

TAUNTON'S

Fine Woodworking

Distinctive details
for boxes, p. 32



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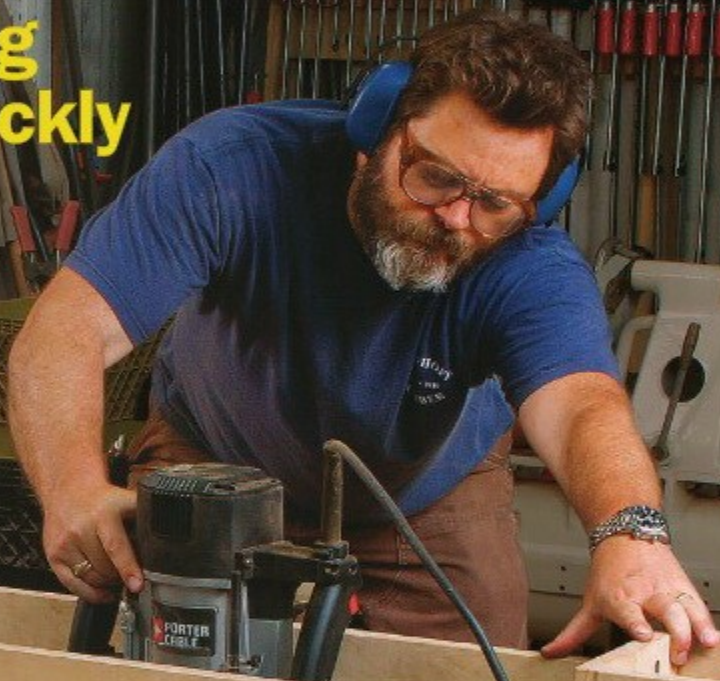
The simple secret
to smooth handplaning

Tool test:
Sanding disks

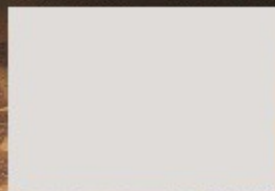
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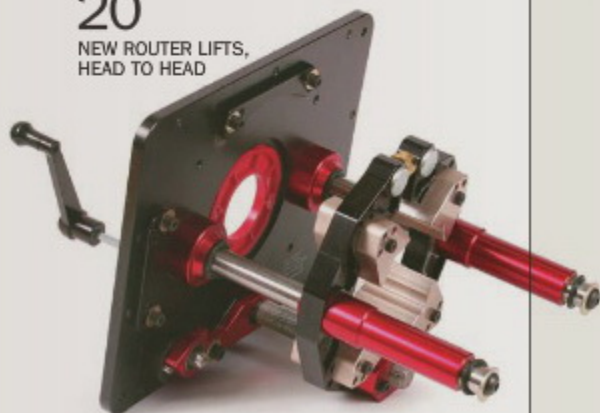
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Back Cover

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on the web

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VIDEO:

Talking Shop with a Sitcom Star

Find out why Nick Offerman of NBC's *Parks & Recreation* is more at home in the shop than on the set.

AUDIO SLIDE SHOW:

Building from the Bottom Up

Furniture maker Geoffrey Warner successfully marries live-edge tabletops with stout bases that celebrate the craft of joinery.



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Consulting Editor	Jonathan Binzen
Methods of Work	Jim Richey

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Web Producers	Ed Pirmik Lisa Morgan
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contributors

Acting and building have always gone hand-in-hand for **Nick Offerman** ("Level Big Slabs in No Time Flat"). He grew up working on a farm in Illinois. His devilish wit led him to the University of Illinois, where he studied acting and set design. Later, in Chicago, he traded scenery-building services for small parts in plays. And those brought him finally to Los Angeles, where he built decks, timber-frame cabins, and Nakashima-style furniture between jobs as a character actor. At age 38, Offerman got his big break as the deadpan Ron Swanson (right) in *Parks & Recreation*, now in its fourth season on NBC. But when the camera stops rolling, Nick still heads for his L.A. woodworking shop, where he and four part-timers turn out beautiful furniture from big slabs of distinctive wood.



Andy Beasley ("Tool Test: Sanding Disks") is a longtime tool reviewer for *Fine Woodworking* and other publications. When he's not in his Colorado Springs shop, Beasley can be found in the cockpit of his experimental RV-3B airplane, performing acrobatic routines or taking long, scenic flights to out-of-the-way airports. **Strangest project?** "With company coming to our unfinished home, I had a day to build and install four temporary doors on the guest rooms. I used sheets of rigid foam framed with wood, turned the knobs on the lathe, and fashioned latches on the bandsaw."

As a child, his favorite toy was Lincoln Logs, and **Danny Kameath** (*Master Class*) has been making things ever since. He went to college to study sculpture but ended up with a portfolio that landed him a job and a 24-year career in advertising design. But woodworking continued to beckon. He's been a full-time woodworker since 2004.

What do you do when not woodworking? "When I'm not in the shop I like to travel with my wife Carol, hike, climb, fly-fish cold mountain streams for trout, and run."



When **Doug Stowe** ("Distinctive Box Details") got an old Shopsmith for his 14th birthday, his path as a woodworker was clinched. He turned pro in 1977 and now lives on a wooded hillside in Eureka Springs, Ark. He teaches woodworking to grades 1 through 12 at nearby Clear Spring School and writes about his woodworking adventures at wisdomofhands.blogspot.com.

What was your most unusual box? "I made a voodoo box with a place for a small voodoo doll and pins. I had been visiting in New Orleans and was inspired. The doll didn't work."

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

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

Fine Woodworking

Advertising Senior Vice President **Stephen Giannetti**
sgianetti@taunton.com

Advertising Director **Peter Badeau**
203-304-3572
pbadeau@taunton.com

Senior National Account Manager **Linda Abbett**
203-304-3538
labbett@taunton.com

Associate Account Manager **Kali Lepak**
203-304-3530
klepak@taunton.com

Advertising Sales Assistant **Diana Mackey**

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Spotlight

ISSUE NO. 221

September/October 2011

p. 40

BENCHTOP SANDERS VS. HAND TOOLS

I enjoyed the articles in FWW #221 by Phil Lowe, Jeff Miller, and Garrett Hack demonstrating effective hand-tool use. In the same issue, Roland Johnson made the case for "Why You Need a Benchtop Sander." Who needs three more benchtop machines when an investment in a few basic hand tools and skills lets you do the same things and more, just as quickly, with better control and finer results?

—STEVE BRANAM, Ayer, Mass.

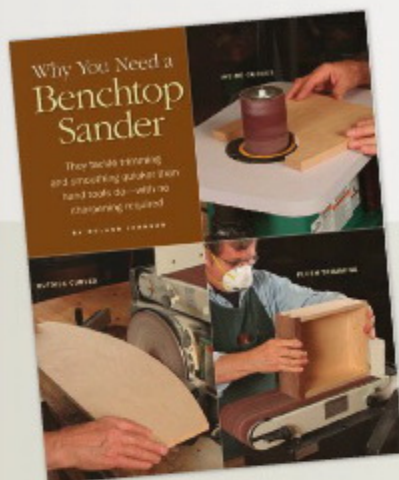
Just because there are many right ways to do things does not mean that there are no wrong ways. Before my grandfather died, I managed to pick up a little of his vast wisdom about woodworking. He referred to himself as a "joiner," and had worked in the Weehawken, N.J., maritime repair shop of the New York Central Railroad for 50 years (barges and tugboats were used to carry railroad cars and equipment across the Hudson River, and tugboat interiors could be stunning with all their brass and mahogany). One of the things I recall him saying is that abrasives should be used to smooth wood, not to remove wood.

I am not saying that I have never violated this precept—benchtop sanders play important roles in my shop. But it is a good thought to keep in mind. Materials

have their natures and tools have their design and their uses, and these things should be understood and respected.

—JOHN DOUGHERTY, Edgewater, Md.

A mix of hand and power-tool techniques. In FWW #221, we not only showed how and when to use a benchtop sander (above), but we also showcased hand skills, as in the Handwork department (left), where Philip Lowe demonstrated a few lesser-known chisel tricks. Our goal is to help readers work efficiently while achieving flawless results, whether by hand or machine.



Do table leaves need latches?

I've been studying Michael Fortune's interesting article, "Finest Way to Expand a Table" (FWW #220), and I notice there is no hardware to secure the table halves in the closed or expanded position. That could be a problem if someone decided to pull the ends while having dinner.

—HARRY BRITTAIN, Walkersville, Md.

Michael Fortune replies: I initially shared your concern and installed latches on my early butterfly-leaf tables, including one for my own house. But the latches weren't used—by my wife or my clients. And none of the old butterfly-leaf tables I've encountered had locking hardware. However, if you do opt for a latch, there are four at leevalley.com that will work well.

Does digital mag spell the end for print?

Since you are starting to post a digital facsimile of the magazine online for members (for a free preview, go to FineWoodworking.com/pages/digital-issue-220.asp), does that mean that the print version is on the way out? I'm a member of the website, and I really enjoy the benefits. That said, I still love getting the magazine.

—CHUCK SCHILLING, Vacaville, Calif.

Editor replies: For me, and for the majority of our readers, nothing can replace paper, at least not yet. But some have requested a paperless version of the magazine. For the rest of us, until engineers come up with an affordable e-paper that can display dozens of full magazine spreads instantly at full-scale with sharp resolution AND can be carried conveniently, dropped by accident, covered with sawdust, turned into a

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The Taunton Press
63 South Main Street
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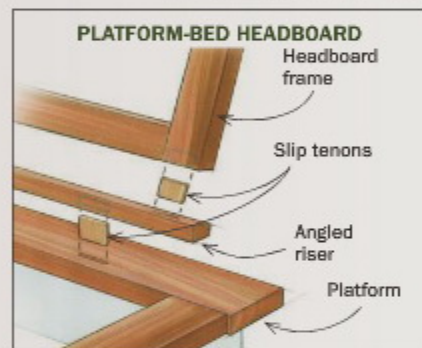
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coaster, and tossed on a shelf for easy reference for decades to come, the print version of your favorite magazine is safe. I don't see the web as a competitor to the magazine, but an invaluable companion. It sets woodworking in motion, connects readers with authors and editors, puts our 35-year archive at your fingertips, and lets us present a far wider range of content that will fit between the front and back covers of the magazine.

Supporting a headboard

In "6 Ways to Build a Bed" (FWW #220), it looks like the headboard of Robert Spangler's platform bed is connected by just two slip tenons. That seems insufficient to me.

—MIKE SHANIN, Waikoloa, Hawaii



Robert Spangler replies: Sorry for the confusion. The detail view showed only two slip tenons (one up and one down). There are actually four up and four down total (each tenon is $\frac{3}{4}$ in. thick and 2-plus in. long), and the angled piece that separates the upper part of the headboard from the lower part is glued along both of its edges as well. I have used this approach many times in various versions and it is rock solid.

Use Schedule 80 pipe for steam boxes

I have made and used several steamers made from PVC pipe, like the one in "Methods of Work," FWW #221. They worked great. But with extended use at

200°, the PVC pipe eventually softened and distorted, and every six months or so I had to make a new one. I finally solved that problem by making one from Schedule 80 plastic pipe, the gray type used in construction for hot water and low-pressure steam lines. I have been using my "Schedule 80 steamer" for five years now, with no sag or distortion.

—NORM FUSS, Williamsburg, Va.

Cover photo was reversed

While I understand the visual issues involved, it was still weird to read Christian Becksvoort's description of constructing his built-in from left to right, and then see reversed photos of the piece on the cover and first page of the article.

—RALPH KATZ, Ann Arbor, Mich.

Take light passes when routing mortises

In "Straightforward Joinery for Curved Work" (FWW #221), Jeff Miller says he routs mortises in very shallow passes: "perhaps $\frac{1}{32}$ in. each." So a $\frac{1}{2}$ -in.-deep mortise would take 16 passes! Does he really go that slowly?

—GARY FELSER, Baltimore, Md.

Jeff Miller replies: I do indeed take passes that are $\frac{1}{32}$ in. deep, more or less. I've found that a bit taking a deeper pass will deflect slightly, leaving a larger mortise and a rougher side wall. Shallow, light passes are the answer. But I change the depth by feel, so the work goes quickly.

Only pros in the Readers Gallery?

Is it me or has Readers Gallery become free advertising for pro woodworkers? I thought that department of the magazine was supposed to be for the small-time hobbyist and small business as opposed to people in the upper end of the market.

—RICHARD KILLIAN, Celbridge, County Kildare, Ireland

Editor replies: The goal of the Readers Gallery is to inspire readers and equip them with new design details and project

ideas to try. Only so many examples of fine woodwork make it into the other articles, and the Gallery allows us to get 10 or 12 more into every issue. That's it. We look at hundreds of submissions, and pick the pieces that are the most beautiful and inspiring, yet still within the reach of most readers. We don't place much stock in who made each piece, except when we occasionally spotlight the work of nonprofit clubs and competitions. As for advertising the work of pros, they tell us they don't sell many pieces to fellow woodworkers!

Camellia oil not tested against the best

FWW #221 (Q&A) lauds camellia oil as the best rust preventer. The ideal rust inhibitor not only leaves a substantial, long-lasting film on the metal surface, but also penetrates the surface and displaces moisture. If moisture isn't removed it will continue to create corrosion. Camellia oil doesn't displace existing moisture—only seals it in, leaving a light film. The author says he has compared camellia oil to WD-40 (a light film that evaporates rapidly), 3-in-1 oil (a light film that does not displace moisture), and also LPS-1 and LPS-2 (dry lubricants that are not rust inhibitors). There are better options. He did not try LPS-3, which is designed as a rust preventer and moisture dispersant, with a surface film rated to last two years. Another ideal rust inhibitor is Boeshield T-9, which also displaces moisture, and leaves behind a dry waxy surface.

—RICHARD O. BYRNE, Staunton, Va.

Editor replies: Some hand-tool users might be bothered by a slippery or waxy surface on their tools. But we'll do a head-to-head test of LPS-3, Boeshield T-9, and other rust inhibitors and see if camellia oil still comes out on top.



About your safety

Working wood is inherently dangerous. Using hand or power tools improperly or ignoring standard safety practices can lead to permanent injury or even death. Don't perform operations you learn about here

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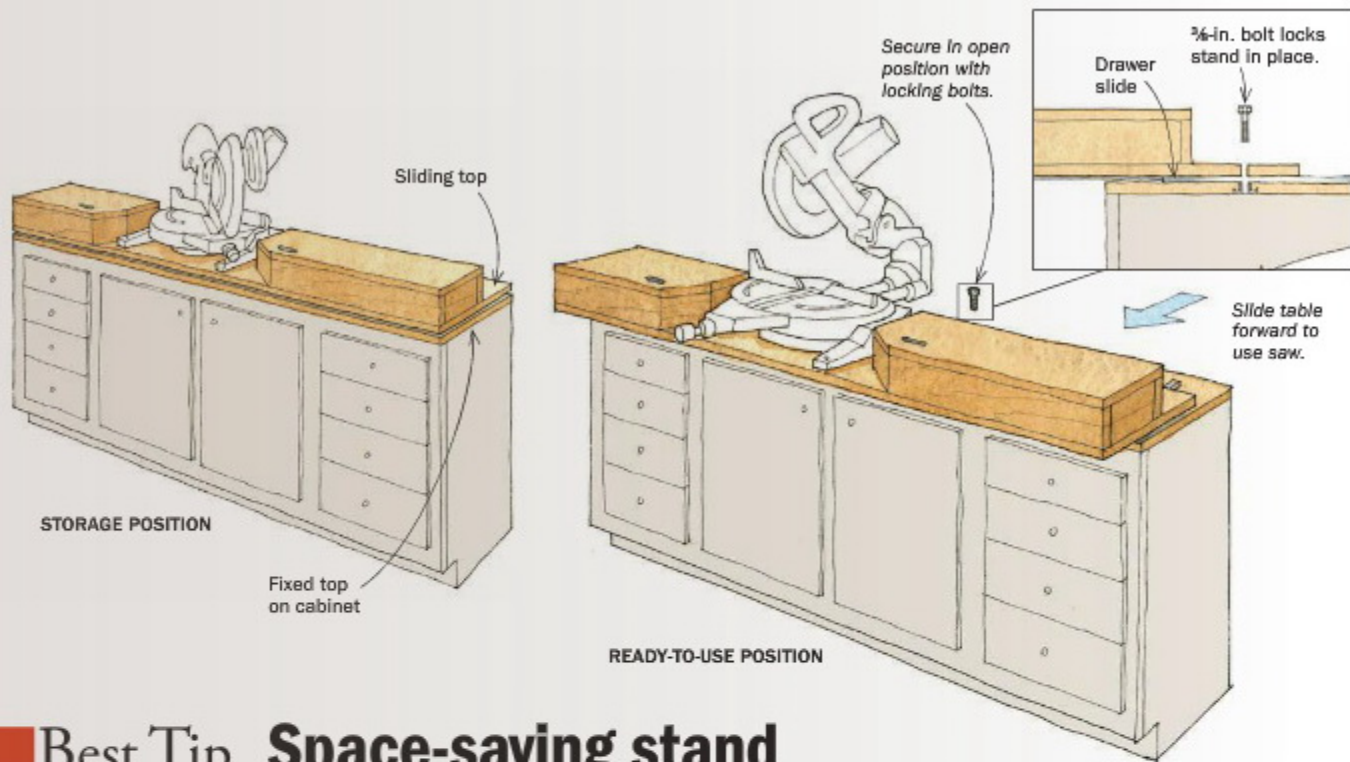
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Best Tip

Space-saving stand for a sliding compound-miter saw



Marc Myers started woodworking at age 12 using his dad's jigsaw and plywood cutoffs. He stuck with it, and people started asking for furniture. If a project needed a new tool, that's what he asked for as payment.

Sliding chopsaws take up a lot of room in a shop, primarily because you need to leave plenty of space behind the saw. This pull-out saw stand opens on ordinary drawer slides to provide this space. When the saw is not needed, it pushes back against the wall.

I built the stand on top of some old kitchen cabinets, which I screwed to the wall studs for stability. The cabinets are the right height and provide lots of storage, but you can make the base to fit your situation. To make the sliding top of the

stand, I ripped a sheet of $\frac{3}{4}$ -in. plywood in half the long way, making two sheets 2 ft. wide. I installed one sheet on the base exactly like a kitchen countertop. Then I installed four 16-in. heavy-duty undermount drawer slides to that sheet.

I attached the other sheet of plywood on top of the slides to make a 2-ft sliding table. Since I didn't need the full 16-in. of travel in the drawer slides, I staggered two of the four slides to stop the travel at 10 in. I mounted my sliding compound-miter saw in the center of the sliding table and built up wings flush with the saw's table.

I also installed a locking feature that consists of two $\frac{3}{8}$ -in. bolts through the back of the sliding table into T-nuts in the lower fixed top. I don't have to use the locking feature often, because the weight of the saw is enough to hold the sliding table in place.

When I'm ready to use the saw, I simply slide the table forward and I have all the room I need in back for the saw's rails. When I'm done, I swing the saw as far to the right as it will go, and slide the whole thing back. All closed up, it takes up no more room in the shop than the depth of the cabinet.

—MARC MYERS, Manchester, N.H.

A Reward for the Best Tip

Send your original tips to Methods of Work, Fine Woodworking, PO Box 5506, Newtown, CT 06470, or email fwmow@taunton.com. We pay for every tip we publish; the best tip also wins a router-bit set from Infinity Cutting Tools.



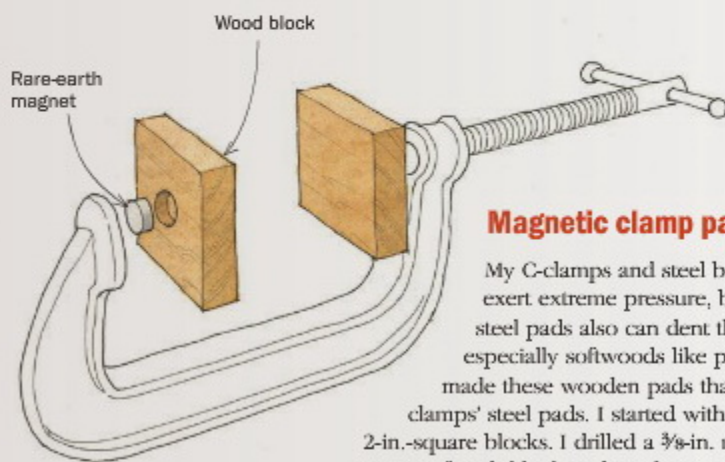
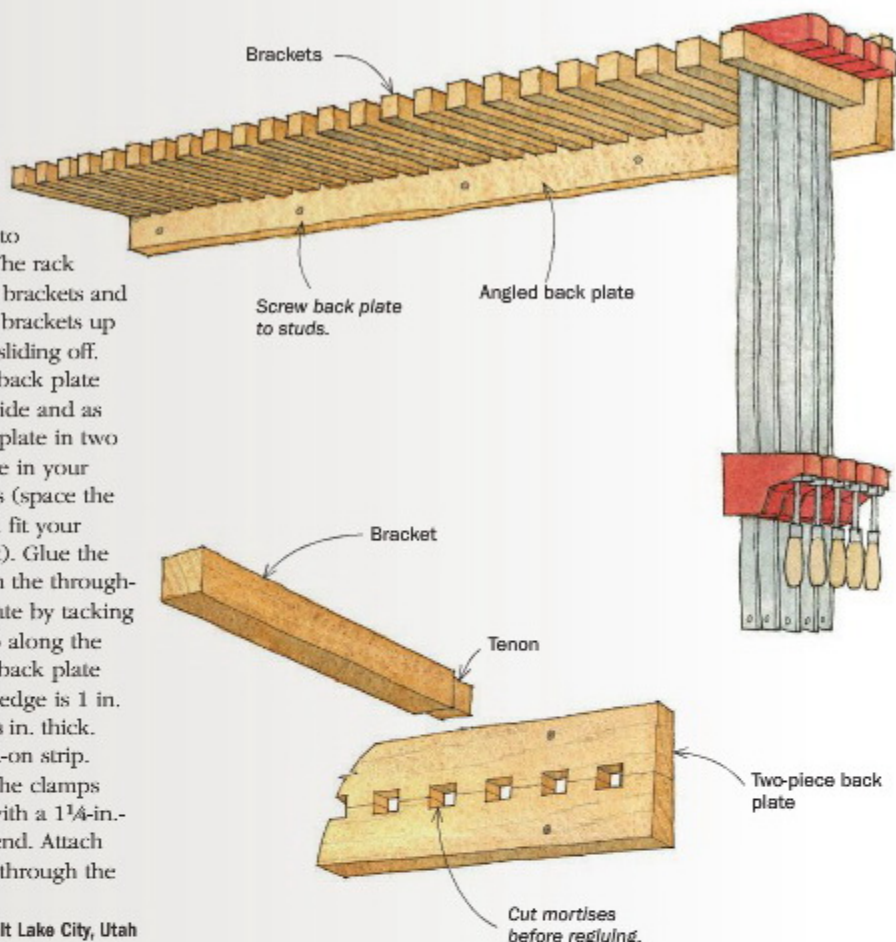
Sturdy clamp rack

This hardwood bar-clamp rack can be made as long as needed, with the spacing altered to hold every clamp in your shop. The rack features beefy mortise-and-tenon brackets and a tapered back plate that tilts the brackets up slightly to keep the clamps from sliding off.

To make the rack, start with a back plate that is $1\frac{3}{16}$ in. thick by $5\frac{5}{8}$ in. wide and as long as you want. Saw the back plate in two lengthwise, and use a dado blade in your tablesaw to notch in the mortises (space the mortises so that the brackets will fit your clamps; in my case $1\frac{3}{16}$ in. apart). Glue the two halves back together to form the through-mortises. Now taper the back plate by tacking a $\frac{1}{8}$ -in.-thick by $\frac{3}{4}$ -in.-wide strip along the face near the top edge. Run the back plate through the planer until the top edge is 1 in. thick and the bottom edge is $1\frac{1}{8}$ in. thick. After planing, remove the tacked-on strip.

I made the brackets that hold the clamps $1\frac{3}{4}$ in. square by $12\frac{1}{2}$ in. long with a $1\frac{1}{4}$ -in.-square, 1-in.-long tenon on the end. Attach the rack to the wall with screws through the back plate into studs.

—CHRIS GOCHNOUR, Salt Lake City, Utah



Magnetic clamp pads

My C-clamps and steel bar clamps can exert extreme pressure, but the small steel pads also can dent the wood, especially softwoods like pine. So I made these wooden pads that attach to the clamps' steel pads. I started with $\frac{1}{2}$ -in.-thick, 2-in.-square blocks. I drilled a $\frac{3}{8}$ -in. recess in the center of each block and used epoxy to glue in a $\frac{3}{8}$ -in. round rare-earth magnet. Now I can quickly attach pads to any of my metal clamps.

—ALEJANDRO BALBIS, Longueuil, Que., Canada

Quick Tip

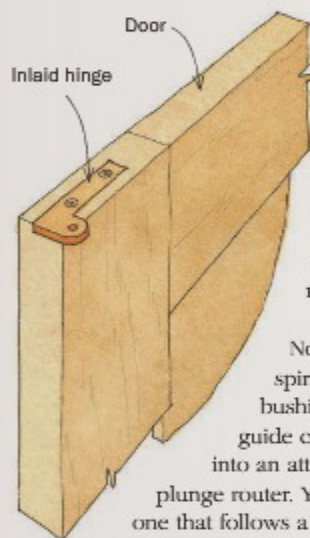
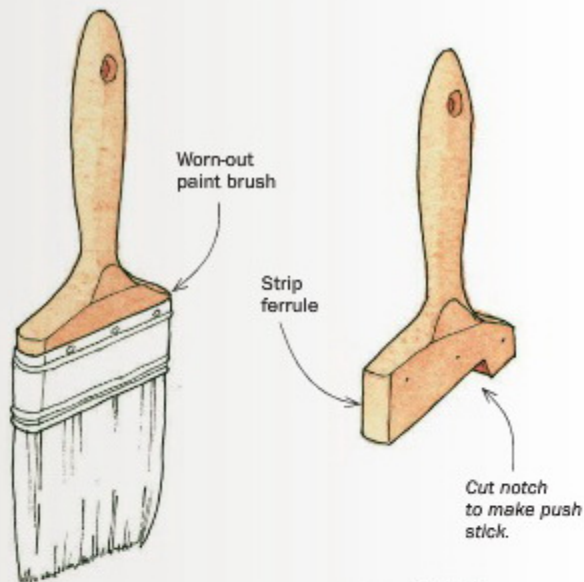
If you're tired of cleaning dried glue out of the tip of your glue bottle and waiting for glue to ooze down to the nozzle, leave the bottle inverted. After you use the glue, replace the small red cap (or close the nozzle) and invert the bottle. In a wooden block drilled with a hole slightly bigger than the cap. If you are not going to use the glue immediately, wipe the cap clean so that it doesn't stick to the nozzle.

—ANDY WESTERHAUS,
Burnsville, Minn.

Turn your paint brush into a push stick

After my paint brushes wear out, I strip off the metal ferrule and use the wood or composite handle for a tablesaw push stick. I simply make two cuts on my handsaw to make an angled notch in the bottom of the handle.

—AUSTIN GARNO, Elk Rapids, Mich.



