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Contemporary cabinet, p. 28



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FEATURES:

- Benchtop design
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- Motor: 3 HP, 230V, single-phase, 12A
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- Cutterhead diameter: 3 1/8"
- Cutterhead: 4-knife, 8" x 3/4" x 1/8"
- Table size: 8" x 76"
- Dust port size: 4"
- Footprint: 16" x 40"
- Dimensions: 76" W x 25" D x 41 1/2" H
- Approx. shipping weight: 484 lbs.



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- **FEATURES:**
- Parallelogram tables
- Extra-long 40" infeed table
- Built-in mobile base
- Cast-iron fence w/rack & pinion adjustment

WARNING! †
G0857 ONLY \$1895⁰⁰



10" 3 HP 220V TABLESAW WITH EXTENSION RAILS

- Motor: 3 HP, 220V, single-phase, 13A
- Rip capacity: 52" right, 18" left of blade
- Max. depth of cut @ 90°: 3 3/8"
- Max. depth of cut @ 45°: 2 1/8"
• Floor-to-table height: 35 3/4"
- Arbor diameter: 5/8"
- Arbor speed: 4000 RPM
- Max. width of dado: 3/4"
- Dust port size: 4"
- Approx. shipping weight: 742 lbs.



2-Year Warranty!
WARNING! †
SB1111 ONLY \$3045⁰⁰

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34" FLOOR RADIAL DRILL PRESS

- Motor: 1/2 HP, 120V, single-phase, 4.7A
- Swing: 34"
- Drill chuck: 1/16"–5/8"
- Drilling capacity: 1/2" mild steel
- Spindle taper: JT-33
- Spindle travel: 3/4"
- Spindle speeds: 5, from 550–3000 RPM
- Table size: 9 3/4" dia.
- Table swivel: 360°; table tilt: 90°
- Footprint: 11" x 18"
- Approx. shipping weight: 147 lbs.

FEATURES:

- Horizontal sliding headstock
- Threaded depth stop
- Cushioned grip quill handles

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W1670 ONLY \$524⁹⁹

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22" OPEN-END DRUM SANDER

- Motor: 2 HP, 230V, single-phase, 7.5A
- Feed motor: 50W, 1A
- Max. stock thickness: 5"
- Min. stock thickness: 1/4"
- Max. sanding width: 22–44"
- Min. sanding width: 2"
- Min. board length: 9"
- Sandpaper speed: 2300 FPM
- Conveyor feed rate: Variable, 0–20 FPM
- Sandpaper type: 3" width roll, plain backed
- Drum Size: 5"
- Overall dimensions: 42 1/2" W x 43 1/2" D x 61" H
- Approx. shipping weight: 341 lbs.

FEATURES:

- Variable-speed conveyor
- Digital thickness readout
- Spring-loaded sanding belt tension/sandpaper



WARNING! †
G0920 ONLY \$2120⁰⁰



16" 3 HP HEAVY-DUTY RESAW BANDSAW

- Motor: 3 HP, 230V, single-phase, 12A
- Rip capacity: 15 3/4"
- Resaw capacity: 14"
- Table size: 20 7/8" x 25 5/8"
- Table tilt: 5° left, 45° right
- Floor-to-table height: 41"
- Blade size: 131 1/2" (1/8"–1" wide)
- Blade speed: 3500 FPM
- Dimensions: 33" W x 36" D x 79 1/2" H
- Approx. shipping weight: 558 lbs.

FEATURES:

- Cast-iron fence with 2-position extruded aluminum resaw fence
- Built-in blade and tool storage
- Foot-operated brake system



WARNING! †
SB1080 ONLY \$3150⁰⁰

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2 HP CANISTER DUST COLLECTOR

- Impeller Motor: 2 HP, 220V, single-phase, 9A
- Main inlet size: 6" with three 4" adapter inlets
- Airflow capacity: 1103 CFM @ 3.5" SP
- Max. static pressure: 11.95"
- Filtration rating: 1-micron
- Filter surface area: 80 sq. ft.
- Impeller: 12 3/4" radial fin
- Machine collection capacity at same time: 3
- Collection capacity: 33 1/2 gallons
- Dimensions: 39" W x 31 1/2" D x 76" H
- Approx. shipping weight: 165 lbs.

