

TAUNTON'S

Fine Woodworking

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Sliding dovetails
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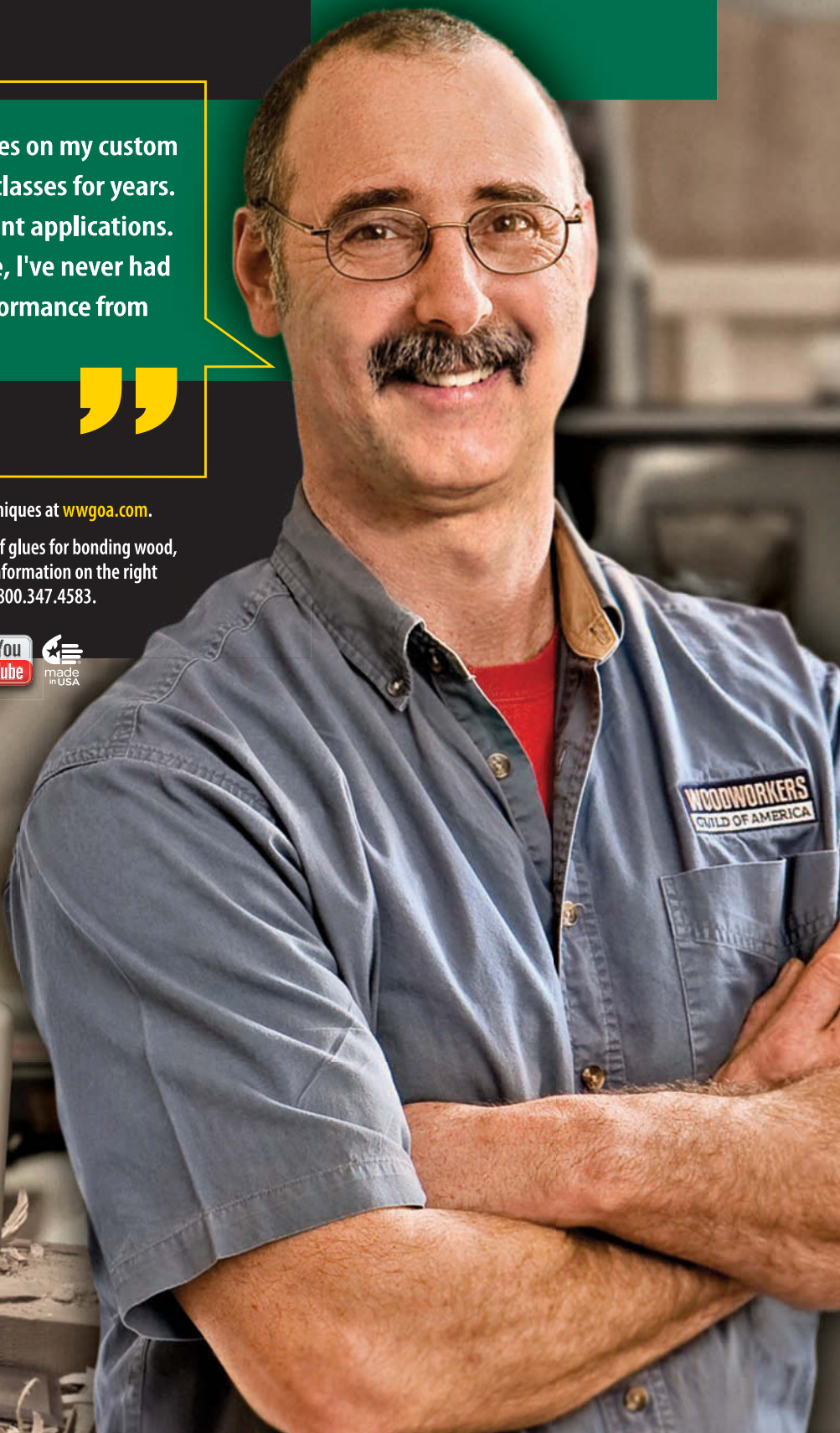
George Vondriska

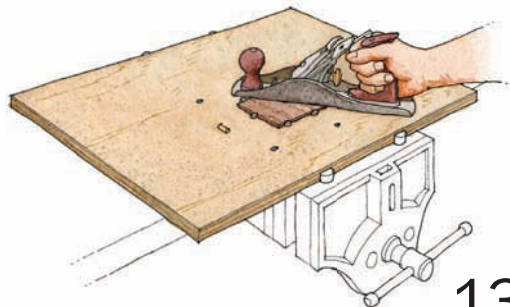
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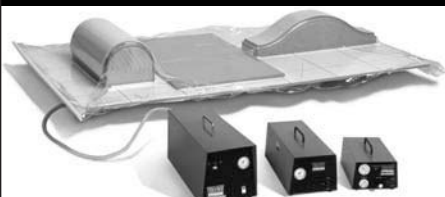
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contributors

Michael Pekovich (“*Stylish Details Enliven a Low Dresser*” and *Handwork*) is executive art director of *FWW* and an avid woodworker, so he’s a familiar face to readers.

What are you working on right now? “I’m starting on a Krenov-style cabinet-on-stand soon. It’s a piece I’ve wanted to make ever since I discovered his writings in college. The cabinet is for an incredibly talented bird carver to display her carvings, so my hope is to make a piece that will be worthy of its contents.”

What’s the best/worst thing about teaching a woodworking class? “Managing the timeline of a class is by far the most difficult thing, but it has made me a more efficient builder in my own work. The best thing is the ‘dovetail dance’ that a student invariably does upon the completion of their first-ever dovetail joint.”

Favorite non-woodworking hobby? “Cooking! I am a master of making do with the leftover.”



When **Christopher Solar** (*Designer’s Notebook*) left his high-tech job as a software designer in the telecom industry, he began “dabbling clumsily in woodworking, making furniture more akin to a forklift skid than something you’d find in *FWW*.” Soon after, he took a few courses at Rosewood Studios to gain a foundation in technique, and for the past decade he’s been making custom furniture in his small basement shop in the old part of downtown Ottawa, Ontario. How small? “Some final assembly does happen in the living room.”



Teri Masaschi (“*Get Started Spraying*”) started her finishing career early—at age 14, she took a summer job painting the house of a fine arts dealer who taught her everything she could about antiques. She began picking up broken antiques and taught herself to repair them, learning not only finishing but also woodworking. “Being skilled at both trades and learning through trial-and-error has given me the ability to plan my projects successfully. I can really envision how a new piece will look in the end, and avoid starting out with bad ideas.”

After 18 years as an award-winning chef in French restaurants, **Bob Van Dyke** (“*Build an Heirloom Box*” and *Master Class*) left the business to begin a career in woodworking and teaching. In 2000, he opened the Connecticut Valley School of Woodworking (schoolofwoodworking.com). The school was an instant success and the demand for classes was so great that a second shop was built to allow two classes to run simultaneously. He lives in a converted mill building in Vernon, Conn., and spends his free time blowing glass and sailing.



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Spotlight

ISSUE NO. 245

January/February 2015

p. 28

BENCH STOOLS IN BUNCHES

I became intrigued by the simplicity of form and elegance and the reported comfort of the shop stool illustrated by Christian Becksvoort in *Fine Woodworking* #245.

Since I occasionally host a visitor in my shop, I was sure that I'd need two of them.

My cousin and compatriot woodworker, Marsh, agreed and we ended up building a few. This morphed the project into production and offered a fine opportunity to work



down lumber and scrap inventory. I used a number of hard-maple planks left over from my workbench project for the legs and rungs. Having depleted the maple supply, I selected cherry for the seat rails, which nicely complement the cherry fronts on my under-workbench drawers.

Our compliments to Mr. Becksvoort on his design and construction details and Vince Babak for the illustrations. The abundance of comfortable seating (left) is a welcome addition to our shops.

—DEAN HEDSTROM, St. Paul, Minn.

Files are no good for joinery

Ordinarily, I welcome articles that emphasize the use of hand tools, but I was more than a little dismayed to read an article (Handwork, *FWW* #247) advocating the use of files to clean up joinery. During my apprenticeship to a German organ builder in the mid-1970s, the use of files was routinely “soft pedaled” (the Germans refer to files as *Bastler werkzeug*—“hobbyist’s tools”). Instead, we were encouraged to use chisels and rabbet, shoulder, and block planes to clean up dovetails and mortise-and-tenon joints. Any apprentice caught working dovetail pins with a file would have had his knuckles rapped!

The reason should be obvious: Unless the file is fixed against some sort of guide, even the steadiest hand will have

difficulty keeping the file straight and unwavering. The result is almost always a roundover, which results in gaps when the joint is assembled. Much better to pare away fine shavings from the pin’s inner face with a sharp chisel, creating a slight concavity. This ensures that the pin fits snugly against the mating tail.

—CHRISTOPHER BRODERSEN, Northville, Mich.

Why not wipe glue squeeze-out?

Michael Fortune says that using a wet rag to remove excess glue is a “no-no” (“User’s Guide to PVA Glue,” *FWW* #247).

I have seen many a well-known woodworker, such as Norm Abram, remove glue with a wet sponge. Why is a wet rag a problem?

—RICHARD LUCEY, Newport Beach, Calif.

Michael Fortune replies: The danger is that the glue gets diluted and then left in the pores and on the wood in a very thin layer. When it dries, it shows up as a light-colored haze under oil-based finishes. Some woodworkers prefer the ease of the wet rag. But I find the corners particularly difficult to clean out using this method. And where there is exposed joinery, washing off the glue will cause the end grain to absorb it rather deeply. Either way, I suggest a quick wipe with denatured alcohol to identify any residual glue embedded in the wood.

Video tip looks familiar

Wow! There really is nothing new under the sun. Watching the latest dovetail template video (and with all due respect to Messrs. Pirnik and Rodriguez), I said to myself, “Self, this rings a bell. Where have I seen it before?” Lo, and behold, *FWW* #27 pp.

68-70, wherein Charles Riordan credits Andy Marlow with inspiring him to adapt the the aluminum flashing technique.

FWW is one terrific magazine! Thank you for 40 years of inspiration.

—DAN BORDENKIRCHER, Silver Creek, N.Y.

Thank you, Rollie

Big thanks to Roland Johnson. After watching his video on quick-change collets, I ran into him at the Atlanta Woodworking Show and asked him about it, then bought one. What a great upgrade to my router table. It’s everything he said it was and makes bit changes so much easier. Rollie gave me great advice last year at the show on getting my used DJ-20 jointer up and running right. It’s great when craftsmen of his caliber take the time to help out less experienced woodworkers like myself.

—DERRICK LEWIS, LaGrange, Ga.



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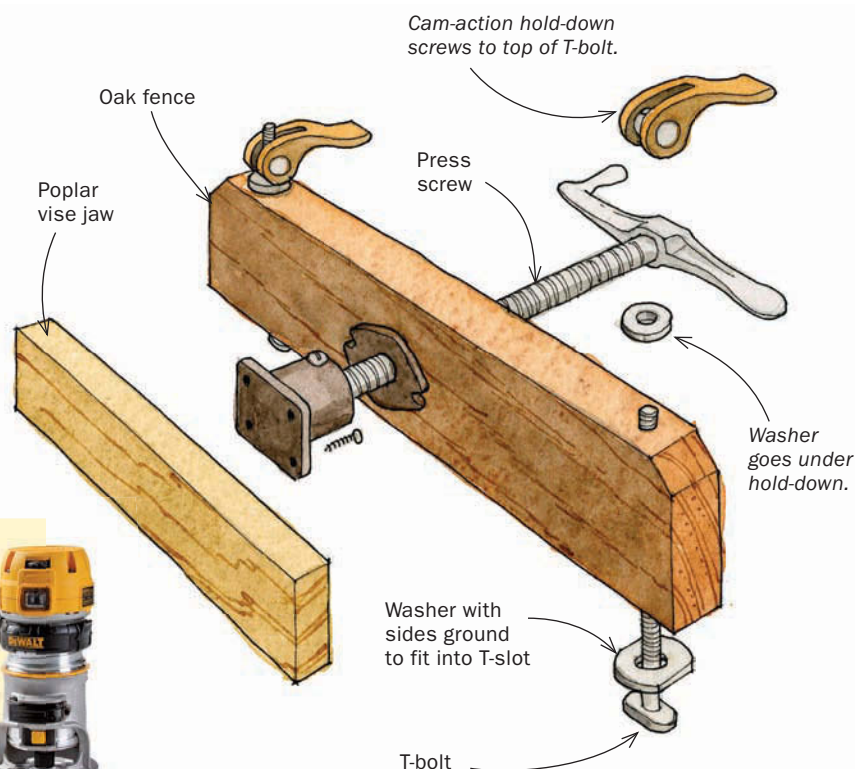
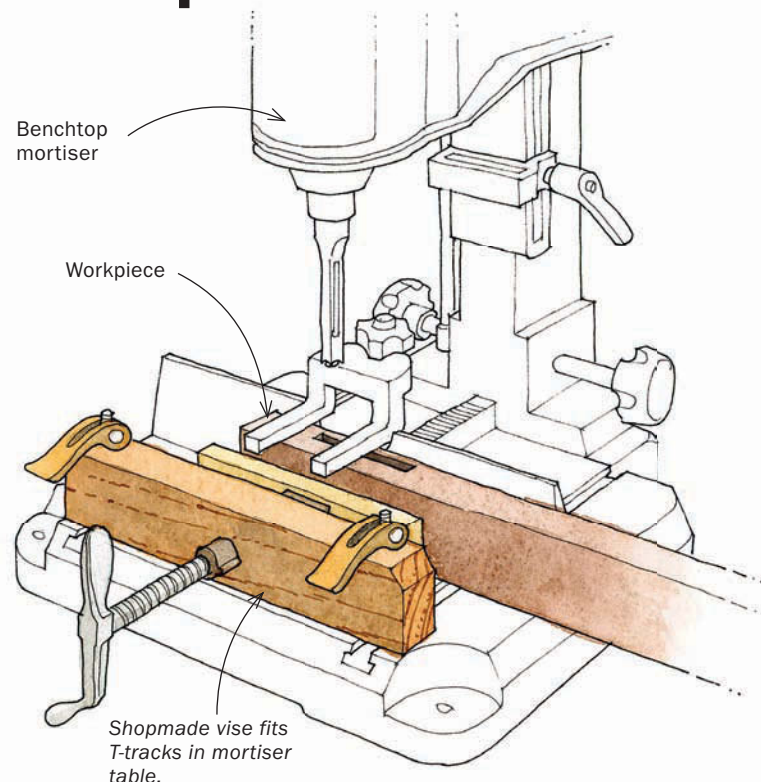
Rolly Rhodes has built four different homes and furnished them with cabinets—and for the last four years, period furniture—all with hand-tool joinery. He recently completed two 18th-century reproductions, a Boston block-front chest and an English music stand. Outside the shop, he loves fly fishing with his sons.

Large commercial-grade mortising machines have a table vise to clamp the workpiece against the fence, but my benchtop mortiser didn't. Without it, I spent a lot of time clamping and unclamping my material to the fence with a spring clamp or C-clamp. Doing this for every cut really slowed the process down.

Following the basic design of the larger machines, I made my own vise. I mounted an oak fence to the T-tracks in the mortiser via two T-bolts. The fence has a press screw with a poplar block at the end of the screw to create the vise jaw. This design should work on any benchtop mortiser that has T-slots milled into the table. On my mortiser, the slots were too wide for a standard T-bolt, so I added a large washer to the end of each T-bolt and ground the sides parallel for a better fit.

To cut a mortise, I set my workpiece in place, and a twist of the vise handle locks it down. Releasing and repositioning it for the next cut via the cam-action hold-downs is just as quick.

—ROLLY RHODES,
Bakersfield, Calif.



A Reward for the Best Tip

Send your original tips to fwmow@taunton.com or to Methods of Work, Fine Woodworking, P. O. Box 5506, Newtown, CT 06470. We pay \$100 for a published tip with illustration; \$50 for one without. The prize for this issue's best tip was a DeWalt router kit.

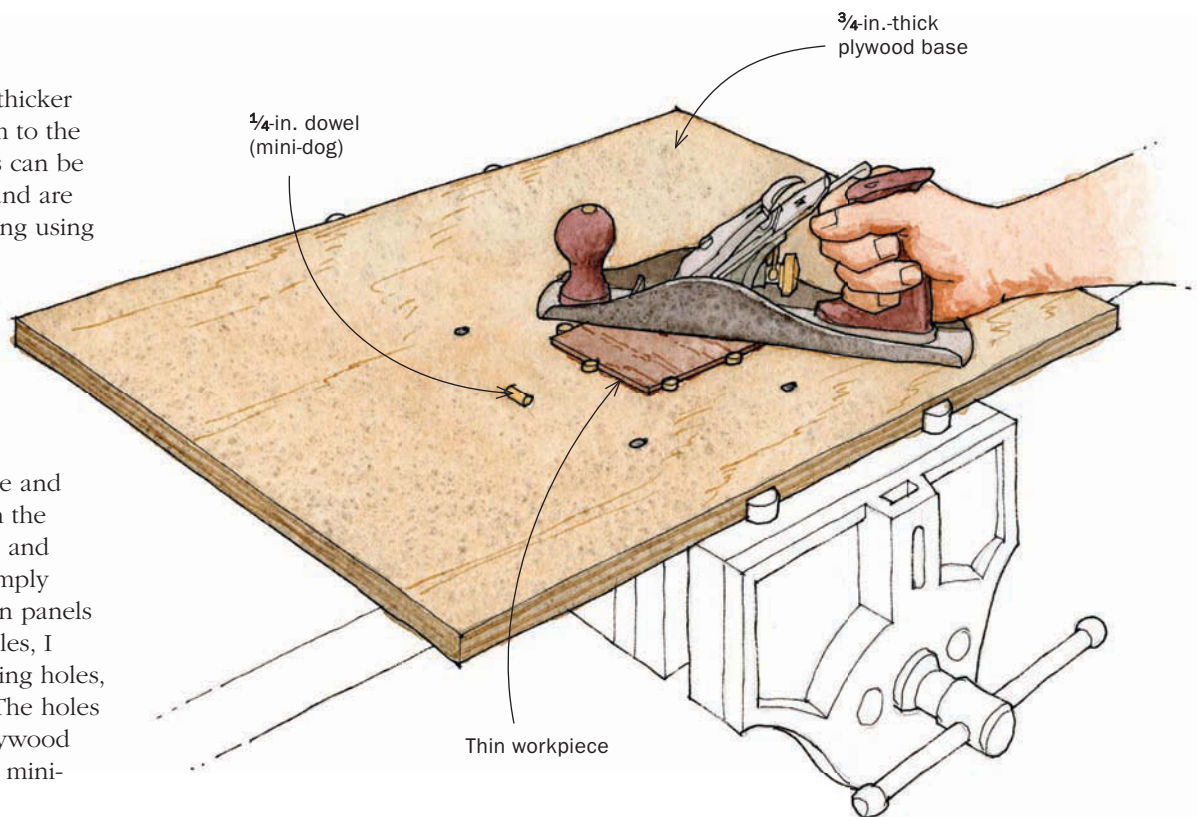


Jig for planing thin stock

I often resaw thin boards from thicker stock, and then handplane them to the desired thickness. These boards can be as thin as $\frac{1}{8}$ in. or even $\frac{1}{16}$ in, and are difficult to secure for handplaning using a standard vise and benchdogs. And if the piece is not fully supported on a flat surface it can flex, making planing almost impossible.

To get the job done, I use a $\frac{3}{4}$ -in. plywood base held on the workbench between my vise and benchdogs. I drill $\frac{1}{4}$ -in. holes in the plywood around the workpiece and insert “mini-dogs,” which are simply $\frac{1}{4}$ -in. dowels. When planing thin panels or thin, flat parts for knife handles, I place several mini-dogs in existing holes, and drill new holes if needed. The holes pass completely through the plywood base so I can easily remove the mini-dogs later.

—ALEJANDRO BALBIS, Longueuil, Que., Canada



Quick Tip

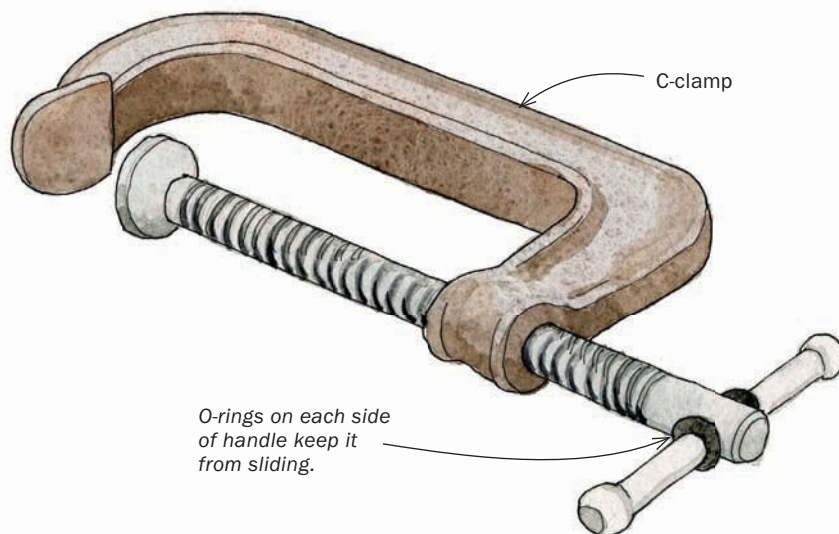
Changing jointer knives can be a slow process. To reduce the “back-and-forth” battle of adjusting the screws, I use two Allen wrenches to set each blade—one for each screw. I leave a wrench in each screw head until I am finished adjusting the blades. The wrenches make the small screws easier to handle, and not having to move them between screws really speeds up the job. I mark the end of each new blade with a permanent marker after installing it.

—JAMES M. BROWN,
Old Forge, N.Y.

Non-slip handle for C-clamp

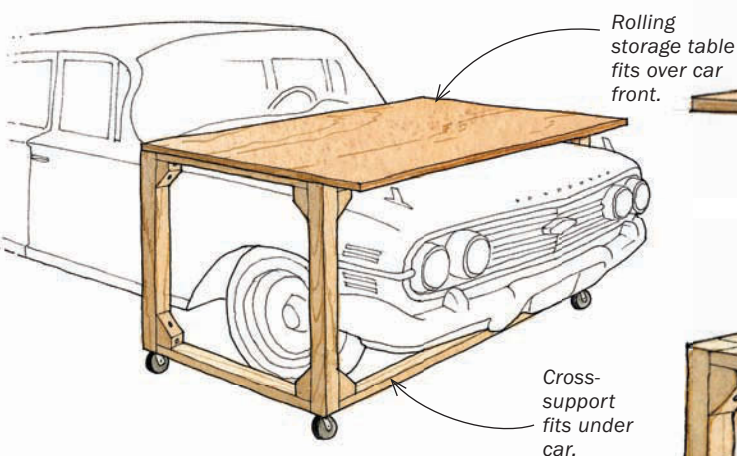
C-clamps are one of the most used tools in my shop. However, the handle that tightens the clamp is free to move and at times it can be a real nuisance. To solve this problem, I slipped an O-ring on each side of the handle. Now it stays where I want it, and I can easily position it out of the way, leave it centered, or even slide it all the way to one end for maximum leverage.

—LEN URBAN, Rancho Mirage, Calif.



methods of work continued

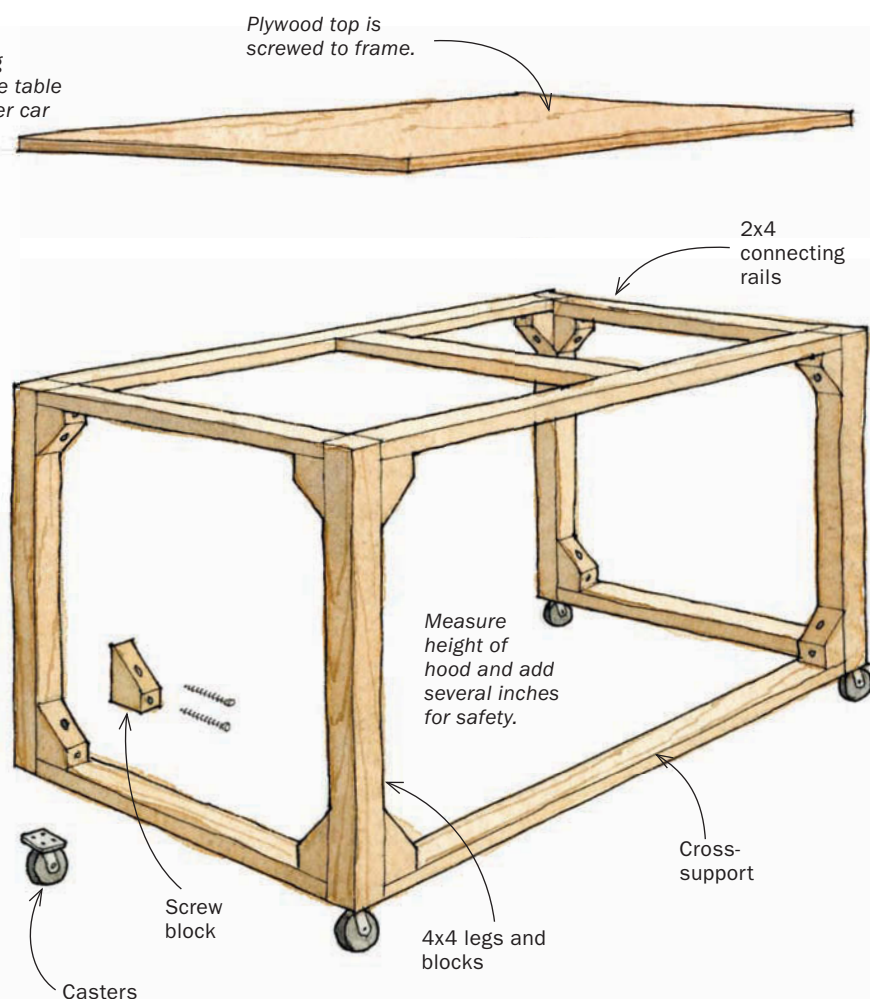
Get more storage in your garage shop



Like many non-pros, I work in a garage shop smaller than some spray booths. I share space with two cars, a washer and dryer, a refrigerator, and other stored items. To add a little storage space, I built a large rolling table that fits over the hood of a car. The table has the footprint of a full 4x8 sheet of plywood, which allows the entire hood of my 1960 Impala to fit underneath.

I built the table from 2x4s and used 4x4s for the legs, adding blocks in the corners for extra stability. The table is too tall to work at comfortably, but it provides plenty of tool, lumber, and project storage.

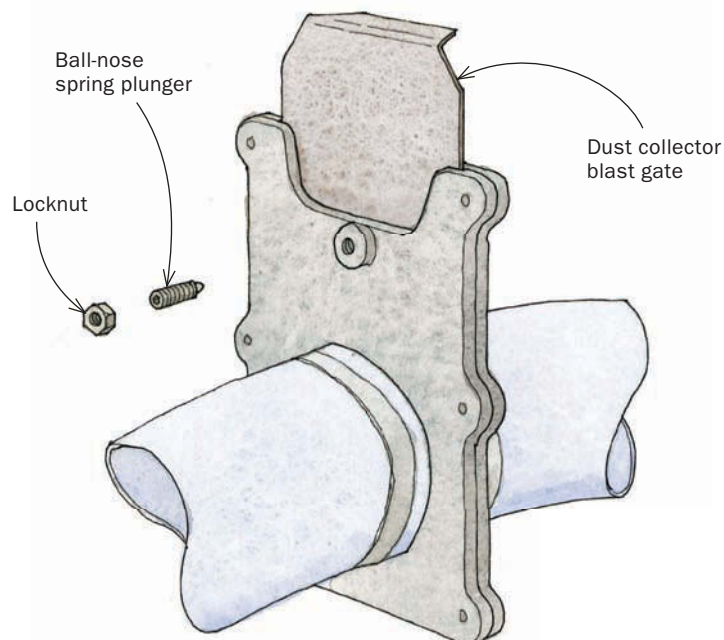
—MICHAEL WATSON, Long Beach, Calif.