Routing a mortise for a knife hinge

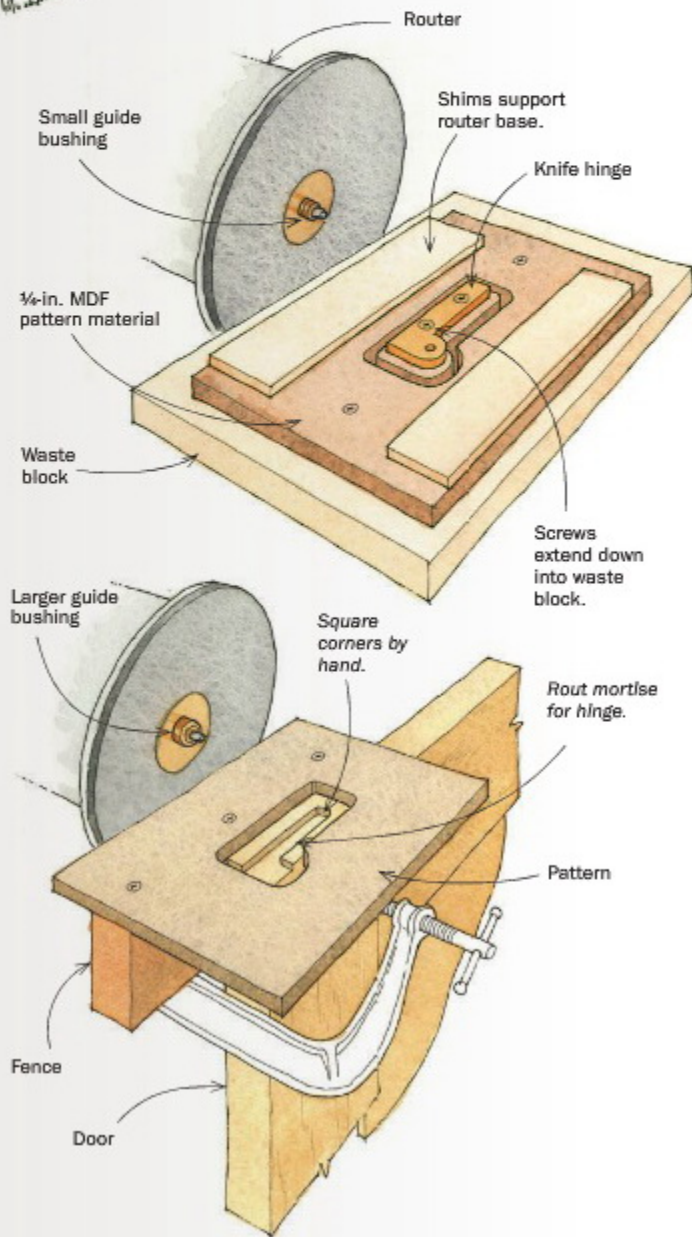
Router inlay sets are used to make precise inlays such as dovetail keys in a tabletop. But they also can be used for many other tasks, including precise mortises for a knife hinge.

A router inlay set (woodcraft.com; No. 09116) consists of a downcut spiral bit (0.125 in.), a small guide bushing (0.310 in. dia.), and a larger guide collar (0.560 in. dia.), which fit into an attachment ring on the base of the plunge router. You have two guide bushings—one that follows a pattern to cut the inlay and one that follows the pattern again to cut the recess.

Start by making the pattern right from the knife hinge. Screw one hinge leaf to a piece of MDF or hardboard. Use double-stick tape to attach shims (the thickness of the hinge leaf) on both sides to support the router base. Install the small guide bushing on the inlay set on the router. Now plunge through the MDF with the small guide bushing riding around the perimeter of the hinge leaf. Remove the hinge leaf, discard the waste piece of MDF the hinge is fastened to, and you are left with a large pattern in the shape of a knife hinge. To complete the pattern, attach a fence to the bottom that locates the pattern on the workpiece and provides a clamping place.

Now attach the larger collar to the inlay set, set the router bit to a depth equal to the thickness of the hinge leaf, clamp the pattern to the workpiece, and rout the hinge mortise. Square up the corners by hand. The resulting mortise will be a perfect press-fit for the hinge. For convenience, I made two patterns (the second is an upside-down version of the first) to cut mortises in the door and cabinet for both right-hand and left-hand hinges. You also could flip the same pattern over and reattach it to the fence.

—ARTHUR BABCOCK, Carmel Valley, Calif.



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■ POWER TOOLS

Finally, a drill and impact driver in one small tool

IMpact drivers are **REALLY COOL**, allowing you to sink the largest screws and bolts without twisting your wrist or stripping the head. But in the past, if you wanted this new technology for your shop, you had to spring for a second cordless drill.

Not anymore.

With its new “3rill” 12-volt drill/driver/impact driver, Rockwell is the first manufacturer to pack all three functions into one tool, and a compact one at that, thanks to its lithium-ion battery.

I first used it to make a cart for my shop, and it drilled and drove with ease, melting long screws through two layers of plywood with no pilot holes needed. The compact size and built-in LED are handy, especially in tight spaces.

I then turned to my favorite torture test for cordless drills: driving dozens of 3-in.-long,

1/4-in.-dia. lag bolts into small pilot holes in hardwood. In this case, I compared the 12-volt “3rill” to my current 14.4-volt drill/driver. That’s when I was convinced that the new Rockwell drill is the only one a woodworker needs.

I started with drilling, watching the 12-volter crank out more pilot holes than the 14.4 without slowing down. After installing fresh batteries, I opened the box of lag bolts. In normal driving mode, the smaller drill came up about 1/2-in. shorter than the 14.4 on each bolt, but when I flicked it into impact mode, the compact “3rill” easily outdove my bulky old 14.4-volt nickel-cadmium (Ni-Cd) drill/driver.

The impact function demands that the chuck be the quick-change,

hex type, so your drill bits will need 1/4-in. hex shanks. A three-jaw keyless chuck is available as an accessory (\$30); it snaps into the hex chuck to handle brad-point bits, Forstners, and conventional bits.

With its versatility and power, Rockwell’s new drill is hard to beat. The \$200 kit includes a 26-piece bit and accessory set and a right-angle drilling attachment. Rockwell also offers free replacement batteries for the life of the tool if you register up front.

—Asa Christiana is editor of FWW.

3RILL 12-volt combination drill/screwdriver/impact driver

\$200 (26 piece set); \$250 (62 piece set)
rockwelltools.com



Choose your weapon. The compact “3rill” can handle almost any drilling and driving job. An easy-to-access switch changes the drill from driving to two drilling speeds to impact driving (the bolt icon).



AWFS Vegas Best tools from the big show

Last July, we braved the blazing sun of Las Vegas to troll the aisles of the AWFS show, a biennial industry event that trades years with the IWF show in Atlanta. Although the number of tool debuts was down, we did see some nifty products that we’ll be taking a closer look at in the coming year. For all the rest of the best, go to FineWoodworking.com/extras.



MUST-HAVE TOGGLE CLAMP FOR JIGS

Bessey’s new toggle clamps (\$20), made for securing workpieces on shopmade jigs, self-adjust for almost any workpiece. They come in two sizes, one for workpieces up to 2 in. thick, and another for workpieces up to 2 3/4 in. thick. Say good-bye to raising the clamps with blocks to handle thicker workpieces, and fussing with the bolt above the clamp pad. The Bessey clamps also have big handles and a built-in screw that adjusts clamping force.



smartHinge
\$65 per pair
smart-hinge.com

■ HARDWARE

High-end box hinge is easy to install



YOU'VE BEEN WORKING HARD on a fine box, and now it is time to put on the hinges.

If you slip up

on this delicate task—whoops!—there goes perfection, and there goes your box. Andrew Crawford, one of the world's finest boxmakers, helped design an elegant hinge that's less risky to install: the smartHinge. The stop is built into the hinge, unlike others with curved stays that require an additional mortise. Rout shallow mortises with a $\frac{1}{16}$ -in. downcut spiral bit using a fence and a stop, and you're done. They look elegant, and work precisely. Smart-Hinges aren't cheap, so you may not want to use them on just any box. But if you are attempting to make the finest box, what is the price of perfection?

—Doug Stowe is a boxmaker and wood-working teacher.



BANDSAW BOASTS BIG RESAW CAPACITY

Rikon's new 14-in. bandsaw (No. 10-350) packs a towering 14 in. of resaw capacity into its European-style frame. It offers two motor options: a 2.5-hp Rikon motor made overseas for \$1,499, and an Arkansas-made, 3-hp Beldor motor that adds \$300 to the price. Other key features are blade guides with a toolless micro-adjust, heavy-duty trunnions, a stiff upper guide post, a lower-vibration belt, and a much bigger table than other 14-in. saws have.

■ DUST COLLECTION

Dust won't clog this collector

PLEATED CARTRIDGE FILTERS are a great new development in shop safety, offering much finer filtration than bags, with enough surface area folded in to keep the suction strong. The trouble is that the pleats fill up with dust pretty quickly, knocking down airflow (measured in cubic feet per minute) by as much as 50%. Manufacturers have countered with internal flappers that rattle the pleats and dislodge the dust. It's a fine solution if you remember to do it after each woodworking session.

Or you can buy one of Jet's new Vortex Cone dust collectors, with an internal sheet-metal baffle just above the air inlet that's designed to keep 98% of the dust from cycloning up into the filter at all. We tested the Jet DC1100VX 1½-hp collector (with Vortex Cone) against its older brother, the DC-1100, identical except for the cone. We found that while the Vortex Cone dampened airflow a bit overall (600 cfm vs. 700 cfm for the coneless original), it kept the filter clean and the airflow level as we filled the lower bag to the top with dust, while the older collector's flow dropped by 40%—until we spun the flappers.

Since 600 cfm is a bit low for machines like planers and tablesaws, and a length of flexible hose will dampen airflow even more, I recommend springing for the 2-hp version of the Vortex-Cone collector, the DC1200VX. Jet also offers 30- and 5-micron bag filters for their collectors, but you should opt for the 2-micron canister, which will keep much more of the dangerous fine dust out of the air. Go to vortexcone.com for more info.

—A.C.

Old school. The old-style Jet collector provides more suction, as long as you keep the filter clean by rotating the flappers.



New school. An internal cone on the Vortex collector keeps all but the finest dust from climbing up into the filter and clogging it.



Jet Vortex Cone Dust Collector

Model DC1100VX
\$650 with 2-micron canister;
Model DC1200VX
\$750 with 2-micron canister
woodcraft.com

VIBRATION-FREE SANDER

Bosch has taken the vibration out of its new random-orbit sander (No. ROS65VC) by isolating the motor from the user with soft internal blocks. Its dust port fits European vacuum hoses, and it comes with an adapter that fits many larger vac hoses. It has a 3.3-amp variable-speed motor. You can buy it with either a 5-in.- or 6-in.-dia. hook-and-loop pad (\$229), or with both pads and a case (\$299).



■ ACCESSORIES

New router lifts, head to head

THE MAST-R-LIFT II AND SIDE WINDER router lifts both make it easier to change bits by allowing the router's chuck to raise fully through the table. Similarities end there, as each model offers unique features. To find out which one is better, I put the same router motor in each one and put them to work.

Overall, the quality of the cuts made with both lifts was equally good, with no chatter or variation in the depth or height of the cuts. That said, I think the Mast-R-Lift is the better choice. It accepts a wide number of different brand routers and its adjustments were smooth and precise.

—John White is a machine expert and freelance writer.

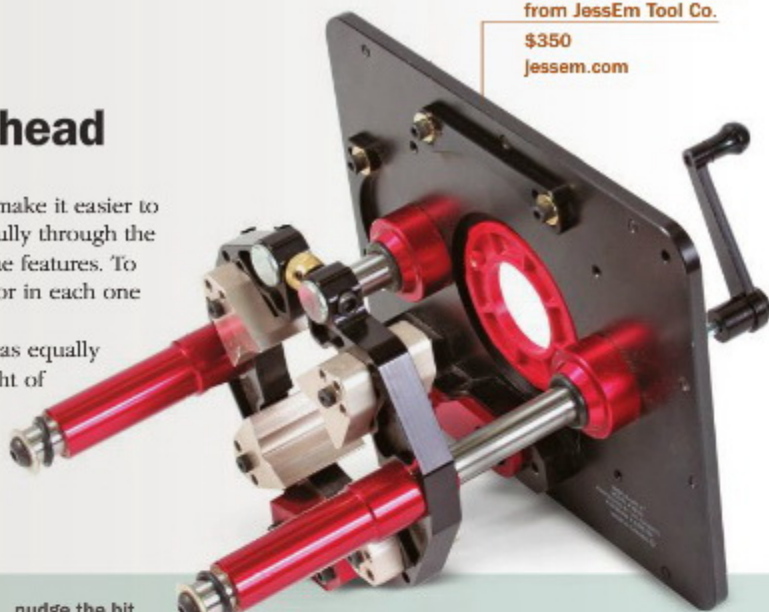
MAST-R-LIFT II

Most router lifts will either accept only one size machine or require you to buy a sleeve matched to your router motor's diameter. The Mast-R-Lift II takes a different approach. It grips the router with four jaws that can be easily adjusted to match 18 router models from eight different manufacturers. Height adjustments on the Mast-R-Lift are made with an above-the-table crank handle. Adjustments are silky smooth without a trace of free play. Fine adjustments are no problem, either. It was easy to

nudge the bit up or down by 0.001 in. or less. To go from the highest to lowest settings takes a little more than 50 turns of the crank.

My only criticism of the Mast-R-Lift is that it comes with only one 2-in. insert. If you want smaller or larger inserts, you'll have to buy them as a set for an additional \$28. The wrench for installing the inserts is very nicely made with a substantial handle that is offset for knuckle clearance.

Versatile design. The Mast-R-Lift accepts 18 router models from eight different manufacturers, a very convenient attribute.



Mast-R-Lift II router lift from JessEm Tool Co.
\$350
jessem.com

SIDE WINDER

The Side Winder SW350 accepts the common 3½-in.-dia. motors from fixed-base routers and combo kits. (The SW420 accepts larger models but costs \$100 more.) What's unique about the Side Winder is how fine adjustments are made. Instead of a removable crank handle that's

inserted through the table plate, the Side Winder uses a side-mounted crank. Unfortunately, the flexible shaft that runs from the crank to the lift adds a degree of play and stiffness to height adjusting that I didn't care for.

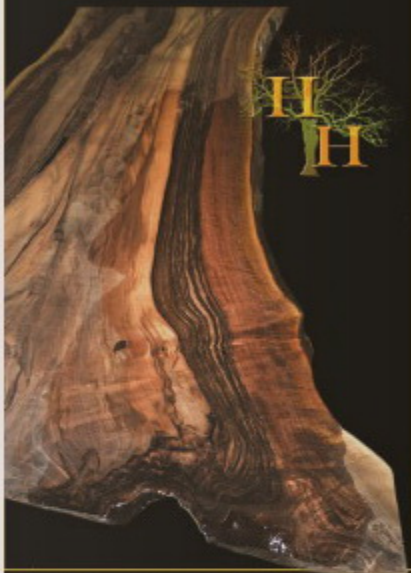
For fast height adjustments, the SideWinder uses an L-shaped wrench that fits through the top plate, locks, and lifts or lowers the motor to get the bit height close. Then you use the side crank to dial in the setting. The wrench saves a lot of cranking but I found it awkward to use.

Easy access. The adjustment handle on the Side Winder lift can be placed close at hand, but it is a bit stiff and jerky in use.



Side Winder router lift from Woodpeckers
Model SW350
\$260
woodpeck.com

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Make strong, simple joints with dowels

BY ASA CHRISTIANA

In all of woodworking, no joint is as undervalued or underused as the one held together by the lowly dowel. Why? The answer lies in a mountain of broken chairs and cabinets. Decades of bad factory-made furniture have given the sturdy little peg a rickety reputation. But savvy pros know better. Dowel joints offer a simple, strong way to make fine furniture, and they often succeed where other joints can't.



Online **Extra**

For a step-by-step video series on this table project, go to FineWoodworking.com/extras.

Shaker table shows that these humble pegs can do it all

1. ALIGN PANEL GLUE-UPS

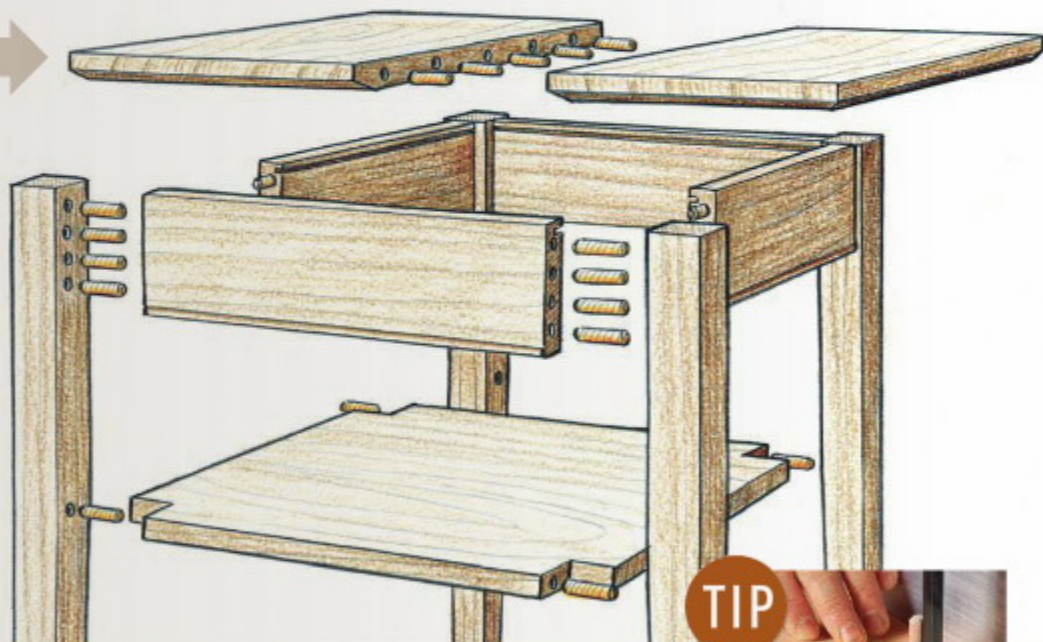
Dowels seated in perfectly mated holes ensure a panel with flush surfaces.

2. A MORTISE-AND-TENON SUBSTITUTE

Multiple dowels act as slip tenons, mortised into both mating pieces with a large glue surface.

3. JOINTS IN TIGHT SPACES

A single dowel creates a hidden joint where traditional joinery would be cumbersome.



TIP



A lengthwise slit releases air and excess glue. A simple bandsaw jig (Methods of Work, FWW #103) handles the task safely.

SECRETS OF SUCCESS

A good dowel joint depends on a snug fit between dowel and hole. Hardware-store dowels won't do, but good, cheap dowels are available from online woodworking suppliers.

To drill accurate holes, use a brad-point bit. Its center spur prevents the bit from wandering and enlarging the hole. To keep mating holes aligned and ensure that the holes are square to the surface, you'll need a doweling jig. The \$14 model from Rockler at left works with dowels of 3/8-in. diameter, a good all-purpose size.

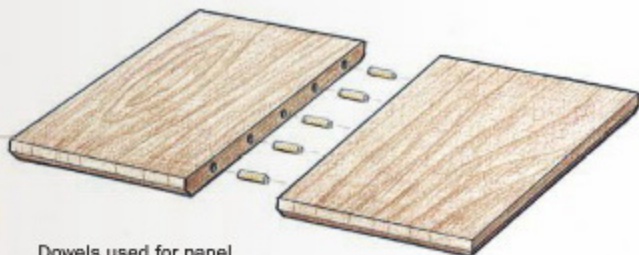
For places where the jig can't go, a set of dowel centers is a smart accessory. These metal plugs (left photo, center) fit a hole precisely and transfer its location to the mating piece (see p. 26).



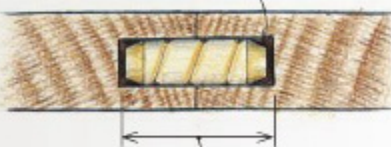
Glue up perfect panels

Set the depth.

Insert the drill bit into the doweling jig until the point protrudes to the desired depth. To create a simple depth stop, wrap a piece of painter's tape into a "flag" around the bit where it enters the top of the jig.



Dowels used for panel alignment need not be longer than about 1 in.



In this joint, the depth of each hole should be half of the dowel's length, plus $\frac{1}{16}$ in. or so at each end to accommodate excess glue.



Layout is simple. Make a series of pencil marks squarely across each joint to locate the mating holes.



Drill the holes.

Registration marks on the doweling jig align with your pencil marks to locate the jig. When the depth-stop flag begins sweeping chips from the work surface, you've reached the correct depth.

Dowels are easy to use in part because they are cylindrical, meaning you can quickly create accurate holes for them using a handheld drill. As to strength, our recent joint test ("Joinery Shootout," *PWW* #203) showed that properly executed dowel joints are strong enough for all but the most demanding applications. This strength means you only have to make simple butt joints before drilling holes. And the best news, especially for beginning woodworkers, is that all you need is that drill, a couple of good drill bits, and an inexpensive jig. Here are my favorite ways to use dowels.

Align glued-up panels perfectly

Woodworkers often edge-glue several boards into a panel for a wide part like a door or tabletop. Dowels work well to keep the boards aligned so their surfaces stay flush.

To mark out for the joinery, draw tick marks across the joints, about 6 in. or 8 in. apart. Use these marks to align the doweling jig for drilling. This joint's strength comes from the long, edge-grain glue surface, so the dowels don't need to be numerous or large. I usually use $\frac{3}{8}$ -in.-dia. dowels, unless the panel is less than $\frac{5}{8}$ in. thick.

For another dowel joint, see Q&A on p. 84.

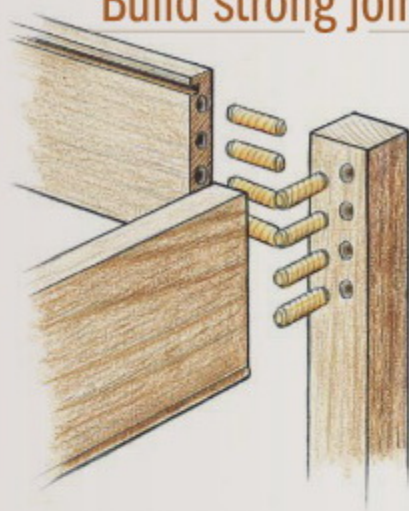
Be sure to drill $\frac{1}{16}$ in. or so deeper than needed to hold excess glue when the joint goes together. Also, when gluing any dowel joints, don't put glue on the dowel itself; the hole will scrape it off and create a

TIP

The strength in a panel glue-up comes from the large long-grain mating surfaces. Be sure to apply glue on these surfaces as well as in the dowel holes, spreading it evenly inside and out.

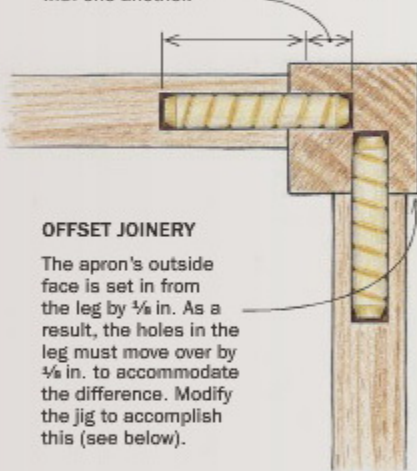


Build strong joints



HOLE DEPTHS DIFFER

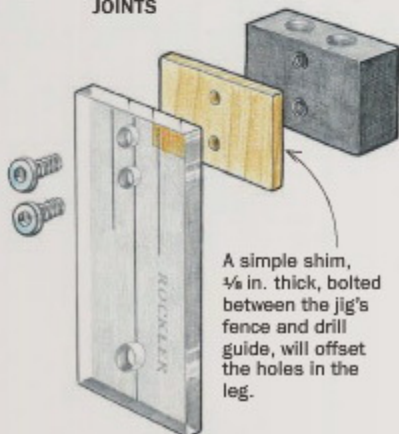
With a 2-in. dowel, the holes in the leg must be shallower to avoid interfering with one another.



OFFSET JOINERY

The apron's outside face is set in from the leg by $\frac{1}{8}$ in. As a result, the holes in the leg must move over by $\frac{1}{8}$ in. to accommodate the difference. Modify the jig to accomplish this (see below).

HOT-ROD THE JIG FOR OFFSET JOINTS

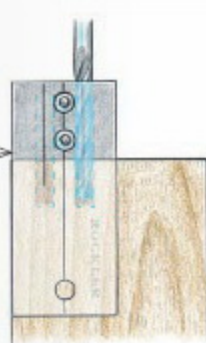


A simple shim, $\frac{1}{8}$ in. thick, bolted between the jig's fence and drill guide, will offset the holes in the leg.



TRICK FOR ACCURATE SPACING

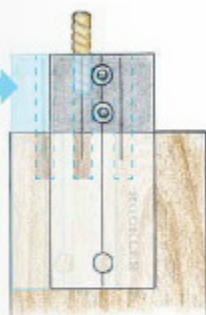
Start with the jig flush to the edge of the workpiece.



Drilling the first two holes. Secure the apron in a vise and clamp the jig so its edge is flush with the top of the apron.



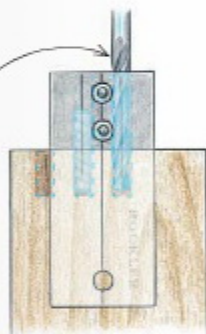
Move the jig and secure it with a spare dowel.



Move the jig over. To continue the line of holes beyond the jig's reach, use a dowel to hold the jig in the last hole you drilled.



With the jig secured, drill the next hole in line.



Drill and repeat. With the jig secured, drill the next hole. Repeat as needed for a line of evenly spaced holes.



Drill like usual. Drill the leg holes with the jig shimmed out by $\frac{1}{8}$ in. (left). When the joint comes together, the apron will have an attractive reveal (above).

TIP



The leg-to-apron joint derives no real strength from glue on the mating surfaces, so apply glue to the dowel holes only.

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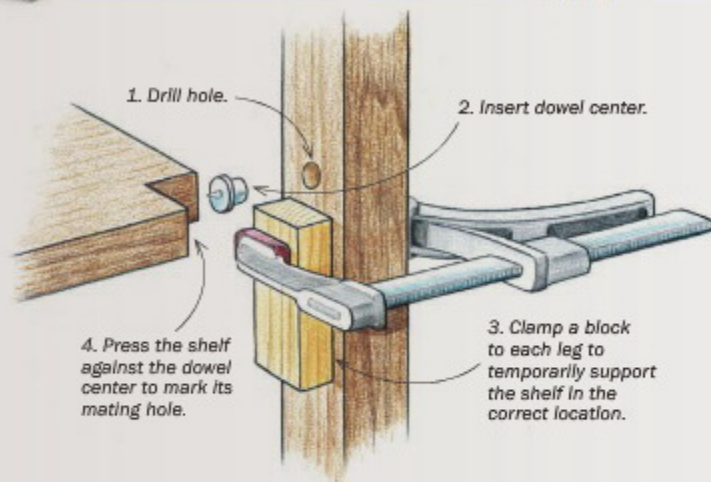
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Dowel centers solve tricky joints



mess. Instead, put glue in each hole and spread it with a small brush or stick.

Build sturdy tables, doors, and cabinets

Almost any joint that calls for a mortise-and-tenon—table bases, door frames, face frames—is a candidate for dowel joinery.

Because this joint relies exclusively on the dowels for strength, you need longer dowels—and more of them. A good rule for dowel size here is one-half the thickness of the workpiece, with $\frac{3}{4}$ in. or more extending into each hole. A $\frac{3}{8}$ -in.-dia., 2-in.-long dowel works great in most situations. To ensure that the holes in the mating pieces line up accurately, start with the jig referenced along a common edge. In this case, use the top edge of the rail and the top of the leg, which will be flush when the pieces are assembled. Also, don't apply glue to the mating surfaces. The end grain won't add much strength and you'll get excess squeeze-out, which is best avoided.

Hide a joint where there's no room to hide

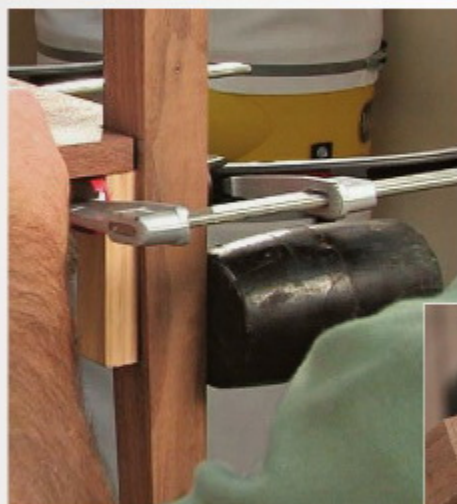
Furniture makers often draft an overall design for a piece first and sort out the joinery afterward. This allows creative freedom but can lead to situations where traditional joinery won't work.

One example is the lower shelf on this table. Rest it on stretchers or cleats and it will look clunky. Traditional joinery would be difficult to execute or visually distracting. Dowels offer a clean solution. You can use the jig to drill the dowel holes in the table legs, but the jig won't work on the small notched corners of the shelf. Instead, dry-fit the legs to the aprons, and clamp a support block to each leg so that its top is level with the shelf bottom. Then insert a dowel center into each hole and rest the shelf on the blocks. A light mallet tap on the outside of each leg will press the dowel center's point into the shelf edge, marking for the mating hole. Now drill the dowel hole in the shelf edge. Again, place glue only in the dowel holes. □

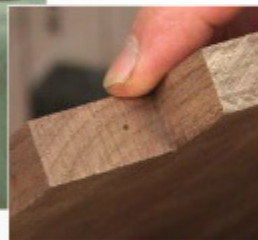
Asa Christiana is Fine Woodworking's editor.



