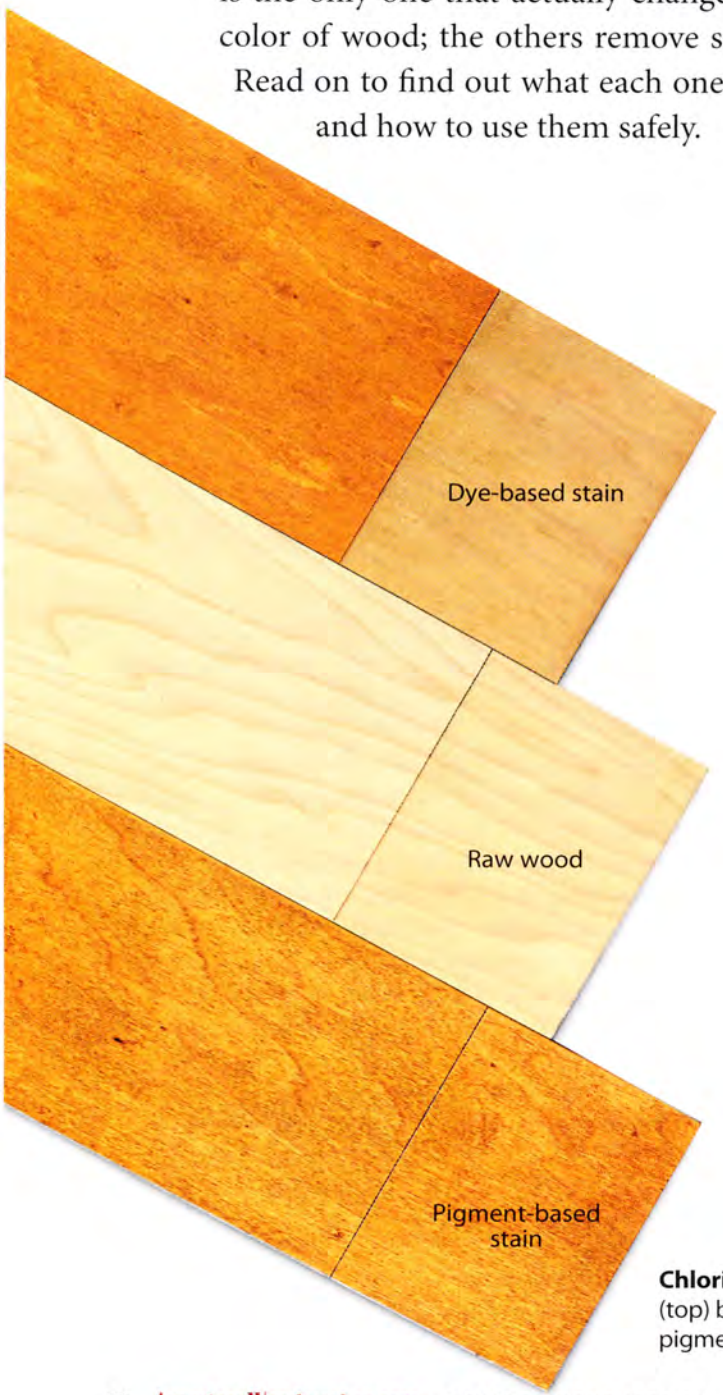
Bleaching Wood

Subtract color to add life.



This wardrobe is made from riftsawn red oak. Several applications of two-part wood bleach turned it bone-white without obscuring the grain.

WOODWORKERS COMMONLY USE three types of bleach: chlorine, two-part wood bleach and oxalic acid. Two-part bleach is the only one that actually changes the color of wood; the others remove stains. Read on to find out what each one does and how to use them safely.



Chlorine bleach, full strength, easily removes most dye-based stain (top) but will not bleach raw wood white (center), nor will it remove pigment-based stain (bottom).

Chlorine bleach

Common household laundry bleach (sodium hypochlorite) will kill mildew on your deck and outdoor furniture, and will remove dye-based stain from wood, but not pigment-based stain. Chlorine bleach can irritate skin and mucous membranes, so wear gloves and goggles.

Deck cleaner. To remove mildew from your deck or exterior furniture, first hose off the wood to remove any loose debris. Mix about a quart of chlorine bleach (Clorox, Purex, etc.) to each gallon of water. Use a synthetic-bristle brush and scrub the surface with the bleach mixture. Be sure to wear goggles—it's easy to splash. Reapply the bleach if necessary in order to keep the surface wet for about 15 minutes. Then, brush off the surface again and hose it down thoroughly with water. Keep the runoff away from plants, pets and other wildlife.