Easy way to lock/unlock blast gates

After the repeated frustration of loosening and tightening the plastic locking knobs every time I needed to open or close the blast gates on my dust-collection system, I replaced the knobs with ball-nose spring plungers. The spring-loaded plunger puts enough constant pressure against the sliding gate that it won't rattle closed from the suction of the dust collector. I found plungers that fit my blast-gate threads at McMaster-Carr (part No. 3408A521), but they are also available from most industrial suppliers. I also added a locknut so that I could adjust the plunger tension and lock in the setting. With the plungers installed, the gates easily slide in and out and stay right where I want them.

—DEAN HEDSTROM, St. Paul, Minn.





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■ MACHINES

Lathe has the power for big turnings

JET'S NEW JWL-1440VSK LATHE has plenty of power for large bowl turnings as well as long, thick spindles. I did what I could to push the lathe's 1-hp motor to its limits, testing its low-speed power and resistance to rocking under a heavy, unbalanced load. It took a lot to stall the motor. Aggressive cuts with spindle and bowl gouges were not a problem, and the lathe faltered only once, when I used a scraper near the rim of a 4-in.-thick by 12-in.-dia. bowl blank.

The lathe has a 14½-in. swing and 40 in. between centers. At 12 in. long, the tool rest needs repositioning only a few times to turn a long spindle like a table leg. The headstock rotates for outboard turning, and slides to the tailstock end for bowl turning. An auxiliary tool rest for outboard turning is supplied.

The Jet is a variable-speed lathe, with a range from 400 to 3,000 rpm. Speed changes, controlled by a Reeves drive (an old-time design), are made by turning a knob at the front of the headstock. The knob turned smoothly at high speeds, but felt tight and balky when slowing from 800 to 400 rpm. I found the speed dial hard to read, too. Overall, I'd prefer an electronic speed control. Nonetheless, at \$1,600, including the cast-iron stand, the JWL-1440VSK is an economical lathe that performs well.

—David Heim is an avid turner.



Go outside. Rotate the headstock out and you'll be able to turn larger bowls more comfortably (those that exceed the lathe's swing).



Adjustable speed. A knob on the headstock allows you to change speed, which can be done only when the motor is running.



Lathe by Jet

Model: JWL-1440VSK
\$1,600

■ ACCESSORIES

Easy storage for tablesaw blades

I WAS IN MY SHOP FOR SEVERAL YEARS before I got around to making a proper storage rack for my tablesaw blades. Hung on the wall next to my saw, it's convenient, but eats up space and leaves the blades poking out from the wall at an angle. I wish I had seen the Woodpeckers BladeSaver before I made that rack.

The BladeSaver wraps around the blade, protecting all of the teeth from damage and your hands from accidental nicks when you grab a blade. There is a built-in hook for hanging the BladeSaver, which means you could hang several blades from a nail or dowel in a small space. I think I'll rig up a dowel bar beneath my saw's extension table and get my blades off the wall.

—Matt Kenney is a senior editor.



Easy hanging. A long nail is all you need to store three or four blades.



**BladeSaver
by Woodpeckers**

\$13 for 10-in. blade
\$14 for 12-in. blade

■ ACCESSORIES

Countersink bit doesn't leave a mark

DRILL BITS WITH BUILT-IN COUNTERSINKS tend to leave a slightly ragged hole and clog easily. Also, even though they often come with a depth-stop collar, I never use it for fear the stop will score the surface of my work. I've resigned myself to the limitations of these bits because they do their job quickly.

However, a new countersink from Lee Valley has changed my thinking. It combines a high-speed-steel drill bit with a carbide countersink and free-spinning low-friction depth stop. The countersink leaves a clean hole, and the adjustable depth stop doesn't mar the surface. The large openings around the collar allow the chips to clear effectively and eliminate clogging. The drill bit smoked a bit in hard maple, but otherwise performed well. Included is a double-ended Allen wrench for bit length and collar adjustments, a nice touch.

—Michael Pekovich is a furniture maker, instructor,
and FWW's executive art director.

**Countersink bit with
low-friction stop by Lee Valley**

\$23 for #8 screw
\$24 for #10 screw





Shooting plane by Veritas

\$351 with PM-V11 blade

\$339 with O1 blade

Shooting board track by Veritas

\$50 for 24-in. track

\$43 for 16-in. track

■ HAND TOOLS

Shooting plane and guide track are an awesome pair

IF YOU'VE NEVER USED A SHOOTING BOARD, you don't see the benefit of it. However, once you've used one, say to fit drawer parts or trim a shelf to length with precision, you wonder how you ever got by without it. Eventually, you use it all the time. That's when you are struck with another moment of clarity: It pays to have a dedicated shooting plane. Why? Comfort. Bench planes certainly do the job, but because they aren't designed to be held on their side, your hand begins to hurt rather quickly.

Recently I tried Veritas's new shooting plane and their guide track, an accessory for a shopmade shooting board. The shooting plane has many great features, but by far my favorite is the tote, which can be adjusted to any angle within a 60° range. This allows you to personalize the angle for the comfort of your hand and arm. I've used the plane a lot with no discomfort.

The blade rests on a bed (like a block plane), which is skewed 20°, giving you the advantages of a skewed cut without the aggravation of sharpening a skewed blade. Depth adjustments to the blade were smooth, and set screws in the plane body kept the cutting edge parallel to the mouth. Speaking of the mouth, it's adjustable, so you can close it down tight to the blade for light shavings. The plane I tested had a PM-V11 blade, which I liked very much. An O1 blade is also available.

I made a new shooting board to test the plane, and equipped it with a 24-in.-long Veritas shooting board track. Simply put, the track is wonderful. Made from aluminum, it has an adjustable rail that snugs up against the plane's sole to keep it moving in a straight line without any need to press it sideways against the shooting board. After I applied two pieces of UHMW tape to the track base and one to the rail (the tape is included with the rail), the plane glided smoothly with little effort. The track can be used with many different planes, so you don't need a dedicated shooting plane to reap its benefits.

—M.K.



Custom comfort.

The handle can be locked anywhere in a 60° arc, so you can find the angle that's just right for your hand and arm.



Rail keeps plane on track. Lock it down snug against the plane's sole, and you won't expend any effort preventing the plane from wandering away from the workpiece during the cut.

■ POWER TOOLS

Small drill packs a punch

BOSCH GOT MANY THINGS RIGHT with their new compact drill. First, it weighs just 3 lb. and is only 7½ in. long, so it's a great size for furniture making. Plus, with an 18-volt battery and a ½-in. chuck, it's capable of heavy-duty work.

I was particularly fond of the trigger, which offered superb speed control that made it very easy to drive small screws. A 21-step torque clutch lets you dial in the drill to handle any job, from tough to easy. The drill is easy to hold in any position, and the LED light is properly located to shine on the bit and screw. You can turn on the light without triggering the motor. The drill comes with two 1.5 amp-hour lithium-ion batteries, which had impressive life, but batteries with longer lives between charges (2, 4, and 5 amp-hour) are available.

—Peter Breu is a woodworker in Manchester, N.H.

18-volt drill/driver by Bosch

Model DDB181-02

\$120



■ ACCESSORIES

Dust mask clears the air

WHEN I STARTED MAKING FURNITURE, the shops I worked in didn't have good dust collection. A single-stage dust collector hooked up to the planer was about all you would find. One of my teachers wore a weird-looking dust mask called the DustFoe whenever he was doing something that generated a lot of dust. I bought one of those masks, and have been using it for the last 18 years. However, because the DustFoe is no longer sold and mine is showing its age, I have been looking for a replacement. The Elipse P100 is it.

The P100 is comfortable, light, and easy to put on and take off. The seal around my face was very good, and the filters are easy to change. Its NIOSH rating (National Institute for Occupational Safety and Health), as its name suggests, is P100, which means that it captures 99.97% of airborne particles and is strongly resistant to oils (not a concern for most woodworking tasks). All in all, the Elipse P100 is a great mask. My only complaint is that it has made my 18-year-old good friend obsolete.

—Tim Rousseau is a professional furniture maker and woodworking instructor near Camden, Maine.



Elipse P100 dust mask

\$30

designer's notebook

A few years ago I was approached by a new client who wondered if I would be able to make her a set of plantation, or planter's, chairs. She said she'd always liked them but had been searching for something, "more refined ... less country kitsch, more Japanese." At the time I honestly had no idea what a planter's chair was, but since this sounded like my ideal design brief I didn't hesitate to say yes.

A little research told me that the essential aspect of this style of chair is a woven seat that curls from seat to back in a single, smooth curve. In keeping with my client's direction and my own aesthetic, I sought to strip away anything heavy or excessively ornamental and keep the focus on those flowing lines. I did quick pencil sketches to try a few different ideas, then moved to the computer to refine the design in 3-D.

Where the traditional chairs (see photo, p. 22) typically have chunky curves sawn

from solid wood, I used bent lamination to keep my parts light. Planter's chairs often have flat, level arms connected to the seat back, and stocky rear legs under the seat. I wanted simpler, more continuous lines, so in my chair the back legs sweep upward to become the arms, which then turn a corner at a splined miter joint and become the front legs. The curve of the seat profile is thus intersected and complemented by the line of the arm and leg. I think curves are more effective when they're played

Reinventing a classic

CURVES AND CANE ANCHOR A RADICAL REVISION OF THE PLANTER'S CHAIR

BY CHRISTOPHER SOLAR



off against harder edges, so for that reason the remaining frame elements are all straight lines.

The commission included an ottoman, so the chair had to look good and work well either by itself or with the ottoman. I designed the ottoman to mate closely with the chair, basically transforming the chair into a chaise lounge. The seat and the top of the ottoman merge into one continuous surface, and the ottoman legs, one curved and one straight, mirror the legs and arms of the chair.

To make the chair more dynamic and welcoming, I wanted the

arms to splay out slightly at the front. At the same time, I wanted the front leg of the chair to line up with the back leg of the ottoman, and I wanted the stretchers on both pieces to line up as well. I resolved these conflicting constraints by putting a kink in the front leg. The bottom portion of the leg is mostly vertical, matching the ottoman's leg, but at seat level the leg veers outward to meet the end of the splayed arm. I think

the kink also adds an element of tension that wouldn't be there if the leg was a smooth curve or a straight line.

The materials I chose for these pieces are essentially traditional: a rich tropical wood (jatoba, in this case) and natural cane for the woven seat. I did not want to use the standard "six-way" caning pattern since that would have introduced diagonal lines that I didn't think fit with the rest of the chair. Keeping in mind my client's request for a Japanese influence, I took inspiration from a woven tatami mat, with its rectilinear weave and wide border, and devised my own pattern, a three-by-three basket weave. That gave me the gridded look I wanted and ensured the woven surface would track the seat profile as closely as possible, because I could string all the side-to-side strips first before adding the curved front-to-back strips.

For a chair, of course, I also had to think about ergonomics. Unfortunately, my computer model was not going to tell me anything about how comfortable the design was, and I could not predict what that curved seat would feel like to sit in. So I made a crude mockup with a series of flexible slats of ½-in. plywood fastened between two MDF slab sides.



THE INSPIRATION

Traditional planter's chair. Made for relaxation in hot climates, planter's chairs were common in British colonies. The wide arms can hold a drink and have boards below that pivot out for use as leg rests.



START IN THE SKETCHBOOK



Paper and pencil rough out the idea. Solar wanted to keep the swoop of the traditional chair's seat but lose the chunky shaped legs. Working quickly in pencil, he made small sketches to generate ideas.

GO DIGITAL TO REFINE THE DESIGN

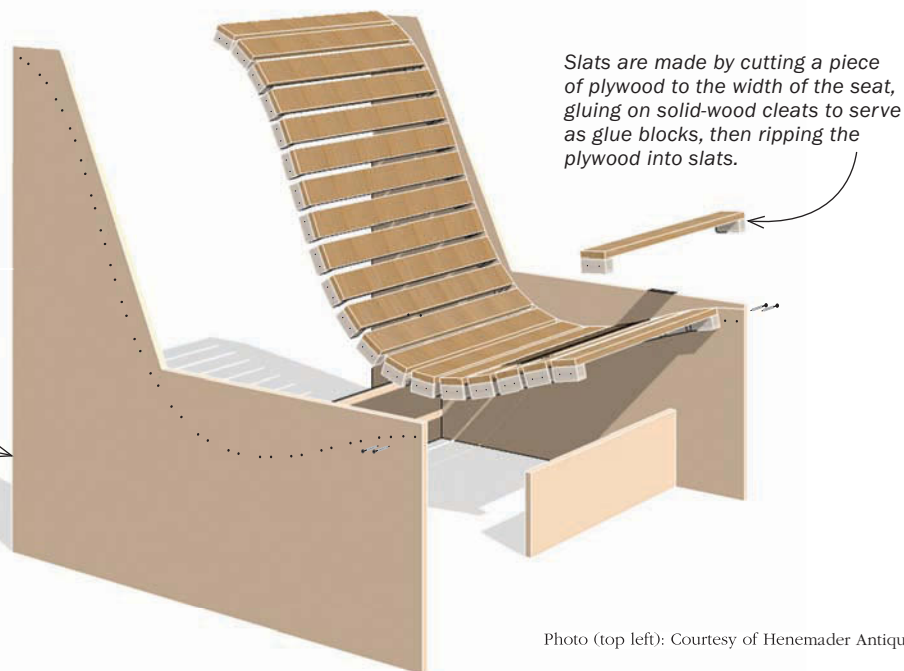


From paper to pixels. Having zeroed in on a few promising designs in his sketchbook, Solar fleshed them out in 3-D with SketchUp, the CAD program. A chair full of curves and angles is difficult to draw in perspective by hand; SketchUp renders it accurately and lets you view it from any angle.

FINALLY, MAKE A MOCKUP

To dial in the comfort of the curving seat, Solar made a rough mockup with $\frac{3}{4}$ -in.-thick MDF sides and $\frac{1}{2}$ -in.-thick plywood slats. The slats, screwed in place through the sides, could be quickly moved to alter the ergonomics.

Side and struts are made from MDF. Drywall screws secure the slats.



Slats are made by cutting a piece of plywood to the width of the seat, gluing on solid-wood cleats to serve as glue blocks, then ripping the plywood into slats.

The slats followed the seat curve I'd drawn in my model, allowing my clients and me to test drive the seat. I repositioned the slats as needed to adjust the curves and angles, and once everyone was happy, I fed the data for the final seat profile back into the CAD model.

There were a lot of challenges when it came to building these chairs (weaving those seats, for instance!) but the design process was really satisfying: taking an iconic, traditional item, reducing it to its essentials, and figuring out how to make it my own. □

Christopher Solar builds furniture in Ottawa, Canada.



Strong and striking. A miter joint creates a clean transition from leg to arm. Solar reinforced the joint with a trio of $\frac{1}{8}$ -in.-thick splines.

Shaker Lap Desk

Celebrate pen and ink
with this quintessential case

BY CHRISTIAN BECKSVOORT

The classic Shaker lap desk, designed two centuries ago to function as a miniature traveling office, was the laptop of its time. With room for paper, envelopes, pens, and a small inkwell drawer, it speaks of an era when pen and ink were king. These desks continue to draw attention in the digital age for their precise joinery and elegant practicality, and of course you can still use one for writing while sitting in an easy chair. But the old design has kept pace with technology: Open the lid and remove the center divider and you'll find space for your laptop; you can coil up power cords in the pencil till, and ear buds and thumb drives find a snug spot in the inkwell drawer.

Made in white pine like the original and sporting exposed dovetails, breadboard ends with cherry pegs, and an unusual little drawer, this piece is fun to make, a pleasure to use, and sure to spark many a conversation.

Start with the carcass

Before cutting the dovetails for the case, mill the parts to $\frac{3}{8}$ in. thick, taper the sides, and make the cutout in the right side for the drawer. Now cut the through-dovetails using your normal approach (for my tails-first method for hand-cutting dovetails, see *FWW* #238 and #239). The only wrinkle is at the back right corner, where the cutout for the drawer leaves space for just two tails. Cutting them is straightforward, but you'll need to take care at assembly. That corner will be more vulnerable than the others until the bottom is in place.

After cutting the carcass dovetails, cut the dadoes for the dividers. The removable center divider drops into through-dadoes in the front and back of the case. The L-shaped divider gets glued into a through-dado in the front and a stopped rabbet just beside the drawer cutout. I cut the through-dadoes with a dado set on the tablesaw, and I cut the rabbet with a router, cleaning it up with a chisel.

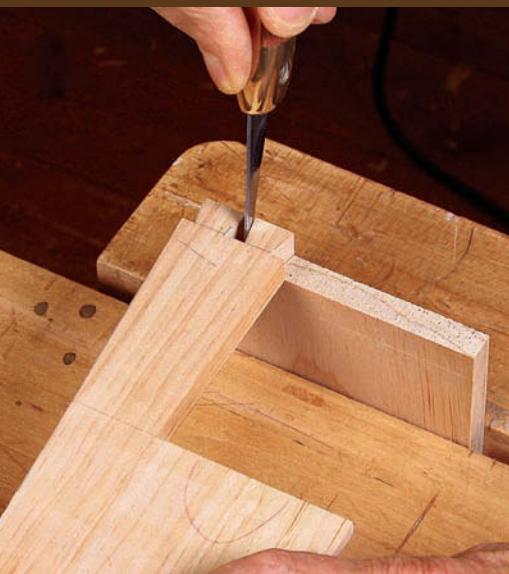
Get to the bottom of it

Once the carcass is glued and sanded, attach the bottom. Rather than being set in a groove, the bottom is simply face-glued to the bottom of the case, adding great rigidity. To deal with this sort of cross-grain glue-up without cracking, the bottom must be made of quarter-sawn white pine—the most well-behaved wood in North America. Through the seasons that 12-in.-wide bottom will move less than

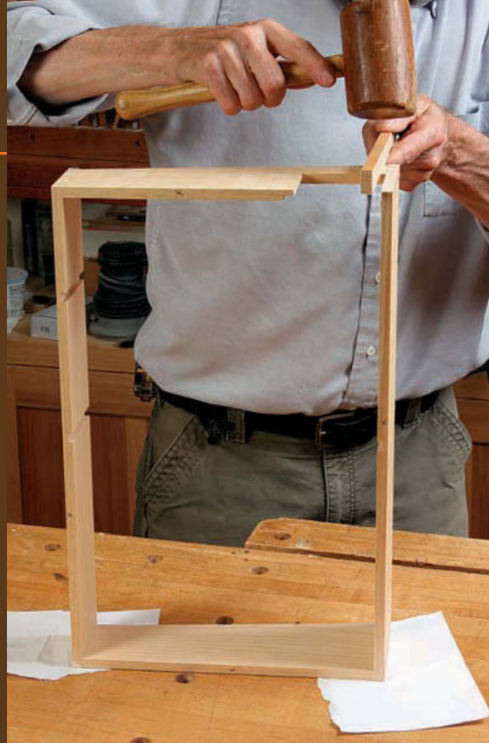




MAKE THE CASE



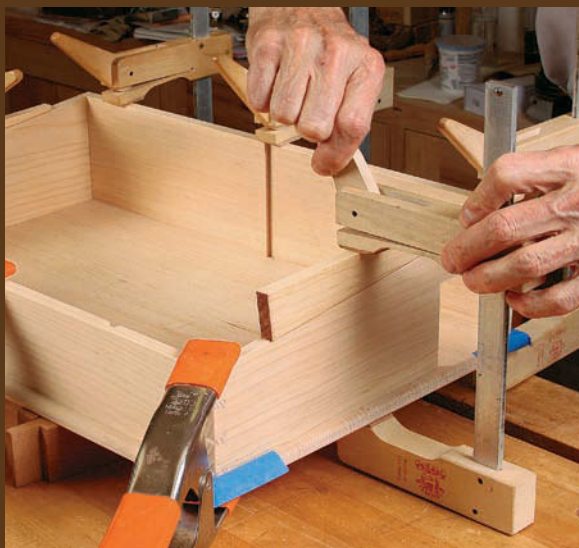
Delicate dovetailing. The case gets through-dovetailed in straightforward fashion—except above the drawer opening, where the side has just two tails. Assemble with care, knocking home the narrow corner last to keep from stressing the joint there.



Square the assembly. After pulling the joints tight with bar clamps, check the box for square. Elevate the drawer-side clamp a couple of inches to avoid exerting pressure at the drawer opening.



Green light for cross-grain gluing. The bottom, made from quartersawn white pine, which barely moves during the seasons, can be glued directly to the case from below. Use colored tape at the corners to locate the case during the glue-up.



Front and sides are rounded under; back is left square for hinges.

Panel, $\frac{3}{8}$ in. thick by $12\frac{3}{8}$ in. wide by $18\frac{3}{4}$ in. long

Bottom, $\frac{3}{8}$ in. thick by $12\frac{3}{4}$ in. wide by $19\frac{3}{4}$ in. long, made from quartersawn white pine, glued to bottom edges of case

Removable center divider, $\frac{3}{8}$ in. thick by 4 in. wide by $11\frac{5}{8}$ in. long

Front, $\frac{3}{8}$ in. thick by $2\frac{3}{4}$ in. wide by 19 in. long

Dado, $\frac{3}{16}$ in. deep by $\frac{3}{8}$ in. wide

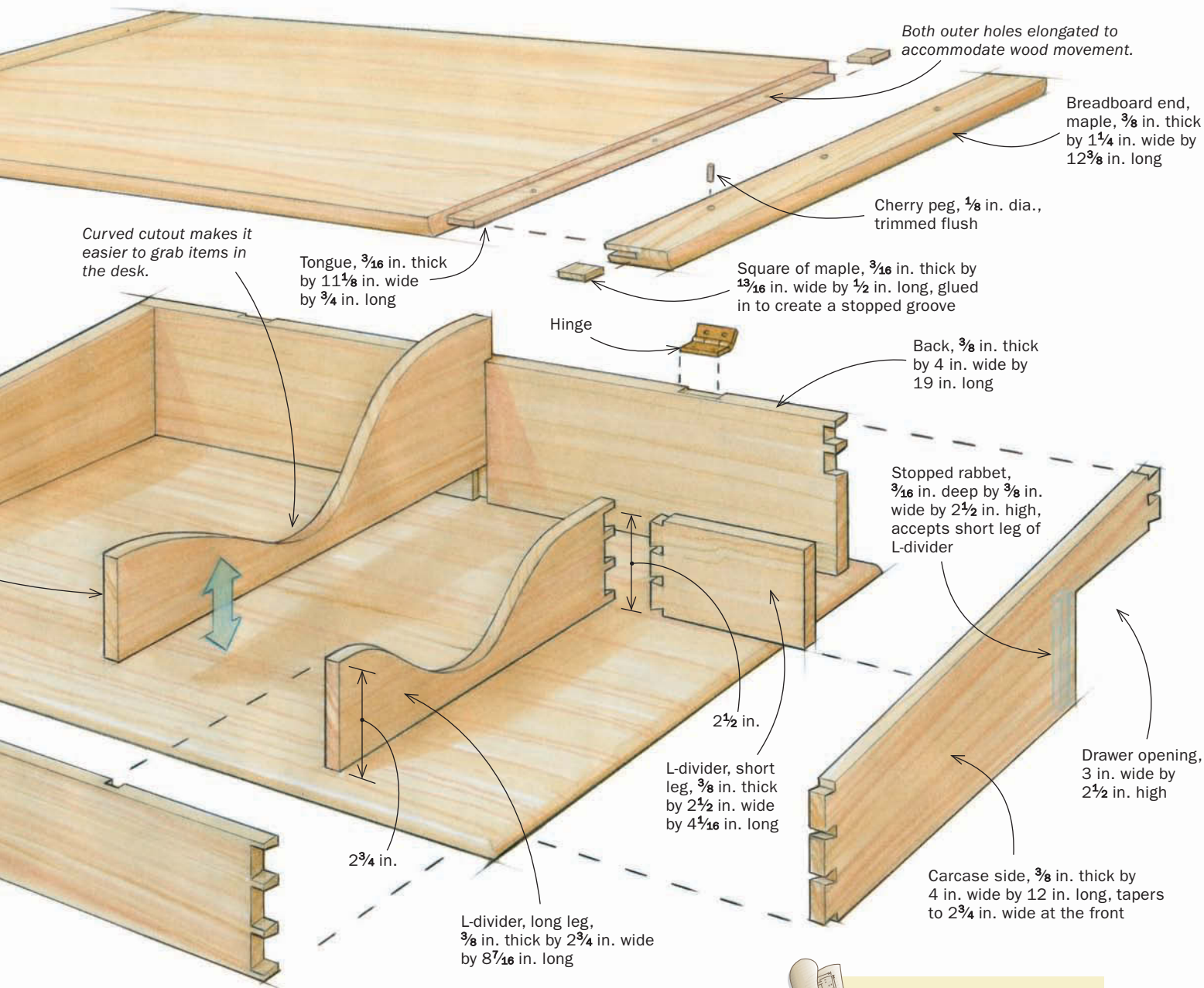
$\frac{3}{64}$ in., well below the elastic limit of the wood and glue. Trust me, it works—or trust the Shakers, since the desks they built this way are still holding up fine.

The bottom extends $\frac{3}{8}$ in. beyond the case and has a quarter-round profile on all four edges. After routing the roundovers I carefully center the case on the bottom and use painter's tape to mark its location. Then I apply glue to the bottom edges of the case and use two large spring clamps to hold it while I check the diagonal dimensions for squareness. That done, I add the rest of the clamps and let it dry.

By the way, even when I make this desk out of cherry I use quartersawn white pine for the bottom. I cut the bottom flush with the outside of the case and cover the pine with cherry quarter-round molding.

Dividers come next

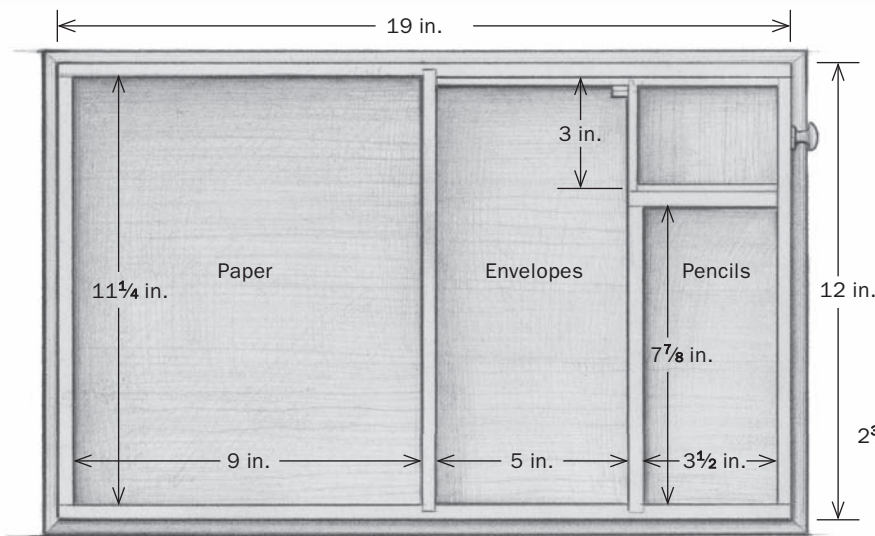
Both dividers get a deep curved cutout. Cut the curves on the bandsaw and clean them up with hand tools



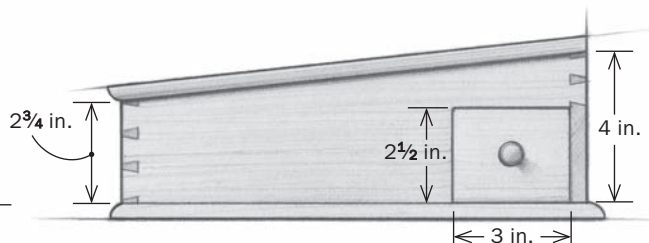
To purchase expanded plans and a complete cutlist for this lap desk and other projects, go to FineWoodworking.com/PlanStore.