Locate the shelf. A support block clamped to the leg holds the shelf in place.



Tap once. A light mallet tap drives the dowel center into the shelf edge (left). The dimple (below) locates the drill bit for a perfectly aligned hole.



Drill the shelf edge. Eyeball the drill and the edge of the shelf to make sure the hole is straight and square.

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handwork

Camber: The secret to perfect planing

CROWN YOUR SMOOTHING PLANE BLADE, AND SAY GOOD-BYE TO SANDPAPER

BY CHRIS GOCHNOUR

The problem: tracks

A smoothing plane can perfect a surface like no other tool, with a glossy smooth, light-reflecting sheen that brings out the inner beauty of the wood. But I've heard from many woodworkers who complain that their planes leave visible ridges in the surface, even after meticulous sharpening.

These defects, known as tracks, can be removed with sandpaper or scrapers, but a better option is to avoid creating them in the first place. You can try readjusting the blade laterally and taking lighter cuts. But often the best option is to add a slight arc to the cutting edge of the blade, called a crown or camber.

I add the camber while honing, applying different degrees of pressure to achieve a uniform arc across the cutting edge (see p. 30). This slight camber is suitable for all smoothing planes that are intended to give the final polish to a wood surface, including board edges, ends, and faces. A cambered blade also excels for tasks like cleaning up dovetails and flushing door frames after glue-up.

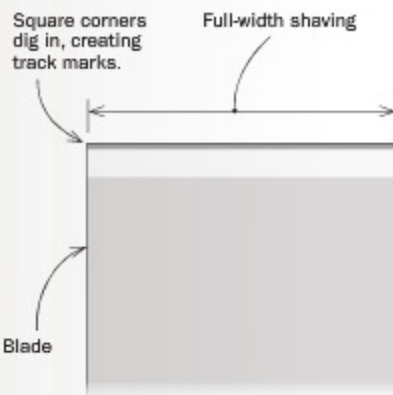
When a cambered smoothing plane is sharpened and set up correctly, it leaves a surface so smooth and so flawless that a finish often can be applied right after planing. The one exception would be a high-gloss tabletop where the reflective quality of the surface is extremely revealing and will show any undulations left by the plane, however slight. In cases like this, it is advisable to scrape and sand the surface after planing.

Chris Gochnour never has a dull blade in his shop.

Warning sign. You can tell your blade needs cambering if it is taking a full-width shaving, with an even thickness. The track marks will be noticeable (inset).



Not hip to be square. A blade sharpened with a square profile will dig in at the corners, creating ridges in the handplaned surface, called tracks.



The solution: cambering



Rock and roll. A single-roller honing guide with a narrow wheel makes it easy to rock the blade to exert pressure where needed for cambering.

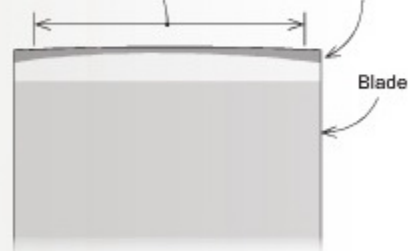


Perfect curve. The degree of camber for a smoothing plane is slight—between 0.001 in. and 0.002 in.—but it's very visible on the bevel.



Shaving tapers toward sides.

Cambering eases corners.



Sharpen and shape at the same time

To add camber, concentrate pressure on different areas of the blade while honing. This technique removes less material in the center and more toward the edges (see sequence below). Start with a coarse grit and work through the finer abrasives.

Once the blade is sharp, test it in the plane. If the shaving is narrow, you have too much camber. Go back to the stones and put more emphasis on the center of the blade. If you still get tracks, place more emphasis on the corners of the blade.

EASY AS 1, 2, 3



Pressure in center for one pass



Two passes each just outside center



Three passes on each corner

Perfect surface.

An ideal camber will produce a thin, nearly full-width shaving that tapers to nothing at its edges (far right). It also will leave a glass-smooth, light-reflecting sheen on the surface of the board.





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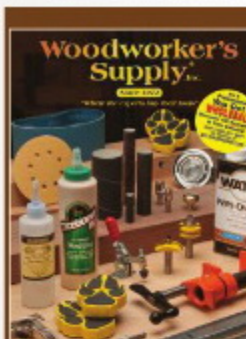
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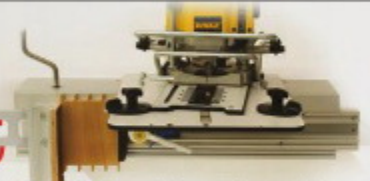
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Distinctive

6 ways to take your next box to the next level

BY DOUGLAS STOWE

PULLS

Don't ignore a box's calling card. Use it as an invitation to open the box and as a set of instructions that tells people where to put their hand and how to open the lid.



FEET

Standing on a distinctive set of feet, a box takes on a life of its own as a piece of furniture. Without them, it tends to blend in and look like an accessory.

Box Details



Online Extra

Learn how to build beautiful boxes in a video workshop with Doug Stowe. Go to FineWoodworking.com/extras.

DIVIDERS

Open interiors quickly become a jumbled mess, but a few dividers keep jewelry sorted and organized. Arrange them to suit the contents.



As a professional box maker, I've thought a lot about what it takes to turn a humdrum wooden container into a unique and desirable piece of furniture. I've learned that the appeal of a box is due in large part to the details, like the shape and size of the pull. That's why I approach every new box as a design opportunity, a chance to create new and distinctive details that allow my boxes to stand out. But there's more to it than design. You also need to be able to make these parts, which can be a challenge because they tend to be very small. That's forced me to develop accurate and

safe techniques for machining them. I'll share some of my designs for feet, pulls, and dividers and demonstrate the techniques I use to make them. Even if you don't want to make the exact designs I do, you can use my techniques to make your own safely and accurately.

Douglas Stowe makes boxes and furniture in Eureka Springs, Ark.

Feet can raise your box above the crowd

A box that sits directly on a table or dresser tends to blend in and get lost. But one raised by feet or legs makes a clean break from the surface beneath it.

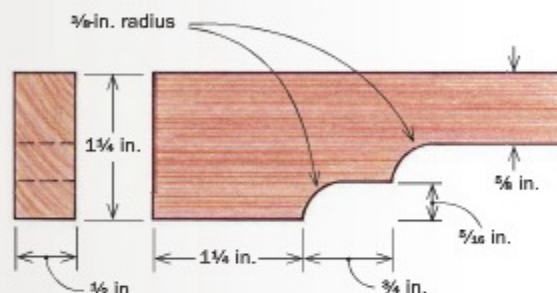
BRACKET FEET ARE ELEGANT AND STABLE

The curves and symmetry of a bracket foot add a graceful and formal base for a stately jewelry box like this one. The feet aren't very tall, so I make two at a time on a single blank (making use of both long-grain edges) to keep my hands well away from the router bit. On feet this small, any lack of symmetry would immediately be seen, so I use a stop block on the infeed side of the router table to start the cut for each foot.



Use a stop for symmetrical feet. After routing the lower arch on the foot, move the stop and fence to rout the higher one.

PERFECT PROPORTIONS



Rout halfway, then flip. There is no stop on the outfeed side, so don't risk getting too close to the foot on the trailing end.

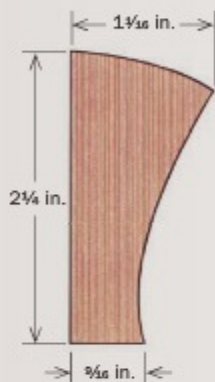


Cut the foot free, then miter the ends. Set the fence and rip all four feet at once so that they are the same height (left). Because the feet already are at final length, use a stop block so the miter is accurate and doesn't shorten the foot (above).

STILT LEGS ARE PLAYFUL

Because they are so akin to the body part they're named for, legs present an opportunity for levity. The mitered legs on this box give it an almost animated quality, and I like that playfulness. I use a template to rout the shape, making it extra long so that it can be clamped to a long blank (and then to my bench). The fence on the template ensures that the shape is routed square to the miter joint, which is cut prior to shaping.

A LEG WITH FLAIR



Cut the miter first. Miter the edge of a blank long enough for all eight halves needed to make the four legs.

TEMPLATE AND FENCE

Template, 3/4 in. thick by 1 7/8 in. wide



Fence, 3/4 in. thick by 1/2 in. wide



Clamp on the template. Place the workpiece against the fence of the template and clamp both so that they overhang the workbench.



Rout the shape. Use a flush-trimming bit so that the leg is an exact copy of the template. After routing the first half, flip the blank end for end and rout the second one.



Cut to length. A stop block guarantees that all eight leg halves are the same length, creating a box that won't rock after assembly. A pencil eraser is the perfect hold-down for small pieces.



Glue up the leg. Use a glue block to reinforce the miter joint and support the box from below. Packing tape and rubber bands add clamping pressure.

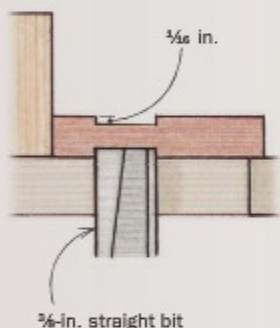
Pulls invite people to open the box

The size, shape, and location of a pull tell the user how a box opens.

LITTLE PULL DOES BIG WORK

There are times when a pull shouldn't call too much attention to itself, like on this understated jewelry box. This one is just big enough to get a finger under and lift. Its diminutive size might be a design plus, but it's a woodworking challenge. I overcome that problem by making several at once. I start working on a large blank to improve safety, I use a crosscut sled at the tablesaw, and then I gang the parts after they've been cut from the blank.

MAKE THE TENON



Rout the tenon on a long blank. This is safer than trying to do it on a short blank cut to the final length of the pull.

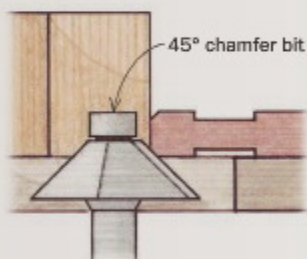


Then cut shorter blanks for the pull. Switch over to the tablesaw, using a pencil eraser to hold the cutoff piece on your crosscut sled.



Cut the tenon to final width. Use a clamp to hold the blank on the sled. The edge is too narrow to hold effectively with the pencil.

CHAMFER THE EDGES

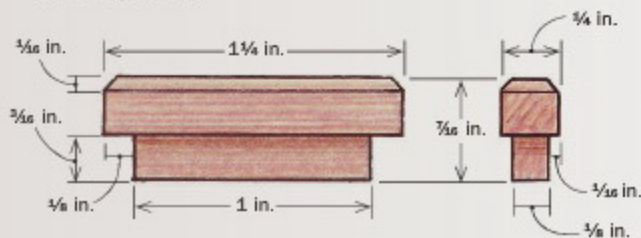


Chamfer on the router table. For safety, Stowe buries the bit in a hardwood fence and uses a push block to steady the blank.



For the end grain, chamfer several pulls at once. Whether you do just one or a small stack as shown, use a push block to support the small piece(s) and prevent tearout.

BY THE NUMBERS



Finally, free the pull. Put a stop block on your tablesaw sled, and use a pencil to hold down the part. Push the sled until both pieces are clear of the blade and turn off the saw before moving the pull. If you pull the sled back, the blade can throw the pull.

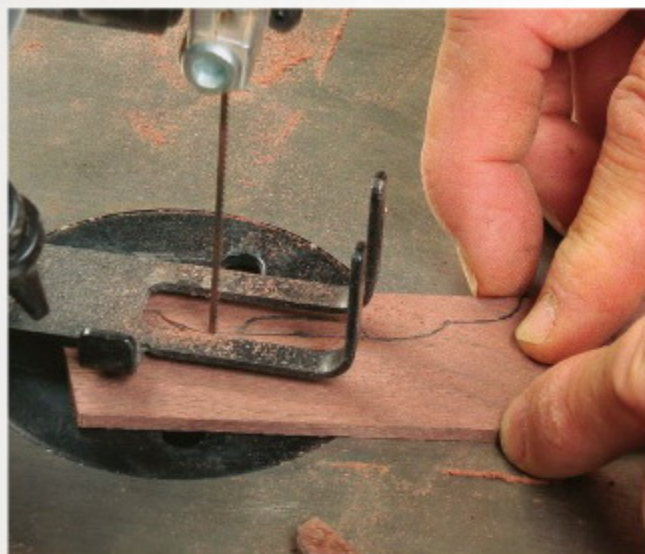
TWO-PART LIFT DOES DOUBLE DUTY

I use a pair of these lifts on opposite sides of boxes that need to be mobile, such as those for stationery. One part of each lift is mortised into the box and the other into the lid. When you pinch the two parts between your fingers, the lid is held in place and the box can be picked up. But the cutout in the lower part lets you get a finger under the upper part and take off the lid. Making the lift isn't particularly difficult, but it won't work if the shape isn't just right. So take your time with the design, tracing it onto the blanks and then refining the shape.



Draw the basic shape. Stowe uses a half-template cut from a manila folder so that the two halves of the pull are symmetrical.

Every other pull gets a cutout. Simply modify the existing template and trace the cutout onto two of the pulls already drawn.

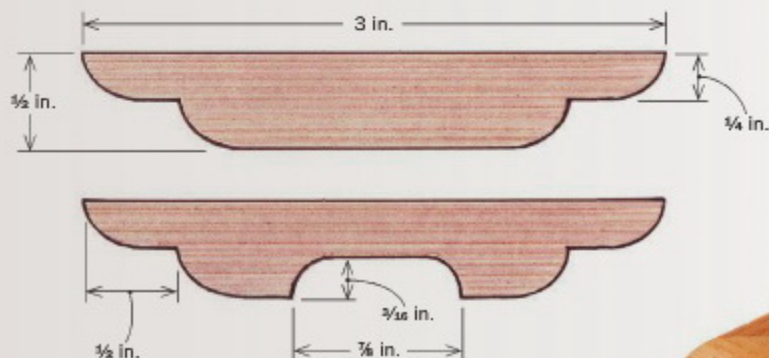


Rough out the parts. A scrollsaw is best because its blade is narrow enough to follow the tight curves.



Refine the shape with sandpaper. Stowe groups the pulls to make it easier to keep the edges square to the faces. He uses 1-in.-wide sandpaper glued to a pencil to get into the tight curves.

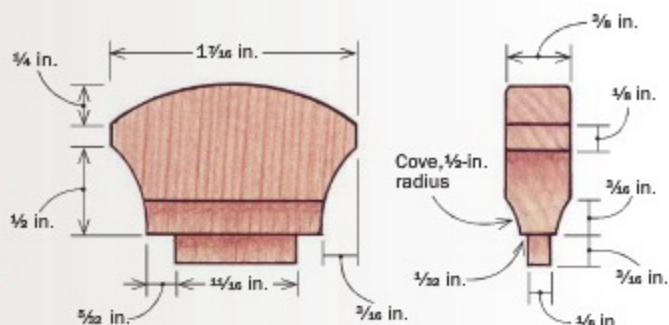
A PERFECT PAIR



Pulls (continued)

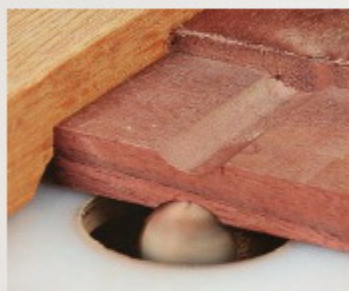
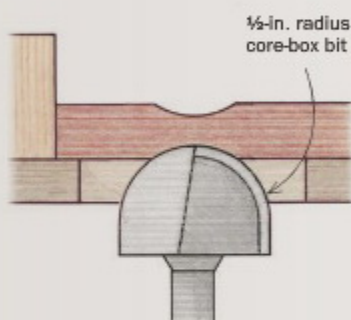
FAN-SHAPED PULL IS READY FOR LIFTOFF

This pull's size and location act like a set of instructions: To open the box, take hold and lift. The shape aids your grip, important when a thick solid-wood top hangs from it. For improved safety, I machine it at the end of a long blank, clamping it to a template to rout the shape. The long blank also makes it easier to round over the edges, because it's easier to control than a small one.



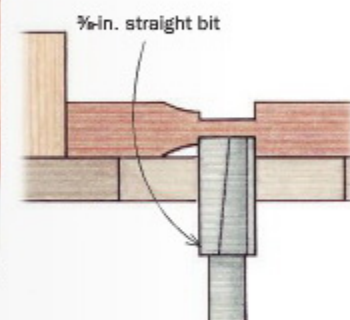
*Everything above the cove has a $\frac{1}{8}$ -in. roundover.

ROUT A RELIEF



Smooth curve. A push block behind the blank prevents tearout and keeps it square to the fence, guaranteeing a straight cut.

THEN FORM THE TENON



Precise tenon. Take several passes to sneak up on final thickness, using dial calipers to check against the mortise as you go.

Shape it with a router and template. Stowe uses a half-template, flipping it over to rout the second side and get a perfectly symmetrical pull.



Soften the edges. Be sure the bearing is against the end grain when starting the cut, so the bit doesn't grab the corner.



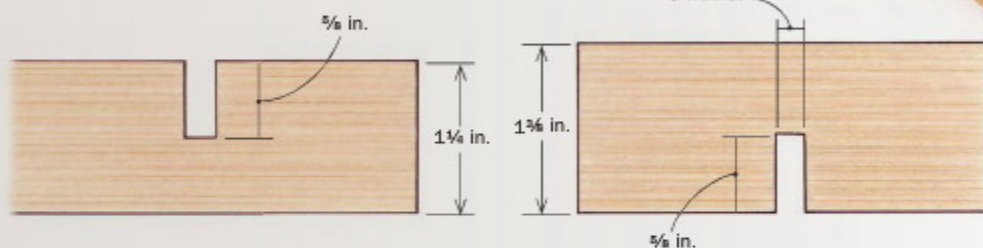
The tenon gets shoulders on all four sides. Use a stop block so that the shoulders cut at the tablesaw line up with those cut at the router table. Last, cut the pull free from the blank.

Dividers sort out the inside

Boxes with one large interior space become cluttered quickly. You can improve organization and utility with simple dividers, sized for the objects they'll hold, whether that is jewelry, minerals, tea, or keepsakes.

OFFSET DIVIDERS HIDE THEIR JOINTS

The bridle joint holding these dividers together isn't difficult to make, but it would be more visible from the top if the intersecting parts were the same height. That's why I make the shorter ones slightly taller than the long ones. The added height creates the illusion that the long dividers are mortised into the short ones.



Thickness of slot equals thickness of dividers.



Two stop blocks control slot width. Stowe makes the first cut with the divider pushed against the stop on the left. He makes the second cut with it pushed against the right-hand stop. Make test cuts to get the fit right.



Don't hold the divider with your hands. Use a clamp instead, so that your fingers are well away from the blade.



Hide the joint. The short dividers are taller than the long ones. That extra bit of material hides the slots.

Sanding

Which brand cuts fastest, lasts longest, and leaves the best surface?

BY ANDY BEASLEY

Whether you work all week in a commercial shop or on weekends in your basement, almost certainly you'll use a random-orbit sander. For any type of wood or grain, it can convert a surface from machine-milled to finish-ready, without requiring a lot of skill. However, I don't know anyone who gets excited about using a sander. As part of the woodworking experience, it ranks down there with extracting splinters and wiping up spilled glue.

Despite the tedium, however, sanding is an essential step that can determine the outcome of an entire project. A rushed sanding job or the use of an inferior product can ruin hours of careful woodworking. That's why it makes sense to ask a few critical questions about the business end of the tool: Which sanding disk works the fastest? Which offers the most bang for the buck? And most importantly, which yields the most finish-ready surface?

Four grits, six brands, eight types of disk

To answer these questions, I tested eight widely available



Disks

product lines of 5-in.-dia. hook-and-loop sanding disks: one each from Gator, Grizzly, Norton, and 3M, and two each from Klingspor and Mirka. I looked at the Premium Gold disks from Woodworker's Supply, but they proved to be one of the Mirka products already in my lineup.

I selected disks specifically designed to sand bare wood. Except for Norton's ceramic alumina blend, all use aluminum oxide as their primary abrasive. Most feature the common "C" weight paper backing, although the 80- and 120-grit Mirka Gold disks rely on the slightly heavier "D" weight paper, and Klingspor's VD980 line boasts the very stiff "F" backing. Mirka's Abranet is the exception, rejecting paper backing in favor of an extremely light and porous polyamide fabric. This grabs so well it can cause premature wear of the hooks on a sander's backing pad (which is why Mirka suggests the use of its \$10 "pad saver" disks between the sander and the Abranet). Only three product lines—Klingspor's VD900, Mirka Gold, and Norton—have a stearate coating designed to reduce loading and extend their life.

Five of the eight products are punched with the common eight-hole pattern that mates exactly with my sander's dust-collection ports. The Norton design is compatible with either five- or eight-hole sanders. The Abranet and 3M "Clean Sanding" disks feature numerous tiny perforations to capture dust. Although this was not a test of dust collection, despite the varied designs, dust collection was excellent across the board.

I tested four different grits (80, 120, 180, and 220, all on the standard FEPA or "P" scale) representing the range commonly used to prepare wood for finishing. It didn't take long to gather the essential components of my testing laboratory: a Bosch eight-hole random-orbit sander, a Festool variable-suction vacuum, a scale accurate to 1 gram, a pair of anti-vibration gloves, and a comfortable chair. I knew this was going to take awhile.

Hours and hours of sanding pleasure

I tested each of the 32 disks the same way, establishing an initial rate of stock removal and stopping when this rate had dropped by 50%. This was a logical time to retire the disk, because I'd found in some pre-test sanding on the hard maple, and in a parallel test I did for *Fine Homebuilding* using poplar, that almost without exception the amount removed in each

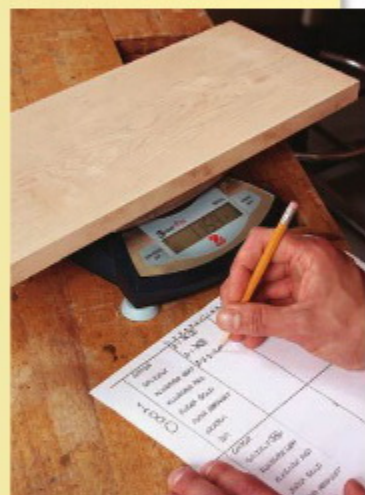
five-minute segment was steady for a while and then began a steady decline when the abrasive began to dull. Thus by the 50% point, the disk had already sanded away the majority of the material it was capable of removing.

I did a number of tests for surface quality. To better assess the

Bottom line



Stock removal varied. Beasley tested each disk on a pre-weighed board of hard maple. After five minutes of sanding, he weighed the board to see how many grams of wood had been removed. Then he sanded and weighed the board in five-minute intervals until the disk's effectiveness began to drop steeply.



Surface quality didn't. After using each 220-grit disk on a section of a cherry board, Beasley applied non-grain-raising dye to one half of each sample and then three coats of a wipe-on poly to the whole board. All the brands left the same appearance.



TEST RESULTS

Since all of the disks produce similar surface quality, your choice should focus on speed and endurance (and price, of course).



DISK TYPE	AVG. PRICE PER DISK	ENDURANCE (MINUTES)				TOTAL REMOVED (GRAMS)			
		80	120	180	220*	80	120	180	220*
Gator gatorfinishing.com	\$0.80	15	10	10	10	5	5	3	3
Grizzly grizzly.com	\$1.09	15	25	10	5	9	9	3	1
Klingspor VD900 klingspor.com	\$0.50	40	40	20	25	17	19	10	8
Klingspor VD980 klingspor.com	\$0.70	20	30	20	10	13	16	9	3
Mirka Abranet mirka.com	\$1.07	15	10	15	10	10	3	5	3
Mirka Gold mirka.com	\$0.32	20	25	10	10	8	11	5	3
Norton 3X nortonabrasives.com	\$1.14	35	10	5	20	15	7	3	9
3M 236U solutions.3m.com	\$0.62	15	10	5	15	5	5	3	5

* Grizzly 240 grit

initial scratch pattern, I applied a Minwax wiping stain to the planks that had been sanded with the 80-grit disks, knowing the pigment would highlight the sanding scratches. Similarly, I stained another set of planks that had been sanded through 220 grit to evaluate the final surface quality.

Sanding fast or sanding cheap?

To single out the best product, I weighed three factors: price, endurance during testing, and the total amount of material removed during each disk's lifespan. Finding an accurate price was one of the trickier

parts of the test. After a lot of shopping around, I determined an average retail price per disk (without taxes or shipping costs) based on small packages of five or ten disks (Mirka Gold and 3M came in lots of 50). However, you can sometimes significantly lower your price per disk if you buy in bulk.

Here's how to use the chart above. If you want to work fast and cost doesn't scare you, look for the disk that has the highest number in the grams per minute column; these disks remove the most material in the shortest possible time. If your focus

is on value for money, use the disk that scores highest on the grams per penny scale. These disks aren't the fastest, but they reward your investment by taking off the most stock for the money you spent on them. It's worth noting that disk endurance by itself is not important. Your objective is to remove material, not to build a long-term relationship with your sander.

Don't worry about surface quality— The ultimate purpose of sanding, of course, is to yield a smooth, finish-ready surface that's free of sanding defects. I examined each of the stained maple planks with a



MIRKA ABRANET



MIRKA GOLD



NORTON 3X



3M 236U

FASTEST REMOVAL

GRAMS PER MINUTE			
80	120	180	220*
0.33	0.50	0.30	0.30
0.60	0.36	0.30	0.20
0.43	0.48	0.50	0.32
0.65	0.53	0.45	0.30
0.67	0.30	0.33	0.30
0.40	0.44	0.50	0.30
0.43	0.70	0.60	0.45
0.33	0.50	0.60	0.33

MOST ECONOMICAL

GRAMS PER PENNY			
80	120	180	220*
0.06	0.06	0.04	0.04
0.08	0.08	0.03	0.01
0.34	0.38	0.20	0.16
0.19	0.23	0.13	0.04
0.09	0.03	0.05	0.03
0.25	0.34	0.16	0.09
0.13	0.06	0.03	0.08
0.08	0.08	0.05	0.08

TIP

Attach your sander to a vacuum



When Mark Schofield and Bob Nash looked at 6-in. random-orbit sanders in FWW #202, they tested each machine with both its onboard dust collection and hooked up to a vacuum. With most of the sanders, including the larger version of the Bosch sander I used for this test, attaching a vacuum doubled the rate of wood removal (and greatly increased the percentage of dust collected). So for both health and efficiency, everyone should hook a vacuum to their sander, and that's how I tested these disks.

It is best to have a variable-speed vacuum. Single-speed models can be so powerful that they suck the sander to the workpiece, slowing the sander, preventing it from spinning randomly, and leaving coarser scratches.

—A.B.

magnifying glass under a bright light, and was pleased to see uniformly good results. With a careful sanding technique and a steady progression through the grits, all these products will work well. When I looked at the cherry samples I was reminded why it is not a good idea to dye cherry (especially a figured/blotch-prone board) that has only been sanded to 220 grit. All the sample boards looked bad, and none of the disks reduced or increased the blotching. Under the clear finish, all the boards had a very similar appearance with no scratch pattern visible.