2-Year Warranty!



FEATURES:

- Remote controlled magnetic switch
- Canister filter has 6 times the surface area of regular filter bags
- Motorized filter paddle brushes automatically clean the filter at regular intervals
- Vacuum gauge that indicates when filter needs to be serviced

SB1100 ONLY \$1249⁰⁰

WARNING! †



6" X 108" VS OSCILLATING EDGE SANDER

- Motor: 3 HP, 220V, 3-phase, 9.5A
- Sanding belt size: 6" x 108"
- Sanding belt speed: Variable, 600–6000 FPM
- Oscillations: 1/4"
- Platen size & type: 6 3/4" x 39 3/4", graphite coated
- Sanding head tilt: 90°–180°
- Main table size: 12" x 35 1/2" x 1 1/2" thick
- Main table vertical travel: 8"
- Auxiliary table size: 10" x 11 1/2" x 3/4" thick
- Auxiliary table vertical travel: 10"
- Approx. shipping weight: 597 lbs.



WARNING! †
SB1097 ONLY \$3145⁰⁰

2-Year Warranty!



24" 5 HP INDUSTRIAL BANDSAW

- Motor: 5 HP, 220V, single-phase, 23A
- Table size: 33 1/2" x 23 5/8" x 2"
- Table tilts 45° right
- Floor-to-table height: 32 1/2"
- Max. cutting width left of blade: 24 1/2"
- Max. cutting height (resaw capacity): 16 1/4"
- Blade size: 180"–181 1/2" long (1/4" to 1 1/2" wide)
- Blade speed: 5300 FPM
- Footprint: 41 3/8" x 23 1/2"
- Overall size: 48" W x 32" D x 83 1/2" H
- Approx. shipping weight: 951 lbs.



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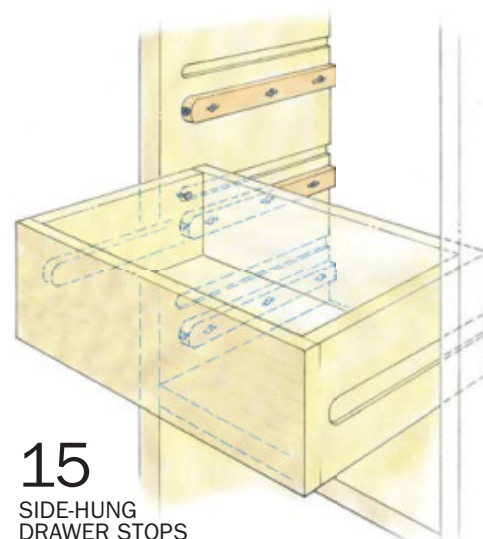
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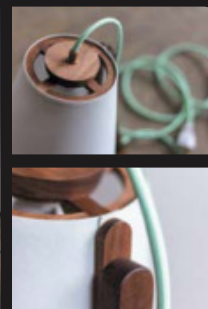
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VIDEO

Upholstery tools, materials, and concepts

Michael Mascelli (p. 50) goes over the tools you'll need to start upholstering, and the anatomy of a well-constructed chair cushion.



VIDEO

All together now

For Christian Becksvoort (p. 38), it's not only more efficient to shape a table's tripod legs as a group, but it also delivers more consistent results.

Online extras

Free content at finewoodworking.com/292



BLOGS

Interview: Scott Landis of GreenWood Global

Curtis Buchanan's chair (p. 72) was inspired during his time with GreenWood, an organization that works with artisans in Honduras and the Peruvian Amazon to produce high-quality wood products from well-managed forests.



Calculated kerfs

Kerf bending can be a powerful tool when creating curved pieces (p. 28). This online kerf calculator will help you figure out the kerf spacing.

VIDEO

Upholsterer's tool kit or treasure chest?

While visiting a local tag sale, professional upholsterer Michael Mascelli came across one worker's complete upholstery tool kit from the early 20th century.