LIGHT, STRONG, AND VERSATILE

The lap desk isn't just for paper and pens. With the center divider removed, the case can hold a laptop. All the parts are pine except the breadboard ends, drawer pull, and keeper.



TOP VIEW, INTERIOR



SIDE VIEW

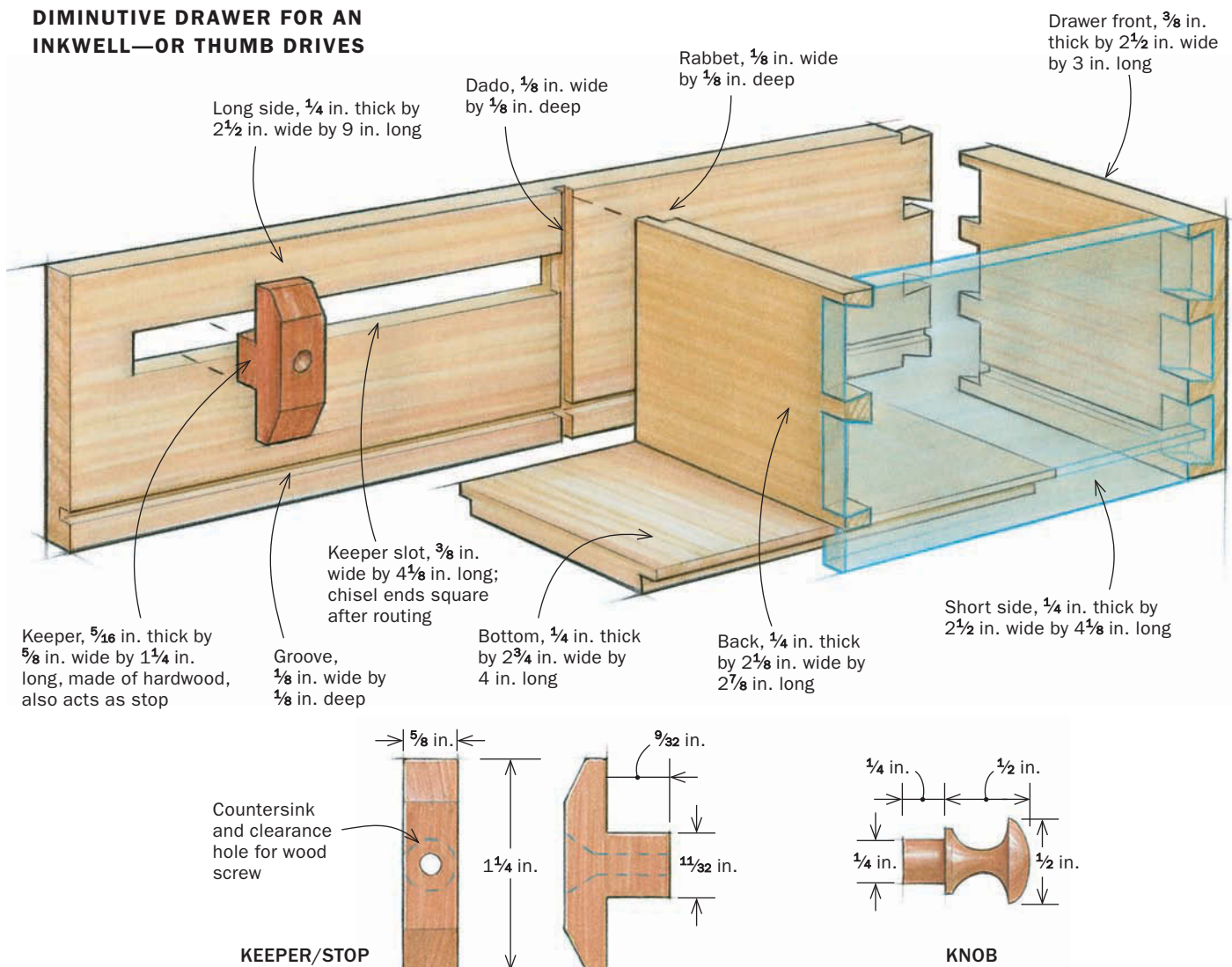
BUILD THE DRAWER



Stopped slot. At the router table, plunge-cut the guide slot in the drawer's long side. Set stop blocks to control the length of the slot, and be certain to anchor the workpiece against a stop block when making the plunge.



DIMINUTIVE DRAWER FOR AN INKWELL—OR THUMB DRIVES



ASSEMBLE THE INTERIOR



Double up the drawer sides. Although the drawer sides are mismatched in length, you can stack them to cut the tails. The short side gets tails at both ends; the long side gets tails for the drawer front and a dado for the back.

and sandpaper. Both dividers are $\frac{3}{8}$ in. thick, but the removable center divider should be face-sanded slightly thinner so that it's easier to take out and put back.

The L-shaped divider creates a till for small items and provides one wall of the drawer pocket. Join the short and long legs of the L-divider with through-dovetails, being sure the legs are square. Then glue the divider in place, applying glue to its bottom edge and ends.

Make and fit the drawer

Now for the fun part: the tiny inkwell drawer, which has a double-length side that's slotted for a keeper, or stop. The drawer's scale makes the joinery challenging. The smallest chisel in your arsenal will be required to cut these smallest of dovetails. But despite its delicate proportions, this drawer is anything but fragile.

A typical dovetailed drawer gets half-blind dovetails at the front and through-dovetails at the back. This drawer follows that pattern except at the back right corner, where the back is rabbeted to mate with a dado in the extralong right side (see drawing, opposite).



Dovetailed divider makes a drawer pocket. The L-shaped divider, dovetailed at its elbow, defines a space for pencils and creates the drawer pocket. The divider is glued into a rabbet beside the drawer opening and into a dado in the case front.



Slide stopper. A T-shaped hardwood keeper in the guide slot keeps the drawer running straight and acts as a drawer stop at both open and closed positions.



Divide it or don't. The scooped center divider, inserted dry, creates spaces sized for writing paper and envelopes. Remove it and you have space for a laptop.

PUT A LID ON IT

Dry-fit and drill. With the breadboards dry-assembled and held tight with a bar clamp, Becksvoort drills for the pegs. He uses a guide block on top for spacing and a scrap beneath to prevent blowout.



Ovals on the outside. With a $\frac{1}{8}$ -in.-dia. round file, elongate the outside holes to allow for seasonal wood movement. Then, after applying glue to the center few inches of the tongue and clamping on the breadboard, tap in the hardwood dowels.



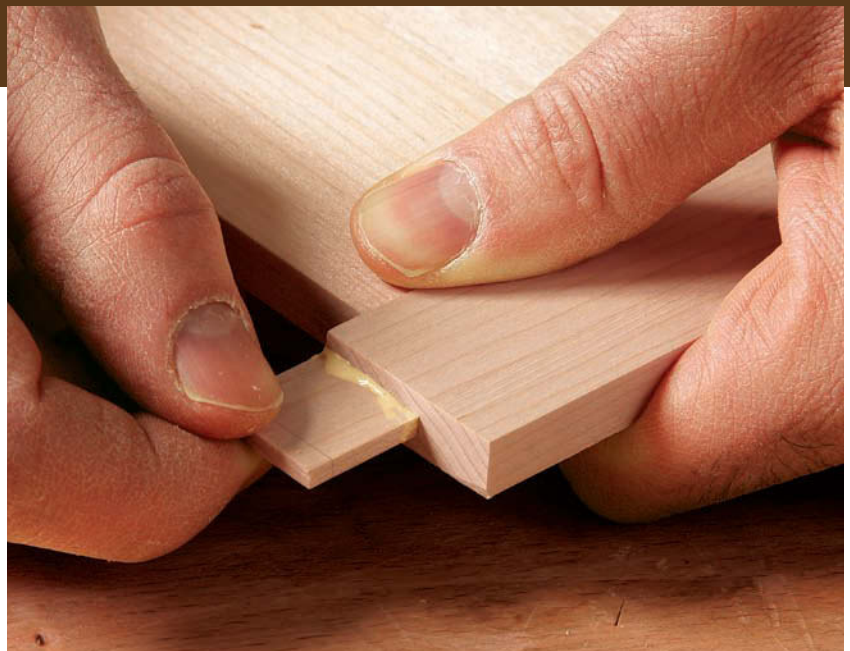
Before cutting the dovetails, cut the keeper slot at the router table. Then, at the tablesaw, cut the groove for the bottom and the dado for the back.

Once you've assembled the drawer, put it in place so the drawer front is flush with the outside of the case. Then put the keeper in the slot, push it up against the drawer back, and screw it into place. Pull the drawer open to be sure it extends fully. If not, you can make the slot a bit longer.

Stiffen the lid with breadboard ends

Finally, make the lid, a white pine panel with maple breadboard ends to keep it flat through the years. Start by making tongues on both ends of the panel. Using a dado head in the tablesaw, you can make the centered tongue in two passes, one from each face of the panel.

Now to the breadboards. Making stopped grooves in such small pieces by plunge-cutting can be dangerous,



Stop those grooves. To turn through-grooves into stopped ones, glue in small squares of maple matching the breadboard ends, then trim them flush.

ADD HINGES TO CLOSE THE CASE



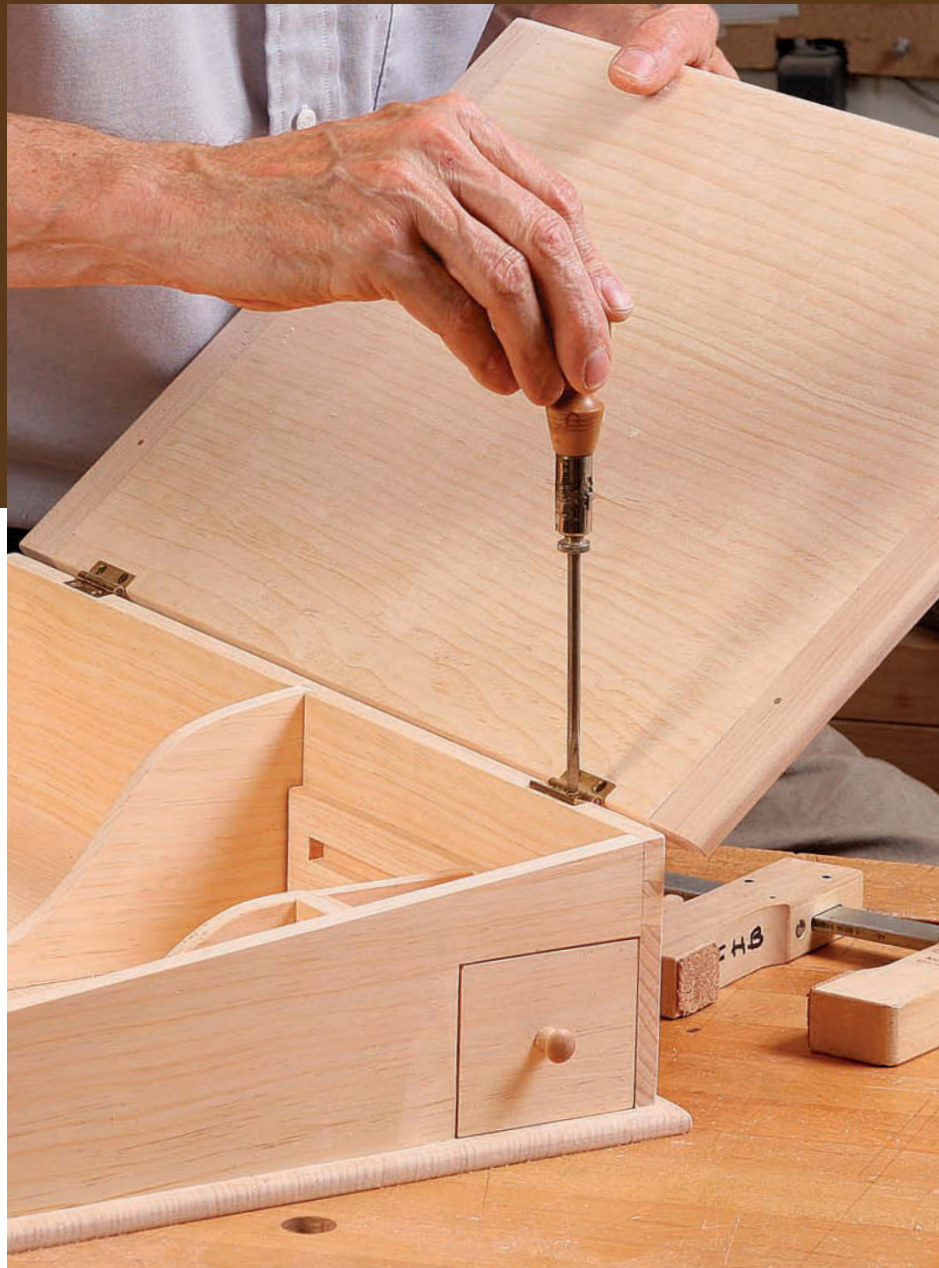
Placement. Mark out the leaf location on the case with a knife, setting the hinge 2½ in. or so from the end.



Eyeball the mortise. Using a detail router with a ¼-in.-dia. straight bit, rough out the hinge mortise. Then clean it up with a chisel.



Top transfer. With the hinge screwed to the case, align the lid and mark the location for the mating hinge mortise (above). Make the mortises in the lid, then install the hinges.



so I recommend cutting through-grooves and plugging the ends with small squares of the same stock.

After trimming the tongues to width, I'll trim their faces with a rabbet plane if necessary. With the breadboards dry-fitted, drill for three pegs. Remove the breadboard and elongate the outer holes in the panel's tongue. Then apply a dab of glue at the center of the tongue, re-clamp, being sure that the center holes align perfectly, and drive ⅛-in. cherry dowels through the holes.

After mounting the hinges and doing a final sanding to 220-grit, I oil the piece with Tried & True Varnish Oil. After a few days, when the first coat is dry, I polish with 0000 steel wool and apply two more coats a few days apart. □

Contributing editor Christian Becksvoort writes on life, work, and Shaker furniture on his blog, chbecksvoort.wordpress.com.

Backsaws

TENON CHEEKS

The all-purpose saw

It might be nice to have several backsaws—a small dovetail saw and a pair of larger saws (one rip, one crosscut) for tenons and other joinery. But it's not necessary, because you can easily cut every furniture joint with just one carcass saw. It's big enough to cut case dovetails, as well as apron and frame tenons, but nimble enough for drawer dovetails. It doesn't matter if the teeth are filed for a ripcut, crosscut, or somewhere between, as long as they are sharpened so that the saw cuts quickly and tracks straight.

that Can Do It All

The versatile carcass saw will cut most joinery—our expert picks the best of a bumper crop

BY CHRIS GOCHNOUR

Dovetail saws are a popular choice for a first joinery saw, but because of the blade's length and shallow depth, they are only suitable for cutting dovetails in thin parts like drawer sides. To cut carcass dovetails, and tenons for door frame rails and table aprons, you need a carcass saw. With a 12-in.-long blade that has 2 in. or more of cutting depth, the saw is big enough for these joints yet small enough for drawer dovetails. Because it's so versatile, the carcass saw is what I recommend as a first saw to new woodworkers.

During the past 10 years, there has been an explosion of new saw makers and saws, and *Fine Woodworking* asked me to take a look at the carcass saws now available. A search turned up 18 saws. Except for one (the Lie-Nielsen tapered crosscut saw), they all have 12-in.-long saw plates, and between 11 and 15 points per inch (ppi). Although I prefer teeth filed for ripcuts, I tested saws filed for crosscuts, too. One saw, the Bad Axe hybrid, has teeth filed between rip and crosscut.

I tested how quickly they cut, and how easy they are to start. I used them to cut dovetails and tenons. I judged how well they track for ripcuts, but not crosscuts. With some ripcuts (such as the tail cuts for dovetails) a cut that goes awry can't be corrected, but a wonky crosscut often can



Article Extra

Don't miss our exclusive interview with Chris Gochmour on Fine Woodworking's biweekly podcast, **Shop Talk Live**.

SHOULDERS, TOO



DOVETAILS BIG AND SMALL



great saws

With the tests completed, it was clear that most of the 18 carcass saws tested are great, and the difference between them is very small. However, four saws were just a bit better than the rest because they were sharpened extremely well, so they started easily, cut fast, and tracked perfectly. They also performed well on both rip- and crosscuts. I noticed some difference in comfort among these four saws, but comfort is subjective and doesn't affect performance. Any of them would be a great do-it-all saw. The Veritas crosscut saw was a solid performer and costs just \$79. It's easily the Best Value.

—C.G.

be fixed with a handplane. After decades of using handsaws, I've learned that a saw's performance hinges on one thing: how well its teeth have been sharpened. Over all, these saws reinforced that lesson: The best performers had the best sharpening jobs. Although most hobbyist woodworkers won't need to resharpen a saw very often (every few years at most), we identified in the chart makers who offer sharpening services (see pp. 36-37).

After weeks of using all these saws every which way, I realized that there are a lot of very good saws on the market. However, four were a bit better than the rest, and one was an exceptional value. Keep in mind that several makers are individuals who make each saw every step of the way. The nature of this work means that if you buy a saw from one of them, you might wait weeks or months before it's in your hands. Their saws can often be customized, so for these makers, we've listed the saw's minimum price. It could be higher depending on the options.

Chris Gochmour's backsaw is never far from reach in his Salt Lake City shop.



BEST OVERALL

BEST OVERALL

ADRIA CROSSCUT

This saw performed wonderfully. It was tied for the fastest crosscuts but was a bit slow for ripcuts. I'm OK with that tradeoff. Despite the saw's performance, the handle was uncomfortable (but my hand is a bit larger than average).

BAD AXE HYBRID

This saw is like a combination tablesaw blade, with a tooth profile designed to rip and crosscut. It wasn't the fastest at either type of cut, but it did both equally well. Because of the hybrid file, the saw started smoothly in both rip- and crosscuts. Of all the saws tested, I liked the handle on this one the best.



BEST OVERALL

LIE-NIELSEN TAPERED CROSSCUT

At 14 in. long, this saw is 2 in. longer than every other saw tested, and it also had the thinnest saw plate. Its kerf was tied for the narrowest. All of this makes a big difference in how fast the saw cuts. It took the top spot in the ripcut and tied for first in crosscut speed tests.



BEST OVERALL

ROB COSMAN TENON

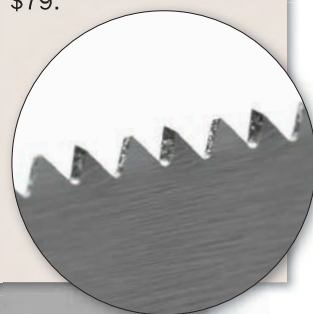
This saw was very easy to start, and cut smoothly. The teeth cut without binding despite having very little set. It has the heaviest spine, and a molded resin handle with individual finger grips. The handle comes in two sizes (standard, extralarge). The standard-size handle I tested was a bit small for my large hands.



BEST VALUE

VERITAS CROSSCUT

This saw did very well in all of the tests. It ripped extremely fast and tracked great during ripcuts. Crosscuts were very quick, too. It also started smoothly in both rip- and crosscuts. Overall, this is a very good saw and a fantastic value at just \$79.




How the saws stacked up



BRAND/STREET PRICE	SPECS
Adria Small Tenon Rip \$170	14 ppi Plate: 0.020 in. Kerf: 0.028 in.
BEST OVERALL Adria Small Tenon Crosscut \$170	14 ppi Plate: 0.020 in. Kerf: 0.027 in.
Bad Axe Rip* \$255 and up	13 ppi Plate: 0.020 in. Kerf: 0.024 in.
BEST OVERALL Bad Axe Hybrid* \$255 and up	14 ppi Plate: 0.020 in. Kerf: 0.025 in.
Blackburn Rip* \$275 and up	13 ppi Plate: 0.025 in. Kerf: 0.033 in.
Bontz Rip* \$250 and up	14 ppi Plate: 0.020 in. Kerf: 0.026 in.
BEST OVERALL Rob Cosman Tenon \$300	12 ppi Plate: 0.020 in. Kerf: 0.024 in.
Crown Tenon Rip \$80	13 ppi Plate: 0.025 in. Kerf: 0.030 in.
Lynx Tenon Crosscut \$110	14 ppi Plate: 0.025 in. Kerf: 0.029 in.
Gramercy Rip* \$210	13 ppi Plate: 0.020 in. Kerf: 0.026 in.
Gramercy Crosscut* \$210	15 ppi Plate: 0.020 in. Kerf: 0.028 in.
BEST OVERALL Lie-Nielsen Tapered Crosscut* \$140	14 ppi Plate: 0.015 in. Kerf: 0.024 in.
Lie-Nielsen Crosscut* \$137	14 ppi Plate: 0.020 in. Kerf: 0.028 in.
PAX 1776 Tenon Rip \$165	13 ppi Plate: 0.025 in. Kerf: 0.027 in.
PAX Tenon Rip \$105	13 ppi Plate: 0.025 in. Kerf: 0.027 in.
BEST VALUE Veritas Crosscut \$79	15 ppi Plate: 0.020 in. Kerf: 0.026 in.
Veritas Rip \$79	13 ppi Plate: 0.020 in. Kerf: 0.026 in.
Winsor Rip* \$169	13 ppi Plate: 0.020 in. Kerf: 0.027 in.

*Offers resharpening service.

RIP START	RIP SPEED	RIP TRACKING	CROSSCUT START	CROSSCUT SPEED
Very good	Very good	Excellent	Very good	Very good
Excellent	Good	Excellent	Excellent	Excellent
Excellent	Very good	Very good	Excellent	Very good
Excellent	Very good	Excellent	Excellent	Very good
Very good	Very good	Excellent	Very good	Very good
Very good	Excellent	Very good	Good	Very good
Excellent	Excellent	Excellent	Excellent	Good
Very good	Fair	Very good	Very good	Fair
Very good	Very good	Very good	Very good	Fair
Very good	Very good	Excellent	Very good	Very good
Excellent	Fair	Very good	Excellent	Fair
Excellent	Excellent	Excellent	Very good	Excellent
Excellent	Good	Very good	Excellent	Fair
Very good	Very good	Very good	Very good	Fair
Very good	Very good	Very good	Very good	Fair
Very good	Excellent	Excellent	Very good	Very good
Very good	Very good	Excellent	Good	Excellent
Excellent	Excellent	Very good	Very good	Good

A man with dark hair, wearing a red textured sweater and a brown leather apron, is focused on assembling a wooden cabinet. He is holding a light-colored wooden panel, likely a drawer front or shelf, and is in the process of fitting it into a larger wooden frame. The background shows a workshop with various tools and wooden materials.

Sliding dovetails are clean-looking and strong, and I use them in cabinets, chests, tables, and more. They allow unique construction, letting me join case sides directly into a top that overhangs them or make a drawer with an overhanging front. Best of all, sliding dovetails are fast and easy to cut with a router.

But there's a problem. When glue hits these joints, they tend to swell, which can leave you permanently stuck mid-glue-up, especially on wide pieces. You can prevent this by leaving the fit a little loose, but that weakens the joint and can look sloppy.

The solution is to taper one edge of the dovetail and the corresponding edge of the slot. The beauty of a sliding dovetail is that it doesn't tighten up until it is slid all the way home. Though it might seem hard to get perfectly matching tapers, the whole process is easier than you think.

I use this joint most often on solid-wood cases that are deeper than 10 in. or 12 in. On chests of drawers, I use it to join the sides directly into the top, and for installing a solid shelf (instead of a web frame) at the mid-span to help keep the case sides from cupping. And on cases where the sides extend down to the floor, the tapered sliding dovetail is the best way to insert a solid bottom.

The payoff is huge: new design and construction options, stress-free assembly, and unmatched strength.

Two options: seen or unseen

There are two variations of the joint—through and stopped. I designed this small stand to show how to cut each version, and to illustrate that this valuable joint is good for more than just big dressers. Tapered sliding dovetails let me use solid panels for every part of this piece, keeping construction clean and simple.

In practice I prefer the stopped version of the joint. The slot stops before it reaches the front edge and the dovetailed panel gets inserted from the back. The dovetail is notched in front to fit the stopped slot, which hides the joinery and means you don't need a perfect fit. In fact I sometimes

Tapered Sliding Dovetails Are Easier than You Think

This wonder joint simplifies assembly and makes cabinets bombproof

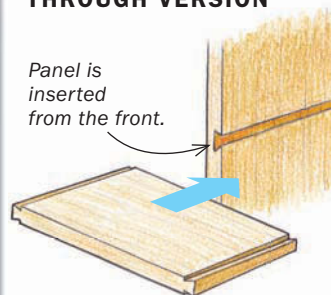
BY TIMOTHY ROUSSEAU

THROUGH VS. STOPPED

Rousseau made this small stand to demonstrate two versions of tapered sliding dovetails. The shelves have through-dovetails while the top dovetails are stopped.

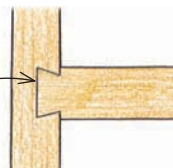
THROUGH VERSION

Panel is inserted from the front.



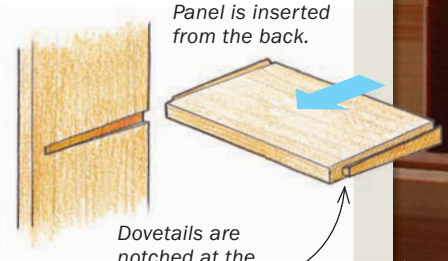
VISIBLE IN FRONT

Dovetail shows, so perfect fit is essential.



STOPPED VERSION

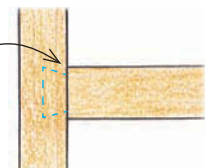
Panel is inserted from the back.



Dovetails are notched at the front edge.

HIDDEN IN FRONT

Square shoulder is easier to fit.

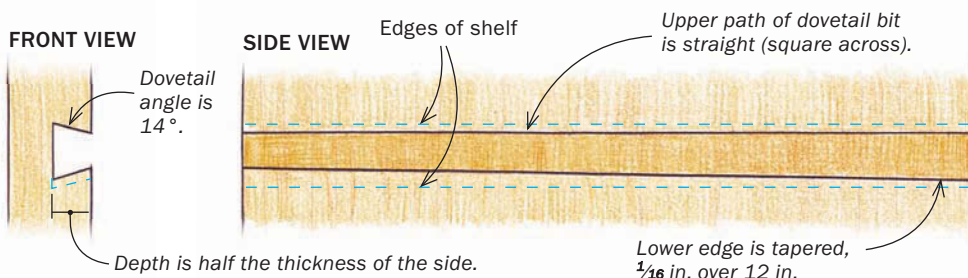


Through-dovetail

Start with the slot

ANATOMY OF THE JOINT

The straight side of the dovetail slot is easier to rout cleanly, so that goes on the top edge, where any gaps along the shoulders would be obvious.



LAYOUT BEGINS AT THE FRONT

With the through version of this joint, the panels (in this case, shelves) slide in from the front. That's also where layout starts.



Outline the slots. After marking the top and bottom edges of the shelf, mark the width and depth of the slot. Note that each edge of the slot is inset $\frac{1}{16}$ in. from the shelf edges.



Angles match bit. Rousseau uses a 14° bit for sliding dovetails, and lays out the sides of the slots to match.

EXTEND THE LINES ACROSS THE FACE

These mark the edges of the slot, and are critical for setting up the router jig.



One straight, one tapered. Now that you know the entry point of the top of the bit, extend a square line across the inside face of each case side (left). To mark the tapered edge of the cut (above), use a long wedge that matches the taper, in this case $\frac{1}{16}$ in. over 12 in. To avoid confusion, Rousseau boldly marks the fat end of the wedge.

leave the dovetail a little short of bottoming out in the slot, so it is sure to pull the shoulders tight, which is the part of the joint that you do see. If you prefer to see the joinery, use the through-dovetail. Since the tapered end of the joint is off center, hide that end at the back. So taper the joint toward the rear and insert the panel from the front.