After the dust settled, two winners emerged

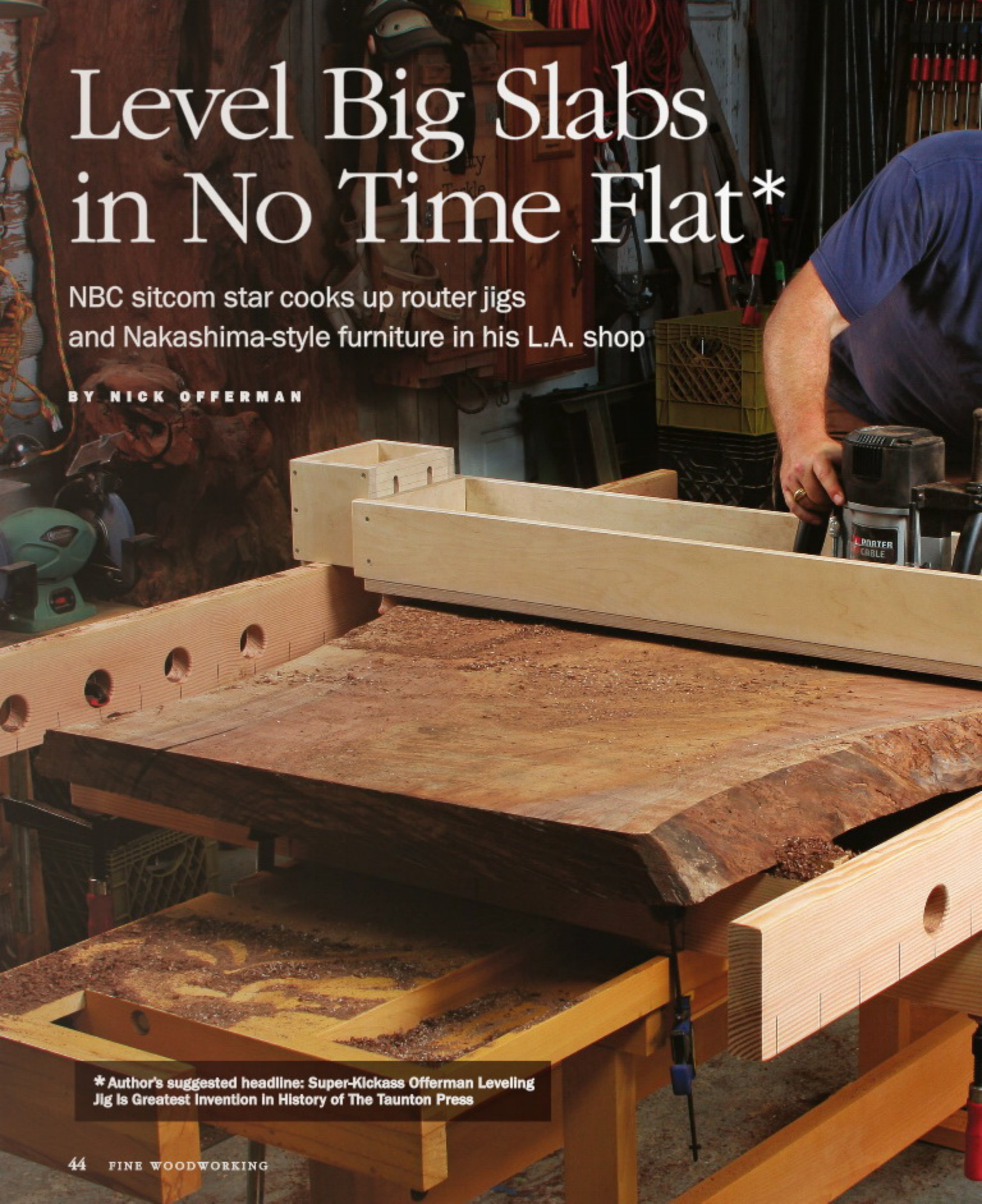
The Norton disks proved generally the fastest, while Klingspor's VD900 series was unquestionably the most cost-effective. I therefore awarded them both Best Overall. I also gave the Klingspor VD900 disks Best Value as they almost always removed the most material and were the best bargain of the bunch. □

Andy Beasley lives in Colorado Springs, where he's had quite enough sanding to last him for a while.

Level Big Slabs in No Time Flat*

NBC sitcom star cooks up router jigs
and Nakashima-style furniture in his L.A. shop

BY NICK OFFERMAN



* Author's suggested headline: Super-Kickass Offerman Leveling
Jig Is Greatest Invention in History of The Taunton Press



Nothing elicits greater gasps of delight from my clients than when I simply oil a piece of furniture and let the wood do the talking, in its velvety language of grain, figure, color, and magic. That's right, I said magic. You may think I'm waxing rhapsodic, but those woodworkers who have seen quilted figure jump out of a piece of newly oiled walnut know what I'm talking about.

It follows that wood will speak its magic the loudest when it is altered as little as possible on its journey from inside the tree to underneath your dish of beef stew. Don't get me wrong, I love a Queen Anne highboy as much as the next pilgrim, but I also love to take a slab or block of wood, make it level and usable, put a hand-rubbed oil finish on it, and send it out into the world. Actually, I get my younger brother Matt to move those pieces. They are as heavy as heck.

How a farm boy became an actor became a woodworker

I grew up among a family of Illinois farmers (natural carpenters and mechanics) and, despite my best efforts to escape this farm tradition with a career in break dancing, I was ultimately forced to hang up my parachute pants. When I enrolled in the theater conservatory at the University of Illinois, my ambition far out-reached my talent, and I found myself being cast in plays accordingly. My greatest role in college was the 92-year-old Ferapont, the butler in Chekhov's "Three Sisters," with a grand total of three lines of dialogue. My saving grace was that, while all of the seasoned 20-year-olds from Chicago were masterful in their character work, they had literally never hammered a nail, let alone heard of a cordless drill. They could play the starring roles, but I could build the scenery!

My self-worth restored, I graduated, moved to Chicago, and found in my tool belt a way to earn dollars building scenery and props, while acting in plays at night for peanuts. This arrangement made for an incredibly rich education in both acting

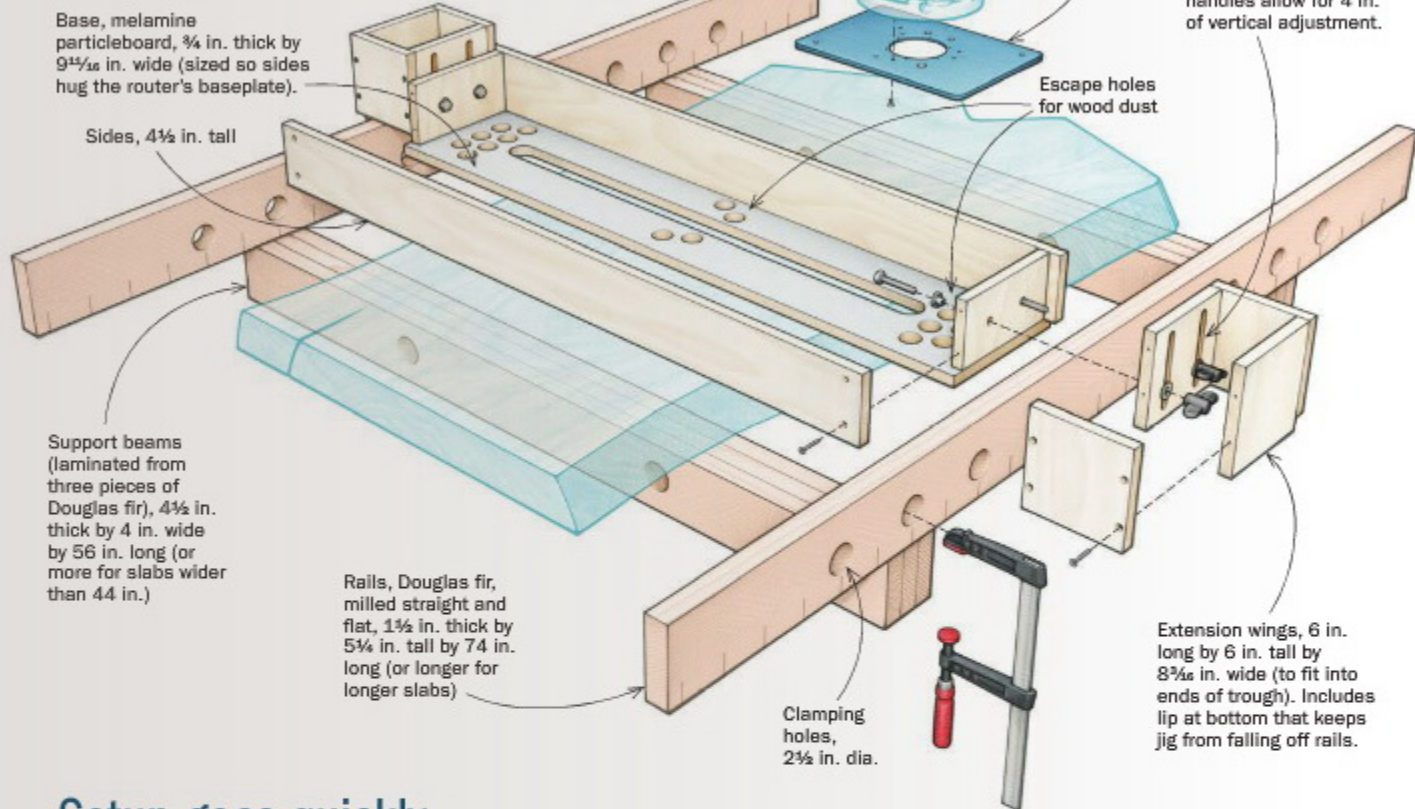
Ron Swanson.
Nick Offerman plays the deadpan Ron Swanson in Parks & Recreation, now in its fourth season on NBC. Both Nick and Ron love breakfast meats, woodworking, and the great outdoors.



LIVE-EDGE COFFEE TABLE

SHOPMADE LEVELING JIG

The heart of the operation is a trough that guides the router over the workpiece. Extension wings are bolted on the ends, allowing 4 in. of up-and-down adjustability. Those wings ride on rails, which can be supported on a broad table, or a narrow workbench using support beams as shown. Except for its base, the trough is made from $\frac{3}{4}$ -in.-thick birch plywood.



Setup goes quickly



Level the slab. After leveling your workbench or worktable, clamp the support beams to it. Then the slab goes on and gets leveled. The idea is to even out the high or low points as much as possible to maximize the finished thickness. One long and one short level, plus a few shims, are all you need. Big workpieces like this will stay in place without clamps.



Add the rails. Size the jig and its support beams to accommodate the largest slabs you think you'll encounter.



Adjust the height of the jig. The extension wings allow up-and-down adjustment, with guidelines on the ends to help you keep the jig level. Adjust the trough so it just clears the highest point of the slab.

and scenic carpentry. By the time I decided to leave for Los Angeles a few years later, I had my own modest scenery shop in a warehouse and a halfway decent resume of acting roles under my (tool) belt.

Upon arriving in Tinseltown, I was astonished to learn that Los Angeles has nowhere near the thriving theater scene that exists in Chicago. That meant no scenery dollars. Of course, the film and television industry require an enormous amount of scenery, but every shop I walked into was a union shop that wasn't interested in an aspiring actor. Lucky for me, one friend needed a deck, then another needed a cabin in the hills, which led to yet another post-and-beam folly in a west-L.A. backyard. Building these structures ignited my love affair with the chisel, as well as solid-wood joinery. As I studied the ins and outs of the mortise-and-tenon, I discovered books by George Nakashima, James Krenov, and Tage Frid (and, of course, *Fine Woodworking* magazine), and, before I could say "half-blind dovetail," I had a shop and my first clients.

The Nakashima bug

Like a lot of other woodworkers, I was enthralled with the designs of Nakashima, so I toured northern California to collect some tree slabs, and began making what has become my shop's bread-and-butter item: the Nakashima-style dining table. The thing that sets a slab table apart from other popular furniture designs is the way the natural edge of the slab lends an organic yet elegant shape to the table. The tricky part is that chainsaw and portable sawmill cuts are often imprecise, and even well-sawn and properly dried slabs warp while they cure.

When I began making these tables, I used a power planer, a belt sander, and a couple of long straightedges to bring the surfaces flat within a tolerance of $\frac{1}{16}$ in., and then I sanded them for finish. Although this worked well, it was very time-consuming. I was beginning to accumulate orders for slab tables, as well as occasional tables that I make out of a large chunk of stump, so I needed to create a simple, convenient flattening system.

A router jig is born

It was a happy day when I came up with this versatile router jig. It was easy to build, and I'm still amazed at how quickly it levels a big, warped slab, leaving only a few minutes of sanding to do.

The heart of the operation is a bridge-like trough that guides the router on a level plane over the workpiece. Tall sides prevent any sag across the span. The router is screwed to a router-table insert plate that keeps it steady in the trough. And the trough itself sits on rails, allowing it to be slid along the slab between passes of the router. That's it. Relatively simple but extremely effective.

Flatten the first side



Get your router ready. A rectangular baseplate (sold for router-table use) guides the router in the trough, and a wide plunge-cutting bit levels a 1½-in.-wide strip with each pass. Offerman uses Amana's A-Max No. 45453, 1½-in.-dia. straight plunge bit.



Hit the high points first. Just slide the router along the trough to make a pass. One hand is enough to control it unless you hit a knot or other rough patch. Don't force the action. Make the final pass only about $\frac{1}{16}$ in. deep for cleanest results.



Lining up a pass. Just slide the jig over, looking through the bit slot to see the edge of the last cut. You don't need to clamp the jig to the rails.

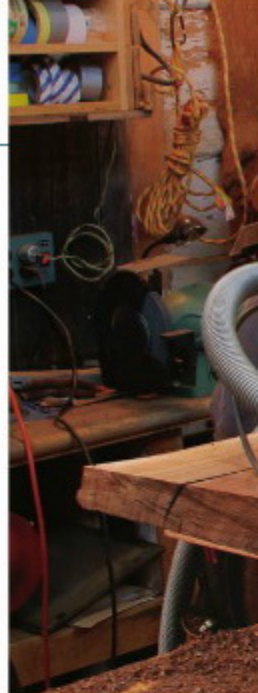
Finish the job



Grip it and flip it. Tip the slab up on edge, and balance it there while you sweep the shims and dust off the rails. You might need some help. Then lay it down flat on its other side. Take a moment to enjoy how it lies perfectly flat on the support beams.



Rout the other side. You'll be surprised at how quickly the whole process goes, leaving smooth rows of router tracks on both sides of the slab.



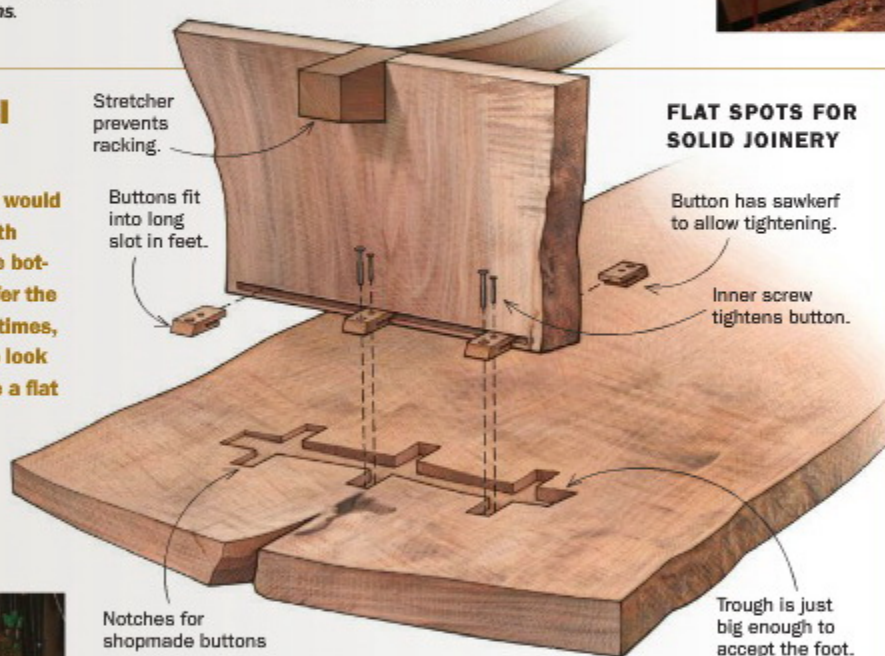
For a thicker slab, don't level the entire bottom

If the wood is very warped and would be too thin if flattened on both sides, I sometimes leave the bottom of the slab rough. I prefer the look of a thicker slab. Other times, a client wants the slab that way. The look

does have a lot of character, but it doesn't leave a flat surface for attaching the trestle base.

The jig offers a great solution. It lets me rout a couple of flat channels just big enough to accommodate the upper beams of my trestle base.

—N.O.



Place and trace the feet. Offerman leveled a smaller slab to make these feet. He decides where they will go on the underside of the tabletop, and then traces their location.



Lock the jig in place. A few clamps on the rails are necessary to keep the jig from sliding sideways, and a few passes get you to finished depth. Then move the jig over, lock it in place, cut to the same depth, and repeat until you've created a trough wide enough to accept the foot.



Room for joinery. Offerman uses a trim router to carve out extra landing pads for the buttons he uses to join the feet to the slab, squaring them up by hand with a chisel and mallet.



Sanding goes quickly, too. Start with a belt sander, with 60- or 80-grit paper, and follow with a random-orbit sander, working up from 80 grit to 220.

I usually set everything up on my big tablesaw outfeed table, clamping the rails to a set of simple plywood towers. But for those of you who don't have a broad, flat table like that, I've devised an alternative rig that can rest on the floor, sawhorses, or any workbench. It works just as well. By the way, I recommend using a big plunge router.

How to flatten a slab

The first thing I do is take a close look at the rough slab and choose the side that will be the top. Usually that is the prettiest side, and the one without any rot. Then I seesaw the slab up onto the base rails and use shims to even out the low points and high points as best I can. The closer you can bring your high and low points to each other, the less material you will have to remove. Most of my slabs are so heavy that I don't have to worry about them shifting during the operation, but if you're working on a smaller piece, make sure your shims are secure and clamp down one edge of the slab.

I usually mill both sides of the slab if there's enough material to afford it. When you surface only one side of any piece of wood, it can react pretty drastically by cupping or warping, based on some fancy science reasons that I am not going to look up right now.

When I first used this jig, I was so proud that I signed it. And now I get to share it in the pages of my favorite magazine. I hope you enjoy it as much as I have. □

Nick Offerman is an actor and a professional woodworker.



Don't forget the edges. Offerman uses a variety of tools, such as this "sanding star" drill attachment (\$18 at woodcraft.com), to remove debris from the edges and prep them for finishing.



Just rewards. The first coat of linseed oil brings the claro walnut to life. Finish both sides equally to avoid warping.

Online Extras

Offerman also uses his versatile leveling jig to create beautiful side tables from stumps that would otherwise be thrown away. He shows how, and leads an entertaining tour of his shop, at FineWoodworking.com/extras.



Build a Serpentine



Sideboard

BY STEVE LATTA

PART 1

Start with the curved front
and you are halfway done
with this Federal masterpiece



I was inspired by a number of pieces from the Carolinas when designing this sinuous, Federal-style sideboard.

Serpentine sideboards are some of the most challenging, and consequently the most rewarding, pieces to build. The sweeping façade makes them graceful and elegant, but introduces some serious head-scratching, at least the first time around. I've done all the problem-solving for you, and to guide you through every key step, we are making this article a two-parter. In this half, I'll take you through the twists and turns of making the front and show you how to add the optional Federal-style inlay, and then in Part 2 I'll demonstrate a way to build the rest of the piece quickly and efficiently. Look for the second half in *PWW* #224 in two months, right after the annual *Tools & Shops* issue.

Everything starts with the doors

The sideboard's two curved doors have a core of laminated bending plywood edged in solid mahogany and face-veneered with mahogany. Any time you are working with curved laminations, there may be a little variation in the sweep of the curve from one example to the next. If this happens, it is easy to tweak the curve of the front rails to match the doors, but it's much harder to fine-tune the doors to fit an already-constructed carcass.

Draw a full-scale plan and build a couple of practice doors, without skipping a single step in the process. Even making one sample door might seem a waste of time and wood, but the effort is rewarded many times over because you'll avoid serious mistakes and can use the practice doors as setup pieces down the road.

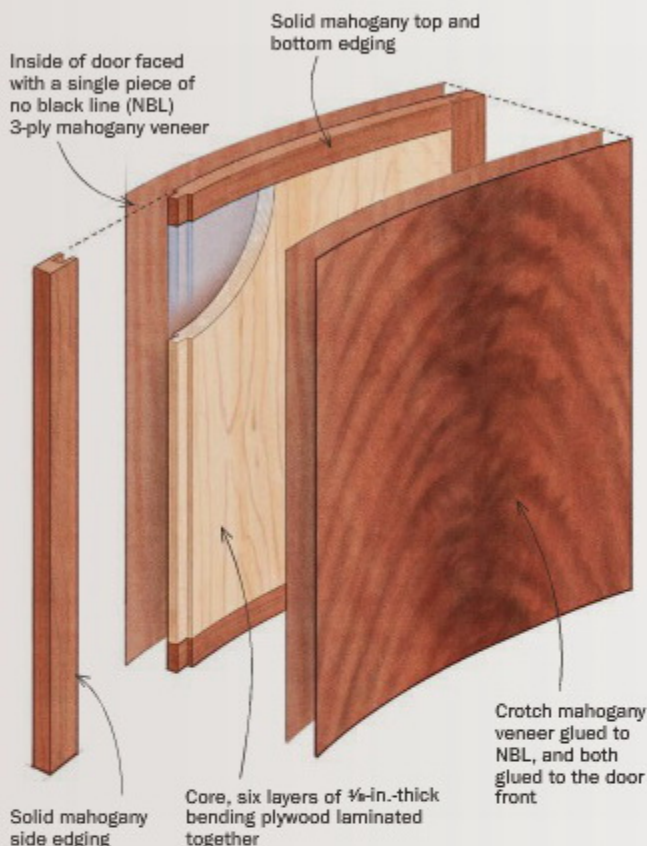
Build the core from six layers of 1/8-in.-thick bending plywood laminated with liquid hide glue. Unlike white and yellow glues, liquid hide glue leaves a rigid bond that won't creep, which would allow this tight bend to relax and change shape. After pressing the plies against a curved form in a vacuum bag, trim the core and apply the solid mahogany edging as shown on p. 52.

The doors and drawer fronts on this piece are made from four book-matched mahogany veneer crotches. To make them easier to work and to resist splitting, mount them to a backer veneer

Make the doors first

The laminated doors might not match the plan exactly after they dry, so adjust your drawing as necessary and build the rest of the piece to fit them.

ANATOMY OF A CURVED DOOR



using liquid hide glue and then apply them to the curved core. After you veneer both faces of the door, trim any overhang with a chisel. Place the finished doors on the plan and tweak the drawing to match the doors. Ideally, the change will be minimal.

The legs are shaped to follow the curve

This sideboard has six legs—two rear corner, two front corner, and two front center. The front legs follow the serpentine curve so each pair is unique, and difficult to wrap your head around. I'd make two front legs in poplar simply to figure out the cuts, and another pair in mahogany to repeat the cuts and to practice the inlay. As with the doors, you'll recover the time spent making the practice legs with a smooth, efficient execution of the actual legs.

I cut the leg blanks 5 in. overlong to have waste to pound on during the multiple dry-fits of the carcass, and to rest the point of a radius cutter on when creating the upper inlay. Mark a line around each leg defining the top, and another line around the middle where it will meet the bottom edge of the side, back, or lower rail. All tapers start at these middle points. Now lay out and cut the mortises.



Core of the door. Six layers of 3/8-in.-thick bending plywood form the curved core for each of the sideboard's doors. After applying the glue but before placing the package in the vacuum bag, nail the plies at the edges to the apex of the form to keep them from sliding around.



Edge the top and bottom. Joint and rip the top and bottom of the core. Then rough out the edging on the bandsaw and, after gluing it to the core, trim it flush on the router table. Then trim the core to width as shown, using a crosscut sled and a block to support the door at the proper angle.

The back legs have straightforward tapers on the inside faces. The front legs are more complicated because the taper on the back of the legs has to be parallel to the beveled front. On the front corner legs, cut a 17° bevel on the tablesaw running from the outside corner to the inner face. Clean up the cut on the jointer or with a handplane. These legs are also tapered on the two inside faces. Define the taper and the resulting diamond-shaped foot by using a combination square to draw a line on the bottom end of the leg parallel to, and a heavy 7/8 in. away from, the outside faces.

Bandsaw the side taper and clean this up with a plane. The rear taper is more complicated. Make a cut on the bandsaw ending at the point of the foot farthest to the rear (see drawing, p. 56). Using a block plane and a card scraper, roll that cut until it flows into the line on the bottom of the foot, giving it the diamond shape.

The center legs require a 15° bevel on the front face running the opposite direction of the front corner legs. Only the front face remains flat while the other three are tapered to form a diamond shape on the bottom. Each face of the diamond is about 7/8 in. long. Saw and then handplane a 3/8-in. taper off each of the

sides. On the rear face, mark a line on the bottom of the leg a heavy $\frac{7}{8}$ in. from and parallel to the front face. Reset the combination square for $1\frac{5}{8}$ in. and, referencing off the front of the leg, mark on the wide ($2\frac{1}{8}$ in.) side a point along the line that defines the bottom of the lower front rail. Using a straightedge and a pencil, mark a line from this point to the diamond outline on the bottom of the foot. Mark the taper on the opposite side of the leg as well. Most handsaw tables tilt only to the right, so for the left center leg you need to cut the taper from the middle to the foot. Because the cut starts away from the edge of the leg, you need a notch to start in. Just below where the front rail will hit, take a handsaw and make a series of cuts totaling about 1 in. wide that run from one taper to the other. This will be an angled cut parallel to the face of the leg. Clean out the cuts with a chisel establishing the start of the inner face. Tilt the saw table to 15° , fit the blade into the notch, and cut the taper. Clean it up with a plane and scraper.

On the right center leg, the cut begins at the foot, so make a single relief cut at the top of the taper.

Stringing and bellflowers brighten the legs

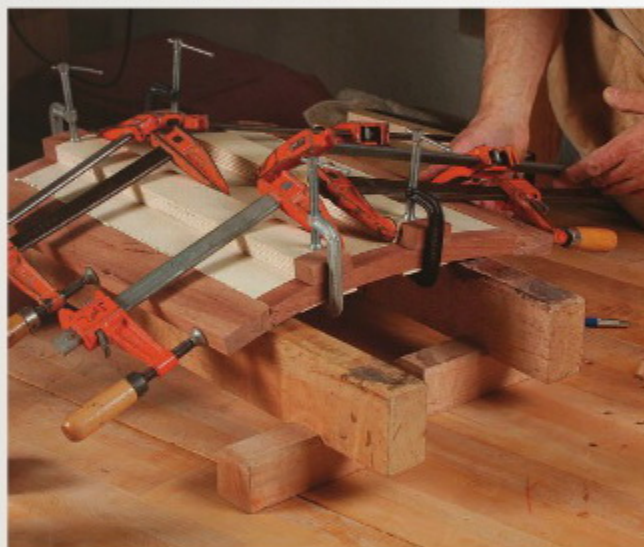
Bellflowers are one of the signature items of Federal-style furniture. Usually adorning the legs, they are also found on tambour doors, and display regional variations. I recommend doing samples of the inlay starting first on a flat piece of stock and then on an actual sample leg. Doing so works out any glitches that might develop and provides layout lines for positioning templates and pivot points. Much of the work duplicates what I demonstrated in the Master Class in *PWW* #180 when I made a Federal card table, so I'll stick to the differences only.

I use solid holly for this inlay, resawing it to about 0.035 in. thick on the tablesaw. Yellow glue has enough open time to get the inlay in the groove, but sets quickly enough to eliminate a lot of down time. Trying to level stringing prematurely may lead to tearout.

Begin by cutting the rings using a Dremel mounted in a router base from Stewart MacDonald. A laminate trimmer is too big and

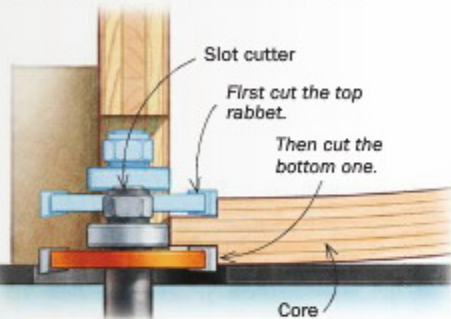


Two rabbets make a tongue. Using a slot-cutter on the router table, create a tongue on both long sides of the core. A support block holds the core at the correct angle. Raise and lower the bit to make the two parallel rabbeting cuts.



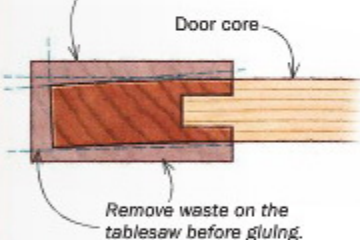
EXTEND THE CURVE ONTO THE SIDE EDGING

The core's curve extends to the solid-wood side edging. Start with oversize stock, dry-fit the tongue-and-groove joint, rough in the curve on the tablesaw, and finish with a scraper.