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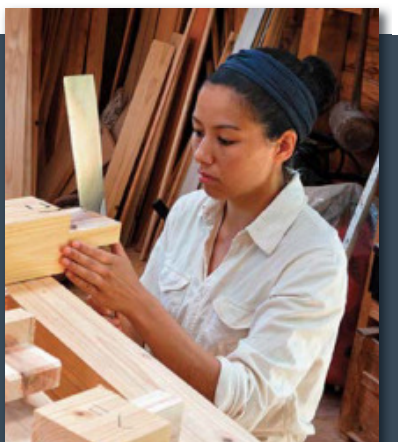
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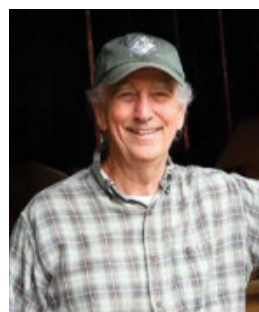
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contributors

Emi Shinmura (“Japanese Joinery in Practice”) worked on and off with her aunt, an experienced carpenter in Japan, for years before setting off on her own. An artist by trade, Emi drew the joints her aunt taught her to better understand them, a practice she repeated when designing and constructing a garden structure in her native London. Emi’s illustrations and sculpture have been displayed and sold at galleries around the world, including The Rowley Gallery in London. See more at emishinmura.com.

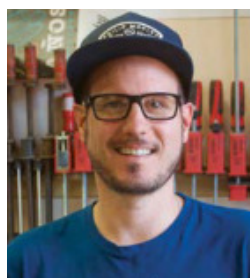


Born, raised, and still living in Latham, N.Y., **Michael Mascelli** (“Upholstering a Slip Seat”) teaches finishing and upholstery at schools and guilds across the country. Not only is Mike an accomplished upholsterer, but he also is an expert finisher and woodworker. He is the director of the Professional Refinisher’s Group and says, “These folks are the true experts in restoration and conservation, so my teaching is just a re-packaging of what I have learned from the pros for over 20 years.” His approach to his work is to respect the piece in front of him and the life it had before it came.



Curtis Buchanan (Greenwood: “The people’s Windsor”) is widely known for his superb chairmaking. Some of his less conspicuous accomplishments, tendencies, and traits include: tending a thriving vegetable garden; never owning a credit card; napping every afternoon; reading novels aloud to his wife, Marilyn, in the evenings; helping found a vibrant farmer’s market and a fresh local food store in his hometown of Jonesborough, Tenn.; obtaining free stationery by writing on the blank back of junk mail letters; carving a spoon nearly every morning for going on four years now.

If you’re walking around the small town of Wimberley, Texas, and hear an English accent amid the twang, you might have just run across **Philip Morley** (“Contemporary Wall Cabinet”). Born in London, he met his wife, Carmen, when both were counselors at a camp in Maine, and they’ve lived in Rhode Island (where she studied at Brown), Florida (where he worked for a millwork shop), and now in her home state (with their four kids). In addition to making custom furniture, he also teaches at and is co-founder of the Austin School of Furniture.



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Spotlight

ISSUE NO. 291

September/October 2021

p. 82

The value of living-history museums

Touching as it does on the decades-old topic of hand tools vs. machine tools, Joshua Klein's article "Confessions of a hand-tool woodworker" is sure to spark some discussion. As many people know, I'm a hand-tool-only woodworker by choice, and have been for more than 30 years. I don't in any way concern myself with how other people do woodworking; that's their business. But Klein opened his column with what my mother would call a "left-handed compliment" about living-history museums. Phrases like "nostalgia" and "show them how it was done in the 'olde' days ..." seem pretty dismissive to me when there are talented people, like Bill Pavlak and Brian Weldy at Colonial Williamsburg, and others doing great work to advance the craft in just such an environment.

I worked for 20 years making furniture in a living-history museum, using hand tools that I deemed functionally equivalent to those used in the period depicted. The repetition resulting from day-to-day work in that environment was key to my growth as a woodworker. My job was to make furniture and woodwork in front of the public, talking about what I was doing as I did it. In the process, I gained experience that would be hard to come by in the "real" world. If getting the product out the door had been the priority, I would have kept my head down and spoken to no one. Working in that environment pushed me further as a hand-tool woodworker than I ever could have gotten if I had to earn my keep at the same time.