One important note: With any type of sliding dovetail, you should do most of your surface prep before cutting the joints. If you do heavy planing on the inside faces of the workpieces afterward, you'll open up gaps at the joints. Save only light scraping and sanding for the end.

Lay out and cut the slots first

Cut the slot first, because it is easier to trim the dovetail to fit afterward. Only one edge of the joint is tapered, and it's easy to lose track, so I lay out every part of each slot and mark the tapered edges with an angled line nearby. Because of the way you rout the dovetail, it is easier to rout a clean shoulder on the straight edge. So I locate the straight edge on the top side of shelves, which will be more obvious to the viewer. Let's start there, with the through-dovetails that connect the shelves to the case sides.

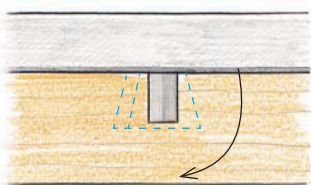
Clamp the two sides together, face to face. Using a sharp pencil with hard lead, draw two lines across the front edges to

ROUT THE SLOTS IN THREE PASSES

Cut the straight and tapered sides of the dovetail slots using a router jig. One of the passes is a climb cut, so the jig's two rails must hug the router base to keep it from wandering.

1. REMOVE THE WASTE

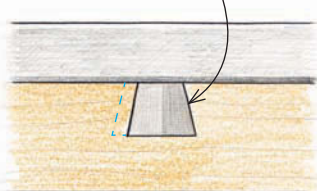
1/4-in.-dia. straight bit



Steer clear of the lines. Set a straight bit a little short of full depth and stay close to the straight side of the dovetail slot. Use double-sided tape to attach a straight stick to the front fence to record the path of the cut. Rough out all the slots before switching to the dovetail bit.

2. ROUT THE STRAIGHT EDGE

Dovetail bit



Change bits. Insert the dovetail bit and make a cut through the wedge attached to the fence.



Setup is easy. Just align the slot in the fence with the straight side of the slot on the workpiece.

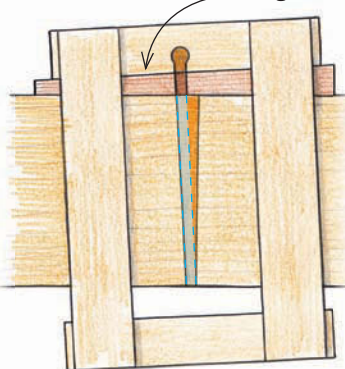


Rout all of the slots. As before, wedge a board at the back to prevent blowout.

3. ADD THE WEDGE FOR THE TAPER

To duplicate the slot's taper angle, insert the layout wedge between the fence and workpiece.

Wedge



Same setup trick. Replace the stick with the wedge, taped to the fence. Rout through it, and use the cut to align the jig with the tapered edge of the slot. Note the slash on the workpiece that indicates the tapered edge of the slot.



Rout all of the slots. Complete each of the slots by routing their tapered edges. Get as close to the pencil line as you can. You'll fit each joint individually.

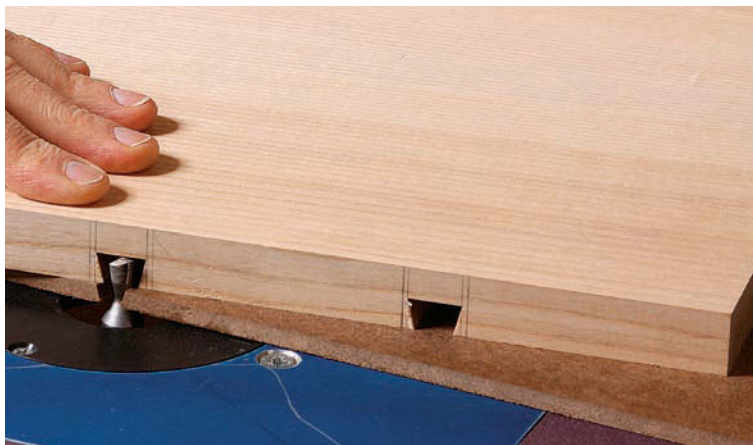
Through dovetail

Cut tails on the router table

continued

Route the tapered side first, dialing in the fit of the dovetail when cutting the straight side. Rousseau adds a zero-clearance panel to the router-table fence to prevent chipout and a layer of slick MDF to the table to ensure smooth travel.

Adjust the bit height. Rousseau tapes an extra layer of MDF to his router table to even out bumps, so he includes that when setting the bit height.



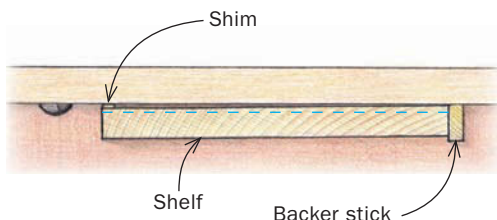
represent the total thickness of each shelf. Now make two marks $\frac{1}{16}$ in. inside the two lines already drawn. These marks show the maximum width of the dovetail joint. The case parts here are all $\frac{3}{4}$ in. thick, so the dovetails will be $\frac{5}{8}$ in. wide. It's good to have the dovetail narrower than the shelf, so you don't risk little flats on the corners. Once the dovetails are laid out on the front edges of the workpieces, carry the lines across the inside faces. One line is straight and one is angled. The taper angle I use is $\frac{1}{16}$ in. over 12 in. That works out to about $\frac{1}{3}$ of a degree. To ensure consistency, I lay out the tapered edge with a long wedge.

I cut dados and dovetail slots with a souped-up version of the classic T-square

TAPERED EDGE FIRST

SHIM EQUALS AMOUNT OF TAPER

Use dial calipers to measure the difference between the width of the front and back of the groove, and handplane a shim to that thickness, including the tape you use to attach it to the workbench and workpiece.



Attach a shim. Lay out the dovetail on the front end of the workpiece, and attach a shim at that edge using double-sided tape. On some dovetails, the shim will go on the back edge.



Creep up on the layout mark by moving the fence. Then rout all of the workpieces at that setting, attaching the shim where needed. Note the extra stick at the rear to prevent chipout.

ROUT THE STRAIGHT EDGES ONE AT A TIME

This cut is simpler, as the workpiece rides flat against the fence, and this is where you'll fit the overall joint. Since each slot will be a little different, each dovetail has to be fit individually.



Use a test piece. It must be the same thickness and width as the real thing. Rout its tapered side with the shim setup, and then flip the workpiece to rout the straight edge.



Start with the widest. See which slot allows the test piece to slide in farthest, and fit that joint first. Adjust the router until the dovetail goes in all but the last $1\frac{1}{2}$ in. with hand pressure.



Now the real workpiece. Identify the dovetail that corresponds to that slot, and rout its tapered side. Now follow the same process for the next widest slot, and so on.

Fit the joints by hand

dado jig (see p. 41). My first step is to remove most of the waste with a $\frac{1}{4}$ -in. straight bit, staying inside the pencil lines. While the bit is in the router, make all four waste cuts for each slot. Then I load up a $\frac{1}{2}$ -in.-dia., 14° dovetail bit and set its depth to match my layout lines. Make separate passes to rout each edge of the slot. Do the straight edge, then use the layout wedge to set up the jig for the tapered edge. Just work to the pencil lines. Because of the fitting process later, you don't have to make every slot exactly the same. Do not unlock the depth setting until both edges of every slot are routed in the case sides. For accuracy, it helps to attach dust collection to the router, keeping its path clear. Also, if the final cut is a climb cut, hold the router firmly.

Do the tails on the router table

On the dovetails, you'll rout the tapered side before the straight one, as it is easier to fine-tune the straight side afterward for a good overall fit. The long wedge used earlier won't work for setting up this tapered cut on the router table. Instead, make a

Off the router table, each dovetail should slide in all but the last $1\frac{1}{2}$ in. or so for hardwoods. During final fitting, the goal is to get them as close as $\frac{1}{2}$ in. before assembly.

Tap test. Push each panel in as far as it will go, and tap its sides. You'll hear and feel rattles where the fit is loose. Concentrate your fitting on the tight areas at first, and then make full passes along both sides.



TWO WAYS TO TRIM

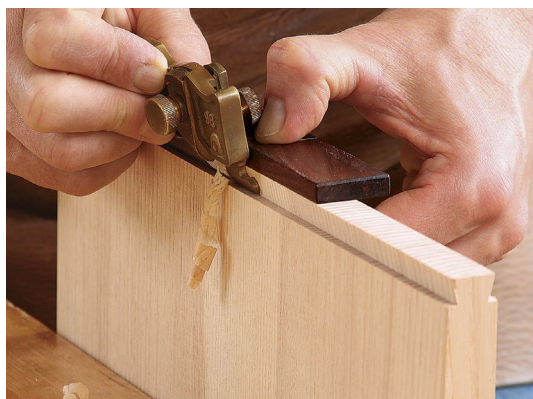
Sanding block.

Rip a block to the dovetail angle, and attach P80- or P100-grit sandpaper to its angled edge.



Specialized handplane.

Rousseau added a 14° wood fence to his Lie-Nielsen side rabbet plane. He prefers this tool for trimming dovetails.



Article Extra

Learn how Rousseau hot rods a hand plane for tapered sliding dovetails.

Fit each joint individually. Trim each dovetail until it slides in all but $\frac{1}{2}$ in. of the way with hand pressure only. Softer woods can stop shorter.

Stopped dovetail

Like before, the slots are cut before the dovetails. But with the stopped joint, the slot stops short, the front edge of the tail is notched, and the parts are slid in from the back.

ROUT THE SLOT



Layout first. Start at the back edge. From there, layout is the same as before, aside from the additional mark for a stopping point.



Rout a stopped slot. The three passes are the same, but you'll stop each one at a pencil mark. Square the end of the slot with a chisel.

FIT THE DOVETAILS



Measure the taper differently. At the open end, you can measure the actual slot. At the other end, you'll need to measure between layout lines, where the mating piece will end. Make the shim accordingly.



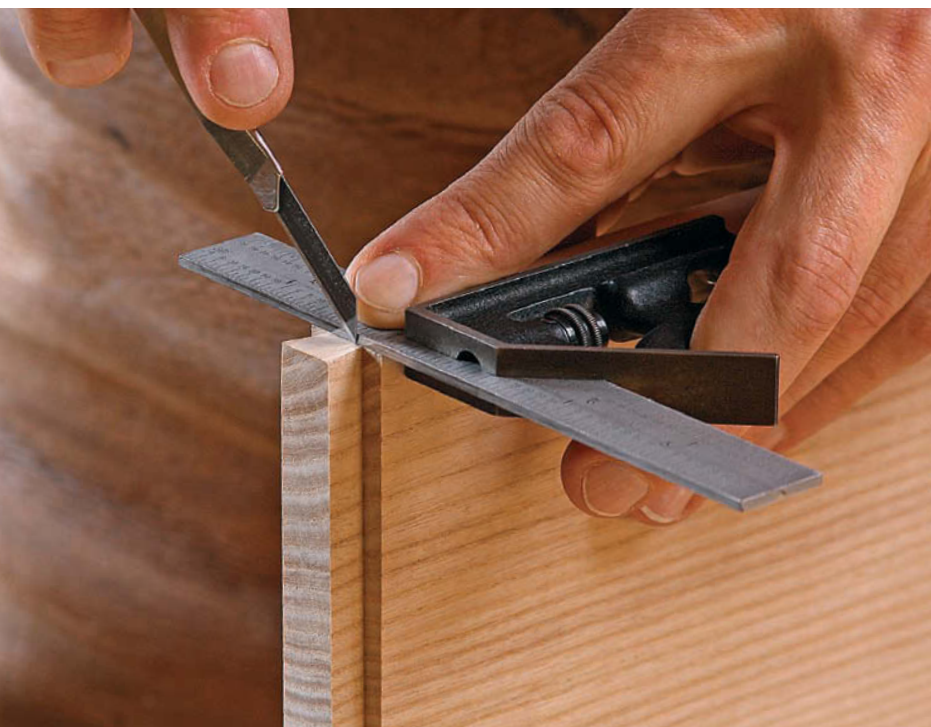
Rout tails the same way. Start with a test piece again, fitting it to each slot individually before routing the real workpieces.

thin shim that represents the difference in size between the fat and skinny ends of the slot. I make that measurement with calipers. The shim then gets taped to the workpiece, shifting one end or the other away from the router-table fence.

To make the shim, I cut a stick over thickness on the bandsaw, put a piece of double-sided tape on one side, stick it to the bench, and then handplane and recheck it until it is the precise thickness I need. Keep the tape on when checking, as it will be used to attach the shim to the workpiece.

To prevent tearout on the shoulders of these cuts, I create a zero-clearance auxiliary fence by taping 1/2-in.-thick MDF to the router fence, routing through it to expose the cutter. As with the slots, layout comes first. But this time, you'll fine-tune each cut on a piece of test stock before routing the real thing. While pushing the workpieces through the cut, try not to flex them by pushing too hard against the fence.

Use the straight side to sneak up on the fit—The straight side of the dovetail is cut without the shim. Each joint must be fitted individually, as all of the slots will vary in width a tiny bit. I don't try to achieve the final fit on the router table, though it's possible. Instead I leave the joint about 1 1/2 in. short for a dense hardwood like ash, and then hand-fit the joint to about 1/2 in. short of all of the way in. With walnut you could leave the joint 2 in. short before fitting and then 3/4 in. short



Notch the dovetail and fine-tune the fit. Connect the shoulders with a scribe line (left) and then saw out the notch and pare it flush with the shoulders. Again, hand-fit the dovetails so they slide in about 1/2 in. short of all the way (above).

Two ways to drive joints home

The joints are easy to assemble, tightening only as they are slid home. Not much clamping is needed.

TIP

BEST GLUE FOR THE JOB



For sliding dovetails, Rousseau prefers Old Brown Glue, a liquid version of hide glue, which is more slippery than yellow glue and offers more working time. Warm the bottle in a hot-water bath to keep the glue thin for use. To create a warm glue dish, pour hot water into a deli container and put the lid on loosely.

before assembly, and softer woods can be left as much as 2 in. short before assembly.

Stopped version is not much different

For this project, I used stopped dovetails to attach the overhanging top. The stopped joint is similar to the through version, except that the panels are inserted from the back and the dovetails are notched at the front. Layout starts at the back.

To lay out the slots, flip the top upside down, and then dry-fit the rest of the table and use it to locate the edges of the sides on the underside of the top. This time, the straight dovetail edges go on the outside, since those shoulders will be the most visible. The other new aspect is figuring out where the joint will stop. The overhang is 1 in. at the front edge, and I usually stop the dovetails $\frac{1}{2}$ in. from the front edge of the sides. That means the slots will stop $1\frac{1}{2}$ in. from the front edge of the top. □

Timothy Rousseau is a professional furniture maker in Appleton, Maine, and an instructor at the Center for Furniture Craftsmanship in Rockport.



Two ways to drive joints home. On the shelves, Rousseau pushes the pieces in as far as he can before tapping them home two at a time with a mallet, protecting their edges with a wood block (above). For the top, he uses another favorite method, pulling the parts the last inch or so with clamps (left).

Stylish Details Enliven a Low Dresser

Frame-and-panel design keeps the look light
and the construction manageable

BY MICHAEL PEKOVICH



A dresser is really just a big box stuffed with smaller boxes. Because of that, dressers tend to look, well, boxy. When I set out to build a chest of drawers for the magazine, I really wanted to get away from the stale, boxy look that is typical. My first strategy was to go with a frame-and-panel design. This allowed me to add legs to the case, lifting it off the floor. Second, instead of stacking the drawers in a tall case, I arranged them side by side to create a wide, low case. This keeps the dresser from looking too tall and dominating the room. Both elements, while creating a nice design, also add to the complexity of the project. The good news is that none of the joinery is particularly challenging. By breaking down the construction into bite-size pieces, you can simplify the build and reduce headaches.

I chose white oak for the legs, frame, and top, and butternut for the drawer fronts, side panels, and back panels to provide subtle contrast. The overall design is simple, but a few playful details give the case personality. There is a subtly curved taper to the outside faces of the legs, and the top rails are coved at the ends and overlap the legs. The top is curved on the ends and has a slight underbevel. Finally, pegged joinery and ebony pulls add a little pop.

There are a lot of parts to mill and joints to cut in this project, so I've simplified construction by using consistent dimensions for parts and joinery where possible. This

Mortise-and-tenons first

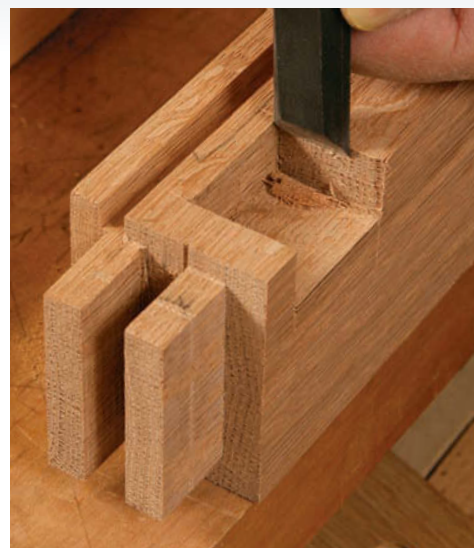
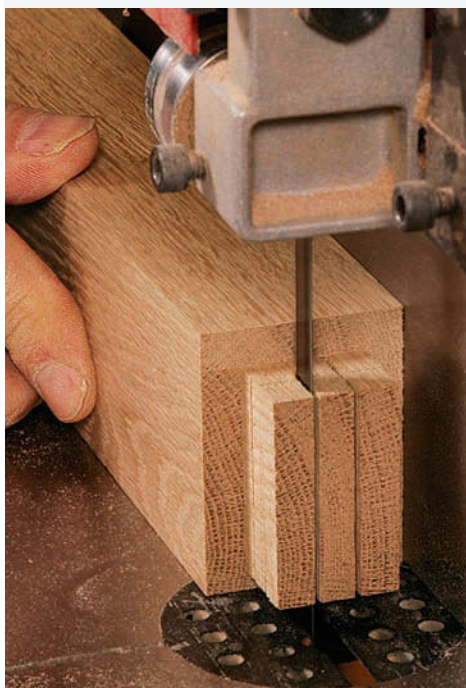
Double mortise-and-tenons join equal-width rails and legs. Centering the joints means both sides can be cut with one setup.



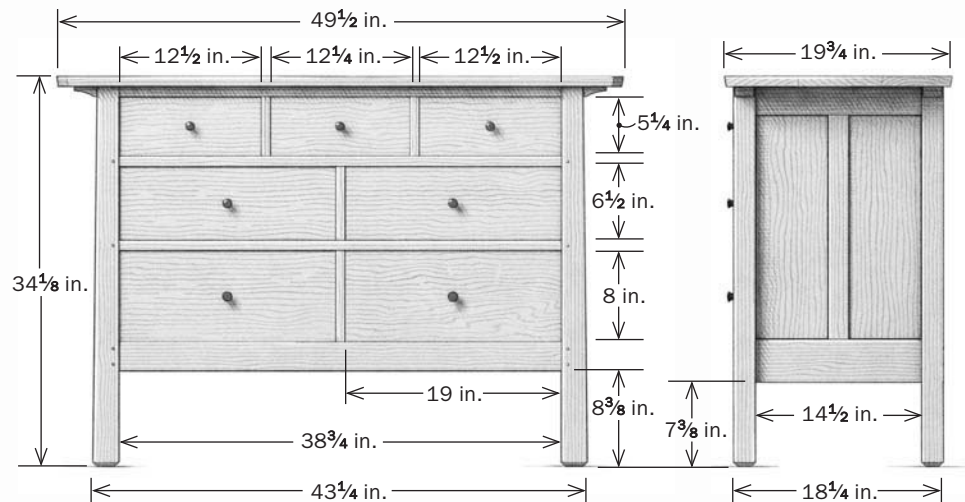
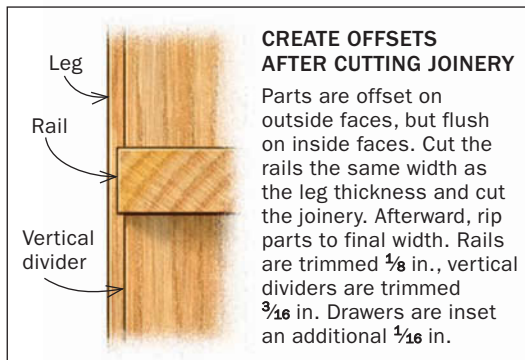
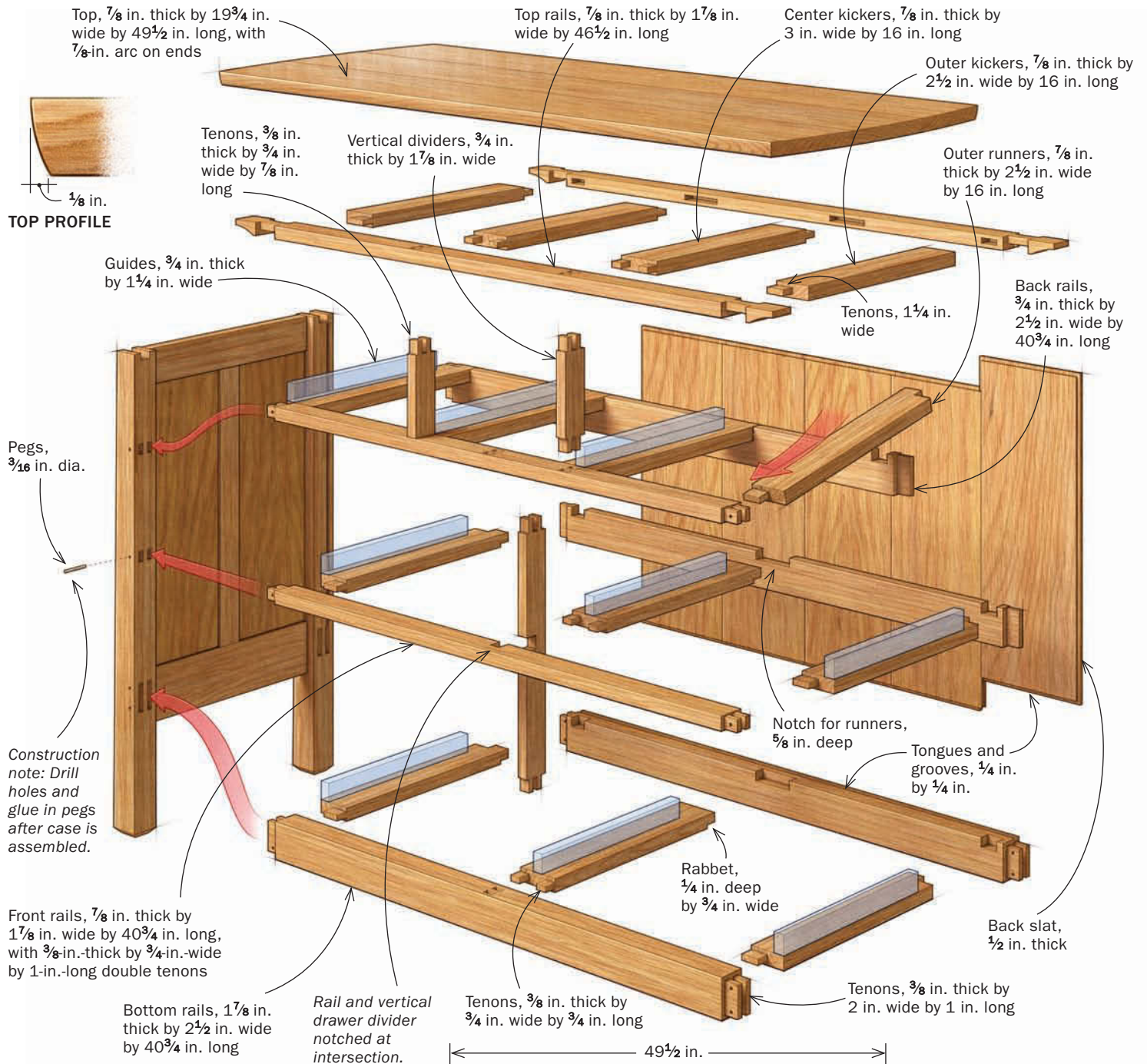
Outside mortises, then inside. Pekovich uses a hollow-chisel mortiser to cut the frame mortises in the legs (above). Set the fence to cut the outside mortise, then rotate the leg for the second mortise. Use the same setup for the double mortises in the rails (right). The remaining single mortises in the legs can be cut with the same fence setting.



Tenons next. With the rip fence set to the tenon length, use a miter gauge and dado blade to cut perfect 90° shoulders (above). Then use a bandsaw to cut the inside cheeks (right), and a coping saw and chisel to remove the waste between the tenons.



Rear rails get notched for runners and kickers. The drawer supports are tenoned in the front and rabbeted to fit notches in the back rails. This allows them to be installed after the case is glued up.



FRAME-AND-PANEL DRESSER

The white oak legs and frame add strength to this dresser, while butternut panels and drawer fronts soften the look and lighten the load.