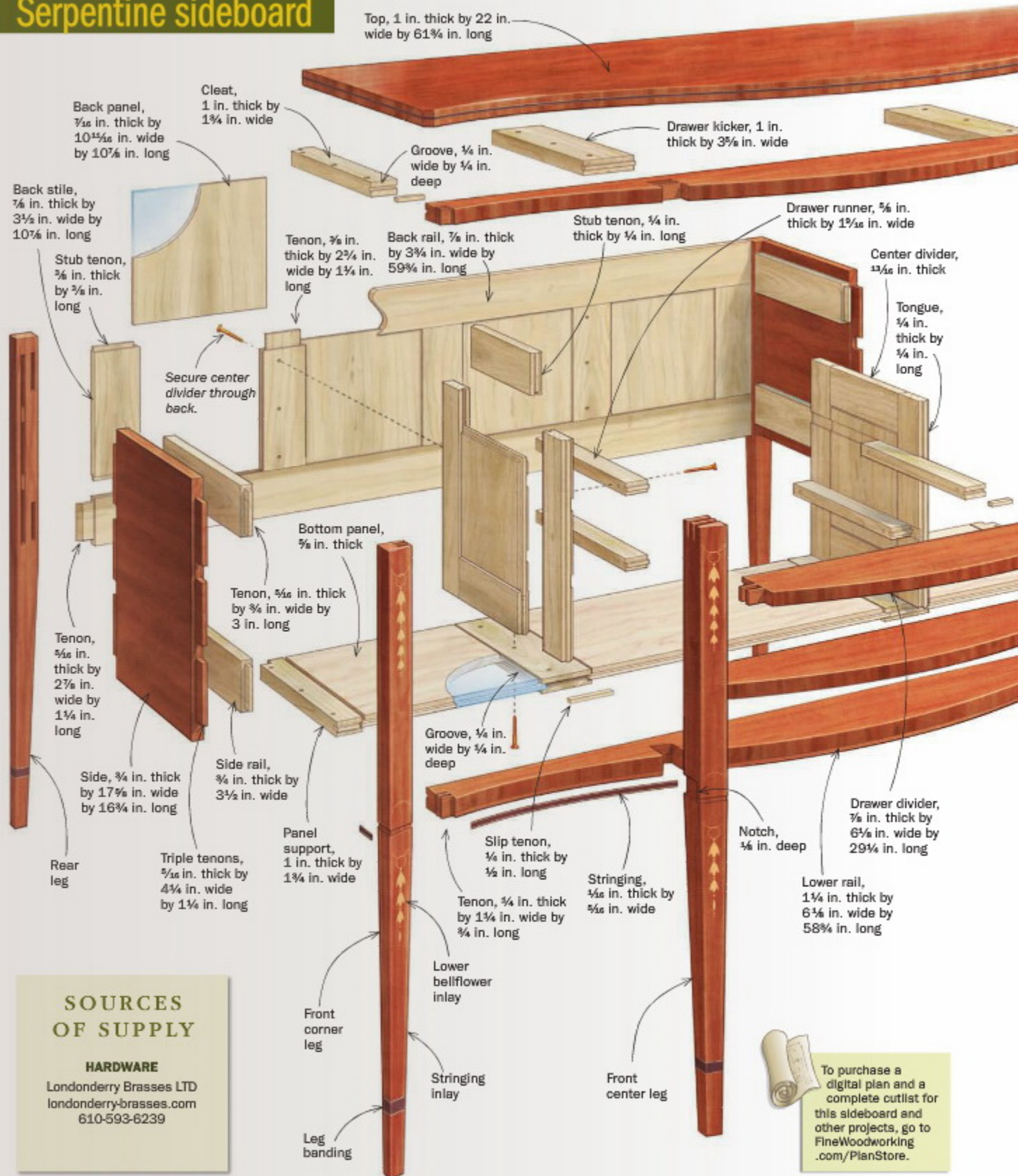
Finish edging the core. After grooving the edging and roughing in its shape on the tablesaw, glue it to the core. Use a curved scraper to fair the curve on both sides of the edging. It is wide enough so you can trim the door later to center the crotch veneer and fit it to the case.

Solid mahogany edging, $1\frac{1}{4}$ in. thick by 2 in. wide by approximately 16 in. long



Veneer the doors. After laminating the crotch veneer to backer veneer, vacuum-press it onto the door using the same form used for the core. A layer of rubber shelf liner covered with wax paper evens out the pressure.

Serpentine sideboard



SOURCES OF SUPPLY

HARDWARE

Londonderry Brasses LTD
londonderry-brasses.com
610-593-6239

To purchase a digital plan and a complete cutlist for this sideboard and other projects, go to FineWoodworking.com/PlanStore.

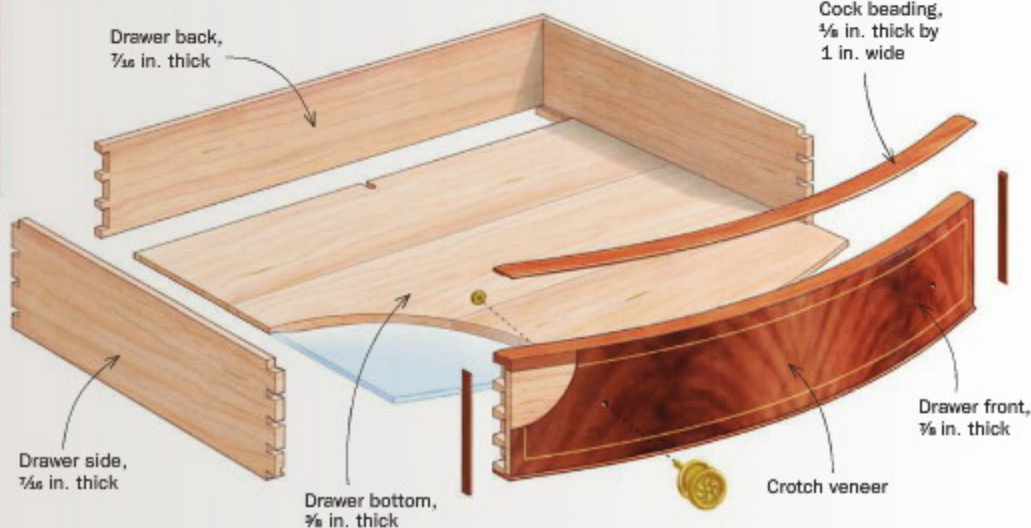
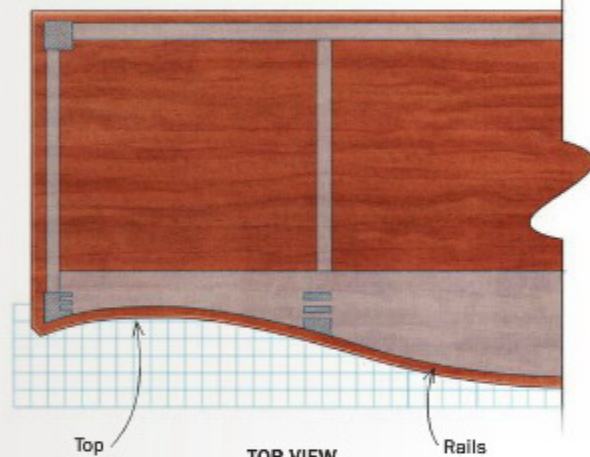
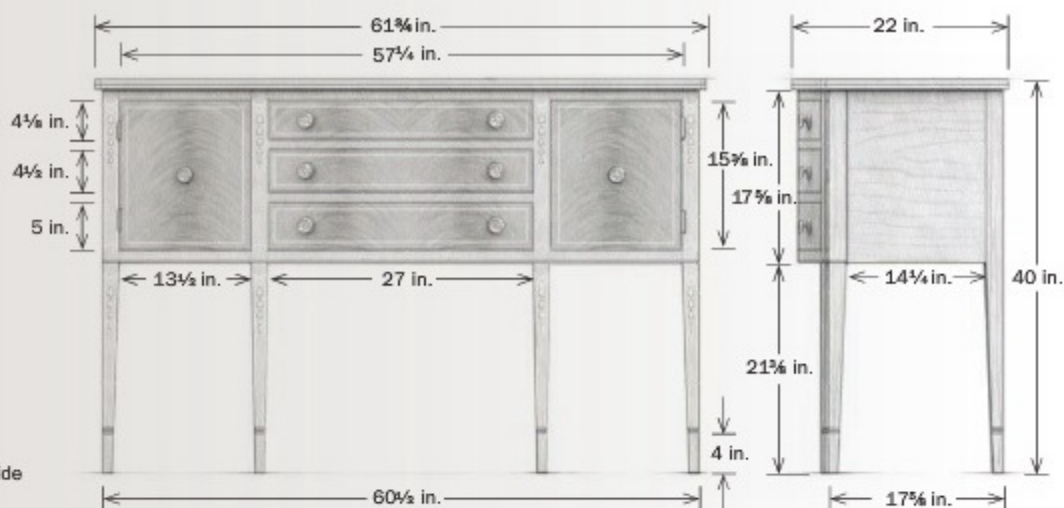


Upper rail, 1 in. thick by 6½ in. wide by 58¾ in. long

Tenons, ¼ in. thick by ¾ in. wide by 1 in. long

Mortise, ¼ in. thick by 1 in. wide by ¾ in. deep

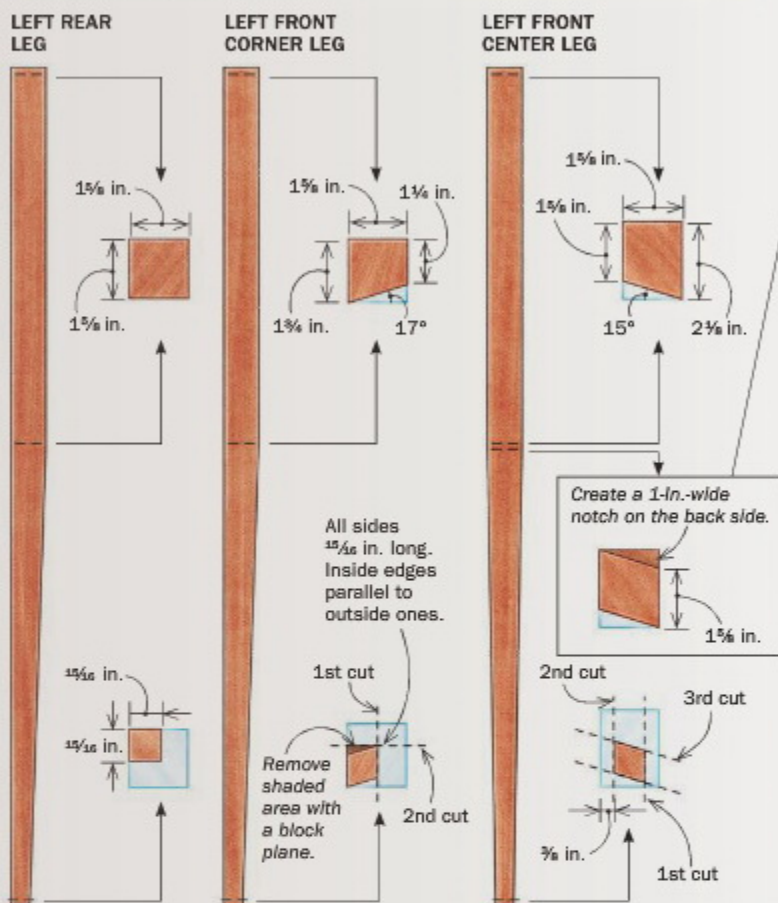
Mortise, ¾ in. thick by ¾ in. wide by 1½ in. deep



3 different legs are needed

The back legs are simple but the front ones are not: For one thing, their faces are beveled to match the serpentine shape, and the back faces need to be parallel to the front face to maintain an even taper. That means the front center legs must make an abrupt transition between top and bottom.

HOW TO TAPER THE LEGS



CENTER LEGS TAPER TO A NOTCH



Create a notch. On the back face of the left center leg, use a handsaw to create a series of cuts angled to match the front face, starting just below where the lower rail will meet the leg. Then clean out the cuts with a chisel.



Bandsaw the taper. Angle the table to line up the blade with the notch, and cut the taper down the back of the leg.

powerful for this delicate work and offers poor visibility of the workpiece. I use a foot-pedal on/off switch to keep both hands on the Dremel at all times.

Using a heating iron with a backing strap (an automotive feeler gauge works well), bend the holly stringing to the shape of the ring and cut a scarf joint. Inject some glue into the groove using a syringe and press the holly in place. After it dries, level the stringing with a sharp chisel. Put in the top and bottom arcs by spinning a Lie-Nielsen radius tool. Glue in a strip of holly, butting the ends to the ring and running out to a point that the straight lines will intersect. Let it dry and level them to the surface.

The straight stringing cannot be cut with a Dremel or a hand tool that references off the sides of the leg because of the diamond shape and absence of 90° corners. Instead, I modified a card scraper by filing a pair of sawteeth on the end of one long edge and grinding back the rest of that edge to let the teeth protrude. To guide the toothed scraper and to avoid having a clamp in the middle that might interfere with the scraper, I bowed one face



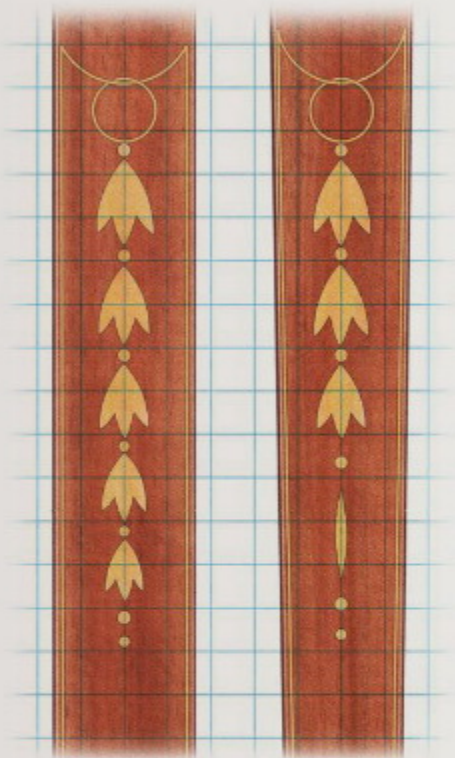
Clean up the cut. Use a block plane and a scraper to smooth and flatten the bandsawn surface.

TIPS FOR THE STRINGING AND BELLFLOWERS

The bellflowers are a beautiful Federal period decoration, but you can go with the stringing alone for a more contemporary look.

TOP OF LEG

BOTTOM OF LEG



For full size, photocopy bellflower layout at 200%.

of a piece of oak about 1 in. square by 20 in. long so that, like a caul, it could be held in place with only a clamp at each end. I covered this bowed side with peel-and-stick sandpaper so that it would not slide when clamped to the leg.

Cutting the intersection with the already inlaid arcs is rather fiddly. The straight stringing ends in a sharp point, so cut this part of the groove using an X-Acto knife or a scalpel and then clean it out using a strip of card scraper about $\frac{3}{8}$ in. wide with each end ground to a low angle. I used a #5 carving gouge to cut the end of the straight line stringing so that it continues the curve of the arc.

Once all the stringing is in, it's time for the bellflowers— Bellflowers originating from the Carolinas do not consist of individual petals; instead, the three petal flowers are cut as a single piece and set into the leg. After scrollsawing the bellflowers, use a #3 fishtail gouge to clean up any curves that just don't flow.

Run a pencil line down the center of the inlay area to help lay out the bellflowers. On a full-scale photocopy of the bellflowers, cut a little window in the paper at the top and bottom of the chain of flowers and use this to position the flowers along the line. With



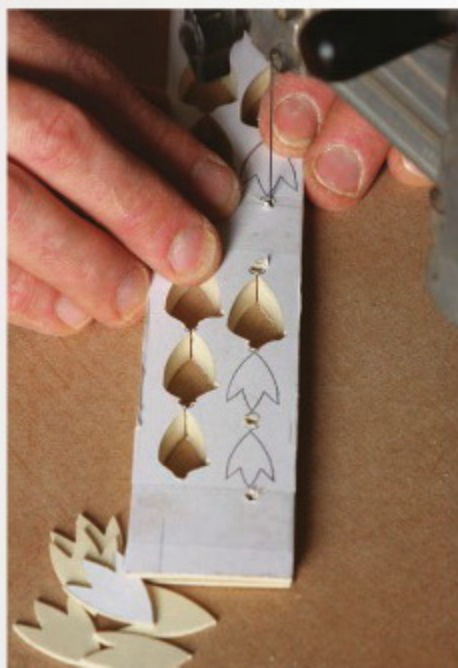
Bellflowers start with a ring. Ride the shaft of a $\frac{1}{2}$ -in.-dia. spiral bit against the sides of a $1\frac{1}{2}$ -in.-dia. hole in $\frac{1}{2}$ -in. thick MDF to create the groove for the inlaid ring of holly.



Excavate an arc. Use a radius inlay tool to cut the arc at the top of each section of stringing. Cut through the ring only in one place to give the impression that it is hanging from the arc.



Hand-cut grooves work best. Because the legs are diamond-shaped, it's hard to guide a power tool off the adjacent side when cutting the grooves for the stringing. So Latta custom-ground sawteeth onto a scraper and ran it along a block of wood.

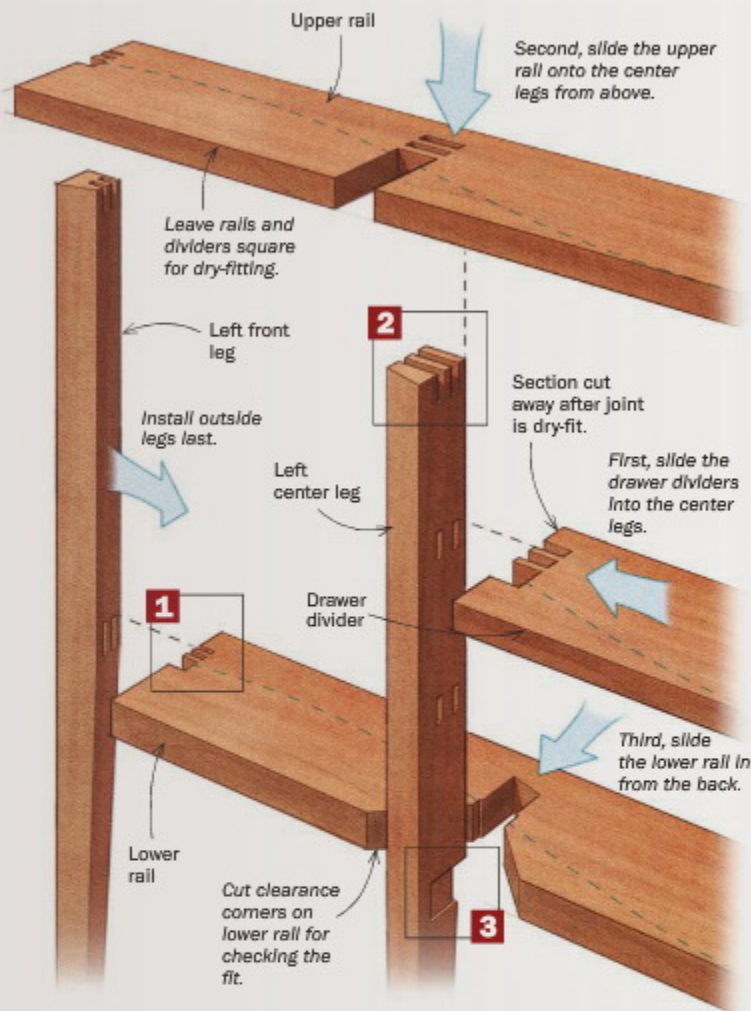


A bunch of flowers. Stacking four sheets of $\frac{1}{4}$ -in.-thick holly between top and bottom waste pieces, Latta spray-mounts the pattern to the top piece and wraps clear tape around the package. After drilling access holes for the scrollsaw blade, he cuts out the flowers.

Rails and dividers form the front

INSIDE THE JOINERY

The center legs connect to the rails and drawer dividers with a variety of joints. Execute and dry-fit the joints before cutting the front curves.

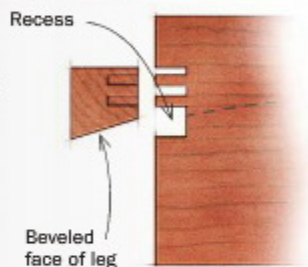


1 Tenon the upper and lower rails. Cut the double-tusk tenons on the ends of both rails. The boards are wide and long, so use a tall fence connected to a pair of miter gauges. Note the tall stop block attached to the fence.



CORNER RAIL DETAIL

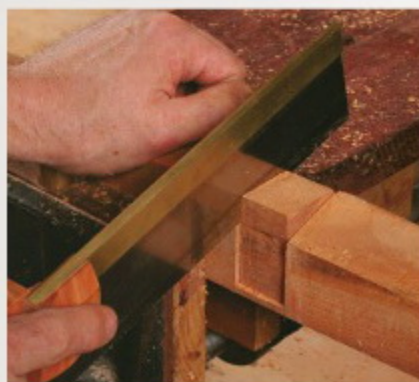
When cutting the tenons on the ends of the front rails, remember to cut an extra-wide recess in front of them to allow the rail to fit in front of the beveled face of the leg.



2 Tenon the center legs. Three tenons connect each center leg to the upper rail. Use the same setup as before.



3 The lower rail-to-center-leg joint. A notch in the center leg receives the lower rail, which is slid in from the back. Rout a $\frac{1}{4}$ -in.-deep recess in both sides of the leg that stops $\frac{7}{16}$ in. from the front (left). Connect the two recesses with an angled cut across the back of the leg (right).



Test the fit. Chisel away the waste between the sawkerfs and then fit the lower rail to the notch.

DRY-FIT THE WHOLE FRONT

After cutting all the joinery, dry-fit the front of the sideboard. Once you are happy with the fit, disassemble the pieces and saw the serpentine profile on the crosspieces (described in Part 2).

Drawer dividers first. Begin by dry-fitting the drawer dividers to the center legs.



Then add the rails. Bring the top rail down onto the tenons on the top of the center legs. Then slide the lower rail in from the rear. Last, add the front corner legs and check that everything is snug and square.

a sharp awl, punch through the pattern at the top and bottom of each flower, leaving a series of small pricks in the surface of the leg. These marks are used to position each flower.

Use a tiny speck of hot hide glue at the top and bottom of each flower to temporarily locate all eight. After the glue has set for a bit, trace around each flower with a scalpel or X-Acto knife and then pop it off using the same tool. I excavate the recess using the Dremel and router base with a $\frac{3}{64}$ -in.-dia. bit and clean up the corners with a Stanley 272 router plane with a tip that has been ground to a point. After all of the recesses are complete, I spread a little hide glue into each one and press in the flowers. Before adding the clamping caul, I place a thin piece of foam faced with clear tape on top to add a little spring and help accommodate any irregularities. After the glue has dried (hide glue fills small gaps), use a card scraper to level the flowers to the surface.

On the front, cut the joinery before the curves

Although there are a lot of components in this piece, you can simplify the building process. First, mill components of the same thickness all at once. For instance, the upper cleat and drawer kicker are the same thickness as the upper front rail. The interior panel assemblies and the side compartment bottoms are joined with stub tenons. Take those components to thickness but leave them a little wide and long for final joinery. Having those pieces ready to go saves a great deal of time when setting up to groove the back edges of the face frame into which they fit.

Besides the four legs, the front of the cabinet consists of an upper and lower rail and a pair of drawer dividers. The rails and dividers are not curved until all the joinery is cut and dry-fitted.

Double tenons create a strong joint—Begin on the tablesaw, cutting the double-tusk tenons on the ends of the rails. Because these rails are wide and long, I fit a short piece of scrapwood first

and that becomes my setup piece. I cut the tenons close and then fit them with a float or file. Use the plan to lay out the location of the mortises on the rail and cut them with the hollow-chisel mortiser. I cut the center legs down to $39\frac{1}{2}$ in. and tablesaw the tenons on one of the cutoffs to use as a setup piece. Because there is such a large glue surface with this joint, the fit should not be overly tight.

To allow the lower rail to slide in from the back, you must first cut some notches in each center leg (see opposite page). Transfer the profile of the notch to the rail and cut the rail to receive the leg. Work the leg back into the notch slowly, making sure it goes back into the rail the proper amount. Use a combination square and reference off the back edge of the rails to make sure that the two rails align or everything will be out of square and twisted. Make sure the openings are square.

Once the joinery on the rails is done, lay out and cut the double-tusk tenons in the drawer dividers. I make these dividers from stock about 7 in. wide to ensure that they hang past the upper and lower rails in the back. Once the dividers have been fitted into the legs, attach the upper and lower rails for a dry-fit. With a straightedge resting on the upper and lower rails and tight to the drawer dividers, place a pencil mark on both ends of the dividers and trim the dividers to this line. This ensures that the back edges of all four pieces are in line. The top rail becomes the template for curving the lower rail and the drawer dividers so they need to have a common point of reference.

Shaping and inlaying the front legs as well as the leg-to-rail and drawer-divider joinery are probably the hardest parts of this project. You are now more than halfway through. In the next article (FWW #224), we'll shape the front of the cabinet, complete the base, fit and finish the doors, and complete the sideboard. □

Steve Latta is a contributing editor.

2 Classic Pulls



◀ Soup up store-bought
or start from scratch ▶

BY MICHAEL PEKOVICH



I've made a lot of traditional furniture and I've learned the importance of getting the drawer and door pulls just right. Fortunately, you don't need to own a lathe to make the elegant turned pulls that are the hallmark of Shaker furniture, and you don't need to commission hand-hammered hardware every time you tackle an Arts and Crafts project. Instead, there's a really easy way to customize store-bought pulls, and I'll share a simple jig that will help you make your own classic pyramid pulls quickly and safely.

Michael Pekovich is Fine Woodworking's art director.

SHAKER PULLS MADE BY MACHINE, PERFECTED BY HAND



Before and after. The mass-produced piece (left) is rough and rounded over. A little sanding at the drill press reshapes it into a period-perfect Shaker pull (right).

You can get turned pulls in a variety of woods from most woodworking retailers. They are a convenient option, but the machine-duplicated profiles leave a lot to be desired. Typically, they lack the crisp detail and graceful curves of a hand-turned pull. They also tend to have heavy scratch marks and a nib at the center of the cap. Finally, the limited size selection often forces you to choose between a knob that's slightly too large and one that's too small.

The good news is that it doesn't take special tools or a lot of time to remedy any of these shortcomings. All you need is a drill press (even a handheld drill will do) and five minutes of sanding to change the profile or the diameter and to transform a generic pull into one suited for fine furniture.



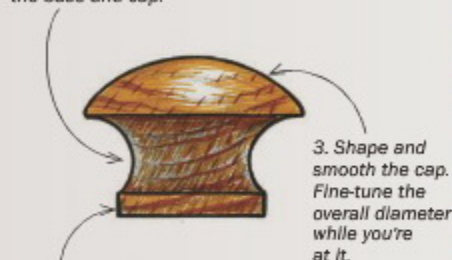
Two ways to mount the pull in the drill press. A tenoned end-grain pull can be mounted directly in the drill-press chuck (top). To mount a face-grain pull with a hole, cut the end off a bolt, chuck it onto the drill, and thread the knob in place (bottom).



FROM ROUGH TO REFINED IN MINUTES

THREE STEPS TO A FINISHED PULL

1. Hollow out the waist to create crisper transitions at the base and cap.



2. Square up the base for a hand-turned look.

3. Shape and smooth the cap. Fine-tune the overall diameter while you're at it.



Trim the wasteline. Wrap coarse sandpaper around a dowel to establish the waist (left), then sand up to 600 grit before moving on to the base. To shape and smooth the base (right), wrap the sandpaper around a small block to establish a flat face.



A smooth cap is the topper. A sanding block helps reduce the diameter (left), which can make pulls look more proportional on large pieces with graduated drawers. With the diameter established, shape a gentle, continuous curve across the cap (right). There should be no flat spots and no point at the center.

TIP

THE SECRET TO A SCRATCH-FREE CAP



Sanding while the pull is spinning will result in rings or a nib at the center. The trick to removing them is to stop the drill after every grit and sand across the cap by hand. Just a couple of strokes will do.

High-speed finish. With the pull spinning, wipe on a thin coat of shellac; it will dry almost instantly. Burnish with wax and fine steel wool for a satin luster that's pleasing to the touch.





MAKE THE BLANK



HOLLOW THE WAIST



BEVEL THE CAP



TRIM THE BASE

PYRAMID PULLS ARE BEST MADE FROM SCRATCH

You can buy square pulls, but the profiles are usually rounded over, lacking the crisp facets that catch the light. Also, the wood selection offers few choices of species or grain orientation. You can do better on your own. The trick, when working with any small part on power tools, is to do it safely. A simple jig solves the problem. Not only is it easy to make, it's also a true multi-tasker. Use it on the drill press to drill the screw hole and shape the waist. Then move it to the tablesaw to bevel the top.