—Peter Follansbee

In praise of hand tools

Joshua Klein nailed it. I am a retired eye surgeon, amateur woodworker, boat builder, bicycle rider, grandfather, tinkerer, and dreamer. Over the years I have accumulated a lot of tools, both power and hand. But now I am finding joy in getting rid of most of my power tools and creating some space in my overcrowded shop. I don't rip big planks of wood anymore. Why do I need a tablesaw? It is much more pleasurable to select one of my myriad spokeshaves (the correct one of course) to fine-tune a curve on a spoon handle or chair arm, or to chamfer the edge of a tabletop with a well-tuned block plane. In short, for a non-production woodworker like me, Joshua is preaching.

—ALAN C. BROWN, Bronxville, N.Y.



One inspiring lamp

The modern floor lamp article and the accompanying rear cover photograph (FWW #291) are quite inspiring. I particularly enjoyed the lamp shade made from burl veneer as it closely resembles the pine knot fires used by Colonial Williamsburg during their evening entertainment. The light filtering through the burl leaves the impression of hot coals and the semi-freeform top edge gives the impression of a blazing fire. Well done!

—W.L. MANER III, Norge, Va.

Anchors? Away!

As a longtime subscriber to FWW, I understand you need to appeal to a broad range of woodworkers, and not every article in every issue will be of interest to me. That said, I must express my disappointment in the "Anchor Your Work to the Wall" article in the latest issue (FWW #291). I'm struggling to understand why you dedicated eight pages to a subject that seems more appropriate to *Family Handyman* than *Fine Woodworking*. Another project or technique would have been appreciated.

—DENNIS HEYZA, New Baltimore, Mich.

Question on router-table fence

I am wondering why Tamar Hannah uses T-bolts rather than carriage bolts ("Adjustable Router-Table Fence," FWW #291). The T-bolts are much fussier to prep for. I can't understand the advantages. The melamine I'm going to use is $\frac{25}{32}$ in. thick. My current router table fence has carriage bolts on the adjustable fence halves. Why not just buy $3\frac{1}{2}$ -in.-long bolts to use on the auxiliary fence? Then I can drill holes and the countersink easily, without having to rout a slot countersink.

—NAME WITHHELD BY REQUEST

Tamar Hannah replies: Carriage bolts can be used for sure. I just always have T-bolts lying around from my multiple jigs and fixtures, so it's what I am most comfortable using.

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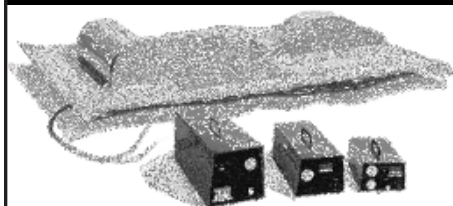
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Hammer

MAKING THE SLED

Sled with a twist makes short work of dovetail pins

This is a basic crosscut sled with a twist: It has a pivoting fence that delivers clean, precise cuts for dovetail pins in minutes, with no complicated layout. All you need to guide your cuts are centerlines; the sled does the rest.

The fence pivots on a hex head bolt at one end and at the other has a sliding barrel-bolt latch—available at any hardware store—which drops into a series of holes for cuts at different angles. Start with the fence at 90°, and position the workpiece so one of your centerlines aligns with the edge of the blade farthest from the pivot point. Clamp the workpiece there. Then simply pivot the fence forward and back to cut each side of that pin. There are two sets of holes in each direction—one for 1:8 dovetails and the other for 1:6.

The sled tends to make narrow pins in the traditional style, and the narrow end is always the same width, regardless of the thickness of the board, given the same blade thickness and the same cutting angle. With a $\frac{3}{32}$ -in.-thick “thin-kerf” blade, the narrow ends will be $\frac{3}{32}$ in. wide at the 1:8 angle and $\frac{5}{32}$ in. at the 1:6 angle.