Fortunately, deck stains are formulated with pigments, so they are not affected by the bleach. Let the wood dry completely if you plan to re-stain. If you live in an area where mildew is a problem, choose a deck stain that contains a mildewcide. Most home centers and paint stores sell them. Another option is to buy mildewcide and add it yourself.

Dye remover. Chlorine bleach will remove most dye-based stains from raw wood but will not lighten the wood itself. This is handy to know if you finish your project with a dye and then decide you want to "erase" it and start over. Chlorine bleach will also remove old dye you might encounter during a refinishing project.

Use a synthetic-bristle brush or a clean rag to apply the bleach full strength. It should remove the color by the time it dries, but for stubborn stains, repeat the process. If you are removing the stain from an old piece of furniture you are refinishing, make sure all the finish is off the surface and lightly scuff-sand it first. Bleach will not penetrate a finish.

As chlorine bleach dries, it breaks down to salt and water. Once the water evaporates, you'll have salt residue on the wood. Brush it off before you finish the wood.

EDITORS: MICHAEL DRESDNER AND TIM JOHNSON | PHOTOGRAPHY: PHIL LEISENHEIMER, LA STUDIOS | "ALABASTER WARDROBE" BY TIM JOHNSON



Two-part
wood bleach takes
the color out of most dark woods and blends the
color of maple's heartwood with its sapwood.

Two-part (A/B) wood bleach

Wood bleach actually lightens the color of wood. It can also de-color many pigments and dyes.

A package of wood bleach contains two bottles, usually labeled "A" and "B." One contains lye (sodium hydroxide) and the other peroxide (hydrogen peroxide). The bleaching action occurs when the two chemicals come together in contact with wood. Instructions for use vary from brand to brand. Some say to put part A on first, then apply B before A dries. Other suggest mixing the two just before application. The object is to get both chemicals and the wood in the same place at the same time. Read the directions.

Use a synthetic-bristle brush or a clean rag to apply the bleach. When the lye goes on first, it initially darkens the wood. Once the peroxide goes on it is likely to foam as it reacts with the wood and lye. Let the wood dry completely, usually overnight, then sponge off all residue with plenty of clean water.



Apply A/B bleach safely. Wear long neoprene gloves, with ends cuffed to catch drips, a waterproof apron, and goggles. Brush carefully. A/B bleach is extremely caustic and will quickly burn your skin and eyes.



Oxalic acid
dissolved in water
removes black iron stains
like magic from tannin-rich wood,
such as oak.

Oxalic acid

Iron, in the form of nails, hardware, or even bits of steel wool, often leaves a blackish stain on woods high in tannin, such as oak. A wash of oxalic solution removes these stains as well as the grayed color of oxidized wood.

Oxalic acid is sold in most hardware stores and home centers as a dry, white crystalline powder. The crystals are toxic and irritating to mucous membranes, so wear goggles and a dust mask when handling the dry powder. In a glass or plastic container, dissolve an ounce of oxalic acid into a pint of warm water.

Make certain that you have removed all the offending metal before you bleach the wood. Sometimes stains are caused by broken-off nails or bits of fencing that are hidden in the wood. Wet the surface with the oxalic acid mixture and let it dry. Repeat if the stain is not completely gone. Once dry, sponge the wood with plenty of clean water to remove the crystalline residue. Any oxalic acid residue left in the wood will make irritating dust when you sand, so wear a dust mask and eye protection.