Upper side rail, $\frac{7}{8}$ in. thick by $2\frac{1}{2}$ in. wide by $16\frac{1}{2}$ in. long

Panel, $\frac{1}{2}$ in. thick, with $\frac{5}{16}$ in.-wide by $\frac{1}{8}$ in.-deep rabbet on each face to fit groove

Panel groove, $\frac{1}{4}$ in. wide by $\frac{1}{4}$ in. deep

Bottom side rail, $\frac{7}{8}$ in. thick by $3\frac{3}{4}$ in. wide by $16\frac{1}{2}$ in. long

Stile, $\frac{7}{8}$ in. thick by $1\frac{3}{4}$ in. wide, trim $\frac{1}{16}$ in. off outside face after cutting joinery

Tenons, $\frac{3}{8}$ in. thick by 1 in. long

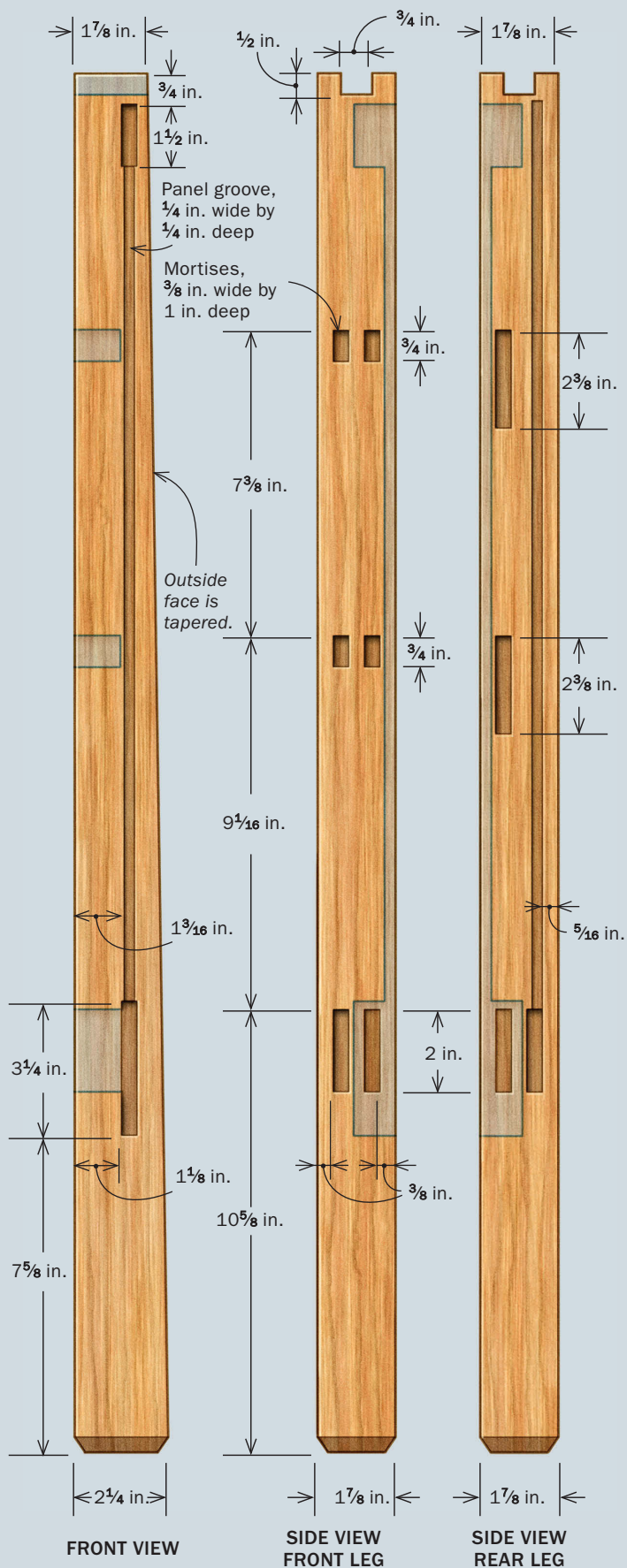
Leg, $1\frac{7}{8}$ in. thick by $2\frac{1}{4}$ in. wide by $33\frac{1}{4}$ in. long

Drawer bottom, $\frac{3}{8}$ in. thick, rabbeted to fit $\frac{1}{4}$ in. groove

Drawer front, $\frac{3}{4}$ in. thick

DRAWER DETAIL

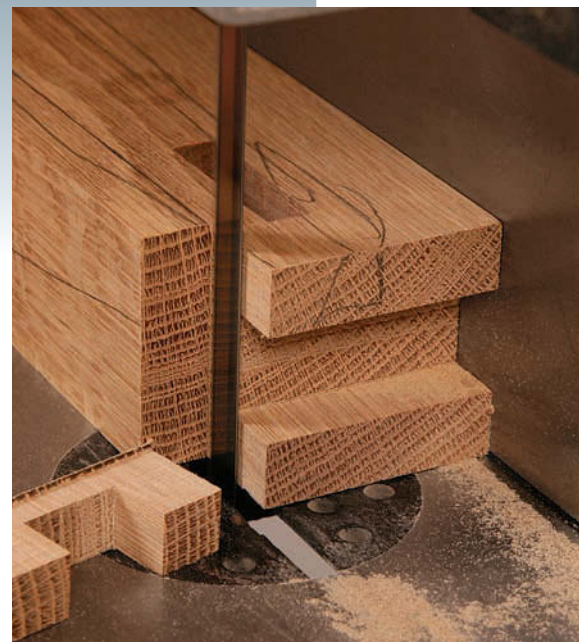
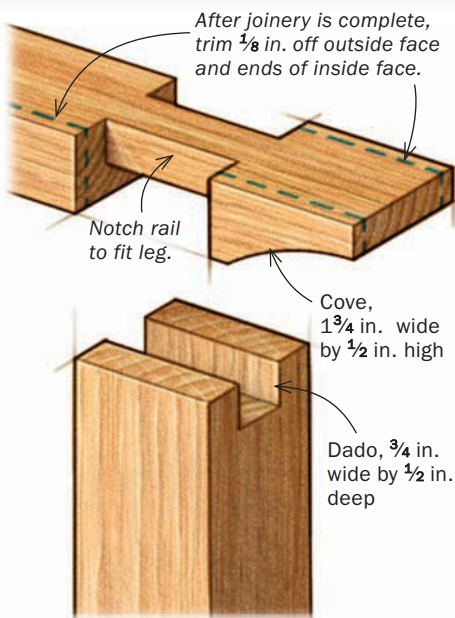
Sides and back, $\frac{1}{2}$ in. thick



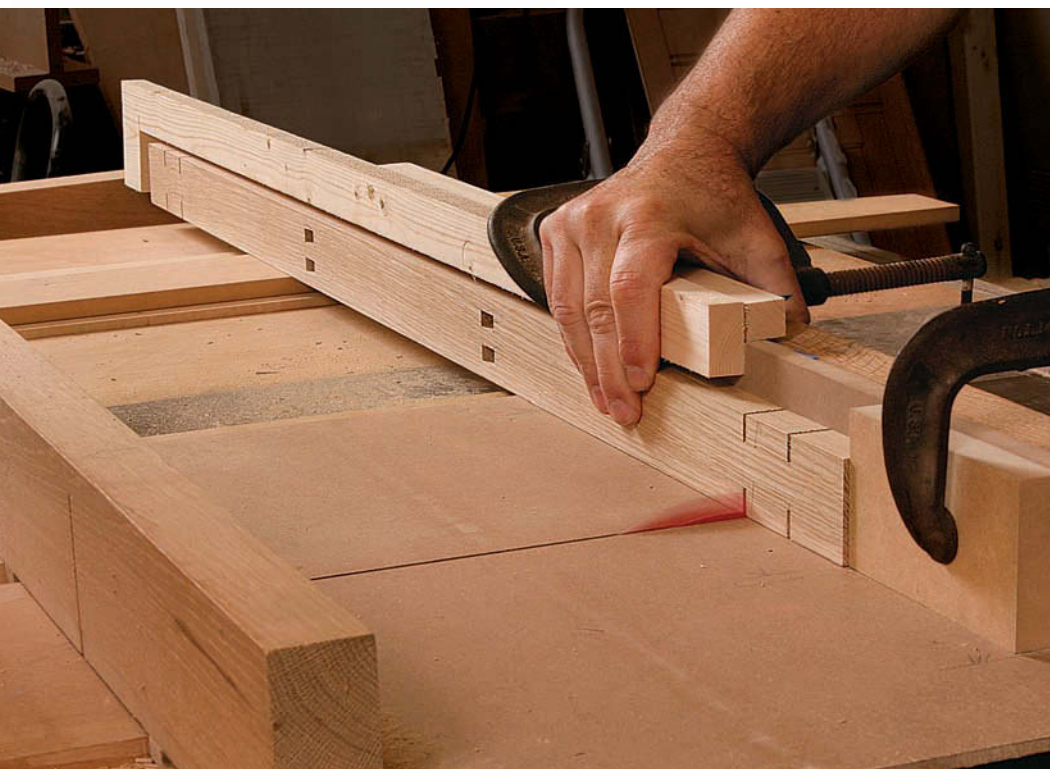
To purchase expanded plans and a complete cutlist for this dresser and other projects, go to FineWoodworking.com/PlanStore.

Bridle joints for the top rails and legs

Instead of being dovetailed to the legs, the top rails are notched to fit dados in the legs. The overhanging ends of the rails are then coved to create a nice design detail.



Notch the leg tops for the top rails. Clamp the leg in a tenoning jig and use a dado blade narrower than the notch to cut one face. Rotate the workpiece to finish and center the cut (left). Later, the outside edges of the legs will get tapered, but for now, just notch the top outer edge of each to final width (above) so you can fit the top rails.



Then notch the rails. Start with the shoulders. Clamp a stop block to the fence for the outside shoulder and attach a hook stop for the inside shoulder (above). Remove most of the waste at the bandsaw, then slide the workpiece across the tablesaw blade to skim off the remaining material.



Notch the bottom the same way. Using the same stop blocks as before, lower the blade and cut the bottom of the notch.



Profile the ends. Cut the cove at the bandsaw, and use the offcut as a sanding block to smooth the shape. Use the first end as a pattern to lay out the remaining ends.

Finish the leg joinery and shaping



Groove, then taper. Install a side rail into the leg and set a combination square to the groove location (left). Use the square to set the router-table fence and rout a groove in the leg between the mortises (above). Finally, bandsaw the taper on the outside face of the leg (right), and plane or sand the surface smooth.



minimizes machine setups, speeds milling and joinery, and ensures accuracy.

Rock-solid frame means a long life

The double tenons that connect the rails to the legs provide plenty of glue surface and are all 1 in. long, so you can cut them all efficiently with a single setup. The bottom rails are wide, thick beams that help prevent sagging, and the vertical dividers are also connected with strong double tenons. I decided to attach the top rails to the legs with a bridle joint. The overhanging ends of the rails are coved to create small corbels below the overhanging top, a small detail that adds a lot of personality to the dresser.

To simplify the machine setups for the joinery, all of the face-frame parts are ripped to match the legs. After the joinery is complete, the parts are ripped to final thickness, creating the offsets between the components.

All of the case components tie into the legs, so that's a good place to start. You'll need to cut double mortises for the bottom rails and front rails, single mortises for the side rails and back rails, and grooves for the side panels and back slats. The legs are also notched on top for the top rails. Once the joinery is complete, you'll finish the legs by tapering the outside faces.

Start with the double mortises. I use a hollow-chisel mortiser with a $\frac{3}{8}$ -in. chisel, setting the fence to cut the mortise farthest from the fence. To cut the second mortise, rotate the workpiece. This centers the mortises, which makes tenoning easier. The double mortises on the front and bottom rails and the single mortises for the side rails and back rails are all cut with this same setup.

To notch the top of each leg, use a $\frac{1}{2}$ -in.-wide dado blade and tenoning jig at the tablesaw. Then use the tablesaw to cut a flat at the top outside face of each leg.

Fit the vertical divider



Notch the divider and rail where they intersect. The lower divider is tenoned to the rails above and below it, and is half-lapped to the middle rail. Start by notching the rail, then dry-fit the case to locate the notch in the divider (left). The divider can slip partway into the rail notch, allowing for an accurate knife line.

Assemble the case

The dresser has a lot of parts, and gluing them all up at once would be a nightmare. So Pekovich finished all of the parts with a thin coat of shellac prior to assembly, then glued up the case in stages.



Case ends first. Start by gluing the side assemblies (above). Then glue the front frame together and glue it to one side assembly. Add the rear rails and then the opposite side (right).



To cut the double tenons in the bottom rails and front rails, start with the outside cheeks. Install a dado blade and use a miter gauge to run the stock along the rip fence to ensure consistent shoulders. Cut one cheek, then flip the workpiece for the second cheek. Next, cut the top and bottom faces of the tenons by lowering the blade but leaving the fence at the same setting. Finally, cut the inside cheeks at the bandsaw, and clean up the waste with a coping saw and chisel. With the dado blade and rip fence in the same position, cut the single tenons on the back rails.

Next cut the half-lap joint where the lower vertical divider and lower middle rail intersect. First notch the rear edge of the rail, then dry-fit the case together and mark the notch in the vertical divider.

The runners and kickers have double tenons spaced around the vertical dividers in the front, and are notched into the tops of the inner back rails. This allows them

to be installed after the case is assembled. Both the tenons in the front and laps in back are $\frac{3}{4}$ in. long, making them fast to cut with one tablesaw setup. The upper kickers are tenoned into both top rails, and are installed as a single unit.

After all of the joinery is cut, rip the rails and dividers to their final widths. On the top rails, trim $\frac{1}{16}$ in. off the rear edge of the decorative ends as well—it will center the rails visually on the legs.

Sides and back complete the case

The case sides are frame-and-panel construction. To cut the grooves for the panels in the side rails and stiles, use a $\frac{1}{4}$ -in. dado set in the tablesaw. Then dry-fit the side assemblies and measure for the stopped grooves in the legs. Set up a router table with a straight bit and rout the grooves, stopping at the mortise locations. Finally, bandsaw the taper on the outside faces of the legs and smooth them with a block plane.

The panels are rabbeted on the inside and outside faces to create a tongue that fits into the groove. The case back consists of tongue-and-groove panels that fit into grooves in the top and bottom rails.

With the router still set up for grooves, rout grooves in the back legs, top rail, and bottom rear rail for the back panels.

Glue up in stages

After prefinishing the parts with a wash-coat of shellac, glue up the case sides using just enough clamp pressure to close the joints. Next connect the sides—first glue and preassemble the drawer rails, bottom rail, and lower vertical divider, then glue this assembly and the back rails between the two sides. Install the kickers and runners, gluing them at the front and back. Then add the short vertical dividers, slide the back panels in place (no glue), and drop the top rail and kicker assembly onto the case. Once dry, add the drawer



Drawer supports come next. The runners and kickers are tenoned into the front rails and drop into notches in the back rails. Taper the bottom edge of the tenons with a block plane to make installation easier.



Top off the case. Install the upper dividers and slip the back panels into their grooves (above). Assemble the top frame and drop it onto the case (left), and clamp until the glue dries. Finally, glue the guides in place, then use a combination square to align the guides with the dividers (below). Rub the guide back and forth to create a vacuum and let it dry.



guides. As a final touch, drill the legs at tenon locations and drive in pegs, leaving them slightly proud of the surface.

To shape the top, cut a shallow curve on the ends at the bandsaw, then clean up the sawcut and give it a slight underbevel with a block plane. Attach the top with screws through the upper kickers. Elongate the front and rear holes to accommodate seasonal movement.

The drawers are traditional dovetail construction. The finish is multiple coats of wiping varnish rubbed out with fine steel wool and brown paste wax. □

Michael Pekovich is a furniture maker, instructor, and FWW's executive art director.

As a professional finisher, I enjoy my work. But let's be honest. Not all woodworkers embrace finishing. That's because the job of brushing or wiping on a finish is time consuming and labor intensive. A faster path to a great-looking finish is to spray it. But the high price of equipment once limited the use of sprayers to commercial shops. Not anymore.

Recently, manufacturers have been rolling out quality high-volume, low-pressure (HVLP) systems with a price that puts spraying within budget for many home shops (see my review of these systems, "Spray for Less," *FWW* #242). These turbine-powered systems do a superb job. Most come in a kit with everything you need to get going, and don't require much setup.

The biggest learning curve is mastering the gun—but don't worry. I'll tell you everything you need to know to get great results. We'll start with the gun's controls and how to adjust them, then move on to proper spraying technique. With practice, you'll soon be able to get a professional-quality finish, and get it done fast. Once you've mastered your sprayer, you may enjoy finishing as much as I do.

What to spray and where

For a home shop in the garage or basement, water-based finishes are the only safe option to spray. Solvent-based finishes like lacquer and shellac are highly combustible and require a spray booth equipped with an explosion-proof fan. Water-based finishes aren't nontoxic, just nonflammable, so wear a respirator mask and eye protection while spraying, and wear gloves when pouring finish and cleaning the gun.

You don't need a large space for spraying, but it should be clean, well lit, and have a way of removing the overspray. You can create a simple exhaust system by placing a normal box fan in a window or door to blow air out, with a furnace filter on it to catch the overspray. This will replenish your

Get Started

Learn the basics, and get a high-quality finish fast—you may never pick up a brush again

FLUID VOLUME



This little knob controls how much fluid you spray. Located behind the trigger, it also serves as the needle's retaining cap.

Get to know the gun

High-quality HVLP systems are compact and more affordable than ever. It takes a little practice getting familiar with the controls, but soon you'll be spraying furniture like a pro.

POWER SOURCE



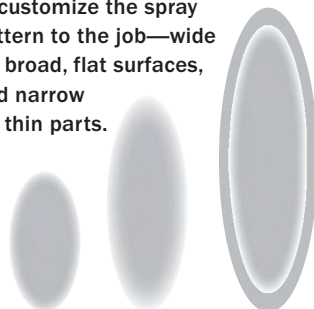
The turbine serves as the spray gun's motor, delivering clean, dry air to the gun.

Spraying

BY TERI MASASCHI

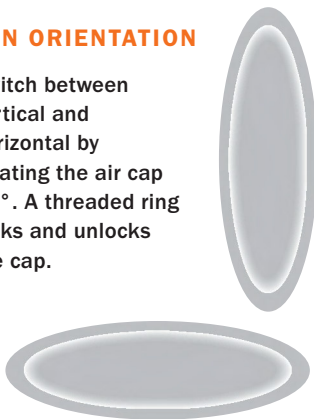
FAN WIDTH

Twist the fan-width knob to customize the spray pattern to the job—wide for broad, flat surfaces, and narrow for thin parts.



FAN ORIENTATION

Switch between vertical and horizontal by rotating the air cap 90°. A threaded ring locks and unlocks the cap.



NEEDLES AND TIPS

The needle and fluid tip control the fluid. You have to match them and the air cap to the finish. The gun should come with a set for spraying lacquer-type finishes, and most manufacturers offer more sizes, allowing you to spray a variety of products.



VISCOSITY CUP

You must determine the viscosity of the finish before setting up the gun. Dip the viscosity cup into the finish and time how long it takes for the finish to run through. Stop timing when the stream breaks into drips. Then use a viscosity chart to choose the right air cap, needle, and tip.



Practice with the gun

Before spraying a real finish, get to know the gun and its controls. A low-risk way to do that is with a practice run using dyed water on cardboard.

Load the gun with dyed water.

A few drops of dye in the water is all it takes. Pour it into the gun's cup through a paper filter, available from finish suppliers. Filtering your materials will keep the gun free of debris and spraying nicely.



shop with fresh air, and keep those overspray particles from landing on everything in the shop, including your freshly sprayed surface. For instructions on constructing your own spray booth, check out “Make a Simple Spray Booth” by Jeff Jewitt (FineWoodworking.com/extras).

Learn the controls

If you've just pulled your new sprayer out of the box and are a little intimidated by all the shiny knobs, don't worry. It's not as complicated as it seems. There are three main controls on the spray gun: fluid volume, fan width, and fan orientation.

Use the fan-width control to match the fan to the work, and adjust it in tandem with the fluid volume—the wider the fan, the more fluid you'll need. You can change the spray pattern's orientation, too.



Start spraying. Turn the fluid knob to a low setting and gradually dial up the fluid until you get an even finish that's smooth and flat.



Looks a little dry. Spray that's too dry will cause dry spots and an “orange peel” texture. The remedy is to either increase the fluid or move the gun more slowly.



Too wet. If you're seeing drips, turn down the fluid or move the gun faster.

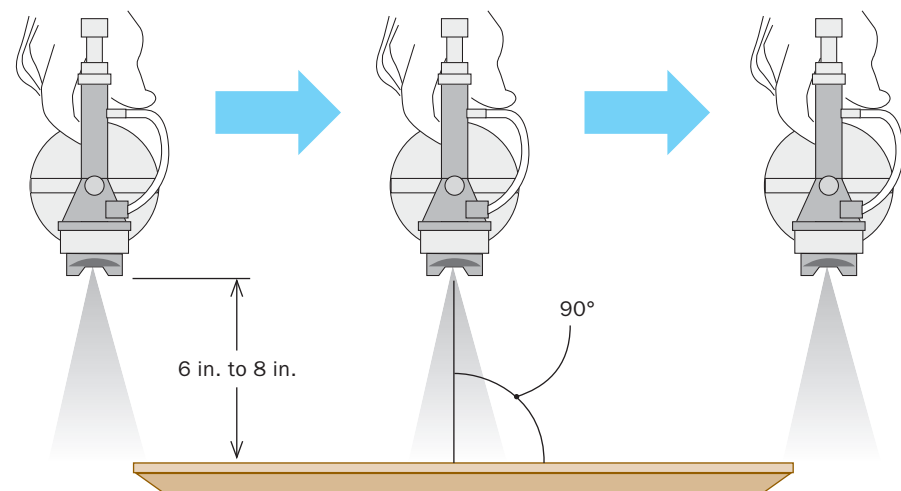


Just right. When you see uniform, wet coverage on the cardboard, with no dry spots or drips, you're on the right track.

Then practice your technique

Consistently using the right technique can have a big impact on finish quality, so a little effort here to build good habits and muscle memory will improve your finish in the long run.

START



FINISH

For tabletops or wide upright parts, use a vertical pattern, and for tall surfaces such as bookcase sides, a horizontal pattern is best. Some systems have an air valve in line on the hose to limit the air pressure to the gun. But limiting the air causes excess wear on most turbines and most jobs require full-strength air pressure, so it's best to keep the valve open.

Practice makes perfect

Spraying is a learned skill, so get used to the gun and its controls before jumping into a project. You can practice by spraying dyed water on cardboard, placed upright.

Load the gun with the water and connect the air hose to the gun. With the fluid turned off, set the gun to the smallest fan width. Press the trigger and slowly dial up the fluid knob until you get a wet, even spray on the cardboard without drips. Now increase the spray-pattern width to 4 in. or 5 in. wide and dial up the fluid too, keeping the two adjustments balanced to produce a fine, wet mist. The fan pattern shape should look like a straight line or an oval that's a little fatter in the middle. Next, play with the settings to get more familiar with the gun—change the fan width, and try spraying vertical and horizontal strokes, too.

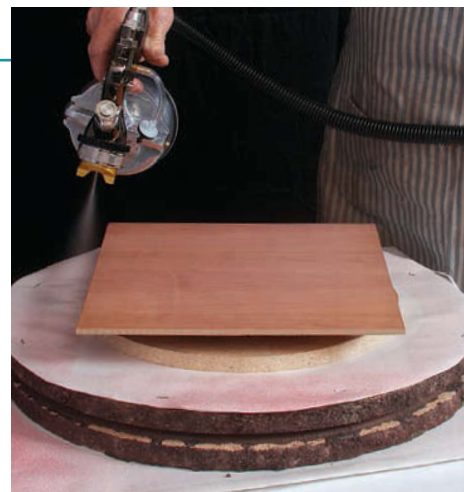
Once you have a handle on how the gun works, focus on using the right tech-

nique. In terms of finish quality, technique is just as important as properly setting up the gun's controls. Hold the gun at a right angle to the surface you're spraying and about 6 in. to 8 in. away: too close and you risk forming drips on the surface, too far and the finish will be too dry and cause a rough "orange-peel" texture. The finish wetness is also a function of the rate you move the gun—faster makes it drier, and slower makes it thicker and wetter. Work at a speed that's comfortable for you and keep it consistent as you're spraying, then use the fluid knob to dial in the wetness. To get seamless beginnings and ends to your strokes, start and stop spraying several inches beyond the edges of the workpiece. To blend stroke lines together so they don't show up in the finish, overlap each stroke halfway over the previous.

Next try the gun with a water-based coating on some scraps of wood. You'll need to readjust the gun a little when you start—the settings for the finish will be different.

Spraying furniture

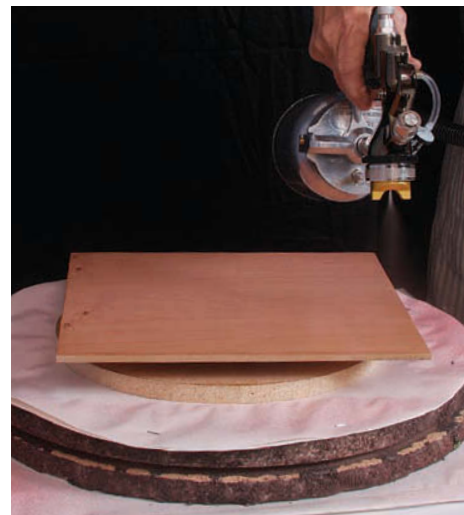
Now I'll walk you through spraying a piece of furniture, using the parts of a Shaker table—the broad horizontal top and vertical legs and aprons—as examples. When spraying a tabletop, remove it from the base if possible to avoid getting overspray



Start your stroke early. For the smoothest finish possible, Masaschi pulls the trigger to start spraying several inches before the gun reaches the workpiece.



Consistency is key. Keep the gun at a right angle and 6 in. to 8 in. from the workpiece, and move it at a constant speed.



Don't forget the follow-through. Just like the beginning of the stroke, keep spraying several inches beyond the edge of the piece.

Spraying tops and narrow parts

You'll have to learn to spray horizontal and vertical surfaces, plus wide and narrow areas. A tabletop and base are perfect for teaching the technique. Remove the top from the base and spray them separately so that the overspray from one doesn't get on the other.

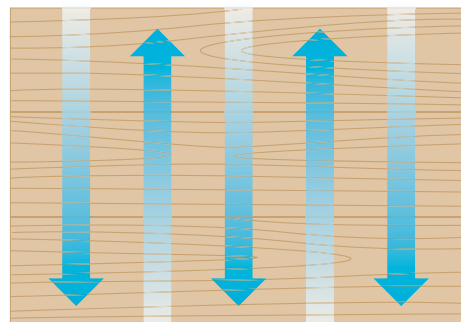
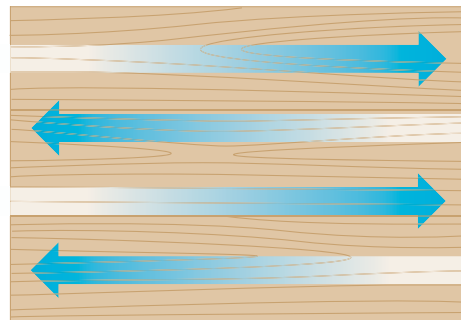


TABLETOPS

Spray the bottom first. Coat the underside of the tabletop, using a cross-hatch pattern (right) for even coverage. Use a wide spray pattern and overlap each stroke halfway over the last.

CROSS-HATCH PATTERN ENSURES UNIFORMITY

To keep stroke lines from each pass of the gun from showing up on broad surfaces, coat the surface with light, even strokes with the grain, then while the finish is still wet, turn 90° and coat the entire surface again, working across the grain.



Once dry, flip it over and do the edges. Masaschi dials in a narrow fan pattern for the edges to save material and limit overspray—rogue, partially dried spray particles that can land on other parts of the top, leaving a rough surface on the finish.



Now spray the top. Because the top is the most visible part of the table, Masaschi does it last to eliminate the chance of getting overspray on it. A smooth finish is most important here, so use the cross-hatch pattern again. Let the top dry before doing the next coat.

on the base. Lay it flat at waist height with the top side down, resting on a nail board or painter's pyramids.

Start with a coat of water-based universal sanding sealer (I use a product from Target Coatings). The sealer coat is important; it fills and seals the wood grain, preventing the later coats from soaking into the wood and leaving it dry looking, letting you build up a finish with an even sheen in fewer coats. Spray the faces with a wide fan using a cross-hatch pattern (opposite)—first with overlapping strokes across the grain, then with the grain—to create a more uniform finish. After it has dried for 45 minutes, flip the top over and use a narrow fan to spray the edges, then widen the fan and spray the top.

Let the sealer coat dry, then scuff-sand it by hand with P320-grit paper. Scuffing should produce fine, dry powder. If clumps of finish stick to the sandpaper, let the finish dry longer. Remove the sanding dust by wiping it down with a damp cloth, then spray on two coats of a water-based clear topcoat (I use water-based acrylic lacquer from Target Coatings), scuff-sanding between each coat. If the last coat doesn't come out smooth or has dry spots, let it dry, scuff it and wipe off the dust again, and spray one last coat across the whole surface.

The table base gets the same number of coats, one sealer and two or three clear topcoats. For the legs and aprons on

NARROW PARTS



Work one side at a time. Spray the inner surfaces of the legs, using a medium-width spray pattern a little wider than the legs.



Then spray the outer face in one pass. Masaschi starts at the bottom of a leg, goes up and across the apron, then down the other leg with a continuous, smooth motion. Then she returns to the apron to spray any remaining dry spots.



Tips for casework

Getting a good finish inside a cabinet isn't always easy, but planning ahead and following a few simple guidelines can really simplify the job.



For tall surfaces, use a horizontal fan. Rotate the air cap to spray tall pieces like this bookcase. Make long, overlapping up-and-down strokes to cover the sides.



Remove obstructions. Taking the shelves out of the cabinet before you spray the interior gives you more space to maneuver the gun inside the cabinet, making the whole job easier.



Spray the shelves flat. Laying the shelves and other loose parts flat for finishing is much easier, and you'll end up with a better-quality finish.



Secret weapon. If you give it your best and still get overspray, let it dry, then rub it away with brown kraft paper. If that's not enough, try #0000 steel wool and wool-lube solution.

this small table, I used a vertical fan; on a larger job with vertical parts like a tall bookcase, it's easier to use a horizontal fan and move the gun up and down. To avoid drips on the legs, dial back the fluid a little. Spray the base one side at a time, first spraying the inner surfaces, then the outer face. Start spraying at the bottom and move up the leg, turn and spray across the apron, then down the other leg in one continuous motion. After spraying all four sides, let the finish dry and hand-scuff any bumps or drips smooth with P320-grit paper or very-fine grit non-woven abrasive pad between each coat. □

Teri Masaschi is a professional finisher in New Mexico and teaches regularly at the Center for Furniture Craftsmanship in Rockport, Maine.