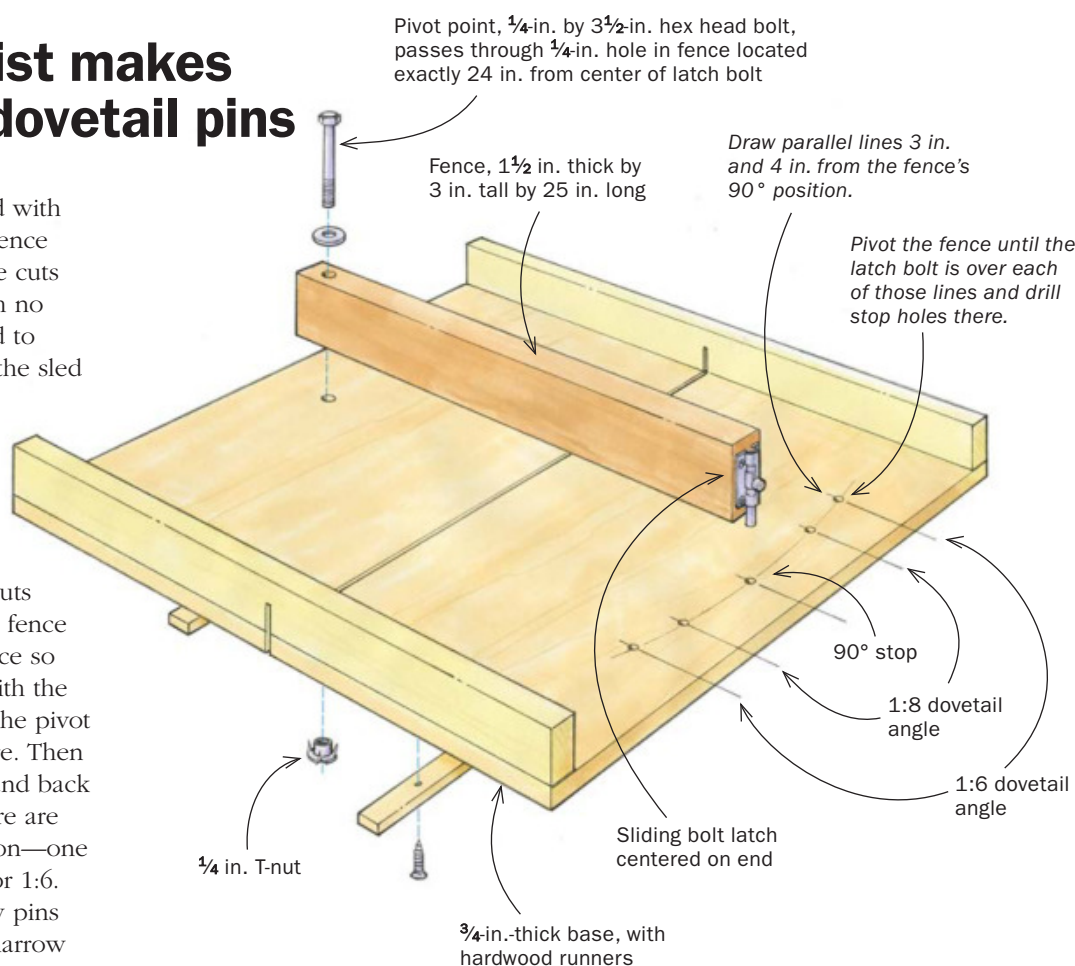
For fatter pins, add a spacer board behind the workpiece to push it farther from the fence axis—or use an even thinner blade. For narrower pins, use a standard-kerf ($\frac{1}{8}$ -in.) blade.

To build the jig, start with any tablesaw crosscut sled. Make a $1\frac{1}{2}$ -in.-thick fence, center the sliding-bolt latch on one end, and drill a snug hole for a hex bolt exactly 24 in. from the center of the latch bolt. Insert a T-nut in the base below the hex bolt hole to secure the pivoting end.

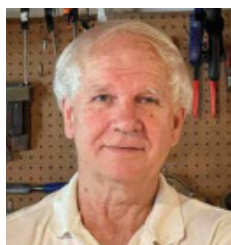
You’ll need to drill holes for a series of fence stops. First mark and drill a hole in the sled so that the barrel latch will hold

the fence square to the sawblade. To set up the angle stops, measure 3 in. and 4 in. from the 90° axis, front and back. Rotate the fence until the center of the latch bolt exactly aligns with each of the lines and drill holes for it there. Because the fence is essentially 24 in. long, the 3-in. and 4-in. offsets produce the above-mentioned dovetail angles.

—PAUL WILLIARD, Providence, R.I.