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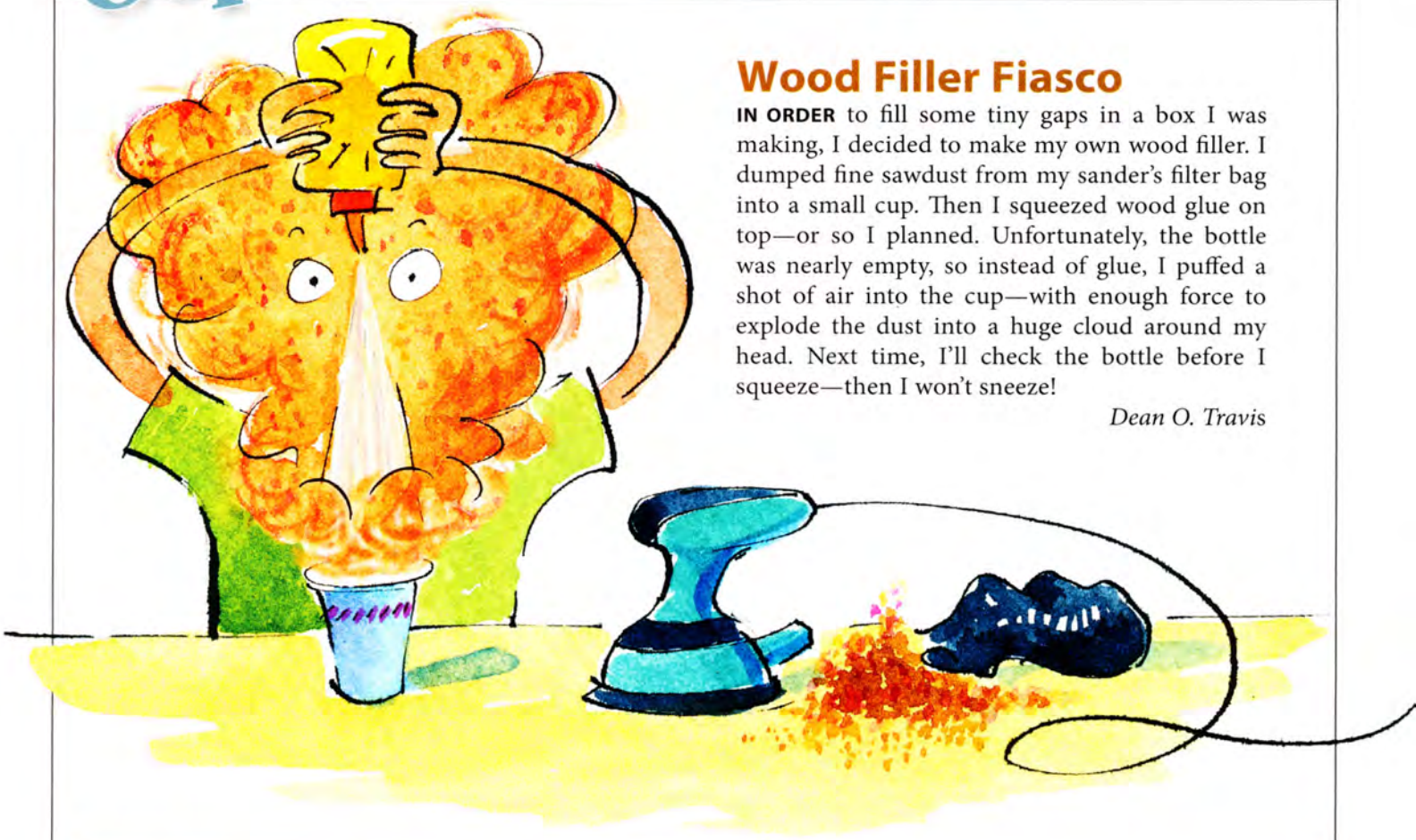
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Oops! Crazy Mistakes Woodworkers Make



Wood Filler Fiasco

IN ORDER to fill some tiny gaps in a box I was making, I decided to make my own wood filler. I dumped fine sawdust from my sander's filter bag into a small cup. Then I squeezed wood glue on top—or so I planned. Unfortunately, the bottle was nearly empty, so instead of glue, I puffed a shot of air into the cup—with enough force to explode the dust into a huge cloud around my head. Next time, I'll check the bottle before I squeeze—then I won't sneeze!

Dean O. Travis

Ninja Woodworking

MY WIFE, a math teacher, asked if I could make 25 wooden triangles for her pre-geometry class. I laid out the triangles on a sheet of thin plywood and started cutting them on my tablesaw. About halfway through, I noticed that the stack of finished triangles was getting pretty high, so I decided to move it to a safer spot. I wasn't going very far, so I left the saw running as I picked up the stack. Naturally, the top triangle slid off onto the spinning blade, which hurled it across my shop and embedded it in the wall, just like a Ninja throwing star. Now I have a new job for tomorrow—wallboard repair.

Roy I. Steele

Correction

"Food Safe Finishes," (AW #165, Aug/Sept 2013) includes instructions for heating a cutting board in an oven in order to apply a molten wax finish, but failed to mention that this process can also damage the board if it's allowed to "overcook." For complete information, visit AmericanWoodworker.com/WebExtras.





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How do we sell high quality tools at the lowest prices? We cut out the middle man and buy direct from the factories who supply other major brands. It's just that simple! Come see for yourself and use this 20% Off Coupon on one of our 7,000 products*, plus pick up a Free 6 Piece Screwdriver Set, a $4.99 value. We stock Automotive Tools, Power Tools, Air Tools and Compressors, Engines and Generators, Welders, Hand Tools, Tool Storage, Tarps and much more.