Load the gun with cleaner. Use a solution of one part ammonia and two parts water to clean the gun after spraying water-based finish.



Give it a rinse. Hook up the hose and turn on the turbine for a moment to pressurize the gun, then turn it off and spray cleaner through the gun to rinse it out.



Break it down and wash each part. Remove the air cap, fluid knob and needle, and fluid tip and wash them in the ammonia solution. Wash the gun body too. Wearing nitrile gloves protects your hands from harsh solvents and keeps them clean.



Reassemble and grease the moving parts. Put the gun back together and apply a little petroleum jelly to the needle just in front of the trigger and to the threads of the air cap.

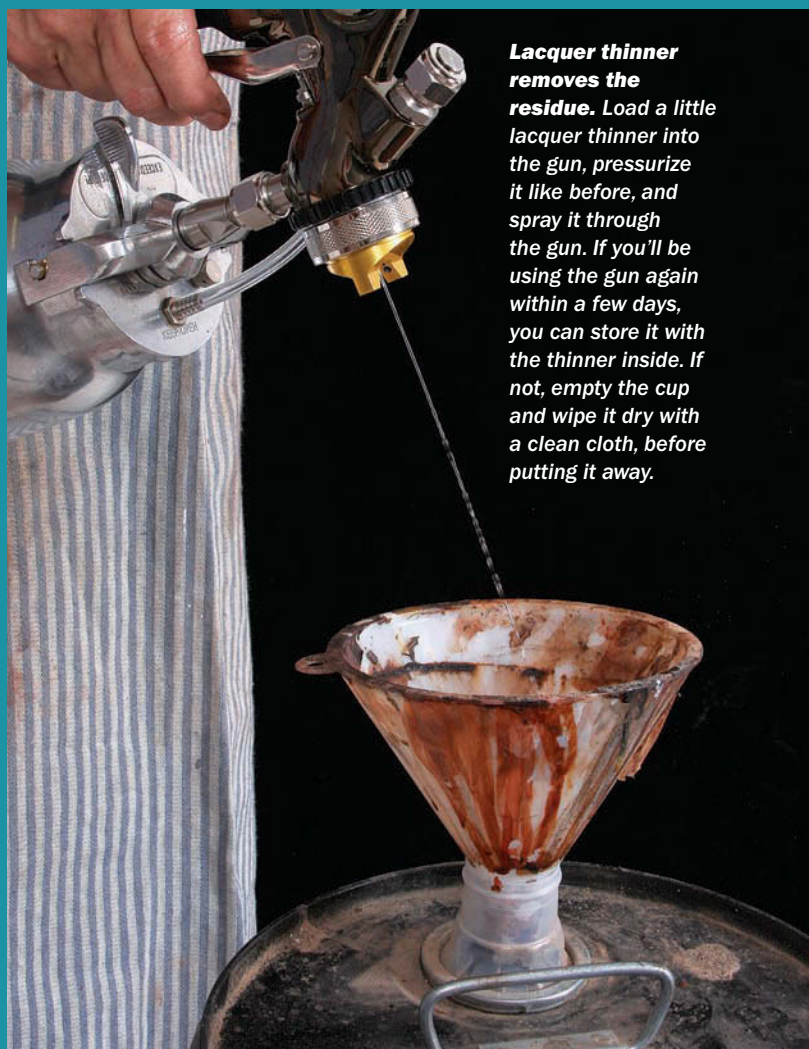


Keep it clean

Cleaning your gun properly after each use is the best thing you can do to ensure stress-free spraying, and will make your sprayer last a very long time. To clean the gun, use a solution of 1 part ammonia and 2 parts water, a clean cotton rag, and a small nylon-bristle brush. Load the gun with the cleaning solution and spray it through the gun. Next take apart the gun, remove the cup, then the air cap, needle, and fluid nozzle, and place them in a small container of the cleaning solution. Wash the cup and gun body by swabbing them with the ammonia cleaning solution, but never submerge the gun body in cleaner. For stubborn dried-on finish, swab the gun with lacquer thinner. Once clean, wipe them dry with a clean cloth. Scrub the air cap, needle and fluid tip, then reassemble the gun and lubricate the needle, air cap threads, and the cup rim with petroleum jelly.

To remove any water and finish residue from the gun, load it with a small amount of lacquer thinner and spray it through the gun for 1 or 2 seconds. Leave the thinner in the cup if you'll be spraying again in the next few days. If it's going to be longer than that, empty the cup, dry it out, and put it away—it will be clean and ready to use next time.

The turbine's intake filter can get clogged with dust and cause overheating, so clean or replace dirty filters. Keep the turbine upwind from the gun and off the floor while it's running—it will pick up less dust that way.



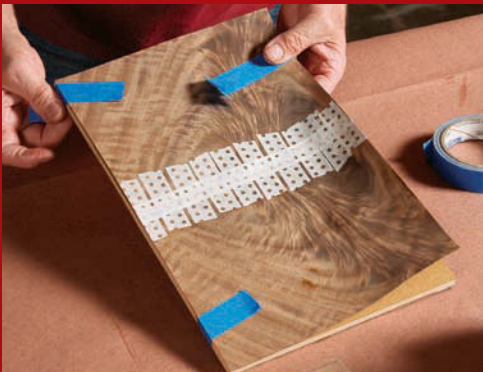
Lacquer thinner removes the residue. Load a little lacquer thinner into the gun, pressurize it like before, and spray it through the gun. If you'll be using the gun again within a few days, you can store it with the thinner inside. If not, empty the cup and wipe it dry with a clean cloth, before putting it away.

Build an Heirloom

Book-matched veneered
top makes this simple
box shine



**LEARN HOW TO VENEER A PANEL
IN THIS ISSUE'S MASTER CLASS, P. 82**



Box

BY BOB VAN DYKE

Boxes are a great place to practice and hone new skills. The materials won't break the bank and you can spend as much or as little time on them as you want. This box project is a great example. With it, you can hone your dovetail skills and learn to cut tongue-and-grooves at the router table. It will also introduce you to working with veneers and bandings, two details that really bring the piece to life.

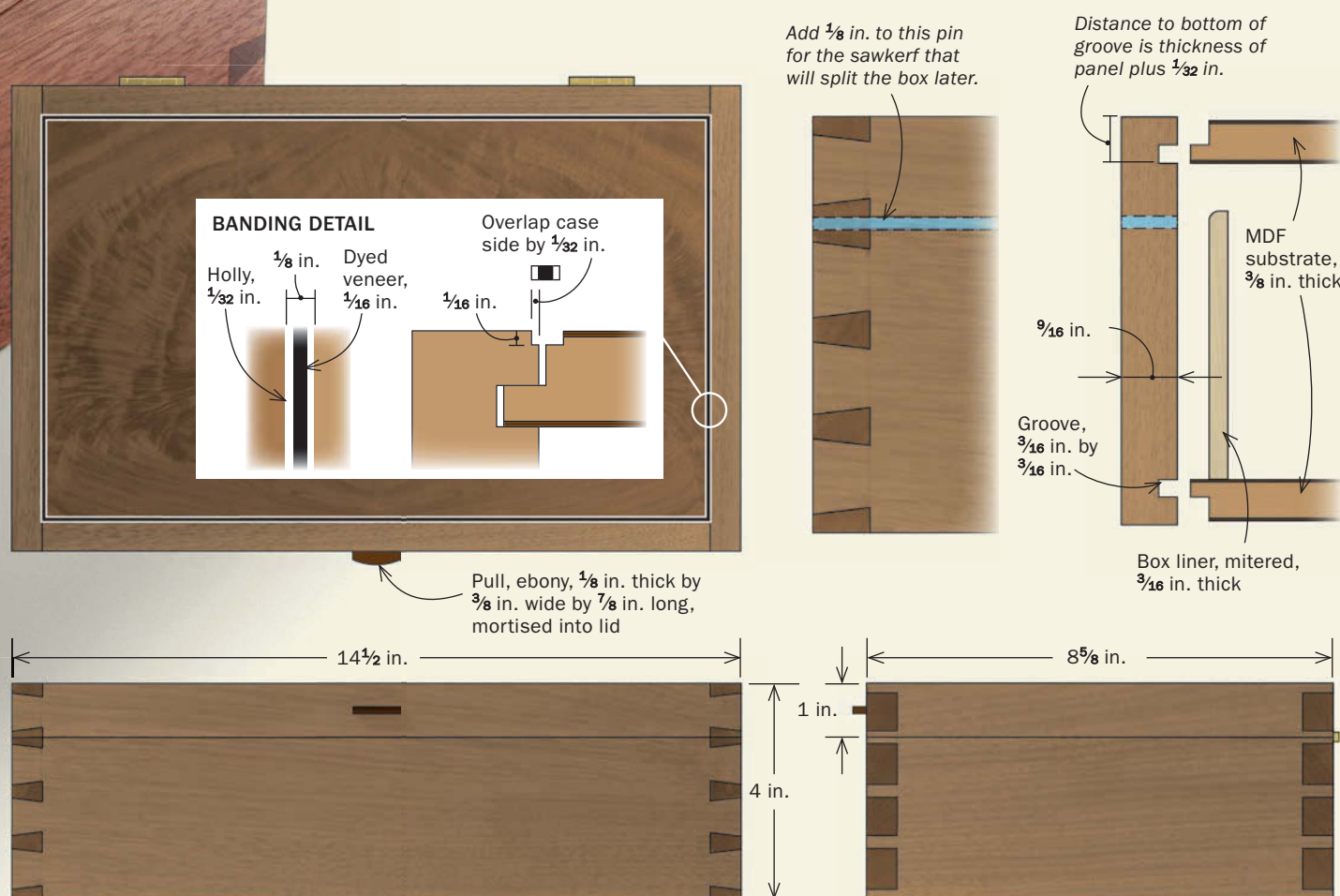
I chose walnut for the case to complement some spectacular walnut crotch veneer I had. Using that veneer for a simple book-match gave me a dramatic-looking panel for the top. Banding frames the veneer beautifully and a pine liner adds a bright, contrasting interior. I'll guide you through putting the box together and show

you some tips for getting the most out of this small project.

Lay out dovetails around the grooves

The case for this box appears to be of basic dovetail construction, but because the top will be sawn off later at the tablesaw, you must provide for the sawkerf when laying it out.

Start by flattening, planing, and cutting the stock to dimension. When laying out the dovetails, be sure to space them so that the tablesaw cut that will separate the top from the bottom falls in the center of a pin. Make that pin extra wide to accommodate the sawkerf. After cutting the dovetails, dry-fit and surface the top and bottom edges with a smoothing plane, taking extra



Dovetail the sides

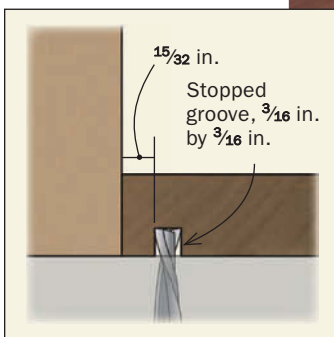
Cut the dovetails. Van Dyke cuts his dovetails at the tablesaw and cleans them up with a chisel. The extra space between the far right tails makes up for the kerf that will be removed later when the box is split.



Level the edges. With the case dry-assembled, use a smoothing plane to make sure the top and bottom edges are smooth and parallel.



Rout the panel grooves. The stopped grooves for the top and bottom panels are cut at the router table. Use stop blocks to control the plunge cut and to avoid routing through the tails.



care to keep them parallel. This is key, to ensure the grooves that come later are not misaligned.

Rout the rabbets and grooves

The veneered top and bottom panels are rabbeted to fit grooves cut into the inside face of each side. Because the distance from the groove to the top edge depends on the thickness of the panel, the panel has to be made first (see Master Class on p. 82 to learn how I make a veneered panel).

To locate the groove, measure the thickness of the panel and add $\frac{1}{32}$ in. That extra $\frac{1}{32}$ in. will leave the solid-wood sides proud of the top, which makes it easier to level the two surfaces later. If the panel were flush with or proud of the edges, trying to level the two could destroy the thin veneer. The grooves must be stopped or they will show. To make these plunging stopped cuts safely, I use the router table with a fence and stop blocks. Square up the ends with a chisel.

With the grooves cut, dry-fit the case again and measure the inside dimensions to get the length and width of the two panels. Add $\frac{3}{16}$ in. to each dimension to allow for the tongue that will fit in the groove.

Fit the panels to the grooves

Now cut the top and bottom panels to size. Make sure to center the veneer seam perfectly when you cut the top. With the panels cut to size, rout the tongue around their edges (you're essentially cutting a rabbet). I cut the tongue at the router table using a $\frac{3}{4}$ -in.-dia. spiral



Fit the panel



Score before routing. Use a cutting gauge to score the show side of the panel. This will help avoid any tearout in the veneer while routing the rabbet.



Rabbet it. To make the tongue on the panel, you need to cut a rabbet all around. Use a router table and a $\frac{3}{4}$ -in.-dia. spiral bit for this cut.



Check the fit. The panel must have a tight, friction fit in the groove. The top edge of the side will be just proud of the panel. The sides will be flushed to the panel later.

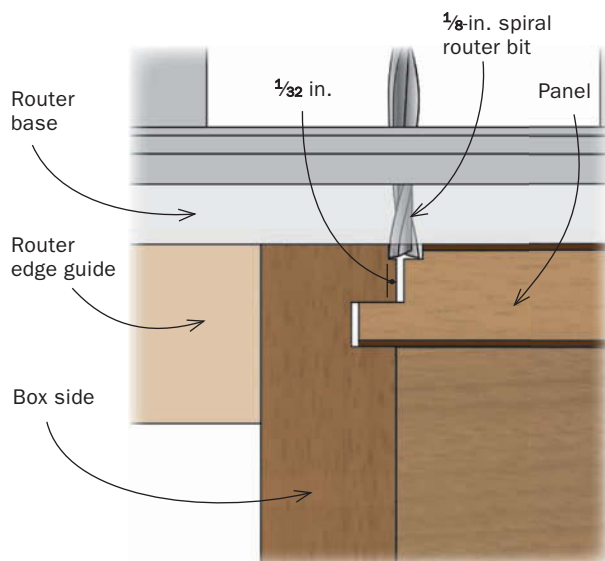
Assemble the case



Softwood cauls are key. Van Dyke uses soft pine cauls placed directly over the tails to protect the box as clamping pressure is applied (left). The softwood will indent around the pins, applying pressure directly on the tails. With the box glued up and dry, rout the sides flush with the top panel (above) using a bearing-guided, flush-trimming bit at the router table.

Add the banding

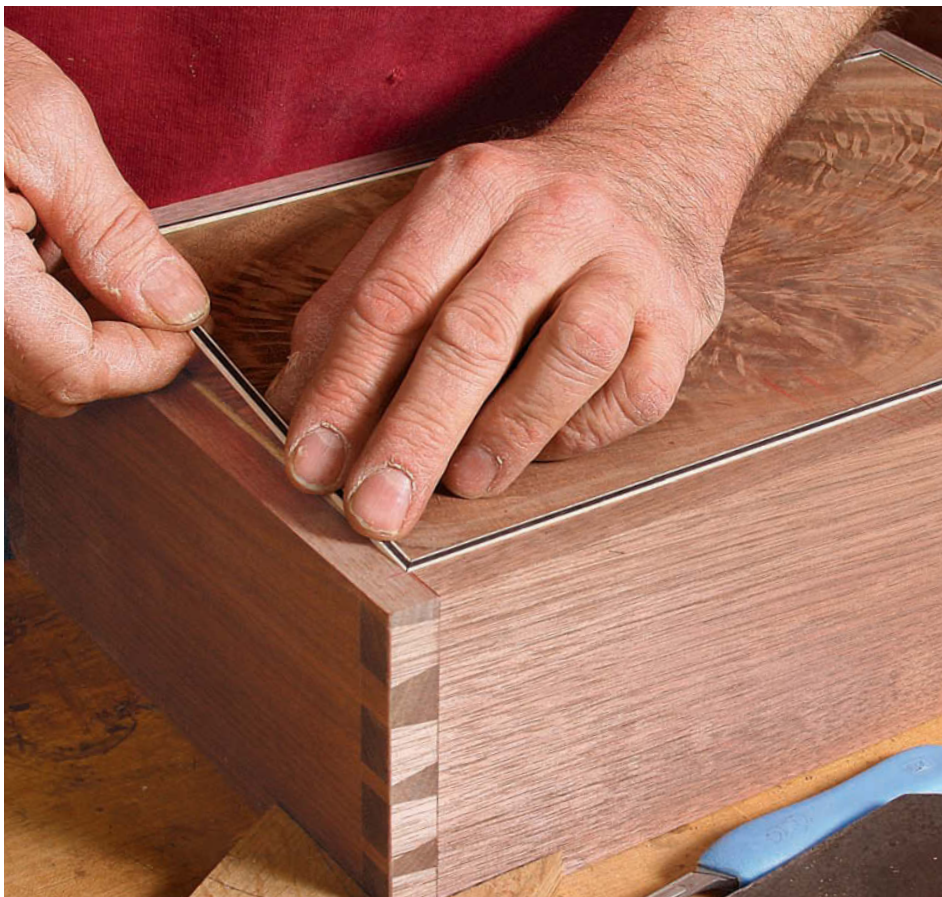
Two-pass routing. After making the banding, rout the groove for it in two steps. The first cut establishes the exterior edge and must fall at least $\frac{1}{32}$ in. on the walnut sides to provide support for the banding. The second cut establishes the interior edge.



Keep things square. Once the routing is done, use a chisel to square up the corners of the groove.



Simple means of mitering. A wooden jig allows miters to be cut with a sharp chisel and a steady hand. A wide chisel and a thin strip of wood keep the banding pressed firmly to the block, providing pinpoint accuracy.



Dry-fit first. To avoid glue-up mishaps, it's important to check the banding's fit before getting the glue. Remove the banding by carefully lifting out the corners with the tip of a marking knife.

bit. Use an offcut from the panel to set up the cut. Once the test piece fits, cut the tongue on the real panels. To prevent the show veneer from chipping during routing, I score a line in the veneer with a sharp cutting gauge. I set the gauge to the width of the rabbet in the test piece. After scoring the lines, rout the rabbet all the way around the show face of both panels.

Test-fit and glue-up

Test-fitting the panels gives you the chance to adjust the fit with a shoulder plane if need be and develop a sound strategy for glue-up, which is always slightly nerve-wracking. When dry-fitting the box, don't put the top and the bottom in at the same time or you might not get the box apart again without hammering.

Do your final surface-prep on all parts and glue up the box, including the top and bottom panels, which don't float. I suggest liquid hide glue for this project because it offers a longer open time and it lets the top and bottom panels slide around in their grooves for adjustment. Yellow glue swells the joints and grabs too quickly. After the glue has dried, level the dovetails using a handplane and then set up a bearing-guided, flush-trimming bit in the router table to level the solid-wood sides that were left proud of the veneered surface.

Banding adds flair, hides gaps

The visible seam between the solid-wood sides and the panel will disappear when you install the decorative banding around the panel. Any banding will work, but I recommend learning to make your own following the simple techniques Steve Latta used

in "Federal Details Transform a Simple Table" (*FWW* #246, p. 67). Set up a trim router to cut the groove for the banding.

Set the depth of cut so the banding sits just a little proud when it's glued in. Position the fence for the first pass so that the bit cuts about $\frac{1}{32}$ -in. into the solid-wood sides and the rest into the veneered top. The second, fitting cut will lie in the veneer surface only. To prevent chipout, I set a cutting gauge to the outside of this final cut and score a line all the way around the top of the box, exactly where the router will be cutting. Test the settings for both the cutting gauge and router on a scrap to be sure the thickness of the groove and its distance from the edge of the work and the outside edge of the banding groove are dialed in correctly. Once I'm satisfied with the banding's fit in the test piece, I rout both passes on the box itself and get ready to install the banding.

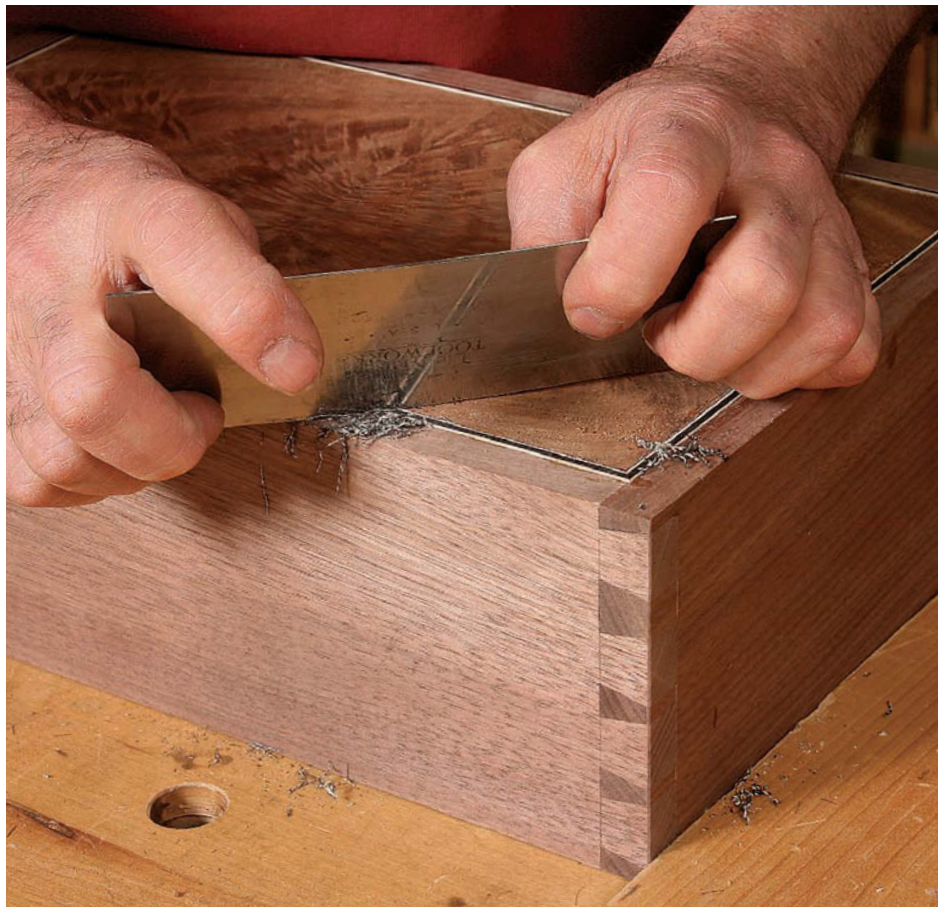
The banding pieces are mitered. Rather than overcomplicate this, I use a sharp chisel and a miter block to get accurate joints. Miter the banding strips all the way around the box. To ensure tight miters, I leave each piece a little long so there is a very slight belly in the banding when I install it. When the banding is pushed into its groove, that little bit of extra length will push into the miter, ensuring a tight fit. When it fits perfectly, glue in the banding with liquid hide glue in the order it was fitted. After the glue is dry, level the banding with a card scraper. Now it's time to open up the box.

Separate the top and add hinges

There are many ways to cut the lid off a box. I use the tablesaw, because it leaves fewer blade marks to clean up. I use a thin-kerf blade set a little higher than the thickness of the box sides. I set



Burnish and level the banding. After applying glue to the groove and installing the banding sections, work the belly out of the banding with the back of a chisel (above), smoothing from the center toward each miter. This pressure will close up the miters for a seamless joint. After the glue dries, a card scraper makes quick work of leveling the proud banding with the rest of the box top (right) without harming the book-matched panel.



Cut away the lid



Off with the top. Van Dyke prefers using the tablesaw to remove the lid because it leaves behind a clean, square surface (above). Once three of the four sides are sawn, place a spacer whose thickness matches the blade width halfway down (right). Squeeze the top side of the box as it passes the blade. When the cut is complete, the lid will pop off the bottom.



the fence so the blade will cut right in the middle of the wide pin near the top. Before I make the cuts, I make a wood spacer a little longer than the length of the box and a hair thinner than the width of the kerf the sawblade will make.

Cut three faces of the box. Before cutting the last, put the spacer into the kerf about halfway down the box. Because the lid is squeezed during the last cut, as soon as it's free the spacer forms a fulcrum point and the top snaps out of the way of the blade, preventing any scarring from the blade's teeth.

Clean up any sawmarks with a handplane or card scraper and then lap the edges on sandpaper glued to a piece of glass to make the mating surfaces flat and straight. This will ensure that there are no gaps when the lid and base are put together.

I prefer the stop hinges from Brusso. They hold the top at a slight angle past vertical and are an excellent quality. Take extreme care to mortise accurately for the hinges. Sloppy hinge installation will skew the top when the box is closed.

A mitered wood liner finishes off the inside of the box. I use $\frac{3}{16}$ -in.-thick pine and rip the stock about $\frac{1}{4}$ -in. wider than the depth of the box. The liners are not glued, but held in place by a friction fit. Once they're fitted, round over the outside top edge with a small roundover bit buried in a router table fence. This way the fragile mitered ends don't get damaged.

The finish is up to you, but I find that these boxes are a perfect place to learn or practice traditional French-polishing techniques with shellac. After a final rubout, your box is ready to hold any number of treasures. □



Hinges and liner. Brusso brass hinges and a mitered pine liner finish off the box. The liner is held in by a friction fit and left unglued.

Bob Van Dyke is the director of the Connecticut Valley School of Woodworking.



Build Lighter, Stronger Furniture

I think many woodworkers forget how strong wood truly is, especially the hardwoods. This leads them to make furniture that is unintentionally stout and heavy. Muscular furniture can be attractive, but I prefer the grace of pieces that are visually more delicate. To achieve that appearance, I take advantage of the wood's strength, designing in a way that pares down the physical and visual weight of a piece without compromising its strength. It's an economical way of building where each joint and every part is used to its full potential to strengthen the piece as a whole.

Through the years I've developed several strategies for building light and strong. One way to shed visual weight without los-

Use thin parts and innovative joinery
to make light, durable pieces

BY GARRETT HACK

be stronger—make the top and bottom shoulders of a tenon smaller, for example. I'll explain these strategies and a few others. Of course, I don't use every one in every piece of furniture that I make, so I'll show you four different pieces and explain how I was able to make each one more delicate and graceful without compromising its strength.

Garrett Hack is a contributing editor.

ing strength is to make a part thin and wide rather than thick. You can also minimize the number of parts in a piece by making one part do many jobs rather than having many parts that do one job each. Or you can replace one big

part with two or more smaller ones. Another approach is to redesign the joinery to

A wide taper on its underside makes a top appear thinner.

Make a rail look thinner by chamfering or cutting a bead on its bottom edge.

Make skinny stronger

Case pieces have many parts, such as drawer rails, that have only one visible edge. These parts can be made to look more delicate by making them thinner. To maintain their strength and stiffness, make them wider. As you never see the part's width, this doesn't affect the case's visual weight. Casework can also be made stronger by integrating the parts more effectively. This might mean creating a better connection between drawer rails, runners, and guides, or using the guides and runners to reinforce the connection between the case front and sides.

GO THINNER AND WIDER

Kickers, dovetailed to back apron and tenoned to front rail, tie front to back. They also get screwed to top to add rigidity to case.

Sliding dovetail locks divider to rail.

Thin, wide top rail helps tie front to case side.

Screw drawer rails to top to add racking resistance and stiffness to case.

Arched cutout in divider allows drawer guide, which is glued to bottom runner, to extend over top of rail, making rail-to-runner joint stronger.

Tenon joins drawer runner to rail.

Rail's beaded front edge appears thin and delicate, but is plenty strong.

TIE THE FRONT TO THE SIDE

Runner is tenoned to rail and glued to guide, and both are glued and screwed to case side.

Bottom rail is joined to leg with double tenon, but also wraps around back of leg, where it's mortised for drawer runner.