START WITH PERFECT SQUARES

Mill the stock to $\frac{7}{8}$ in. thick and $1\frac{1}{4}$ in. wide. Make the strip longer than you need and save the excess to make the jig at right.



1 A sliding stop is safe and accurate. Use the width of the blank to set the stop's distance from the blade.



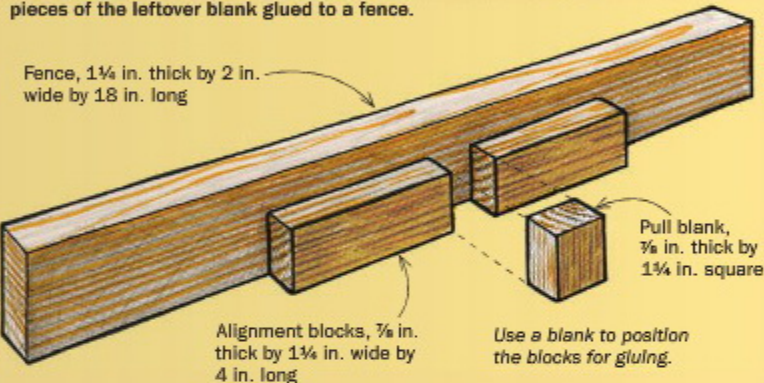
2 Position the workpiece. Hold the stop firmly in place while sliding the stock against it.



3 Slide the stop out of the way before making the cut. This prevents the block from being trapped against the blade.

MAKE THIS SMART JIG

This jig takes you through the rest of the steps. But it's nothing more than two pieces of the leftover blank glued to a fence.



Secure the blocks with pins. To prevent the blocks from sliding around during glue-up, Pekovich drives 23-gauge pins into the inside face and clips them off just above the surface.



Set the spacing during glue-up. When assembling the jig, sandwich a blank snugly between the two pieces to set the proper distance between them.



Drill the mounting holes. Insert a blank facedown on the table with the center point marked. Align the blank with the drill bit and clamp the jig in place. Now all the mounting holes can be drilled after marking just a single blank.

DRILL THE SCREW HOLE AND WAIST ON THE DRILL PRESS

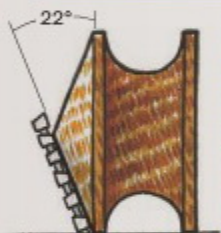


Center point, $\frac{1}{8}$ in. from fence, aligned with edge of blank. $\frac{1}{2}$ in. dia.

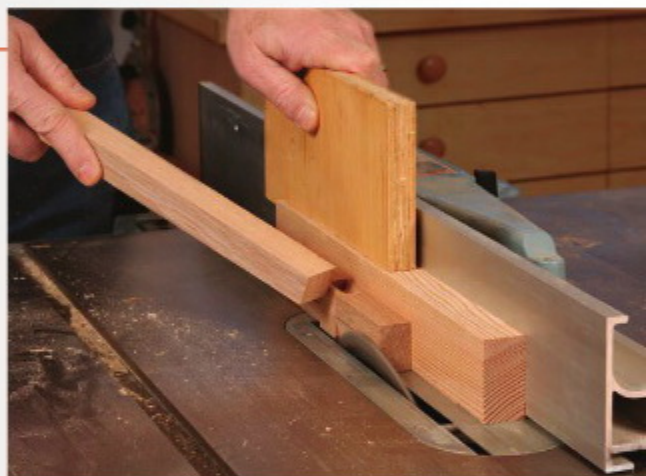


A Forstner bit shapes the waist. Install a blank with its bottom toward the jig's fence and position the jig so that the bit is centered on the edge of the blank. Drill the blank and rotate until all four sides are complete.

BEVEL THE CAP ON THE TABLESAW



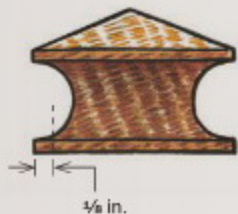
Set up the bevel cut. Draw a center line on the jig, tilt the blade 22° , and adjust the rip fence until the blade cuts just to the line. When the setup looks right, insert the first pull.



Cut the facets. Use a normal push stick on the jig and a simpler stick (a piece of scrap will work) to keep the pull in place throughout the cut. Rotate the blank after each pass until all four sides are beveled.

USE A CROSSCUT SLED TO TRIM THE BASE

Final cuts. Clamp a stop block to the crosscut sled and cut each edge of the base.

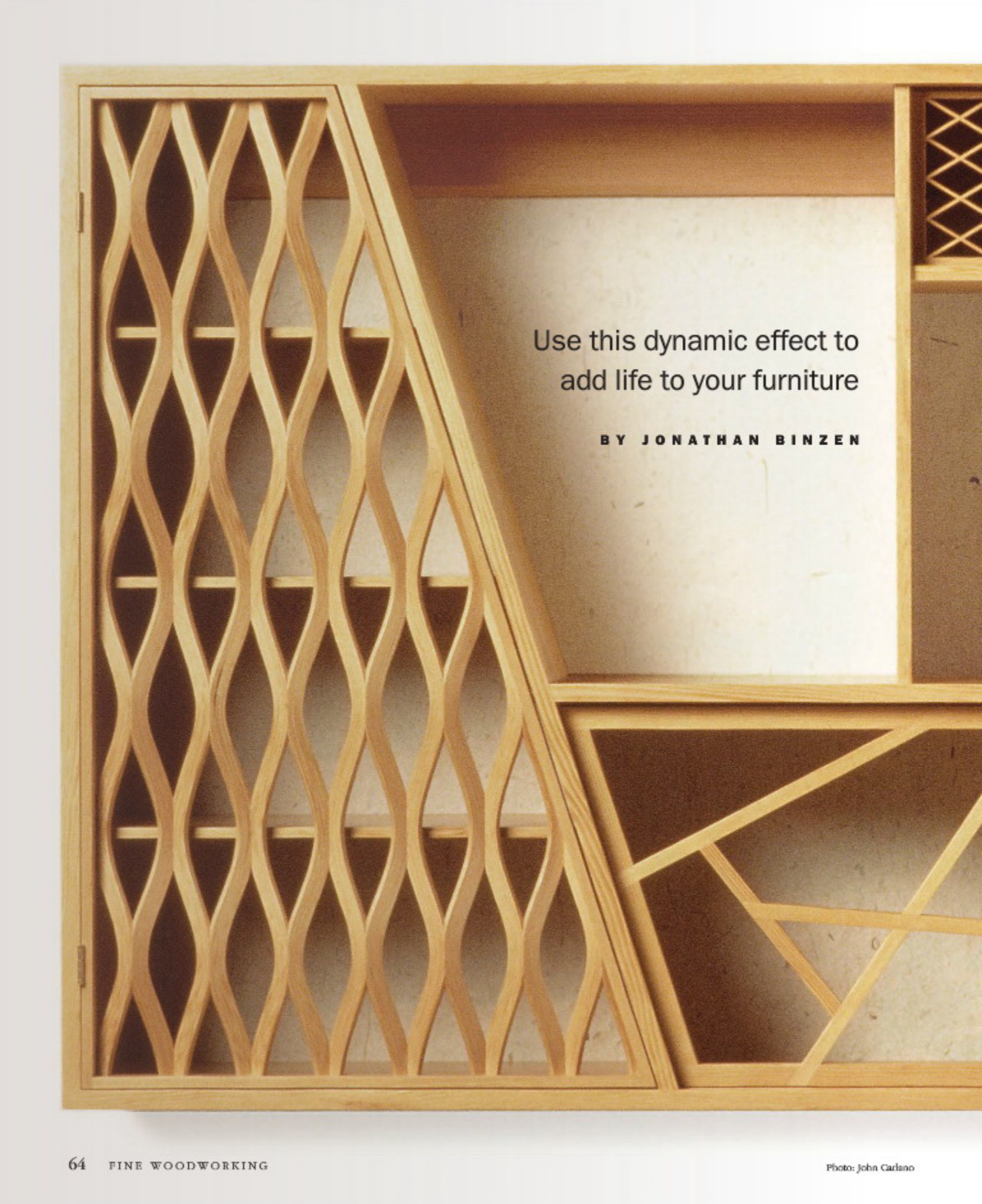


TIP

HOW TO SAND THE FACETS CLEANLY

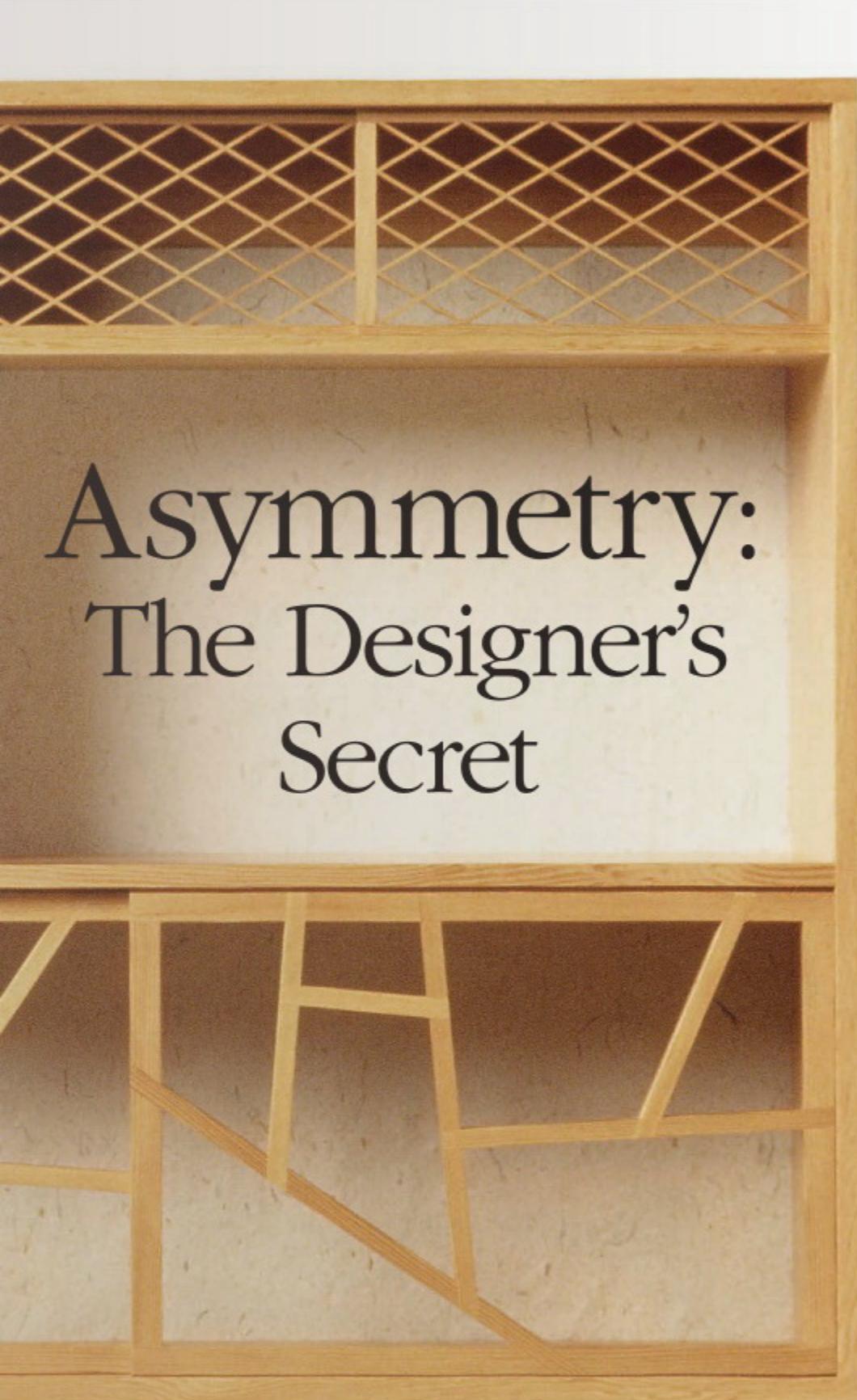


Place sandpaper on a flat surface and rock the piece up onto one of its facets. Keep it flat as you sand to maintain a crisp profile.

A photograph of a light-colored wooden cabinet. The cabinet door on the left features a complex, wavy lattice pattern made of thin wooden strips. The interior of the cabinet has a white background. The side panel of the cabinet has a geometric pattern of intersecting lines. The text is overlaid on the right side of the image.

Use this dynamic effect to
add life to your furniture

BY JONATHAN BINZEN



Asymmetry: The Designer's Secret

If you open a history of world furniture and leaf all the way through from Ancient Egypt to the present day, you'll find examples of perfect symmetry on nearly every page. In furniture—as well as in buildings and cars, toasters and tweezers—we almost always create designs based on bilateral symmetry: If you draw a line down the center of the object, everything to one side of the line is mirrored on the other side.

Perfect symmetry is the most direct way to achieve a gratifying visual balance in a design. Its appeal is likely wired into us—our faces and bodies, after all, are examples of bilateral symmetry, as are the plants and animals that surround us.

Because we're so conditioned to see symmetry, anything asymmetrical immediately commands our attention. In furniture, too, asymmetry can draw the eye. Too much, though, can make a piece simply look a mess.

The trick is to use asymmetry sparingly, and to find ways of establishing a visual balance without complete symmetry. This might be done by containing an asymmetrical pattern within a symmetrical frame; by creating a strongly symmetrical piece with just one or two asymmetrical elements; or by balancing the visual weight of asymmetrical elements. Here we'll show you a variety of successful strategies furniture makers use to elevate their designs through asymmetry.

Jonathan Binzen is a consulting editor for Fine Woodworking.

Leaving symmetry behind.

With its irregular partitions, variety of lattice patterns, and organic rice-paper back, Michael Hurwitz's wall cabinet illustrates the power of asymmetry.

Form

Some furniture makers apply asymmetry to the entire shape of a piece. Beware: These unconventional structures often require innovative solutions to joinery as well as to door and drawer installations.



Photo: George Ermi

Timothy Philbrick designed this two-drawer hall table, he says, "by taking the forms of a very curvy Louis XV desk and pulling them around" until he found a pleasing asymmetry. Philbrick achieves a visual balance by pairing a long, shallowly bowed drawer with a shorter drawer that has a rapid S-curved shape. Philbrick made swelling, S-curved side and back aprons as well, though none of the curves are quite the same. By keeping the curves and contrasts balanced and subtle, Philbrick created a piece that feels both classical and slightly subversive.



Photo: Courtesy of Timothy Philbrick

Japanese tansu cabinets. Although the layout of doors and drawers was generally uniform, Japanese makers strayed from symmetry when function required it.



Asymmetry through the ages

Asymmetrical furniture designs appear occasionally in many cultures, but most notably in Japan, where asymmetry is an essential element of the national aesthetic. The masterful balancing of asymmetrical components has been a hallmark of Japanese gardens, buildings, graphic arts, and furniture for many centuries. Whenever a vogue for asymmetry has arisen in Western furniture, the influence can often be traced back to the East.

Japanese tansu—portable storage cabinets—sometimes have an asymmetrical array of doors and drawers, which is both functional and pleasing to the eye (see photo, left).

Peter Shepard is typically drawn to symmetry and classical proportioning in his furniture. But when a customer asked him to design a buffet and said he wanted it to be asymmetrical, Shepard agreed to try. Shepard's design, based on the classic golden rectangle, balances a stack of four bow-front drawers with a pair of doors below two flat-front drawers. The four drawer fronts bow outward, adding more visual weight. To help tie the composition together, Shepard echoed the bowed fronts with an outward curve in the front edge of the top. He also cock-beaded all the drawer fronts, establishing a visual link between the curved drawers and the flat ones. By the way, the inlay in the top is marble.



Photo: Dean Powell



Photo: Michael Fortune

Michael Fortune's asymmetrical nightstands were built to flank a bed. Fortune says he frequently combines playful asymmetrical shapes to produce a balanced, symmetrical-feeling design. In these nightstands, to provide a visual counterweight to the asymmetrically rising arc of the back, Fortune curved the lower edge of the door so it sweeps in the other direction.

Most Chinese furniture is symmetrical in overall shape, but one prominent exception is root furniture, the practice of fashioning stools, chairs, and tables from the branches, trunks, or roots of trees (see photo, right), showing a reverence for nature. Echoes of such rustic pieces can be glimpsed in the work of Western designers from Thomas Chippendale to George Nakashima.

Cracked ice is another influential instance of asymmetry in Chinese design. A fractured pattern often found in Chinese ceramic glazes, it is also seen in furniture as wooden latticework filling window and door frames (see photo, next page). Western furniture makers adopted cracked-ice patterns as early as the



Deep roots in Asia. Furniture made from gnarled tree roots—symbolizing the asymmetry and unruliness of nature—has been coveted for centuries by Chinese scholars and intellectuals.

Partitions

You can create asymmetry within the borders of an otherwise symmetrical piece by playing with drawers, doors, and shelves.



Photo: Tom Benneet

Michael Hurwitz says that any designer's aim is "to find a balanced composition that's at peace with itself—and symmetry will get you to that harmonious place faster and easier." Still, Hurwitz sometimes takes the slower, harder route, as he did in this tansu-inspired bureau. He began the design by drawing an overall shape he liked, and then experimented with various drawer arrangements within it. He settled on a pattern of one short and one long drawer in each row, their disparity emphasized by two styles of custom-made Damascus-steel pulls.



Cracked Ice. The asymmetrical lattice pattern in this kitchen cabinet, traditional in Chinese furniture, has been adapted by a number of Western furniture designers.

Like almost all of **James Krenov's** cabinets, this one in Honduras rosewood and pear is symmetrical in overall form. But inside, Krenov divided the space unevenly, used dividers of different thicknesses and lengths, and reversed the usual graduation of drawers, placing the larger one on top. Casting aside convention, Krenov created a meditative composition from unmatched parts.



Photo: Seth Janofsky



Photo: Bill Traskow

Garrett Hack was inspired early by Shaker chests and built-ins, taking special note of their artful arrangement of drawers and doors and their occasional use of asymmetry. For his "Lil' Shaker" table, he decided to use an asymmetrical drawer arrangement to inject a bit of the unexpected in an otherwise restrained piece. Hack says that "asymmetry always draws your eye," but he thinks it should be used with care. "We want to see balance and quiet—not awkward and unresolved energy. The tipping point is very easy to cross."

Asymmetry through the ages (continued)

18th century, and the distinctive pattern continues to crop up in contemporary work.

In the West, from the Renaissance on through the first part of the 19th century, most furniture—and architecture—was designed using the precepts of symmetry and proportioning embodied in ancient Greek and Roman buildings. Adherence to symmetry was so strict that the rococo style of the late 18th century was characterized as "asymmetrical" for its use of slightly asymmetrical moldings and embellishments.

Shaker cabinetmakers employed asymmetry as deftly as anyone ever has. Most Shaker cabinets, with their chaste detailing, finely calibrated proportions, and banks of rhythmically graduated drawers, observe bilateral symmetry. But like the makers of

Decoration

Some furniture makers use their pieces as a canvas for asymmetrical decoration. Whether inlaid or carved, these playful details bring a piece to life.

Craig Vandall Stevens says that adding an asymmetrical pattern of marquetry or carving “can bring liveliness and tension to a symmetrical cabinet.” When a customer asked him for a cabinet with marquetry depicting a pair of Eastern phoebes—birds that mate for life—Stevens knew immediately that having just the two birds could lead to a design that felt flat-footed. He needed a third element to break up the symmetry and found it with the flowering dogwood branch. It gave the birds a place to perch and enabled Stevens to create an asymmetrical composition that sweeps down from the upper left, drawing the viewer’s eye with it.



Photo: Craig Vandall Stevens



Photo: Seth Janofsky

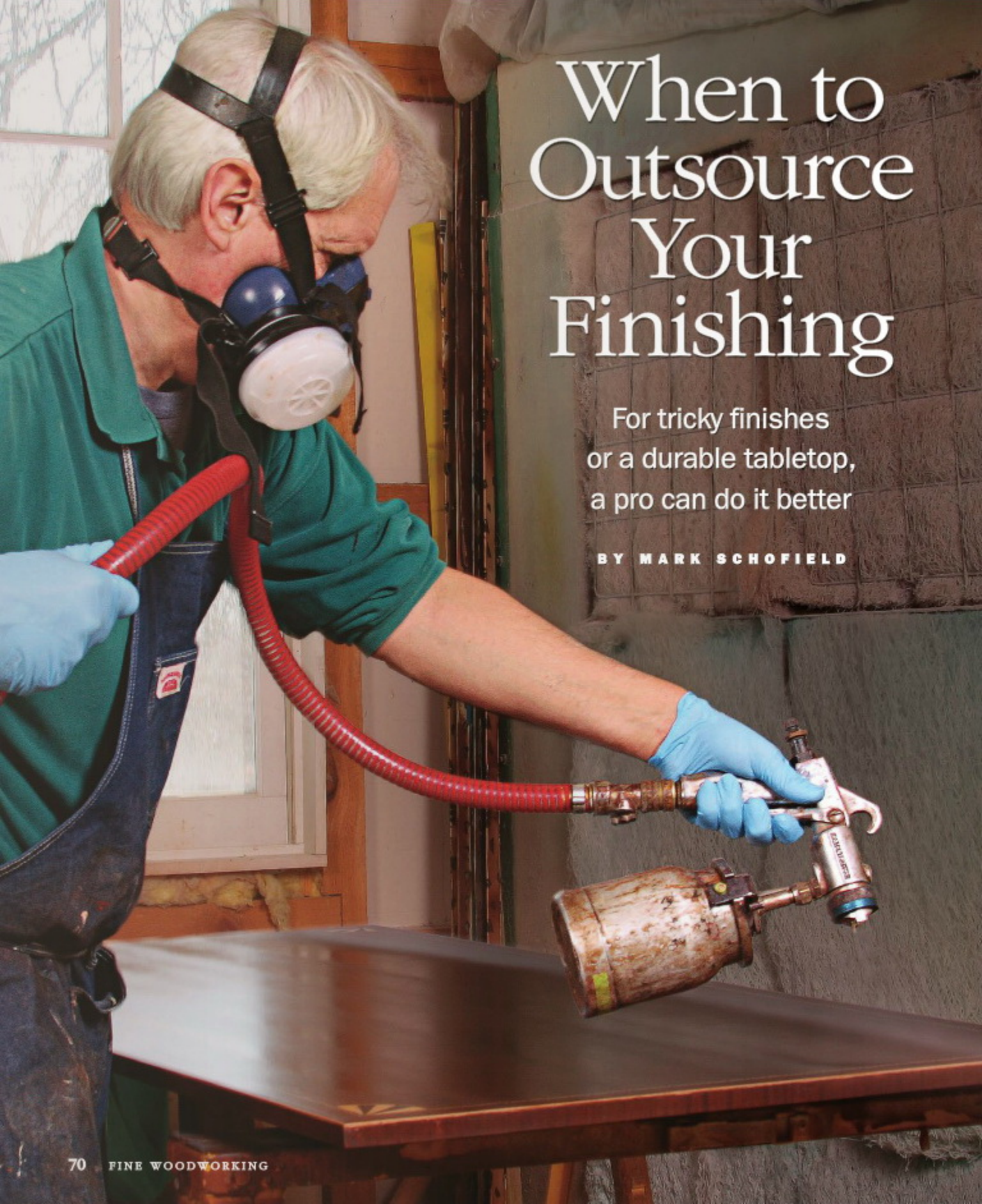
Seth Janofsky applied an asymmetrical marquetry pattern to this otherwise symmetrical cabinet. A shrewd observer of both Eastern and Western fine art and craft, Janofsky points out that furniture rooted in the symmetries of Greek and Roman architecture aims to attain “a sense of solid repose—a static quality. But the Japanese aesthetic entails a more complicated sense of balance.” Janofsky derived the radically asymmetrical pattern from Japanese graphic arts.

Japanese tansu, Shaker furniture makers felt no compunction in straying into asymmetry when function was better served by it (see photo, right). Working in cloistered communities largely removed from popular taste and demand, Shaker cabinetmakers built furniture with the user uppermost in mind. For example, Shaker sewing chests often feature banks of drawers that open from adjacent faces of the piece—presumably so that two people could work comfortably together.

As you can see here, contemporary makers tapped into historical precedents, taking the idea of asymmetry in all directions, from the overall form to the partitions and decorative patterns.



Shaker asymmetry. The maker of this Shaker piece struck a balance between four smaller drawers and three larger ones.



When to Outsource Your Finishing

For tricky finishes
or a durable tabletop,
a pro can do it better

BY MARK SCHOFIELD

For 11 years now, I've written and edited *Pine Woodworking* articles aimed at helping readers finish furniture they've made. Recently, while admiring Peter Gedrys's work finishing a Federal-style desk that I made ("Antique Finish that Holds Nothing Back," *FWW* #220), I had something of a Road-to-Damascus conversion. Why, I wondered, don't more woodworkers use a professional to finish some of their pieces? After all, most woodworkers don't like finishing and many struggle at it. So why do something you don't like, aren't good at, and at the same time risk ruining a piece you've invested a lot of time and money in?

When and why to use a pro

The two obstacles to using a pro are guilt and money. Many hobbyist woodworkers worry that if they have someone else finish their work, then it won't really have been made by them. On my desk, not only did I not apply the finish, but I also didn't saw and dry the lumber, slice the veneer, make the bandings, or cast the hardware. Still, I have no problem saying that I made the piece.

Regarding cost, if you are a pro it's fairly easy to calculate whether the time you'd spend finishing, multiplied by your hourly shop rate, is more or less than the cost of having a piece finished professionally. If you are an amateur, consider the cost of top-notch finishing tools such as a spray gun, a compressor, and a spray booth, as well as paying for classes in how to use them.

Unless you make a mess just wiping on a few coats of oil, I'm not advocating that you give up finishing your projects entirely. But there may be times when a particular finish is beyond your reach either technically or artistically.

I had this in mind when I did some research around the country about what a professional finisher would charge. I gave each finisher three finishing scenarios to price (see chart at right).

Three finishes to farm out

A really bombproof finish for a kitchen tabletop is beyond most woodworkers because they aren't set up to spray. There is simply no brush-on—let alone wipe-on—finish that can match a sprayed, catalyzed finish in terms of toughness and durability. While brushing or wiping on polyurethane to the less-touched, lesser-seen base of the table is fine, having a pro finish the top will give you a better-looking,



The most durable tabletop finish



An antique look for a tiger-maple bed

3 test cases

I contacted several professional finishers, gave them descriptions of three pieces of furniture and the type of finish I would like, and asked them to quote me prices for labor and materials. The owner is responsible for shipping the piece each way.

Each finishing project will be different, but these will give you some guidance in how much you should pay. At the very least, the range of prices suggests that you try to get more than one bid.

—M.S.



A high-style finish for a lowboy

TYPE OF PROJECT	FINISH APPLIED	PRICE RANGE
Kitchen tabletop, 3 ft. wide by 6 ft. long, close-grained wood	Sealed both sides, then two coats of a solvent or waterborne catalyzed finish on top, no rubout	\$270 to \$600
Pencil-post bed in tiger maple, queen-size	Antique maple water-based dye, coat of sealer, then two coats of solvent or waterborne lacquer	\$600 to \$1,200
Lowboy in mahogany	Medium brown, water-based dye, grain fill, selective glazing, clear coat with shellac that is rubbed out	\$1,000 to \$1,800

TIPS FOR WORKING WITH A PRO



PREP THE PIECE PROPERLY

A properly prepped piece will not only look better when finished, but it will also save you money by letting the finisher stick to finishing (below). The last thing you want is to have the finisher sanding your work while the meter is running. Be sure to remove all machine marks and glue squeeze-out, and carefully sand the piece (left) up through the grit specified by the finisher.



longer-lasting table overall. No one will notice the differences in the two finishes, particularly if they are the same sheen.

Most woodworkers have a phobia of dyeing wood. They don't have the knowledge of colors and how to combine them that a professional finisher has. Nor can they anticipate how a wood will react to the color, and because they lack the ability to remedy a problem, the fear of a mistake is that much greater. So I asked for prices on dyeing and then clear-finishing a tiger maple pencil-post bed.

Finally, even if you are a reasonably accomplished finisher, you may one day make a really special piece that deserves an equally special finish. If you've invested thousands of dollars and hundreds of hours making a period piece, just wiping on a coat of oil is rather like planting a single shrub in front of a new house and calling it landscaped. My final price request was to dye, seal, fill the grain, glaze, and clear-coat a mahogany lowboy.