- 1 Year Low Price Guarantee!
- No Hassle Return Policy!
- 100% Satisfaction Guaranteed!
- Over 25 Million Satisfied Customers!
- 430+ Stores Nationwide!

NOBODY BEATS OUR QUALITY, SERVICE AND PRICE!

SUPER COUPON!

FREE!

WITH ANY PURCHASE



Item 47770 shown

PITTSBURGH 6 PIECE SCREWDRIVER SET

ITEM 47770/61313

REG. PRICE $4.99

LIMIT 1 - Cannot be used with other discount, coupon or prior purchase. Coupon good at our stores, HarborFreight.com or by calling 800-423-2567. Offer good while supplies last. Shipping & Handling charges may apply if not picked up in-store. Non-transferable. Original coupon must be presented. Valid through 1/3/14. Limit one coupon per customer per day.

37700101

SUPER COUPON!

20% OFF

ANY SINGLE ITEM!

LIMIT 1 - Save 20% on any one item purchased at our stores, HarborFreight.com or by calling 800-423-2567. *Cannot be used with other discount, coupon, gift cards, Inside Track Club membership, extended service plans or on any of the following: compressors, generators, tool storage or carts, welders, floor jacks, Towable Ride-On Trencher (item 65162), open box items, in-store event or parking lot sale items. Not valid on prior purchases after 30 days from original purchase date with original receipt. Non-transferable. Original coupon must be presented. Valid through 1/3/14. Limit one coupon per customer per day.

26502527

SUPER COUPON!

14" OSCILLATING SPINDLE SANDER



Item 95088 shown

SAVE $60

CENTRAL MACHINERY

LOT NO. 69257/95088

$89.99 REG. PRICE $149.99

79528556

LIMIT 4 - Good at our stores, HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 1/3/14. Limit one coupon per customer per day.

SUPER COUPON!

27 LED PORTABLE WORKLIGHT/ FLASHLIGHT



Item 67227 shown

SAVE 56%

LOT NO. 67227/ 69567/60566

HFT

Requires three AAA batteries (included).

$2.59 REG. PRICE $5.99

31983824

LIMIT 9 - Good at our stores, HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 1/3/14. Limit one coupon per customer per day.

SUPER COUPON!

ELECTRIC PAINT SPRAY GUN



SAVE 40%

KRAUSE & BECKER

LOT NO. 47274/60446

Item 60446 shown

$14.99 REG. PRICE $24.99

33 OZ.

74980694

LIMIT 6 - Good at our stores, HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 1/3/14. Limit one coupon per customer per day.

SUPER COUPON!

DOVETAIL MACHINE

CENTRAL MACHINERY

LOT NO. 34102



SAVE 28%

$24.99 REG. PRICE $34.99

86921367

LIMIT 3 - Good at our stores, HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 1/3/14. Limit one coupon per customer per day.

SUPER COUPON!

ALUMINUM OXIDE SANDING SPONGES - PACK OF 10

Lifetime CARBIDE



SAVE 41%

YOUR CHOICE!

$3.49 REG. PRICE $5.99

COARSE LOT NO. 46751

MEDIUM LOT NO. 46752

FINE LOT NO. 46753

83687666

LIMIT 8 - Good at our stores, HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 1/3/14. Limit one coupon per customer per day.

SUPER COUPON!

MOVER'S DOLLY

LOT NO. 93888/60497

HaulMaster



Item 93888 shown

1000 LB. CAPACITY

SAVE 46%

$7.99 REG. PRICE $14.99

62870261

LIMIT 8 - Good at our stores, HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 1/3/14. Limit one coupon per customer per day.

SUPER COUPON!

CENTRALPNEUMATIC 2.5 HP, 21 GALLON, 125 PSI VERTICAL AIR COMPRESSOR



SAVE $70

LOT NO. 67847/ 69091/61454

$149.99 REG. PRICE $219.99

Item 67847 shown

60665047

LIMIT 3 - Good at our stores, HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 1/3/14. Limit one coupon per customer per day.

SUPER COUPON!

CENTRALPNEUMATIC 28° ANGLE FRAMING NAILER



SAVE $50

Item 69928 shown

LOT NO. 68068/69928

$69.99 REG. PRICE $119.99

48101562

LIMIT 5 - Good at our stores, HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 1/3/14. Limit one coupon per customer per day.