Get more muscle from joinery

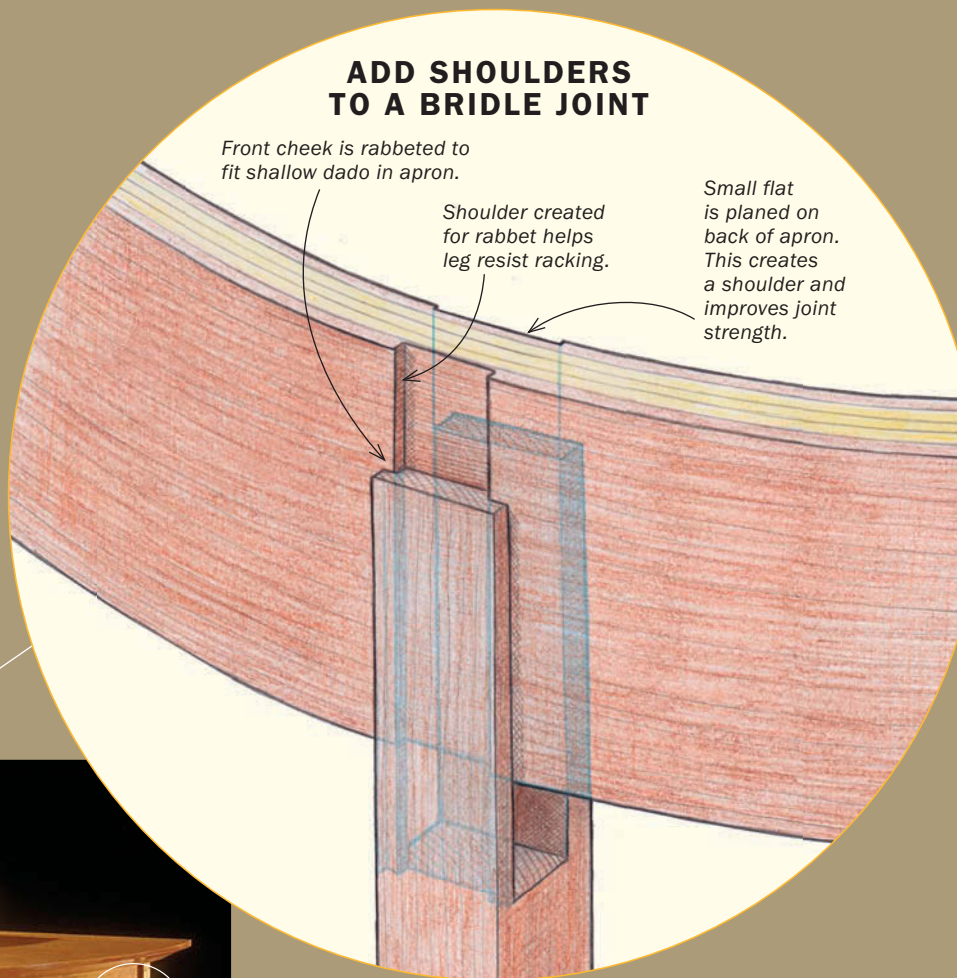
Sometimes all it takes is a slight change to greatly improve a joint's strength. For instance, add shoulders to a bridle joint and it resists racking much better. And if the joinery is stronger, the parts it joins can be lighter.

ADD SHOULDERS TO A BRIDLE JOINT

Front cheek is rabbeted to fit shallow dado in apron.

Shoulder created for rabbet helps leg resist racking.

Small flat is planed on back of apron. This creates a shoulder and improves joint strength.

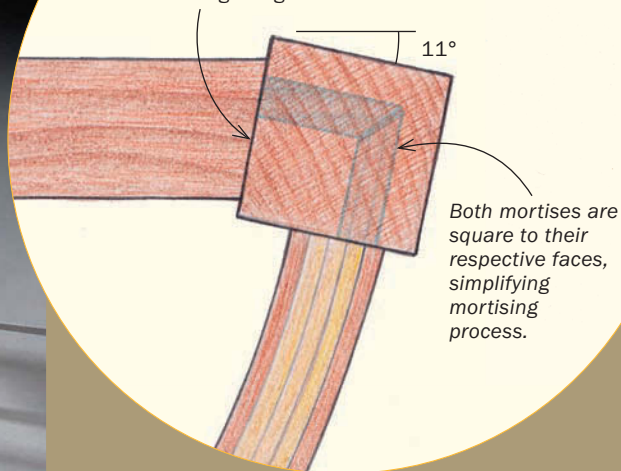


Glue cock beading to apron edge to add strength without adding mass to apron.

Use string inlay on legs to give them a longer, finer appearance.

ROTATE LEG

Rotating back leg slightly creates a stronger joint between curved front apron and leg because tenons have straighter grain.



Force one part to do many jobs

An effective way to shed visual weight from a piece of furniture is to reduce the number of parts in it. Instead of having one part for each job, make one part do several jobs.

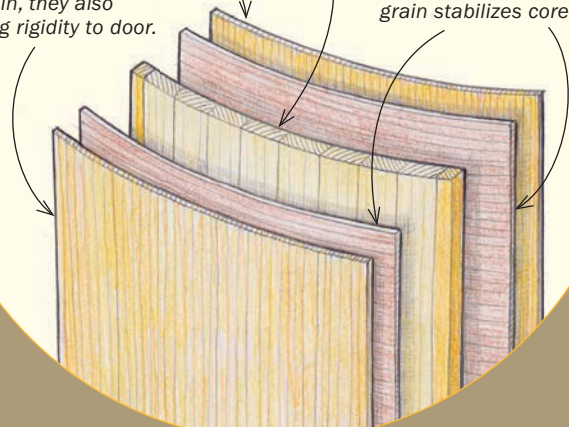
Not only does center shelf serve as top rail of drawer pockets, but it's also integrated with shell and legs, adding strength to case.

MAKE A CURVED DOOR STRONGER

Show veneers aren't just for looks. Glued parallel to core's grain, they also bring rigidity to door.

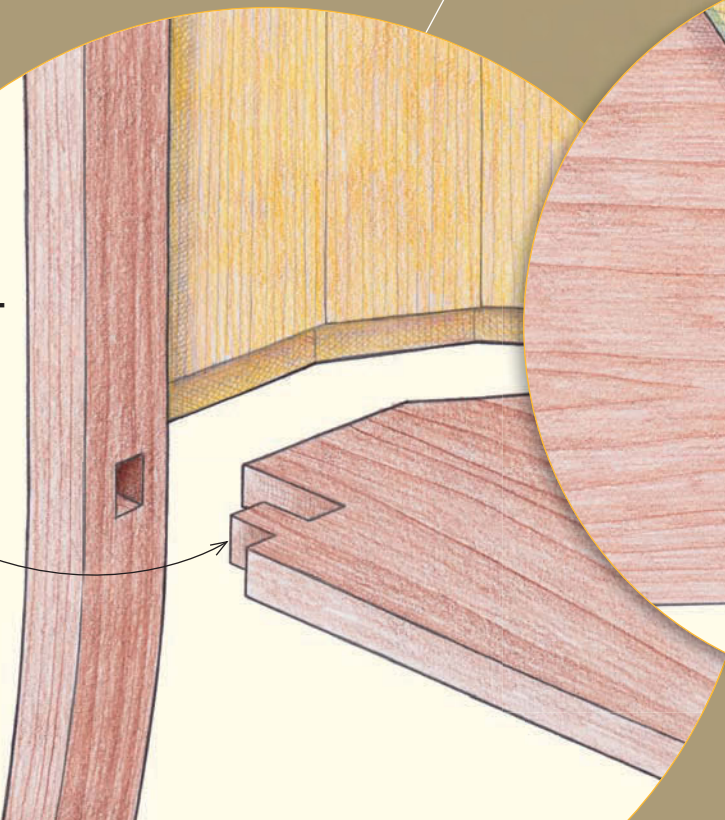
White cedar makes a lightweight core.

Veneer glued with its grain 90° to core's grain stabilizes core.



CABINET BOTTOM WORKS AS RAIL

Bottom is tenoned to leg, locking together two front legs, like a rail.

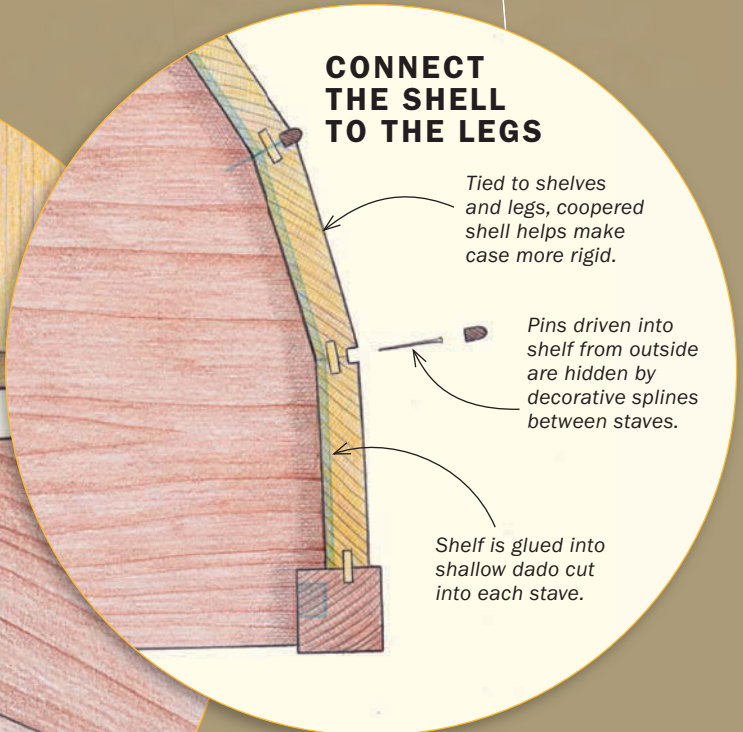


CONNECT THE SHELL TO THE LEGS

Tied to shelves and legs, coopered shell helps make case more rigid.

Pins driven into shelf from outside are hidden by decorative splines between staves.

Shelf is glued into shallow dado cut into each stave.

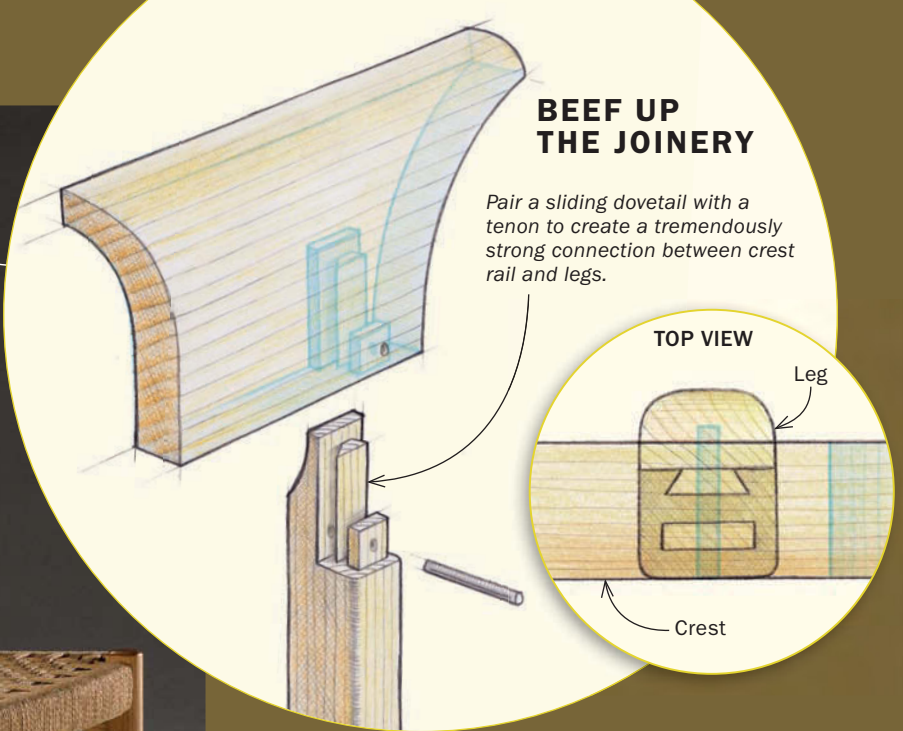




Lumbar supports, back seat rail, and crest are all light parts but work together to make a strong and stiff "backbone" for chair.

BEEF UP THE JOINERY

Pair a sliding dovetail with a tenon to create a tremendously strong connection between crest rail and legs.

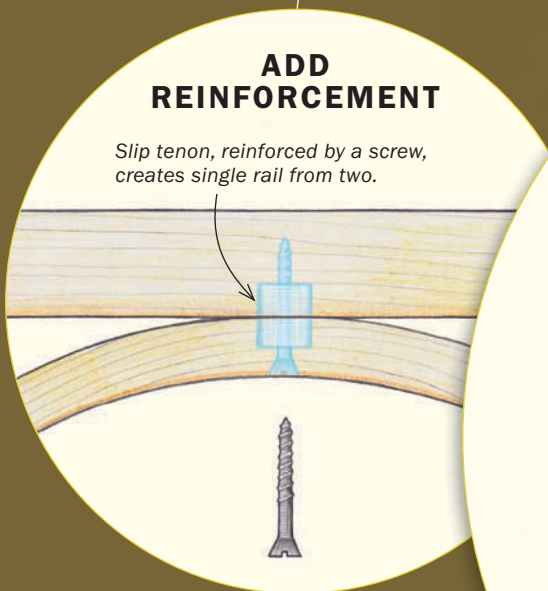


Make lightweight parts carry a bigger load

A joint's strength doesn't come from the overall mass of the parts it holds together. Use this to your advantage by breaking up a single part into two (or more) smaller ones. Two narrower aprons are just as strong as one wide one as long as they are spread apart far enough.

ADD REINFORCEMENT

Slip tenon, reinforced by a screw, creates single rail from two.



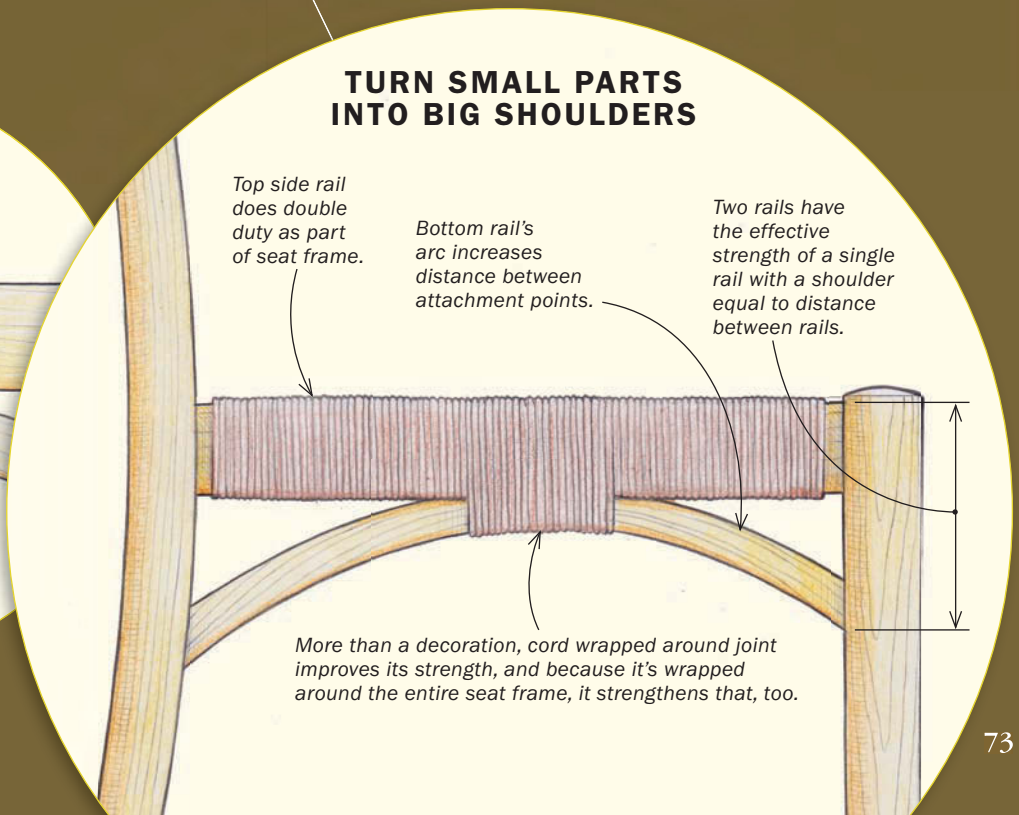
TURN SMALL PARTS INTO BIG SHOULDERS

Top side rail does double duty as part of seat frame.

Bottom rail's arc increases distance between attachment points.

Two rails have the effective strength of a single rail with a shoulder equal to distance between rails.

More than a decoration, cord wrapped around joint improves its strength, and because it's wrapped around the entire seat frame, it strengthens that, too.



readers gallery

LONNIE BIRD

Dandridge, Tenn.

Bird designed this Federal-style serpentine chest for a class to be taught at his woodworking school (lonniebird.com). "The abundance of curves makes this chest highly sculptural in form," he says. The deep, exaggerated curved front terminates beyond the drawer fronts with angled case corners. All of the details combine to make for a challenging project.

FLAME MAPLE AND POPLAR,
20D X 39W X 35H



WANDA KRAIKIT

San Francisco, Calif.

Kraikit's bench is the first personal project she completed after attending woodworking classes for a year. The square leg frames are joined with hand-cut dovetails. Cutouts in the bench seat allow the exposed frame portions to be used as handles when moving the bench around her apartment.

HICKORY AND WALNUT, 14D X 50W X 18H

Photo: Joe Schopplein

Submissions

Readers Gallery provides design inspiration by showcasing the work of our readers. For submission instructions and an entry form, go to FineWoodworking.com/rg.



CHARLES GRIFFITH

Pound Ridge, N.Y.

This piece is based on a Shaker table at the Philadelphia Museum of Art and built from a single board of curly maple. To enhance the extreme figure, Griffith used aniline dye followed by a few coats of a mixture of tung oil, boiled linseed oil, and urethane.

CURLY MAPLE AND POPLAR, 18D X 28W X 27H

JASON DAKIS AND MARTIN GOEBEL

St. Louis, Mo.

Fit to a nook in the entry of a client's home, this geometric cabinet was designed to frame the organic door panel, creating a focal point to bring warmth to the piece. "It's a whimsical piece that didn't really need to hold anything. It just needed to make people happy as they entered the home," Goebel says.

BLACK WALNUT, ELM, AND ZIRICOTE, 17D X 32W X 64H

Photo: Noah Alexander



PETER SERAPHIN

Hinsdale, Ill.

Using wood harvested from his father-in-law's central Illinois farm, Seraphin created this six-piece table with curved, interlocking triangle tops and diamond-shaped legs. The pieces can be separated and rearranged (right). "This is one of my first projects in this new hobby," says Seraphin. "I was inspired by a piece I saw on the British version of *Antiques Roadshow*."

WALNUT, 42 DIA. X 18½H



ARTISTRY IN WOOD SHOW: 2014

The Sonoma County Woodworkers Association hosted its 32nd annual Artistry in Wood show last fall and, as always, it featured work by some of the region's finest woodworkers. Here are a few pieces that caught our eye.

JOSHUA SMITH

Fort Bragg, Calif.

"I designed this piece as an up-to-date, cozy rocker for the fireside," Smith says. His use of pillowed surfaces and chamfers, elbow-lapped double tenons, and woven cord maximized the strength, stability, and comfort of the chair.

CLARO WALNUT AND DANISH CORD, 34D X 26W X 32H

Photo: David Welter



SCOTT CLARK

Santa Rosa, Calif.

After turning this bowl from green wood, Clark let it dry and left the contours caused by wood movement for a more natural form. He created the basket-weave texture using a homemade high-temperature branding device, then accentuated the pattern with acrylic gesso and tint.

SWEETGUM, 8 $\frac{7}{8}$ DIA. X 4 $\frac{1}{2}$ H

Photo: Tyler Chartier

KENT ODELL

Benicia, Calif.

Inspired by the French Art Deco movement and the work of Émile-Jacques Ruhlmann, Odell's dressing table was designed with a flip-top lid and interior storage. "The most interesting part of the build was coopering the urn base at the back and shaping the stave legs."

BUBINGA, HOLLY, AND POPLAR, 16D X 44W X 38H



CASEY MOFFIT

Fort Bragg, Calif.

Moffit built this sideboard during his first year at College of the Redwoods. While the exterior is madrone, the case sides are madrone-veneered spalted curly maple, which is left visible on the interior. The madrone pulls were especially difficult: "I must have made 30 of them before I arrived at the five I needed for the piece."

MADRONE AND MAPLE, 16D X 43W X 28H

Photo: David Welter



JAMES MEINDERS

Fort Bragg, Calif.

This end table was designed to showcase Meinders's favorite domestic hardwood, black locust, the beauty of end grain, and the beauty of mathematics. The top was designed around a modified Penrose tile pattern and contains pentagons, a theme that is echoed from the top to the five-sided post and five splayed feet.

BLACK LOCUST, 29 DIA. X 30H

Photo: David Welter



CHUCK QUIBELL

Santa Rosa, Calif.

Quibell decided to turn this presentation bowl after acquiring a particularly amazing piece of burl wood. "The bowl form let me display the fantastic grain of the burl as well as the coarse, natural surface along the edge."

BIG-LEAF MAPLE BURL, 13½ DIA. X 6H

Photo: Tyler Chartier



SCOTT BORSKI

Petaluma, Calif.

The simple form of Borski's coffee table was inspired by the curved edges of a log harvested from a Sonoma County ranch. The center void left by the book-matched slab top is filled with a piece of polished, pitted steel. "I wanted the most corroded piece I could find. Once polished, it perfectly mimicked rippling water."

CLARO WALNUT AND STEEL, 37D X 77W X 16H

Photo: Tyler Chartier



Make your own dowels

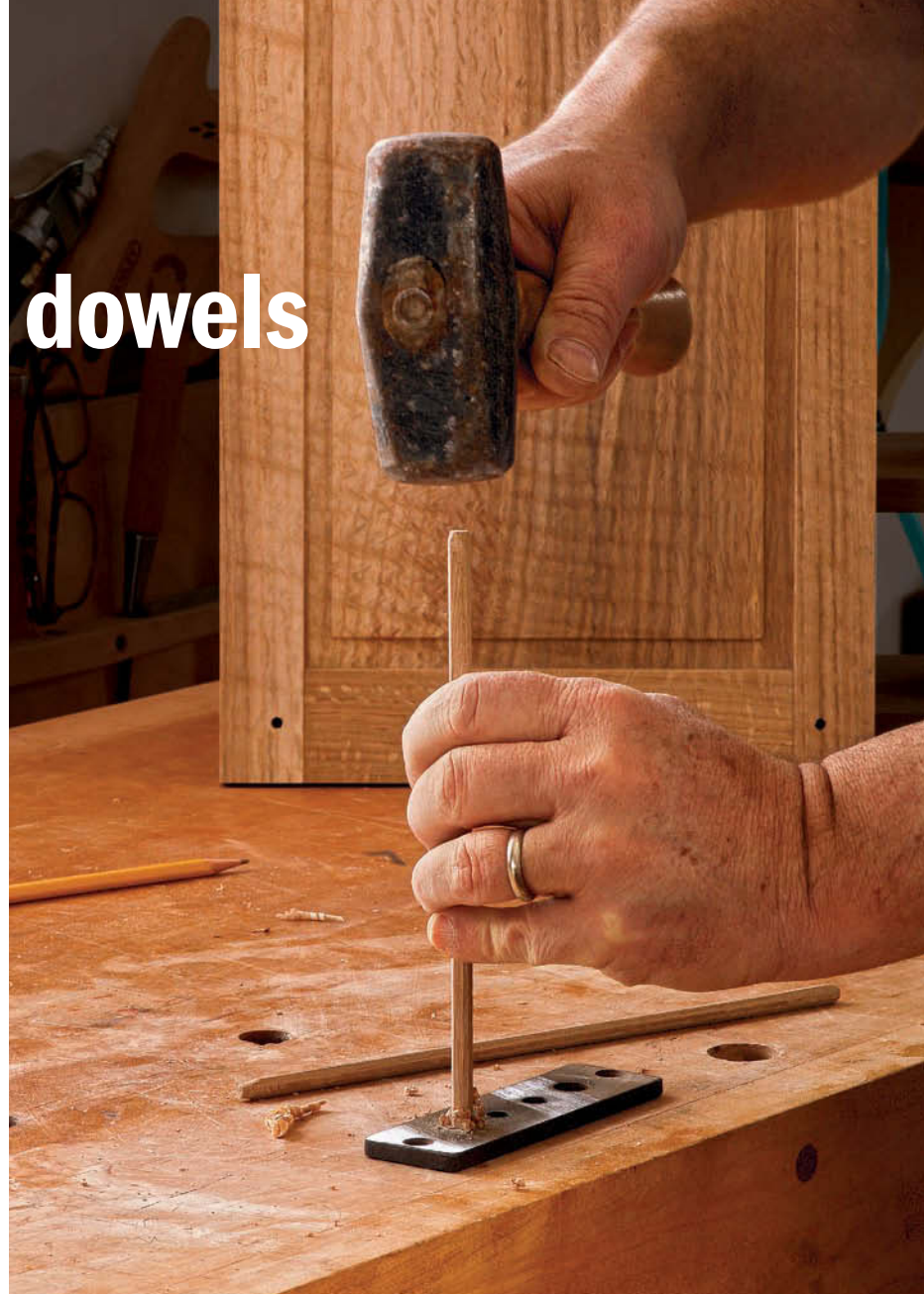
WITH A DOWEL PLATE, YOU CAN CUSTOMIZE THE SIZE AND SPECIES TO MAKE STRONGER, PRETTIER PEGS

BY MICHAEL PEKOVICH

Because the furniture I make is heavily influenced by the Arts and Crafts movement, I cut a lot of mortise-and-tenons, and peg the joinery to add strength and visual pop. I'm always in need of dowel stock to make the pegs. Store-bought dowels are fine, but they come in only a few species, and if you don't have what you need on hand, work stops until you get it. That's why I began making my own. With a dowel plate, it's a snap to bang out a few dowels whenever I need them, in whatever species I choose.

Making a dowel might seem simple: Pound a stick through a hole. But there are a few potential pitfalls—broken pegs being the worst. Through the years, I've learned some tricks that help you to avoid these headaches. I'll show you my techniques so that you, too, can end up with nicely formed dowels.

Michael Pekovich is a furniture maker, instructor, and FWW's executive art director.



Places for pegs

Sure, a joint reinforced by a peg is stronger than the same joint without one, but that's not the only reason to peg joinery. Even when made from the same wood as the joint, there's just enough contrast from the end grain to sound a quiet decorative note.



FLUSH IS ELEGANT

A pegged tenon is easier to execute and just as strong as a dovetail for joining drawer rails to a case side.



TOGETHER FOREVER

A drawbored joint is pulled and locked together as the peg is driven home, making the joint ideal for hard-to-clamp assemblies like big table bases.



PROUD BEAUTY

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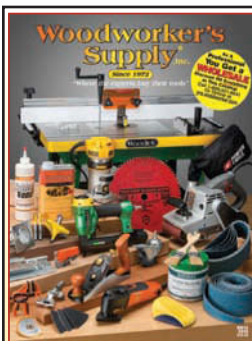
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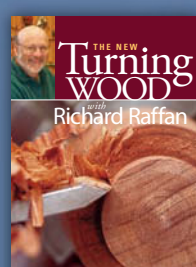
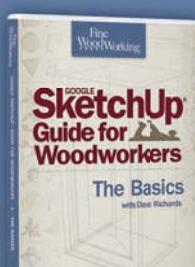
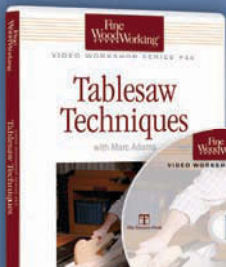


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Making a dowel

USE STRAIGHT-GRAIN STOCK

Runout—grain that flows out to a board's edge—in the blank causes it to split when you pound it through the dowel plate or, even worse, when you're driving the peg into the joint. Resaw the peg blank so you get stock with straight grain. The blank should be as close to the dowel's final diameter as possible.