Finding the right finisher

Finding a finisher who'll work with you may not be easy. Begin by looking in the yellow pages under furniture repair and refinishing and also furniture stripping. Online, Angie's List has a section for furniture refinishing and repair with customer reports on individual companies. Contact furniture makers, both one-man shops and medium-size operations. If they don't outsource their finishing to a professional, they may have one in-house, or they may be willing to do some extra finishing themselves. Check with local woodworking clubs. There may be a member who specializes in finishing and is happy to finish another woodworker's piece, often at a lower price than a professional would charge.

In all cases, ask for references, look at their past work, and if possible, visit their shop. With finishing you get a much better



BE CLEAR ABOUT WHAT YOU WANT

Both you and the finisher should have a good understanding of the finished look before work starts. Schofield shipped sample boards using different veneers from his desk to Peter Gedrys, who then applied a range of dyes and clear coats for Schofield to approve or suggest changes.

idea of the quality by seeing a piece in person rather than in a picture. Running your eyes over a surface lit with a raking light will show imperfections no photograph can reveal (I know, I've tried to capture them to illustrate finishing faults).

Clear communication avoids a disappointing finish

Once you've picked the finisher, you must agree on the finish. Unless you're just having a tabletop clear-coated, send photos of finishes that you like and of your unfinished workpiece, and sample boards of all the woods used. The finisher, for a fee, should work up different colors and/or sheens on these boards for you

HIRE OUT THE WHOLE THING OR JUST PART OF IT?

You may not need to have the whole piece finished by a professional. Sometimes it makes sense just to have the pro finish part of the piece or handle part of the finishing process, and do the rest yourself.

Spray the case, wipe the legs. Brian Sargent, a professional furniture maker in New Hampshire, isn't set up to spray, nor does he like the fumes of solvent lacquer. To obtain the durability this finish offers, he had a professional spray the case part of this lingerie chest. He finished the legs himself by wiping on Waterlox and then attached them to the finished case.



Spray the top. Another New Hampshire furniture maker, David Lamb, estimates he does 85% of his own finishing. However, "a furniture maker can't specialize in everything" and there are occasions when he goes to a pro. On this library table, Lamb finished the base with shellac. Another woodworker sprayed lacquer on the top, and then Lamb rubbed out that surface.

to approve. If you don't like the look, say so. It is better to correct the sample boards than to be disappointed with the final results.

The finisher should also tell you how to prepare the workpiece. Finishers' number one complaint was shoddy prep work by woodworkers, and all of them included some prep work in their prices. See if they'll reduce the price if you do the prep work properly.

Sand the surface to whatever grit the finisher specifies. Do the final sanding within two days of delivering the piece so that the surface doesn't get time to oxidize. Check the whole piece minutely for glue residue. Break all the sharp edges. To make access to the piece easier, don't attach backs to cases or bottoms to deep drawers. Remove any hardware, including drawer slides.

You want the table when?—Don't deliver the table to the finisher on December 20 and then tell them you need it for Christmas lunch. Even the simple catalyzed clear finish on the kitchen tabletop will take a couple of days to spray and should rest for three days before being wrapped and shipped. And if the topcoat needs to be rubbed out, it has to cure first for at least 200 hours.

How to get a finished piece home safely—To get the workpiece home without damaging it, it's a good idea to invest in one or more moving blankets or quilted pads (\$15 at U-Haul) and also some stretch plastic wrap to hold them in place around the workpiece. Don't wrap a finished piece directly in plastic or bubble wrap as this may imprint the surface, especially in hot weather.

Once the piece is home and all your friends, relations, and fellow woodworkers are admiring it, then you'll know that going to a finishing pro was money well spent. And you'll be halfway done with your next project already! □

Mark Schofield is the managing editor.



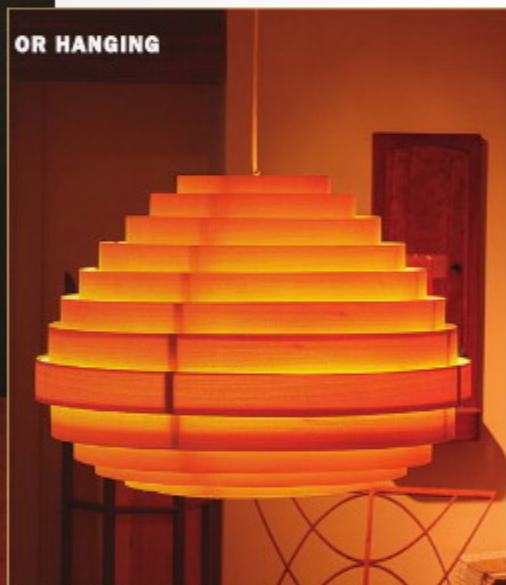
Start to finish. Schofield tasked Gedrys with the entire job on this Federal desk. With a multi-step finishing process like this, it may make more sense to let a pro handle everything. This avoids disputes about who is to blame if things go wrong.

Two Unique Lamps

I love the warmth of light passing through wood, and lamps made with thin veneers are the perfect way to get that effect. I've designed many hanging, floor, wall, and table lamps using a variety of veneers. Standard commercial veneers and wide edge-banding are just the right thickness, and lighter-colored woods tend to make the best lamps: birch, maple, pine, holly, white cedar, sycamore, and basswood, to name a few. This is one of my favorite designs, handsome yet easy to build, and versatile enough to work as either a table lamp or hanging lamp.

The table lamp has a crosslapped base,

TABLE OR HANGING



Make two different lamps using one technique. See p. 79 to build Becksvoort's hanging version.

four vertical posts, and a smaller crosslapped top to tie the posts together. The shade is hard maple veneer rings alternating from outside to inside. I had store-bought edge-banding in my shop, which made this project easy because I used the existing width and didn't have to cut veneer strips. But you can always use full sheets of veneer and cut them to width without complicating things too much. That would give you grain

Rings of veneer create style
and ambience

BY CHRISTIAN BECKSVOORT

A DIFFERENT KIND OF TABLE LAMP

Top crosspieces, $\frac{3}{8}$ in. wide by $\frac{1}{2}$ in. tall by 11 in. long

Notch, $\frac{3}{8}$ in. wide by $\frac{1}{2}$ in. deep

Posts, $\frac{1}{2}$ in. thick by $\frac{1}{2}$ in. wide by $20\frac{3}{4}$ in. long

Outer and inner maple veneer rings, $2\frac{1}{4}$ in. wide

1-in. spacing between rings leaves $\frac{1}{2}$ -in. overlap between inner and outer rings.

Lowest inner ring is $4\frac{7}{8}$ in. from the base.

Lowest outer ring is $3\frac{13}{16}$ in. from the base.

Slot, $\frac{1}{8}$ in. wide by $\frac{1}{2}$ in. deep

Brass socket

Brass tubing with threaded ends, $\frac{3}{8}$ in. dia. by 7 in. long

Tenon, $\frac{3}{8}$ in. square by $1\frac{5}{16}$ in. long, trimmed flush after glue-up.

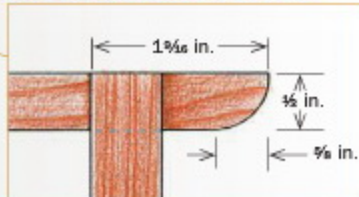
Sawkerf for wedge, $1\frac{1}{16}$ in. deep

Notch, $1\frac{1}{16}$ in. wide by $\frac{3}{8}$ in. deep

Bottom crosspieces, $1\frac{1}{16}$ in. wide by $1\frac{1}{16}$ in. tall by 13 in. long

Inline switch

TOP CROSSPIECE TENON DETAIL



PERFECT CROSSLAPS

Create the crosslaps at the top and bottom of the lamp using a standard tablesaw blade.

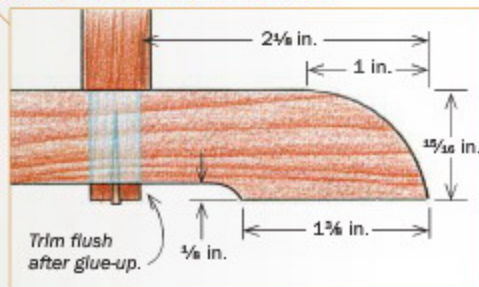


Center the joints. Using the rip fence as a stop, make repeat cuts to waste away the joint. Start at the center point and work your way out, flipping the piece back and forth to keep the joint centered in the stock.



Sneak up on the fit. Keep test-fitting the second piece to the first as you make the centered cuts. The pieces should fit snugly.

BOTTOM CROSSPIECE FOOT DETAIL



SOURCES OF SUPPLY

VENEERS/BANDING

woodcraft.com;
homecraftveneer.com;
forestplywood.com

LAMP PARTS

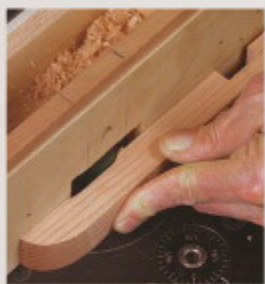
Available at most hardware stores and at
mylampparts.com;
grandbrass.com

ZINSSER BULLS EYE SPRAY SHELLAC

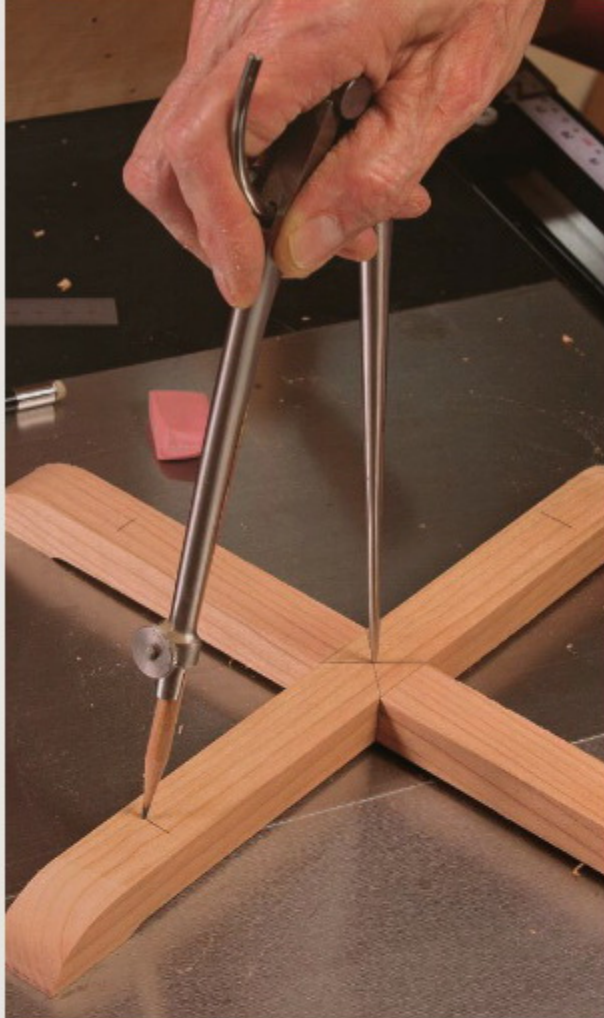
Aerosol can, available at any hardware store

DRILL AND MORTISE THE BASE

The base gets four mortises to hold the posts, and a center hole for the brass lamp post.



A shallow relief creates the feet. Using a stop block against the router-table fence, Becksvort pivots into the cut and pivots out at the halfway mark. Then he flips the piece and pivots in again from the other side. This ensures that all the feet are exactly the same size.



Work from the center out. Locate the center of the crosslap, and then use a compass to mark an equal distance on all four feet. The distance is not as important as that they all be identical.



Start on the drill press and finish up by hand. While the base pieces are together, drill for the center hole that will hold the brass post (left). Then take apart the base and drill the four holes that will be the through-mortises (center). Use a chisel to turn the drill-press holes into square mortises (right).

continuity along the height of the lamp and open up your wood choices.

Easy joints for the base and posts

I started with the base, crosslapping the parts at the center. When I had a perfect fit, I drew the curved ends of the pieces, cut them on the handsaw, and sanded them smooth. Also, I routed a relief on the bottoms that created four feet.

At the drill press, I drilled a hole near each end of the crosspieces and a fifth hole in the center. Next, I chiseled around the holes to make four through-mortises, leaving the center hole round to accommodate the brass tubing that holds the wire. Finally, I glued and clamped the lap joint.

The four posts are easy to make. I tackled the tenons on the bottom ends first, then on the top end, I made a centered slot to form the inside of the bridle joint.

Top pieces get crosslaps and tenons

The top is similar to the bottom, two pieces crosslapped in the center, but you don't have to cut through-mortises for the posts. Instead, cut a tenon on the ends of each piece, which forms the center of the bridle joint. Again, I made the crosslap on the tablesaw, then cut a centered tenon on



FINISH UP THE FRAME

Four posts are mortised into the base and then the top pieces are added to provide the framework for the rings. The bottom of each post gets a traditional tenon to go into the base. The top of each post gets a bridge-joint slot to hold its top piece.



Tenon and slot the posts. You can form the tenons with a standard tablesaw blade. Use a miter gauge, with the rip fence as a stop. Work your way around the stock, making multiple cuts (above). Create the slot on the top of the posts with a tenoning jig (right).



Glue the posts into the base. For added strength, Becksvoort hand-saws a kerf in the tenons and wedges them during the glue-up (above). So the top doesn't get in the way while gluing in the rings, he only dry-fits it at this point, holding it place with rubber bands (right).

each of the four ends. The bottom edges of the tenons are rounded. After sanding, I glued the crosslap but just dry-fitted the top onto the posts, until the rings were in place. This completed the lamp frame and left me with the fun part, the shade.

Nine rings for the shade

To make the shade, I prefer plain wood banding, but banding with thin paper backing works, and makes the wood less likely to split. The pre-glued stuff does not work, because the glue may melt. I made the rings first and then attached them to the frame. A simple formula determines the length of the veneer strips that



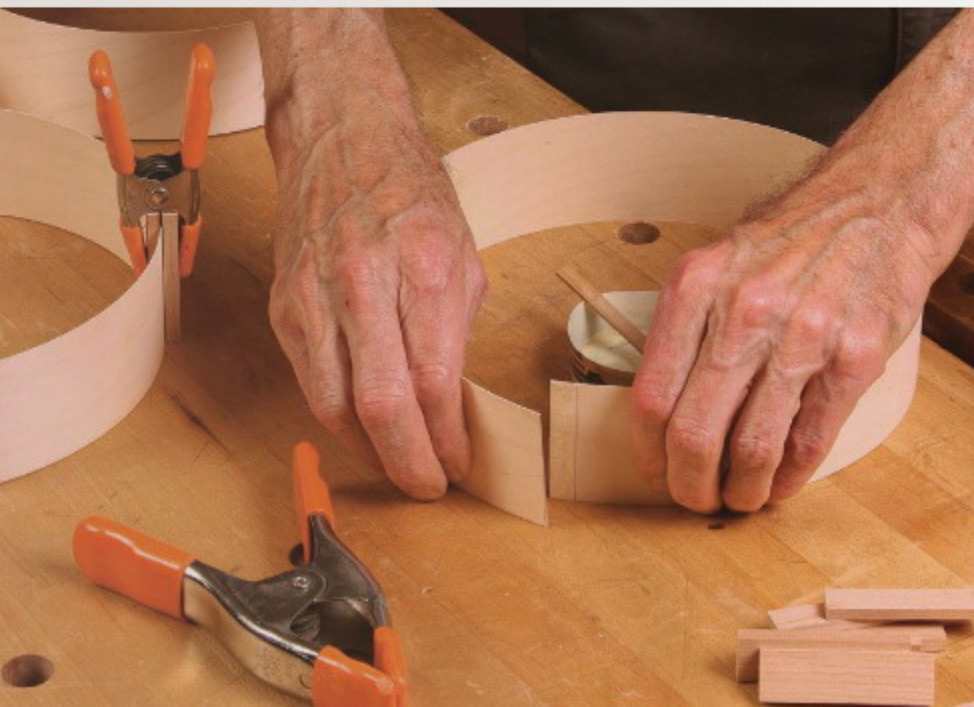
ADD THE RINGS

The nine veneer rings give this lamp its unique look and warm glow. Use an easy mathematical equation to figure out the size of the rings. First create the rings, and then glue them to the frame.

Embrace the math. For perfect-fitting rings, Becksvoort uses a simple formula. Measure the distance from the outside of the posts for the outer rings and the inside of the posts for the inner rings. To find the circumference (the length of the veneer strips), multiply that distance by pi (π), 3.1416. Add $\frac{3}{8}$ in. for the gluing overlap.



Rings are easy to make. Cut the rings to length with each end square (right). Mark the $\frac{3}{8}$ -in. overlap at the ends of each strip, apply a thin layer of glue, and tape the lap to form a circle. Working on a flat surface, add a small caul on the inside and outside of the lap and apply a spring clamp for pressure (below).



I glued into the rings (see photo, left). You might be tempted to just test-fit one ring for the outside and one for the inside and make the rest to match. I am leery of this method for two reasons. Test-fitting a circle on the inside is more difficult than the outside. If you don't get it right, you could mess up all the interior rings. Also, you could end up with squarish circles instead of the consistency you get with minor calculating.

Once I cut the veneer strips to length, I marked the overlap on the ends of each strip, applied a thin layer of glue, and clamped the overlap to form a circle.

I laid out the location of the rings on the posts. Since a table lamp is seldom seen straight on, the rings overlap to hide the bulb. This also creates a dramatic effect because the lighting is different where the rings overlap. I glued on the bottom outside ring first and worked my way up, alternating between the outer and inner rings. Because the spring clamps I use for pressure get in the way of gluing and clamping the next ring, I also use tape to keep things in place. That way I can pull the clamps after a few minutes and keep working. The top crosspieces go on last.

Adding electricity

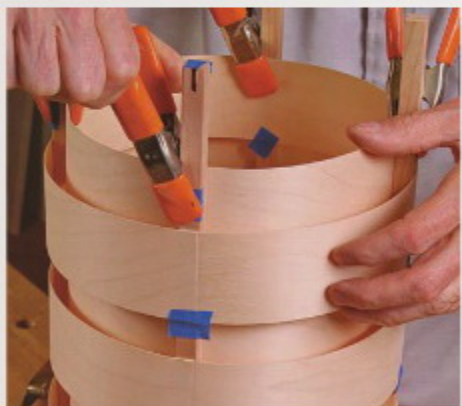
To electrify the lamp, I purchased a brass socket, brass tubing with threaded ends, two threaded brass lock washers to fit, about 10 ft. of electrical cord, an inline switch, and a plug. Simply wire the cord to the socket, tie an underwriter's knot, pass it through the tubing, screw the tube through the $\frac{3}{8}$ -in. hole in the feet, and attach the plug and inline switch. I use compact fluorescent bulbs because they create less heat than standard bulbs.

For a finish, I decided on spray shellac. Any wipe-on or brush-on finish is out of the question, because of the overlapping rings. I concentrated on spraying the outside of the rings, but to do a good job covering the overlapping areas you will have to get some spray on the inside of the shade, which is not a big deal. □

Christian Becksvoort is a contributing editor.



Dry-fit first. Mark the locations with tape (above), make sure the rings fit well, and make sure all the joints end up on the same post (right), which will become the back of the lamp. When you are ready to apply glue, work from the bottom ring up, putting glue on the posts only, not the veneer.

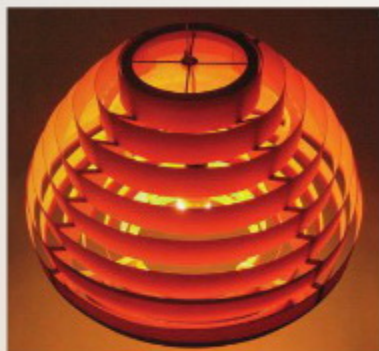


Add the top. When all the rings are dry, glue the top into its bridle joints. Spring clamps are perfect for this glue-up.

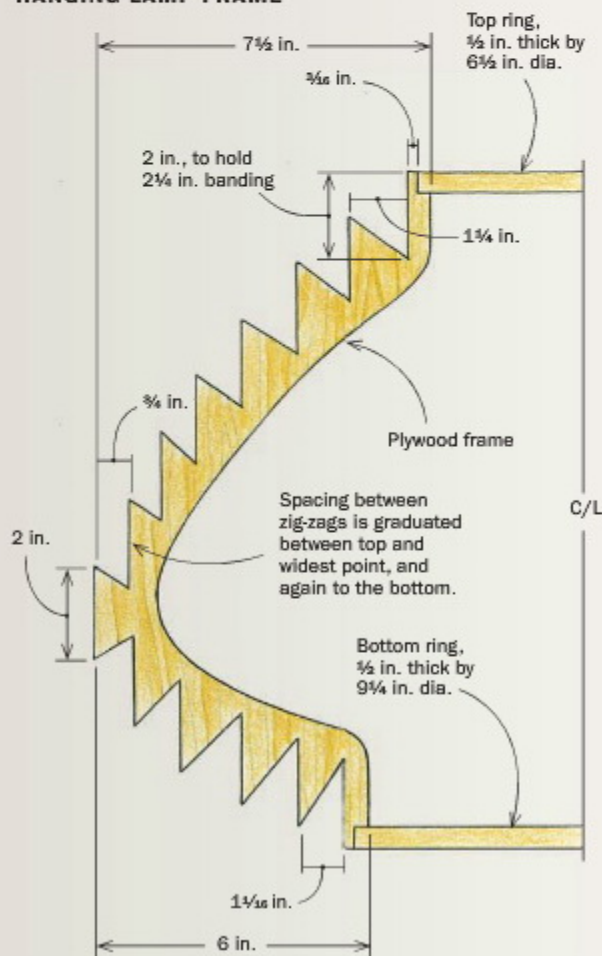


A twist on the straight lamp

This version of the veneer ring lamp uses store-bought edge-bandings the same way as the straight version. The difference from the straight lamp is the internal frame. Rather than four straight posts connected to a top and bottom, four curved, notched plywood frames get screwed to a top and bottom ring turned from a bricklaid block of cherry. When the rings are attached, they follow the stepped shape of the frames. The brass hanger is from Lampshop.com, with its ring snipped off and its arms inserted into the cherry ring. —C.B.



HANGING LAMP FRAME



readers gallery

KEVIN AINSWORTH

Manchester, N.H.

Ainsworth, a North Bennet Street School graduate, took his inspiration for this heart-back armchair from a Philadelphia original, circa 1780-1800. The original was mahogany, but Ainsworth used black walnut and also scaled up the size slightly to fit the modern stature. His chair, finished with shellac, is 18½ in. deep by 22½ in. wide by 39½ in. tall. PHOTO: LANCE PATTERSON



ROBERT ROEMISCH

Ojai, Calif.

While demonstrating 19th-century woodworking at the historic Shaker Village of Pleasant Hill in Kentucky, Roemisch wanted to build a project that wasn't a typical Shaker reproduction yet still showed historic woodworking techniques. This cherry loom—with its through-mortise-and-tenons, wedged mortise-and-tenons, and bridle joints—fit that bill. Finished with Danish oil, polyurethane, and wax, it is 38 in. deep by 39 in. wide by 60 in. tall.



Submissions

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

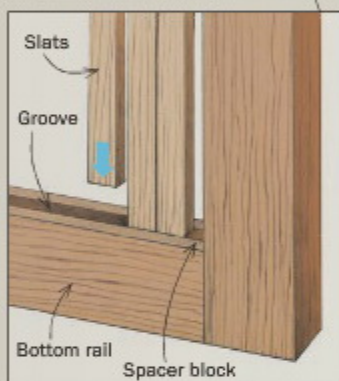
HEATHER TROSDAHL

Fort Bragg, Calif.

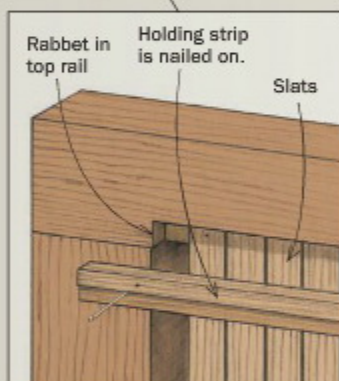
A FEW NEW TWISTS

It isn't easy to come up with a new treatment for door panels, but these twisted slats are proof that not everything has already been done. Instead of solid door panels in this brown oak and valley oak credenza (16 in. deep by 49½ in. wide by 29 in. tall), Trosdahl used individual slats that she steamed and twisted. The negative space created by those slats inspired the shape of the door and drawer pulls. The top is finished with Liberon Finishing Oil, and the rest of the case with shellac. PHOTO: DAVID WELTER

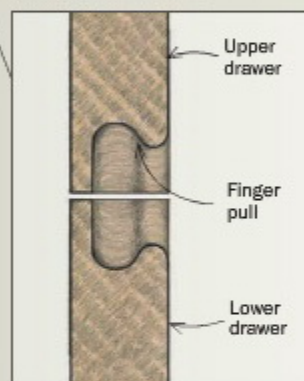
INSTALLING THE SLATS



After Trosdahl steamed and twisted the slats, she set the bottom ends into a groove in the bottom door rail (left), and against a rabbet in the top rail (above), nailing a delicate strip over them to lock them into place.



CREATING THE PULLS



To create the recessed pulls, Trosdahl used an overlong template and a finger-grip router bit (Amana No. 53806) equipped with a guide bushing.

ZACHARY HARMS

Cicero, Ill.

When the Shedd Aquarium in Chicago was throwing away solid wood from an old exhibit, Harms jumped at the chance to salvage the lumber and use it in this credenza, 26 in. deep by 62 in. wide by 32 in. tall. He used the Australian red mahogany (also known as red eucalyptus) in the legs, door frames, and side frames. The panels and top are sapele and the interior shelves are jatoba. The finish is shellac and wax.

PHOTO: DAWN HOLLER-WISHER





KENNETH L. WILLIAMSON

South Hadley, Mass.

When asked how long it took to complete his Philadelphia highboy, Williamson said, "Several hundred hours and 35 years." He started it four decades ago but kept working on it and changing things until he was finally satisfied. The piece was inspired by an original Garvan Carver chest. Although that piece was walnut, Williamson's version (22½ in. deep by 39½ in. wide by 89 in. tall) is mahogany. The finish is orange shellac and wax.



RON NOLTE

Salt Lake City, Utah

Nolte designed this cabinet-on-stand (12 in. deep by 44 in. wide by 69 in. tall) around an ingrown branch he discovered when he resawed a board. He bookmatched that piece of maple for the doors, and the rest of the cabinet is beech. The finish is catalyzed lacquer. PHOTO: ANTHONY OLIVER

ROBERT LUSSIER

Blackstone, Mass.

This lacewood chair (24 in. deep by 16 in. wide by 30 in. tall) is Lussier's interpretation of Gerrit Rietveld's 1934 Zig-Zag Chair. Lussier says the simple lines of the chair are misleading, because it is deceptively difficult to build. He used stainless steel hardware (www.jakob.ch) as a design element that also reinforces the miter joints. The finish is hand-rubbed lacquer.



NEW YORKERS FOR NEPAL

Kids of Kathmandu is a fledgling nonprofit that uses the arts to raise awareness about the needs of orphans in Kathmandu, Nepal. Part of the group's first large-scale fundraising initiative, The Desk Project enlisted 11 prominent New York City woodworkers, architects, and designers to build desks for kids. All 11 desks were sold in a silent auction at the organization's first annual gala and the proceeds will send 41 Nepali orphans to school. For more information, go to kidsofkathmandu.org. PHOTOS: JAMI SAUNDERS

MARK RIGHTER

Brooklyn, New York City

When it comes to children, says Righter, curves are king because they are safe, fun, and playful. He also wanted to create the feeling of motion and found design inspiration in the leg area of a Vespa scooter. This red oak, maple, and maple plywood desk (40 in. deep by 20 in. wide by 24 in. tall) is finished with latex paint and water-based lacquer.



ANDREW RUMPLER

Brooklyn, New York City

Rumpler used reclaimed mahogany pallets for the frame and gridwork of this desk, and he created the bold graphic pattern of the top with epoxy resin. His design inspiration came from the paintings of Piet Mondrian. Borrowing the painter's playful yet structured aesthetic seemed like a good fit for a children's school desk. Finished with tung oil, the desk is 16 in. deep by 30 in. wide by 20 in. tall.



ANDREW RAIBLE

Brooklyn, New York City

Raible, a co-founder of Kids of Kathmandu, was inspired by classic school desks of the 19th century. His modern take (18 in. deep by 40 in. wide by 22½ in. tall) turns the inkwell into a port for computer wires. The maple desk is finished with Danish oil and accented with green latex paint.



Strengthen cope-and-stick joints with dowels

Q: I'm making a cabinet that will see everyday use. It has two frame-and-panel doors with solid-wood panels. Are cope-and-stick joints strong enough to be used on the doors?