SUPER COUPON!

2.5 HP 12" PLANER

CENTRAL MACHINERY

LOT NO. 95082



SAVE $80

$219.99 REG. PRICE $299.99

93311633

LIMIT 4 - Good at our stores, HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 1/3/14. Limit one coupon per customer per day.

SUPER COUPON!

2 HP INDUSTRIAL 5 MICRON DUST COLLECTOR



SAVE $100

$149.99 REG. PRICE $249.99

LOT NO. 97869

16511131

LIMIT 3 - Good at our stores, HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 1/3/14. Limit one coupon per customer per day.

SUPER COUPON!

4 PIECE WOOD CHISEL SET

PITTSBURGH

LOT NO. 69471/42429



1" 3/4" 1/2" 1/4"

SAVE 41%

$4.69 REG. PRICE $7.99

Item 42429 shown

41199823

LIMIT 9 - Good at our stores, HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 1/3/14. Limit one coupon per customer per day.

SUPER COUPON!

1" x 30" BELT SANDER

CENTRAL MACHINERY

LOT NO. 2485/60543



SAVE 40%

$29.99 REG. PRICE $49.99

Item 2485 shown

11284680

LIMIT 5 - Good at our stores, HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 1/3/14. Limit one coupon per customer per day.

SUPER COUPON!

26", 8 DRAWER ROLLER CABINET WITH 8 DRAWER TOP CHEST

830 LB. CAPACITY

US★GENERAL PRO

LOT NO. 67831/61609



$299.99 REG. PRICE $499.99

SAVE $200

Item 67831 shown

74063552

LIMIT 4 - Good at our stores, HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 1/3/14. Limit one coupon per customer per day.

SUPER COUPON!

4 PIECE 1" x 15 FT. RATCHETING TIE DOWN SET

HFT



Item 90984 shown

LOT NO. 90984/ 60405/61524

SAVE 55%

$7.99 REG. PRICE $17.99

95303500

LIMIT 7 - Good at our stores, HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 1/3/14. Limit one coupon per customer per day.

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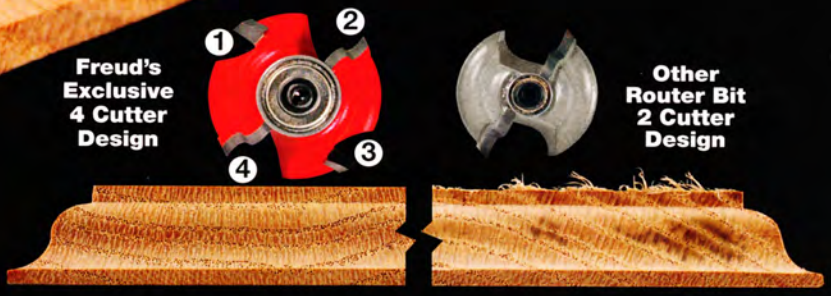
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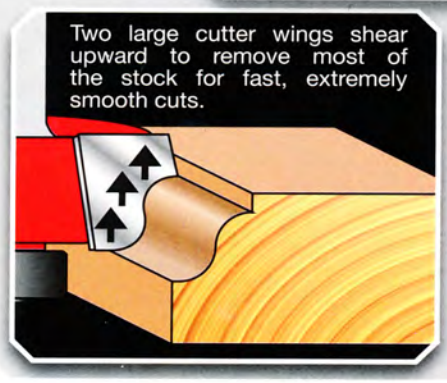
SCAN WITH MOBILE DEVICE

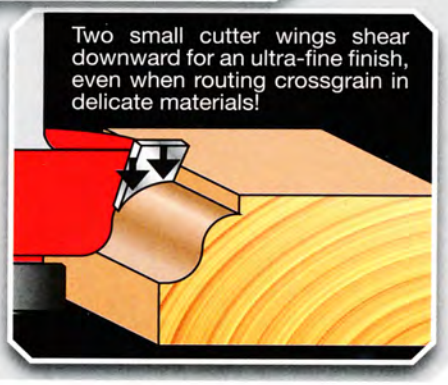
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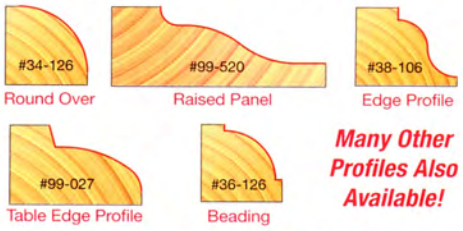
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