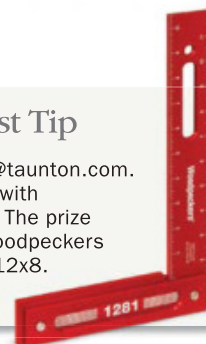
Best Tip



Paul Williard is an organic chemist at Brown University, where he has worked since 1979. That's roughly the same time he began subscribing to *Fine Woodworking*—a “much-needed diversion” from his academic duties. He got hooked on making period furniture in the 2000s, when he built a Philadelphia-style clock in a class with Gene Landon and Bess Naylor. Upcoming projects include a Goddard kneehole desk and a French-style bombé chest.

A Reward for the Best Tip

Send your original tips to fwtips@taunton.com. We pay \$100 for a published tip with illustration; \$50 for one without. The prize for this issue's best tip was a Woodpeckers Precision Woodworking Square, 12x8.



USING THE SLED

Mark centerlines for whole pins.

1. With fence in the 90° position, move the workpiece to align the pin centerline with the edge of the blade farthest from the pivot point, and clamp it there.

Mark half-pins where angled kerf will enter.

2. Pivot fence to the desired angle and make a cut.

3. Rotate fence to the opposite corresponding angle and make a second cut.

Whole pins are centered on layout lines.

Half-pins are cut directly on layout line.

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—RODGER AHLBERG,
Bennet, Wis.



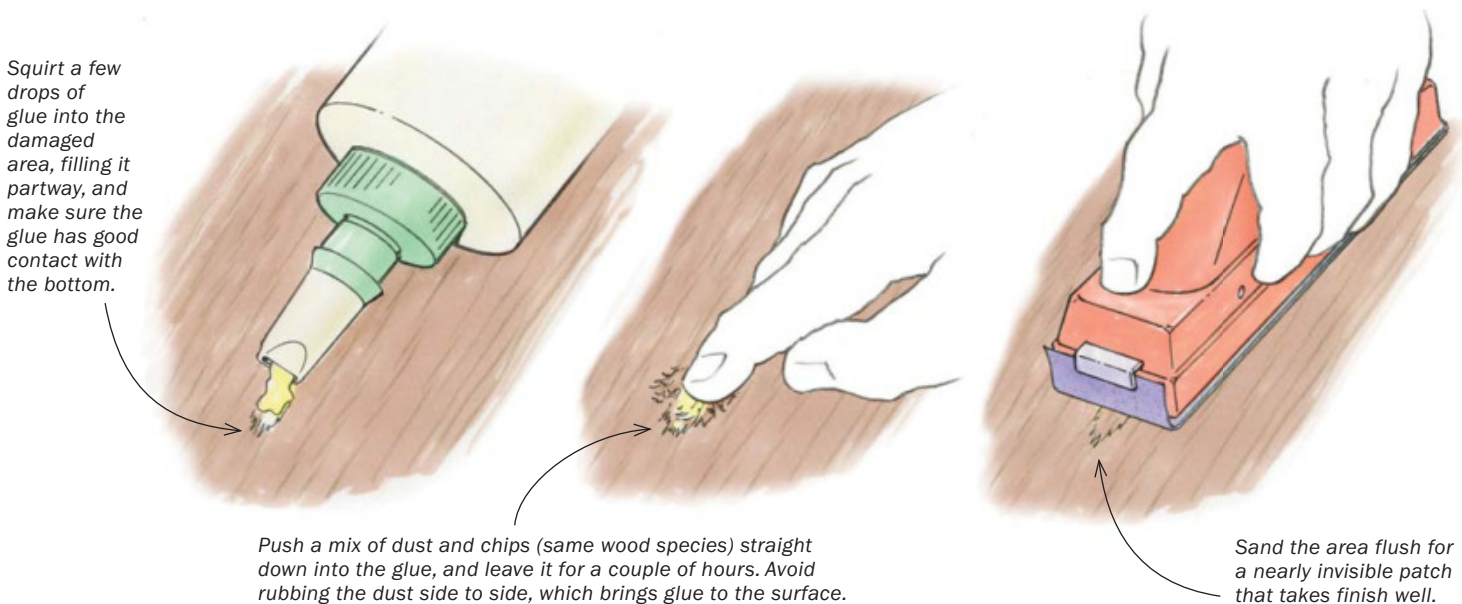
Easy way to hide damage

While it's always best to fill gaps or damage with real wood if you can, that's not always possible. In the past I've filled troublesome dings or damage with two types of material: a wax pencil or a mixed-up sludge of glue and sawdust. Frustratingly, the color of the wax pencil is never quite right and the dust/glue gunk is always darker than the wood it's made of.