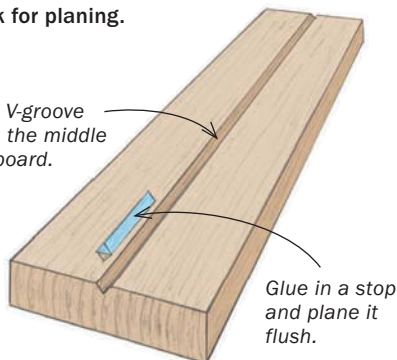


Cut parallel to the grain. A pencil line along the grain suffices as a guide (left). Clean up the newly cut edge with a handplane. To account for the blade's rough cut, rip the blanks just a hair over the final diameter (above).

EASE THE CORNERS

The sharp corners of a square blank get rolled up and jam when the blank is driven through the plate's round hole. To prevent this, chamfer the corners with a block plane first. A jig holds the small stock for planing.

Cut a V-groove down the middle of a board.



Jig holds the blank. A V-groove in the jig turns the blank 45°, standing the corner up for planing. Flatten the corner, but don't get too aggressive. If you plane too far, the dowel will have a flat side.



POINT BOTH ENDS

Sharpened to a blunt cone, the leading tip starts more easily than a square one, while the tapered trailing end leaves the plate more cleanly.



Tapers result in better dowels. Use a pencil sharpener to create a blunted point on both ends (left). This ensures that the blank will be centered in the hole when you begin (center). Also, as the blank exits the plate, the waste breaks off easily at the taper.



Tips for installation

CUT IT FLUSH

The trick to perfectly flush pegs is cutting them cleanly without damaging the surrounding wood. Here's how to do it.

Get it close. Protect surfaces with P400-grit or finer sandpaper. The fine paper is thin, so there's very little peg waste left. Also, fine grits don't scratch the surface.



Trim flush. Pare the waste with a freshly sharpened chisel. Take it all in a single pass.

SET IT PROUD

Hammers aren't delicate tools, which makes it hard to drive a bunch of pegs so they are all the same distance above the surface. Fortunately, there's a jig for that.

Round the exposed end. Pekovich uses P400-grit sandpaper on his benchtop.



Cut the peg short. This way it doesn't bottom out in the hole before you drive it to the correct depth.

Two tools for dowels

To make your own joinery pegs, you'll need a dowel plate. My now-vintage plate is no longer sold, but both Lie-Nielsen and Veritas sell a tool for making dowels. I've tested both, and they performed well. If you need just a size or two, the Veritas Dowel

Former (\$12 for the plate, \$10 per insert; left) is the tool for you. If you'd like to make a wide range of sizes ($\frac{1}{8}$ in. to $\frac{5}{8}$ in.), the Lie-Nielsen dowel plate (\$55) is a great value.

—M.P.



Perfectly proud. Drill a hole in the end of a block that's as deep as you want the peg proud. Use it to knock in the peg.

Book-matched veneer panel

AN EASY WAY TO START ADDING VENEER TO SMALL PROJECTS

BY BOB VAN DYKE

Some of the finest furniture made features spectacular book-matched crotch or burl figured panels, exquisite marquetry designs, and sunburst patterned tabletops, none of which would be possible without the use of veneers. Becoming an expert in veneering is a lifelong endeavor, but you have to start somewhere.

In this master class, I'll introduce you to the basics by showing you how to make a beautiful book-matched panel (used in my box project on p. 62). For small panels like this, you don't need a lot of equipment, just the veneer, a veneer saw, and some cauls and clamps. A mirror is handy, too, for laying out the pattern. Once you master working with veneer on a small scale, I'm sure you'll be eager to take on bigger projects.

The design possibilities are endless, but your first foray into veneers should probably be a simple one. Using two sheets of veneer for a simple book-match is an excellent way to add veneer to any project. Almost any veneer with figure can yield



Flatten first



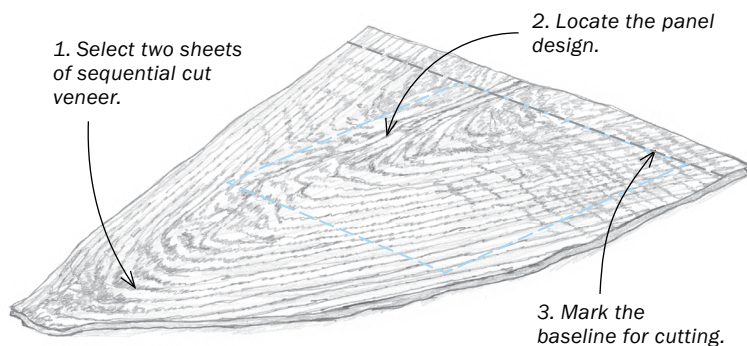
Hose them down. Apply a heavy coating of flattening solution across both faces of each sheet of veneer and stack them for pressing. Van Dyke places the consecutive sheets on the clamping platen with a few pieces of blank newsprint in between each sheet.



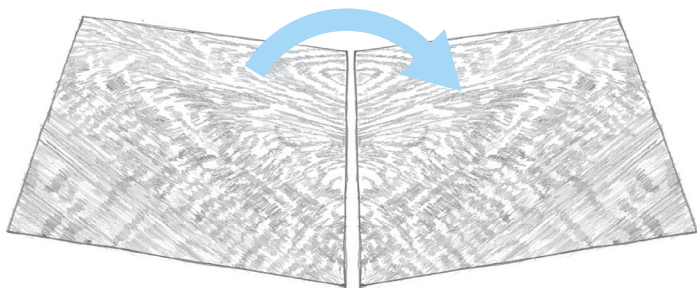
Apply some pressure. A few clamps are enough to tame the wavy veneer. Change the newspaper a few times a day over the course of two days, or until the veneer is no longer cold to the touch.

Decide on the show veneer

THE BASIC BOOK-MATCH



Cut the panels oversize and flip for a book-matched pattern.



a striking book-match, but one of my favorites is walnut crotch, which I used for this panel.

A book-match consists of two consecutive sheets of veneer stacked on top of each other, cut to size, and then opened like a book. It's perfect for a show face, but a less-spectacular piece of veneer will do for the hidden back side of the substrate.

Buying veneer is inexpensive compared to the equivalent solid stock, but it can be hard to find the right veneers. The best are usually available only from specialty veneer companies and the best source is probably online. Some websites have the actual flitch pictured and it's important when ordering to specify that the leaves must be sequence-matched.

It's best to buy at least one more sheet than you'll need and buy the thickest veneer you can—more than $\frac{1}{40}$ in. is ideal. Many veneers sold today are thinner than that and are very hard to work with. Veneer, especially a highly figured sheet, does not come ready to use; you usually have to flatten it.

Flatten the veneer

For a book-matched panel, you'll need at least two sheets of face veneer and a single sheet of veneer for the back side. Keep in mind, it takes a few days to flatten the veneer.

Before flattening, number the sheets and be sure to keep them in order throughout the process. Spray both faces of each sheet with a veneer-flattening solution (GF-20, veneersystems.com). Let this stand for 20 minutes, then stack the wet veneer sheets with a few sheets of blank newsprint in



Mirrored view. Two pieces of mirror taped together help you visualize potential matches in the veneer. A couple strips of scrap pine can be used to section off the actual size of the panel, giving a better view of how the book-match will look.



Mark out the cuts. Once the match has been selected, Van Dyke marks out the book-match seam and the edge perpendicular to the seam. A red pencil makes the marks stand out on the dark walnut veneer.

between them. Put the entire package between $\frac{3}{4}$ -in. melamine cauls, clamp it firmly, and let it sit.

Replace the wet paper a few times a day for two to three days until the veneer is no longer cold to the touch. It's easier to keep the treated veneer flat if it stays in the clamped cauls when not being worked on. With the veneer flattened, select two sequenced sheets to begin designing the book-match.

Mirror reveals a perfect match

To help visualize the book-match, I use a couple of mirrors taped together—about 8 in. by 10 in. is a good size. For a simple book-match, place the mirrors upright on the veneer stack, in the approximate place of the glue seam. The reflection will show you the match. To help visualize



VIDEO SERIES

Bob Van Dyke demonstrates traditional veneering techniques in a three-part members-only series.

Cut and tape the veneer

the panel, use a couple of scraps of wood to outline the finished panel. Remember, it's doubled along the length by the mirrors, so the sticks to mark out the long sides are half-length. When you're happy with the match, mark a line against the mirror. This will be the seam of the book-match. To determine the bottom and top edge of the panel, use an architect's triangle to draw a line perpendicular to the mirror.

Cut the sheets

With the match drawn out, double-check that sheets are exactly aligned, one on top of the other, so they can be cut to size. To do this, pick a grain line or mark and make sure that it does not migrate diagonally to the next sheet. If it does, move the top sheet so that the grain lines on both sheets are parallel to each other. Rough-cut both sheets at the same time. Check for square with the edge of the panel and, using a veneer saw and straightedge, cut both sheets at least 1 in. oversize.

Now, open the sheets along the seam to see the match. If you lined them up correctly, the match should be close to perfect. If it's not, slide one sheet over the other until the joint lines up better and draw a new line. Cut one sheet on that line, put the two pieces back together, and cut the joint again—parallel to the new cut you made and about $\frac{1}{8}$ in. away from it. When you get the grain match you want, turn the sheets over and butt them together on the bench to prepare them for glue-up.

Preparing for glue

To get the veneer ready to be glued, I use a combination of the standard crinkled blue painter's tape and traditional veneer tape to get a seamless glueline. Cut a handful of pieces of blue tape about 4 in. long and fold over the ends to make a removal tab. Starting in the middle of the back of the sheets, put a piece of tape on one sheet, pressing down on the first sheet and then carefully pulling the sheets together with the tape. Press the tape onto the mating sheet and repeat with the other pieces of tape. The tape stretches and acts as a clamp, stitching the sheets together.

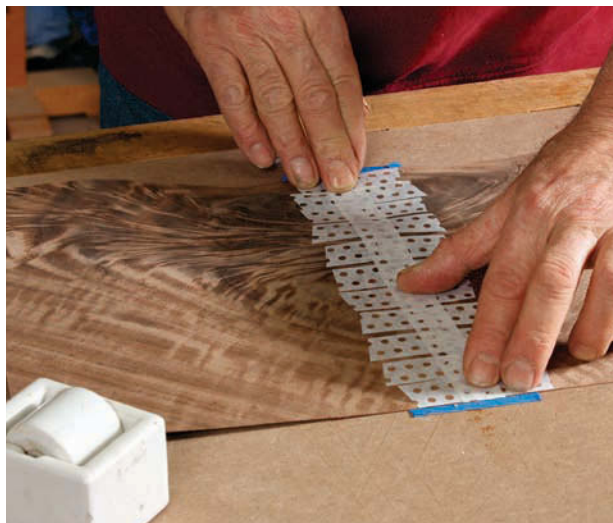
Now turn the taped sheet over and do the same on the show face using veneer tape. The veneer tape is activated by water and must be moistened before applying it. After the stitching, I usually put



Rough out the veneer. With the two sheets for a book-match stacked and aligned, use a veneer saw and straightedge to rough out the pieces. The straightedge must be wide enough to register the veneer saw fully.



Tape brings it together. After lining up the grain for the match, stretch blue tape from one side to the other to bring the seam together tightly. Folding the ends of each strip makes removal much easier.



Flip it over for more tape. With the blue tape on, flip the sheet and apply veneer tape to the other side, stretching it over the seam horizontally. A final strip of veneer tape down the seam helps reinforce it even further. Once it's set, flip it back over and remove the blue tape.

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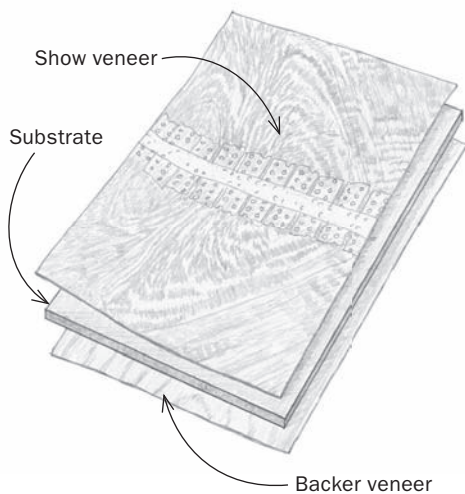
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Glue the panel

VENEER FRONT AND BACK



Roll out the brown carpet. Roll a healthy coating of liquid hide glue on the substrate for the panel (left). The coating has to be even and full to avoid dry spots. After both sides are loosely taped in place on the substrate, put the panel in the cauls for clamping (right).

a longer piece of veneer tape along the length of the joint to further reinforce the stitched pieces. When the veneer tape is dry, carefully remove the blue tape from the other side. To avoid pulling the veneer apart, pull up the blue tape diagonally, keeping the tape close to the surface. The veneer's now ready to be glued to the panel.

Get the glue going

Start by cutting the MDF substrate and the taped veneer about 1 in. oversize. When sizing the veneer to the MDF, make sure the seam stays in the middle and is square to the edge.

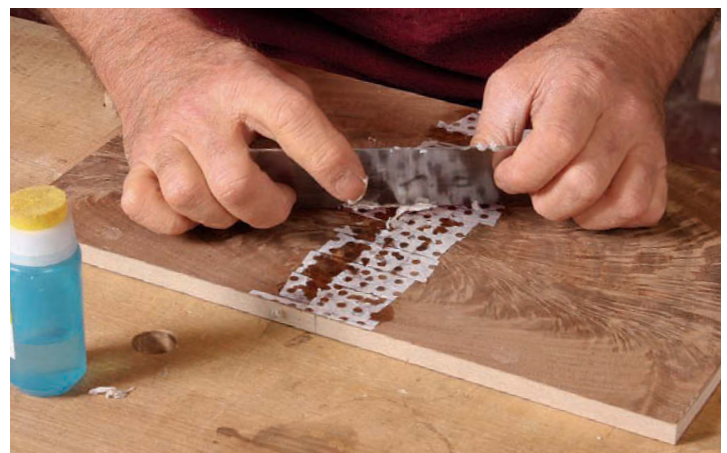
Set up two 3/4-in.-thick glue cauls that are about 1/8-in. bigger than the panel all around. To keep glue off the cauls, line the inside faces with clear packing tape. I apply the liquid hide glue with a roller, which is fast and easy. Set up a way to suspend the roller when not in use; otherwise, it will stick to the surface you lay it down on. Roll an even layer of glue on one side of the MDF and place the veneer. A single, thick layer on the substrate is more than enough. Turn the assembly over and repeat for the inside face. Tape the corners of the assembled panel so it doesn't shift and place it between the cauls. Put the assembly on two blocks and add the clamps, starting from the middle. Let the panel dry for at least 24 hours before removing the clamps.

The finished panel

When the panel comes out of the clamps it will have glue squeeze-out and rough edges. Strike a straight line about 1/4 in. from the bottom edge, perpendicular to the glueline. Using the tablesaw with an L-fence, cut on the line. Joint that edge and rip the panel to final width. Now mark the center of the top and lay out the two end cuts, keeping the seam in the middle. Cut to those lines, step back, and admire your work. □



Keep an even keel. The panel should see even pressure across the cauls, so using numerous clamps is advantageous even on a small panel. Give the panel 24 hours to cure before removing the cauls.



Scrape it clean. To make the veneer tape easier to remove, Van Dyke wets it with an envelope moistener and then uses a card scraper to gently scrape away the remnants.

Bob Van Dyke is the director of the Connecticut Valley School of Woodworking.

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how they did it

The craft of coopering

STAVES AND A HOOP
MAKE A WATERTIGHT VESSEL

BY JONATHAN BINZEN

Carl Swensson's staved vessels (Back Cover) are inspired by the traditional milking buckets of Swiss cooper Ruedi Kohler (*FWW* #40). To make this faceted version, Swensson first makes a tapered, smooth-sided bucket, then disassembles it to continue shaping the staves. Getting the staves just right is a challenge, but Swensson says that making the interlocking hoop (p. 90) is

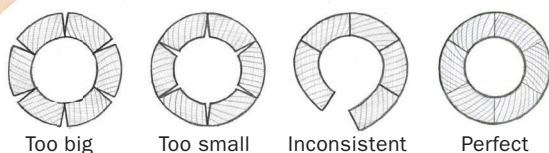
Staves

1 MITER AND SHAPE THE STAVES

Try the miters. After cutting the stave to length and planing the outside face convex, Swensson shoots the miters on an inverted try plane. Next, he scoops the inside face with a cooper's drawknife. Then he drills for a pair of locating pegs in each joint.

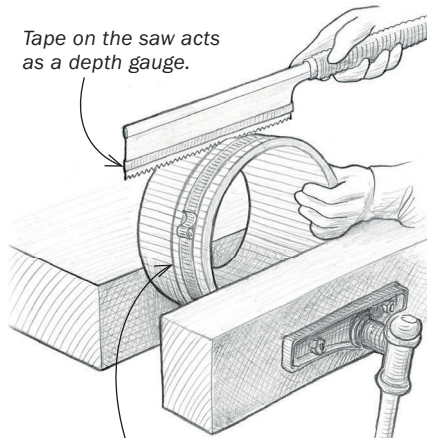


SIZE STAVES FOR A PERFECT CIRCLE



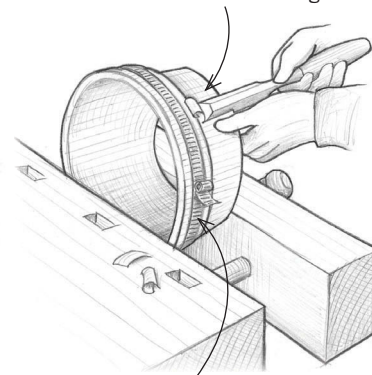
2 CUT A RELIEF FOR THE HOOP

Tape on the saw acts as a depth gauge.



After dry-assembling the staves with a temporary strap, Swensson cuts a kerf around the bucket using a handsaw.

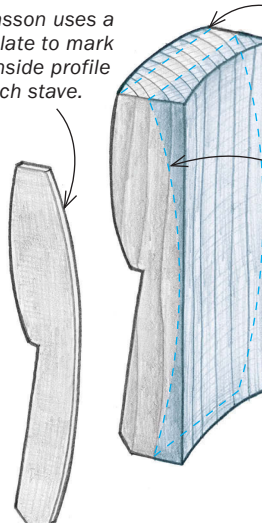
Working from the bottom of the bucket to the sawkerf, Swensson chisels a flat to receive the hoop. He smooths it with a sanding belt.



After moving the strap, he will plane this area cross-grain to a convex shape.

3 SEPARATE THE STAVES FOR FINAL SHAPING

Swensson uses a template to mark the inside profile of each stave.



To give the vessel its faceted look, he planes the area above the hoop relief until the circumference curve is flattened out.

He planes to this line, working cross-grain.



Reassemble. After shaping, Swensson dry-fits the staves, again using the locating pegs and temporary strap.

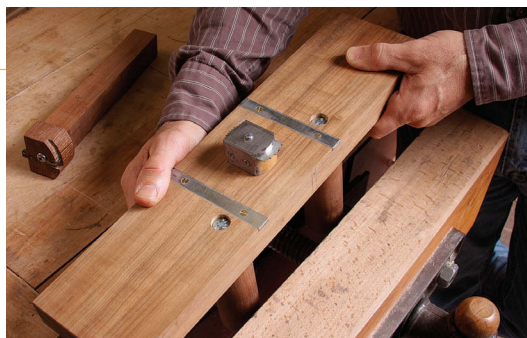


how they did it continued

Bottom

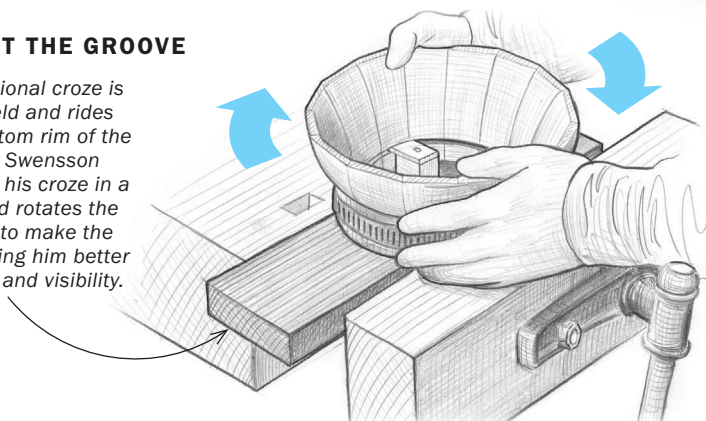
Custom groover.

To cut the groove, Swensson uses his version of a cooper's croze. First he cuts two kerfs, then switches to a cutter that cleans the waste between them.



1 CUT THE GROOVE

A traditional croze is handheld and rides the bottom rim of the bucket. Swensson clamps his croze in a vise and rotates the bucket to make the cut, giving him better control and visibility.

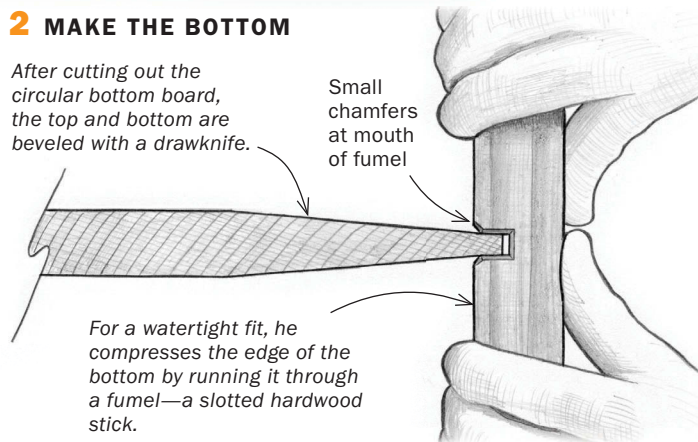


2 MAKE THE BOTTOM

After cutting out the circular bottom board, the top and bottom are beveled with a drawknife.

Small chamfers at mouth of fumel

For a watertight fit, he compresses the edge of the bottom by running it through a fumel—a slotted hardwood stick.



Hoop

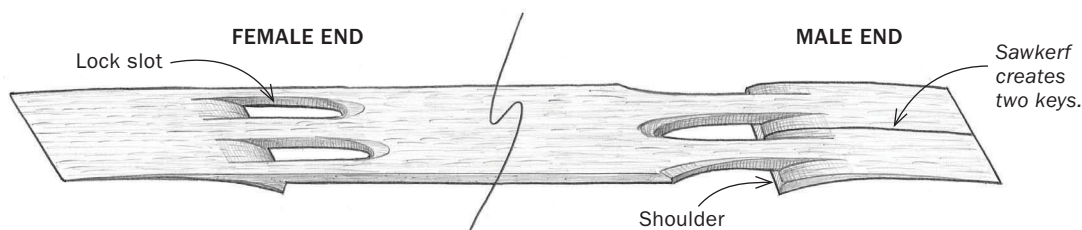
1 SUPER LIMBERING

Spiral bending turns the hoop into a wet noodle. After soaking and then steaming the hoop, Swensson bends it to a tight spiral, then flips it and bends it the other way.



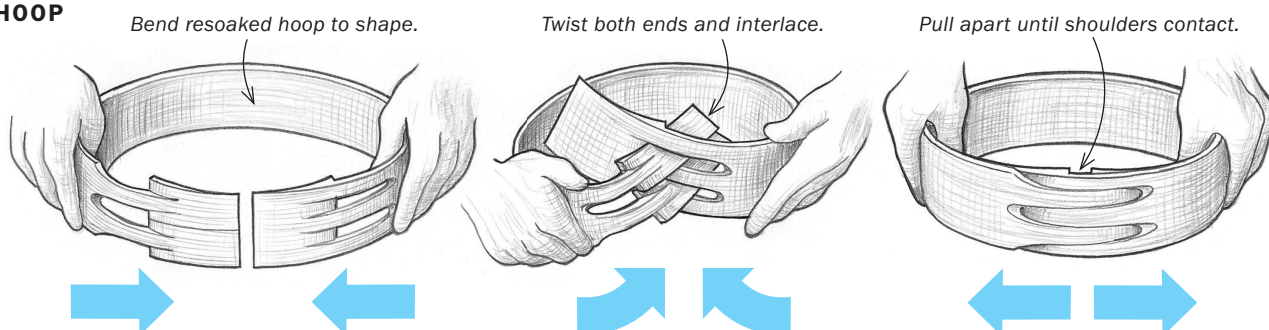
2 DOUBLE ARROWLOCK

The interlocking joints are cut after the hoop has been limbered. Swensson tapers the inside face of the hoop across its width to match the 3° flare of the hoop relief.



3 WEAVE THE HOOP

With the joints cut, Swensson soaks the hoop to fiber saturation and laces the double lock together. Once on the bucket, the hoop is pegged in place.



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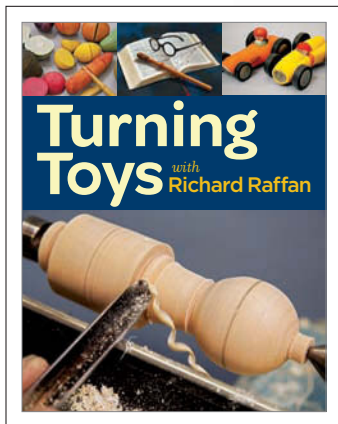
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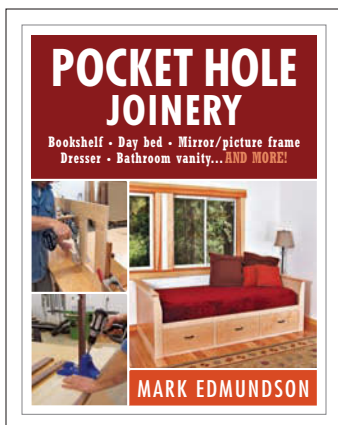


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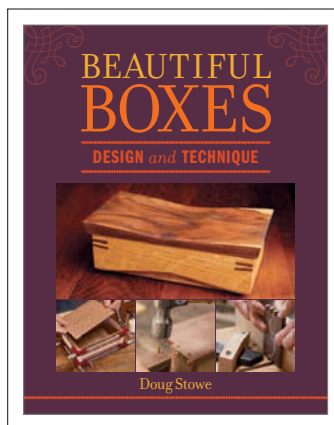


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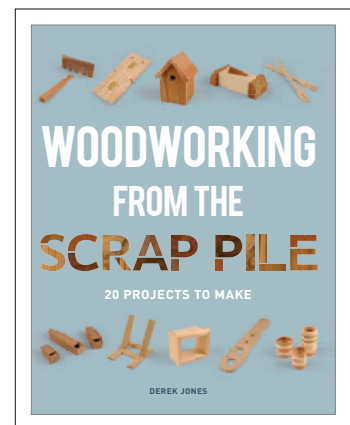


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A Cooper's Learning Curve

Carl Swensson, who works wood in a modest basement shop in Baltimore, has skills of remarkable depth and diversity. He learned Japanese woodworking well enough to be invited to build the doors for a traditional post-and-beam temple in Kofu, Japan. He's helped build wooden tracker organs—some of the largest and most complex of musical instruments—and made masterful Danish Modern rockers, Arts and Crafts cabinets, greenwood chairs, and Swedish bowls and spoons. But of all the things he's made, the most vexing was a humble Swiss milking bucket (top right). “Superficially,” he says, “it's kind of simple. But underneath that it's a very sophisticated piece of woodworking.” Making the staves went well, but the hoops were a hair-puller, and he endured one failure after another. He dropped the project for a decade, picked it up and failed again. When he finally figured it out, having amassed a bulging sheaf of notes and sketches, he began building vessels of his own design. About the monumental struggle to build a bucket, Swensson seems almost pleased. “I'm an experimental woodworker,” he says. “I find hard things and see if I can do them.”

—Jonathan Binzen



Photo: John Tetreault



How They Did It Turn to p. 89 to see how Swensson builds one of his coopered vessels.



Watch an audio slideshow covering the astonishing range of Swensson's craftsmanship.