—BERT KNEAL, Chico, Calif.

A: NO, THE JOINT ISN'T STRONG ENOUGH for daily use, because the lateral forces created by the door repeatedly striking against the case or face frame weakens the joint and may cause it to fail. I've repaired numerous doors that have suffered that fate. If you want to use a cope-and-stick joint, reinforce it with two dowels. After milling the rails and stiles to their final dimensions, use a doweling jig to drill the holes for the dowels before cutting the cope and sticking. I like using $\frac{5}{16}$ -in.-dia. dowels, splitting the 2-in. length evenly between the rail and stile.

By the way, the situation would be different with plywood panels, which can be glued into their grooves, strengthening the door and eliminating the need for the dowels.

—Steve Latta is a contributing editor.

Ask a question

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



Drill holes for the dowels first. On the rails, they need to be far enough in from the edge that you don't cut into them when forming the sticking.



Rout the sticking. It goes on the inside edge of all four frame parts, as shown. Then rout the cope. It shapes the end grain of the rails so that they nest over the sticking on the stiles.



Assemble the door. Glue the dowels in the rails first. Then spread glue over the coped end grain and the exposed dowel before adding the stiles and panel.

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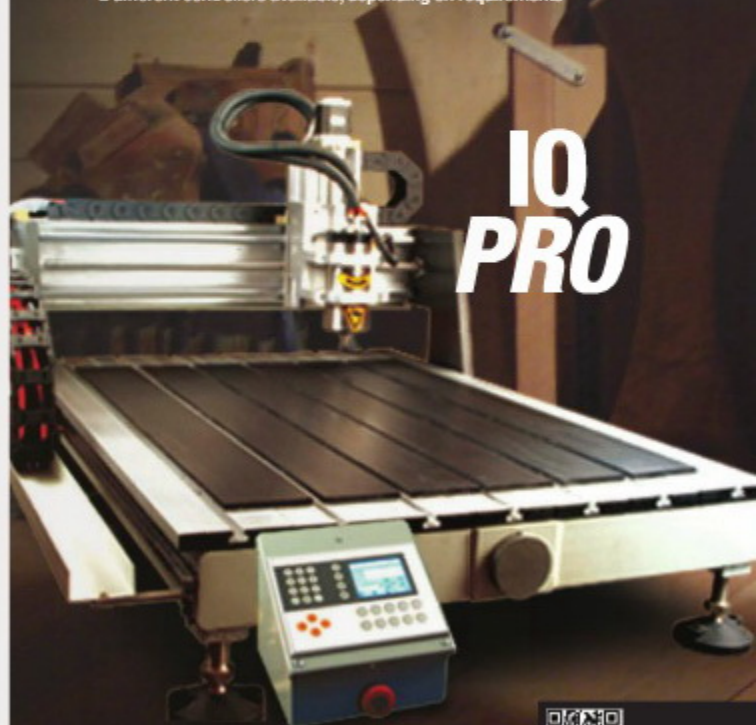
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Secondary bevel saves time and effort

Q: Many woodworkers talk about using a secondary bevel on their chisel and plane blades. Why would I want to do this? It seems like more work than using a single bevel.

—BRAD PERRY, Valdosta, Ga.

Keep it narrow.

That's all you need for a sharp cutting edge and it will save time when you re-hone.

A: ACTUALLY, USING A SECONDARY BEVEL takes less time because you are honing a much smaller area. For a blade to be sharp, both surfaces that form the cutting edge must be polished and free of defects, even the slightest nicks. On a single bevel you must hone the entire surface area of the bevel, a job that takes much time and effort. However, if you raise the blade a few degrees to form a secondary bevel, the area that must be honed is greatly reduced, so you get that flawless cutting edge much more quickly and easily.

—Matt Kenney is a senior editor.



Hone just the secondary bevel. What remains of the primary bevel isn't involved in the cutting and so doesn't need to be smooth and polished.

Make a stronger shiplapped back

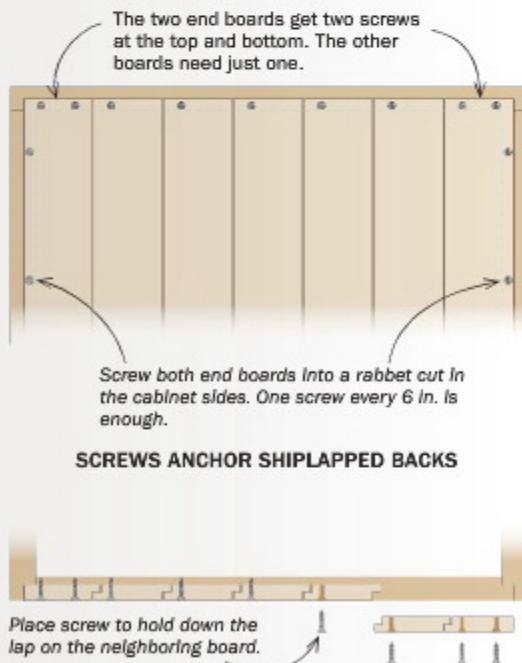
Q: I'm making a bookcase and I like the look of a shiplapped back, but I'm worried that it won't resist racking very well. Is there any way to improve its resistance?

—EDWARD NASH, Casper, Wyo.



A: TRADITIONALLY, SHIPLAPPED BACKS are screwed or nailed at a single point at the top and bottom of each board. Although it provides plenty of room for wood movement, this type of back doesn't provide a lot of racking resistance. One solution is to rabbet the back of the case sides and screw the end boards to the case along the side rabbets as well as at two points along the top and bottom. This will lock the end boards to the case and help to prevent racking. The remaining boards are attached in the traditional way. Place the screws so that each board locks down the one next to it.

—Michael Pukovich is the art director.



The two end boards get two screws at the top and bottom. The other boards need just one.

Screw both end boards into a rabbet cut in the cabinet sides. One screw every 6 in. is enough.

SCREWS ANCHOR SHIPLAPPED BACKS

Place screw to hold down the lap on the neighboring board.

ONE SCREW BATTENS DOWN TWO BOARDS

To allow for seasonal movement, the boards in the middle of the back get just one screw. Locate it so that the lap on one board locks in the lap on the one next to it.

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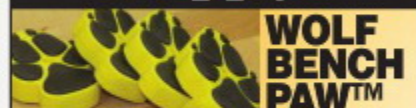
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Sand biscuit joints after 24 hours

Q: I recently edge-glued several cherry boards to make a top, and used biscuits to align them. I let the glue dry, sanded the top, and then applied the finish. As I was putting on one of the last coats, I noticed indentations along the glue lines where the biscuits had been placed. What caused those indentations, and how can I prevent them?

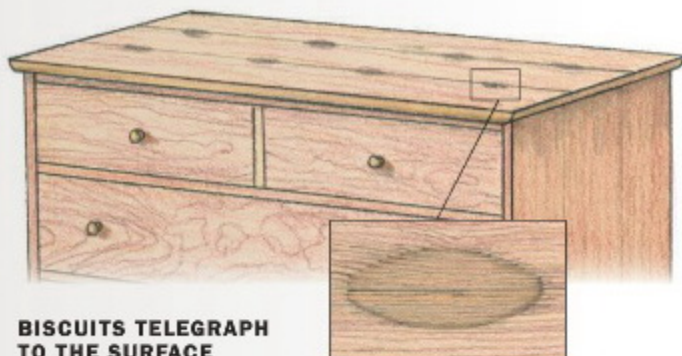
—JACK EIDLER, Caledonia, Wis.



Biscuits swell when wet. The difference in thickness between a dry one (bottom) and a wet one (top) is about 0.010 in.

A: THE DENTS ON YOUR TOP appeared because you sanded it too soon after the glue-up. Biscuits are compressed during manufacturing and when glued into the slot with water-based glue, they absorb water from the glue and swell. That causes the wood around the slot to swell, too. As the glue dries, the water evaporates and the biscuit and the wood around the slot shrink. If you sand the surface before that process is complete, the wood continues to shrink, forming the indentations you noticed. Fortunately, the solution for future projects is simple. First, go easy on the glue and apply it only to the slot. Then, wait at least 24 hours before you level the joints and sand the top.

—Michael Fortune is a contributing editor.



BISCUITS TELEGRAPH TO THE SURFACE

If you sand too quickly after gluing up the top, indentations form over the biscuits as the glue dries, a problem that can ruin a beautiful panel.



No glue on the biscuit. Just put it on the edges of both boards and in every slot.

How to finish interior drawer parts

Q: Should the interior parts of a drawer be finished? If so, what type of finish should be used?

—ANDERSON CURRY, Hannibal, Mo.



Use a low-odor finish. Shellac, lacquer, or a water-based finish work best for sides, backs, and bottoms.

A: I RECOMMEND FINISHING THEM. A finish slows the wood's seasonal movement, making the drawer less likely to bind in summer. It also makes the surface easier to keep clean. Finally, a finished surface feels better, especially important on the drawer bottom, which your fingers often touch. Choose a finish that has little inherent odor when dry, like shellac, lacquer, and waterborne finishes. It takes only a few thin coats of shellac or lacquer, or one thin coat of a waterborne finish. Never use an oil-based finish on the interior. They cure by oxidation and inside a drawer there is not enough oxygen to cure, so their unpleasant smell will never go away.

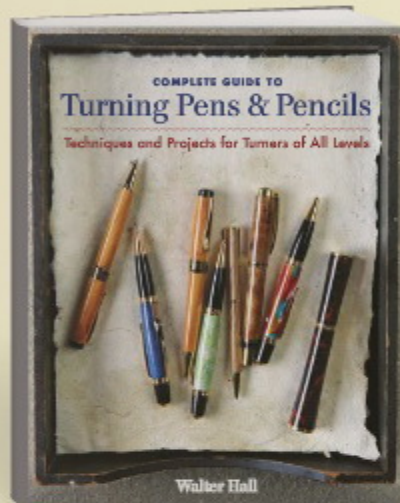
—Peter Gedrys is a finishing expert and regular contributor to FWW.



Just a thin coat. On the outside, it's enough to slow the wood's expansion and contraction, but not enough to foul the drawer's fit. And don't forget the inside. That way both faces of the board are equally protected, expanding and contracting at the same rate.

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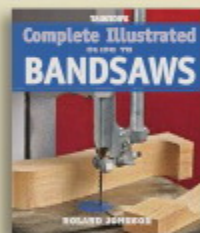
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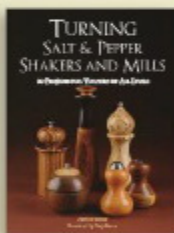
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How to sculpt a contemporary piece

SYMMETRY IS THE GOAL
AND SMART LAYOUT IS THE SOLUTION

BY DANNY KAMERATH

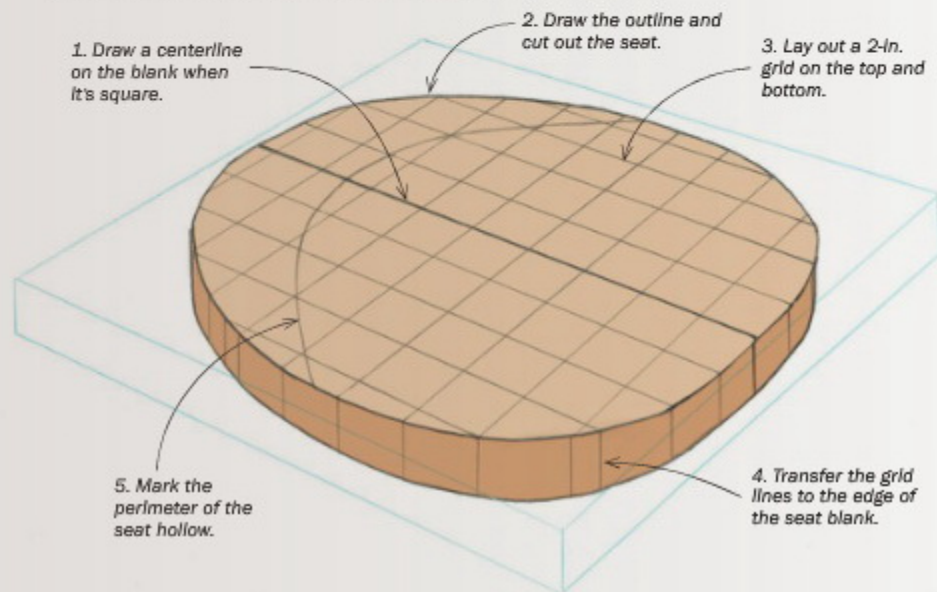
Many of the chairs I make have shaped parts, and I've learned that they should feel as good as they look. Over the years, I've tried many tools and techniques and the ones I use now are the most efficient way to make shaped chair parts that are attractive and comfortable.

My layout tools are important, because they help me get a symmetrical shape. I use plastic vellum, a flexible ruler, a drafting triangle, a compass, and a pencil. The technique can be broken down into three steps: First, I rough out the shape at the bandsaw. Then I use an angle grinder equipped with a coarse disk called the Holey Galahad (katools.com, No. 47851 RCB) to shape the concave and convex surfaces. I follow that with a power sander and various grits of sandpaper, a coarse file, and sanding blocks to refine and smooth the curves.



Sculpted seat is a good example

It is difficult to make a symmetrical seat without some help. The grid creates intersections where you can check on both sides of a centerline for irregularities.



Draw the outline first. Use a template to guarantee symmetry. Kamerath makes his by folding a piece of vellum (available at art-supply stores) in half and cutting the shape. The fold aligns with a centerline drawn on the blank.

I should note that this is a loud and messy process. I always wear safety glasses, a dust mask, and hearing protection. I also wear a pair of heavy leather gloves and tuck in my shirttails. Finally, I work outside when the weather permits. If I'm stuck inside, I set up a dust collector and large shroud to capture as much of the fine dust as possible.

Bandsaw defines the perimeter

Start by milling a piece of lumber for the chair seat flat and square. Next, draw a centerline along the grain on both faces and both ends to help keep the seat symmetrical.

Now fold a large piece of vellum in half and draw the shape of half of the seat on it. Cut out the shape and unfold the vellum for a perfectly symmetrical pattern for the whole seat. Place it on the seat blank, lining up the fold in the paper with the centerline on the blank. Trace the shape onto the blank.

Cut just proud of the line at the bandsaw, then sand down to the layout lines, taking great care to keep the curve smooth and remove all of the flat spots. This is an important step, because all the grinding in the world won't make up for a curve that starts out with flats. Here's how I do it: I stop often and check my progress by holding the curve at eye level and looking for flats. I also quickly run my fingers along it. Their sensitivity makes it easy to find flats in the curve. Mark the flat spots and then continue to sand until they're gone. Then drill holes for the back and legs at the drill press.

Draw a grid across both faces of the blank. The lines should be perpendicular to the centerline and spaced about 2 in. apart. Connect the lines on the faces with lines on the edges.

Finally, draw a circle on the top of the blank to act as a reference for shaping the concave side of the seat. For this

chair, the circle has a diameter of 12 in. and is located 1½ in. from the center of the mortise for the seat post.

Grinder scoops out and rounds the seat

The bandsaw works great for shaping wood along its edges, but it can't round or hollow the broad faces of a seat blank. I use a 4½ in. grinder for that.

To get started, attach a strip of vellum to the front edge of the seat blank with spray-mount glue. The vellum should be as wide as the blank is thick and cover the front half of the edge. Draw a curve on the vellum. On this chair, it is level with the top on the sides and ½ in. below the top at the centerline.

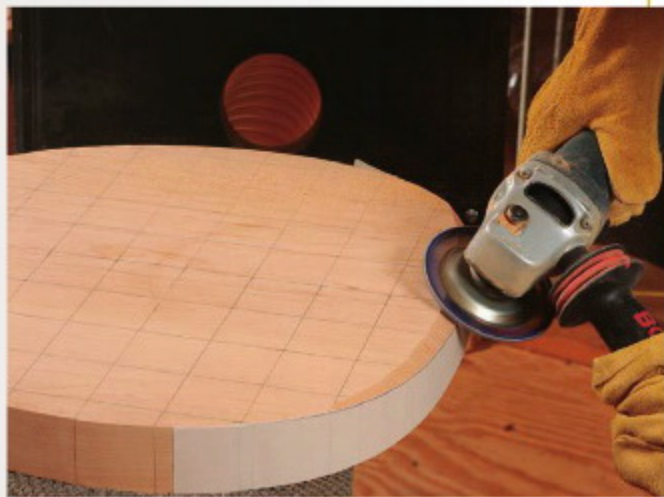
Grind the curve into the edge of the blank with the grinder and a coarse steel wheel. At this point, peel back one half

Top: Start with the edges

For the sake of comfort, you need a gentle and smooth curve on the top front corners.



Lay out a relief on the front edge. Draw it on a piece of vellum glued to the blank temporarily with spray adhesive. Then use an aggressive grinding disk (Kamerath uses the Holey Galahad coarse disk from King Arthur's Tools; katools.com) to grind to the line. After grinding the relief, fold the vellum over on itself to check for symmetry.



Make a grid on the top and bottom. For the lines perpendicular to the centerline, Kamerath uses a drafting square registered to the straightedge, which he clamps to the blank.



Mark the perimeter of the hollow. Kamerath's compass is left over from his days as a graphic artist, but a beam compass would work just as well.



Top: Work the interior

With a chair, comfort is always king, so dish out the top of the seat. Before moving on to the underside, be sure to sit in it so you know it's comfortable.



Start with the grinder. It makes a big mess, but most of it can be caught by a large dust hood hooked up to a dust collector. Then sand the hollow with a P60-grit pad on a random-orbit sander (above) to remove the marks left by the grinder.



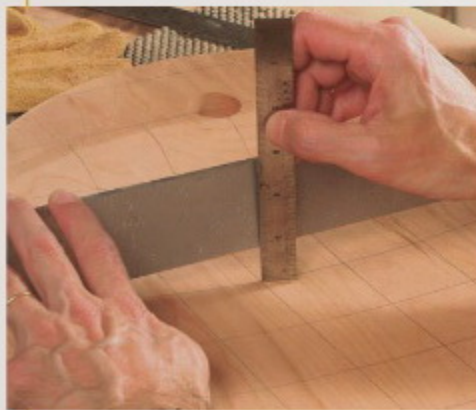
of the vellum, fold it against the other half, and check them against one another. Look for spots where the edges of the two halves don't line up with one another and use a pencil to mark the lower edge on the higher one. Re-glue the vellum and grind the high spots to match the low ones.

Now hollow out the rest of the seat top. Grind a slope from the front to the back that reaches its deepest point, $\frac{7}{8}$ in., about 3 in. from the chair back. At that point, it rises more steeply to meet the back of the circle drawn earlier. Also, grind a shallow curve across the width of the seat. Replace the steel disk with the sanding disk and smooth the hollow.

As you are grinding and sanding, be careful not to remove the layout lines around the edge. They're used to check for symmetry. Here's how to do it. First, use a flexible ruler to redraw all of the lines, including the centerline. Then lay a straightedge over the lines. Starting at the centerline, move out along the layout lines and measure from the bottom of the straightedge to the seat. I do this about every inch along the layout line, on both sides of the centerline. If you find two spots that aren't symmetric, use a random-orbit sander with P60-grit sandpaper to take down the high spot. Repeat this process over the entire seat.

Now is a good time for a break, so put your seat in your just-shaped chair seat. How does it feel? There shouldn't be anything poking you or any noticeable dips. If it fits your anatomy and you find it comfortable, then it will be fine for others, too. If there are a few uncomfortable spots, work them with the grinder and coarse sanding wheel.

After your break is over, turn the seat over and work on the convex bottom. The idea here is to lose visual weight, so start with the coarse steel wheel and round over the edges. Work your way back toward the center, but stay clear of joint locations. And leave enough of a flat near the centerline to



Redraw the grid. Use a flexible ruler that follows the curve of the hollow. Check for symmetry by measuring at the intersections. Mark the high spots and take them down with the random-orbit sander. Then sand up through P220-grit.

Flip the seat and shape the bottom

You don't have to worry about comfort here, just looks. Leave the area around the leg mortises flat so the shoulder on the legs makes good contact.



Grind a curve onto the edge. Kamerath raises the seat blank on a block of foam so the grinder doesn't dig into his bench (above). Check for symmetry after redrawing the grid, marking the high spots with a pencil (right).



File the high spots. Use a coarse, single-cut file. Be careful to blend them into the surrounding area without creating any hollows.

rest a straightedge on. After you're done grinding, use the straightedge to check for symmetry as you did on the top side. I use a large, coarse file to knock down any high spots, because it's easier to finesse the curve with it than the grinder.

Smooth all of the surfaces

With all of the shaping done, it's time to smooth the surfaces for appearance. Start with the top of the seat. Use the random-orbit sander and start with P100-grit paper. Sand the entire top, but be careful around the edges. You want them sharp for now. (They'll get slightly rounded over as a final step.) Then repeat the process with P150- and P220-grit paper. Finally, use a foam sanding block and P220-grit paper to remove any swirl marks.

After you're done with the sanding block, run your fingers over the seat to check for flat spots. If you find one, sand with the foam block and P220-grit paper until it feels right. Then sand the entire top with the foam block and P320-grit paper.

Next, sand the convex side of the seat using the same tools and grits as for the concave side. After the chair is completely assembled, sand everything with P400-grit sandpaper.

I shape the chair back with the same techniques. However, I don't start with a single blank. Rather, I start with a square spindle and turn a tenon on one end. I then glue a square blank onto both sides of the spindle at the opposite end. □

Danny Kamerath (dannykamerath.com) designs and makes furniture in Texas.

TIP FOR THE BACK: TURN A TENON, THEN BUILD UP THE BLANK

The back has a round tenon that fits into a round mortise in the seat. Turn it on a narrow post and then add pieces to get a blank that's roughly the right shape.



Glue the three parts together. After turning a tenon on the narrow center post, glue a "wing" to both sides.



Rough out the shape. From here, the shaping process is identical to how you made the seat.

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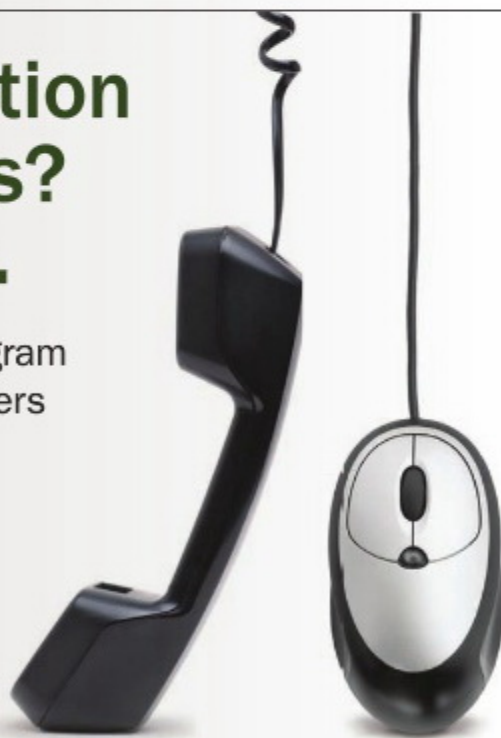
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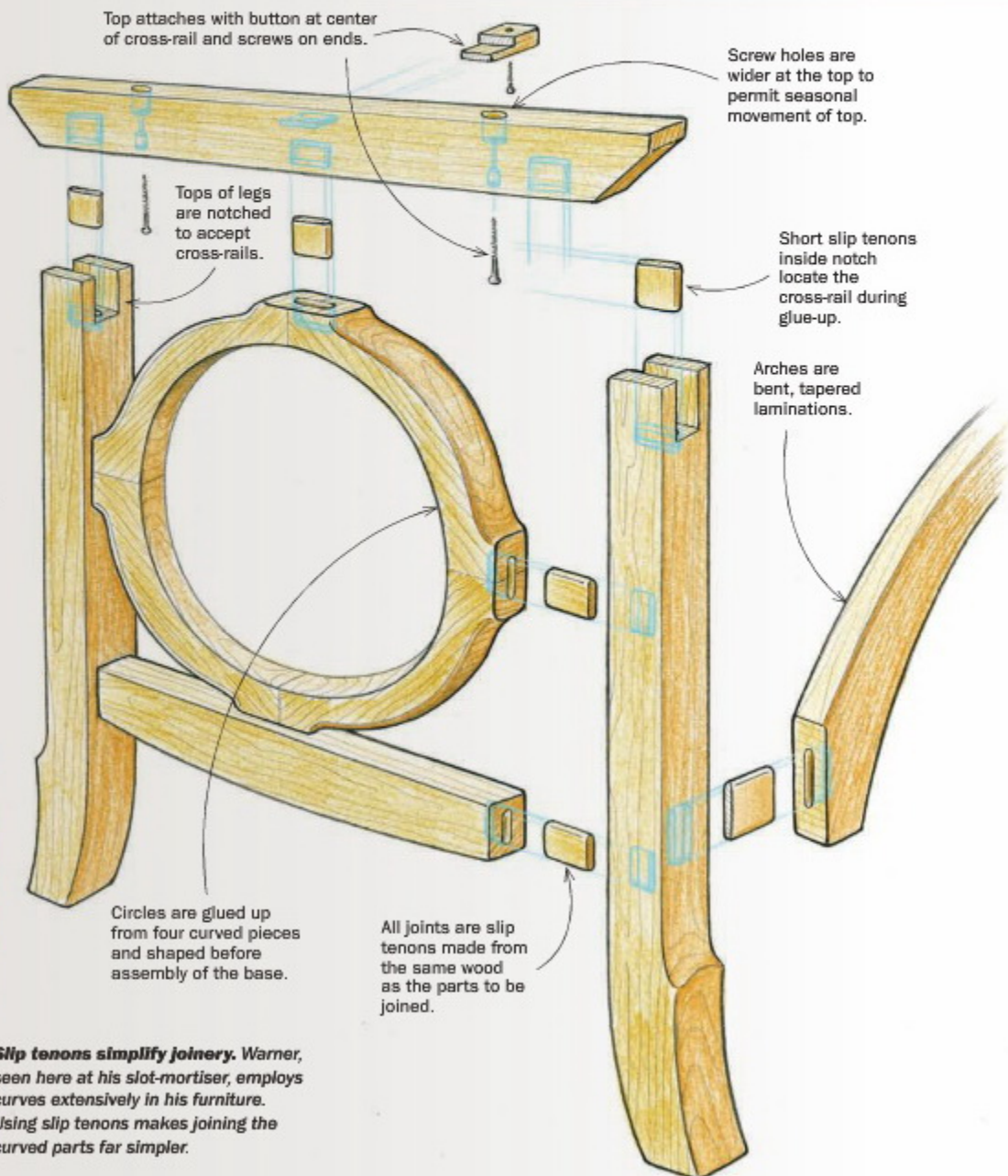
Sturdy yet sprightly base for a thick top

BY JONATHAN BINZEN

The bases Geoffrey Warner designed for his tables (see the back cover) have to work visually with the live-edge tops, but they also have to be powerfully built to support slabs weighing hundreds of pounds. Both purposes are served well by curves: The circles and arches that link the legs and rails of the bases bring a natural element to the design while providing rock-solid joinery. To build the bases, Warner uses slip tenons, so that despite the curves, the joinery is not extremely difficult. Warner cuts the mortises for his joints with a horizontal slot-mortiser, though most of the slots could also be cut with a router.



Slip tenons simplify joinery. Warner, seen here at his slot-mortiser, employs curves extensively in his furniture. Using slip tenons makes joining the curved parts far simpler.





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Lively Bases for Live-Edged Tables



For years, Geoffrey Warner bought flitch-cut slabs for his tabletops and sliced away the natural edges to create uniform boards. But the more the Maine furniture maker worked with beautiful full-width planks, the stronger his urge became to feature their live edges instead of removing them. Warner learned to deal with the bark, knots, and fissures in these planks, but the thorniest question was how to hold them up. Like many, Warner was inspired by George Nakashima's use of live-edge slabs with simple, rectilinear bases. Embodying reverence for nature and a minimalist design aesthetic, Nakashima's designs are so powerful they can be hard to shake. But Warner went in a different direction, designing curvy bases that celebrate a joiner's flair for structure. Employing stout proportions, springing curves, and heavy shaping, Warner found forms that resonate with the organic edges of the slab tops and have the visual heft to hold them up.

—Jonathan Binzen



Photos: Jonathan Binzen

How They Did It Turn to p. 98 to see how Warner handles the joinery on his curvaceous bases.

Pro Portfolio To watch an audio slide show featuring a variety of Warner's furniture, go to FineWoodworking.com/extras.