While planing some solid-wood edging flush on a recent cabinetry commission, I damaged the walnut plywood in a few spots, revealing the yellow glueline beneath the veneer. On a whim, I tried a new patching approach. I filled the little pit with

a few drops of yellow glue, making sure the glue had good contact with the bottom. Then I mashed up some dry chips and dust from the solid walnut and pressed it onto the glue, pushing straight down without rubbing the chips from side to side. This keeps most of the glue away from the surface while still allowing it to hold the chips in place. Give the patch two hours to dry before sanding it level with a block. The patch takes any kind of finish well, with only the slightest darkening, making it really hard to find unless you tell someone it's there. Resist the urge to do that!

—ASA CHRISTIANA, Portland, Ore.

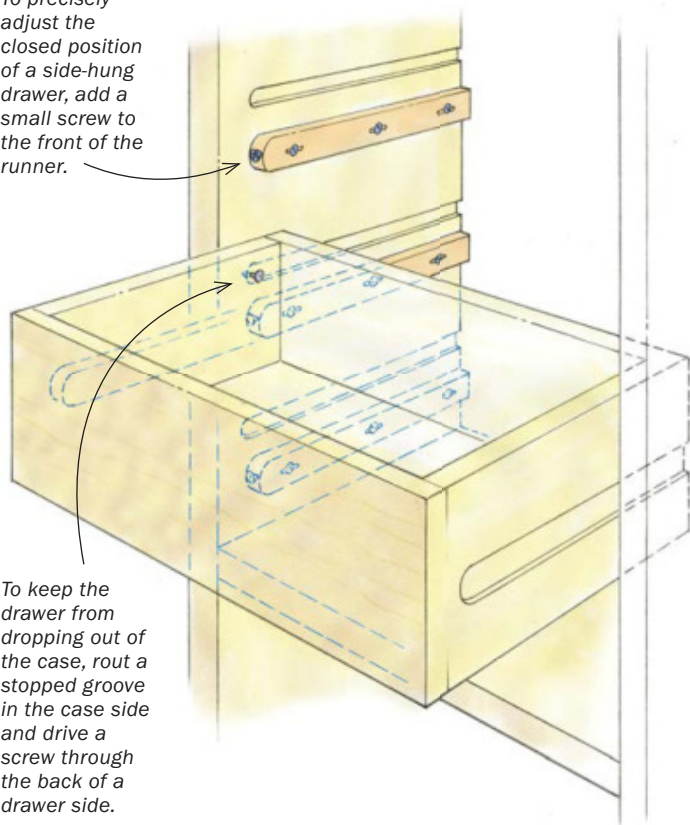


Two handy stops for side-hung drawers

Side-hung drawers work great, but the slides do not provide a way to keep drawers from being pulled out too far. It can also be tricky to position the drawer face for a flush fit when the drawer is closed. To keep the drawer from falling out, rout a stopped slot in the case side and drive a screw through the back of the drawer side so it will pass into the slot. Withdraw the screw to allow the drawer to slide into place (or be removed) and then extend it into the slot. To precisely adjust how far the drawer will go into the case, add another screw to the front of the side-hung runner.

—ROLAND MATTISON, Lincoln, N.H.

To precisely adjust the closed position of a side-hung drawer, add a small screw to the front of the runner.



To keep the drawer from dropping out of the case, rout a stopped groove in the case side and drive a screw through the back of a drawer side.

Quick Tip

Drilling deep holes

There are times when you need to drill a hole that is deeper than your drill press will travel. Here's a quick, easy solution. Drill to the maximum depth on the machine. Then chuck the same bit in a handheld drill and finish the job. The initial hole will keep the bit square and true.

—BRUCE PLATT, Buffalo, N.Y..

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Circular saw sets the shape of a sculpted seat

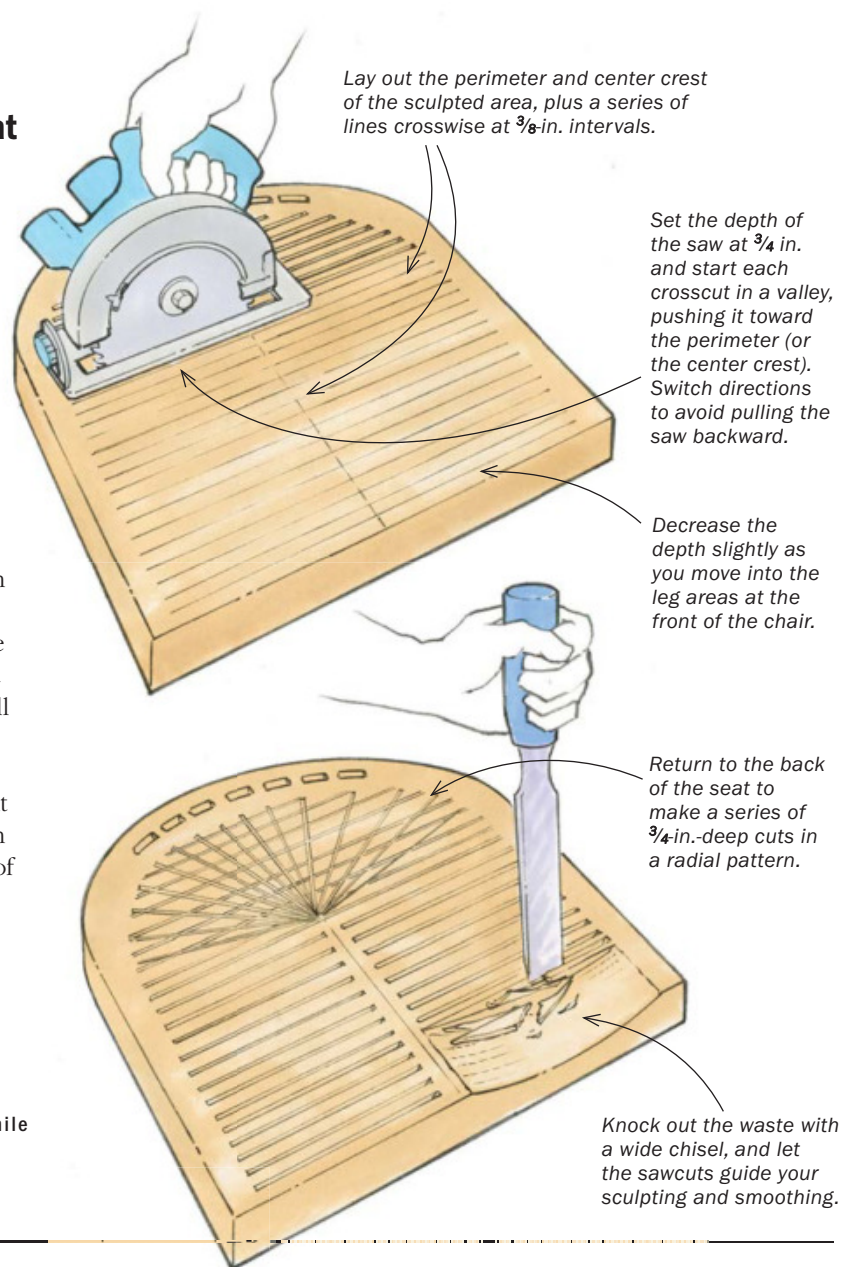
On a recent bar-stool project, I was struggling to find a controlled way to carve out the wooden seat. Then I realized that the 7¼-in. blade in a circular saw would create a nice curve for the edges of the sculpted areas, and by making a series of cuts to a penciled layout, I could control the depth and slope in all areas, making it easy to remove the waste in a uniform way.

Start by marking the perimeter of the sculpted area at the sides and back. Then lay out a centerline to mark the crest that goes between the legs of the sitter. Last, mark pencil lines across the entire sculpted area, ⅜ in. apart, to guide your cuts. Now set the cutting depth of the saw (¾ in. worked well for me) and make plunge cuts across the back of the seat, starting and stopping the cuts at the pencil lines. It's best to start in the valleys and push toward the perimeter. Pulling the saw backward will cause it to jerk up and back, past the line.

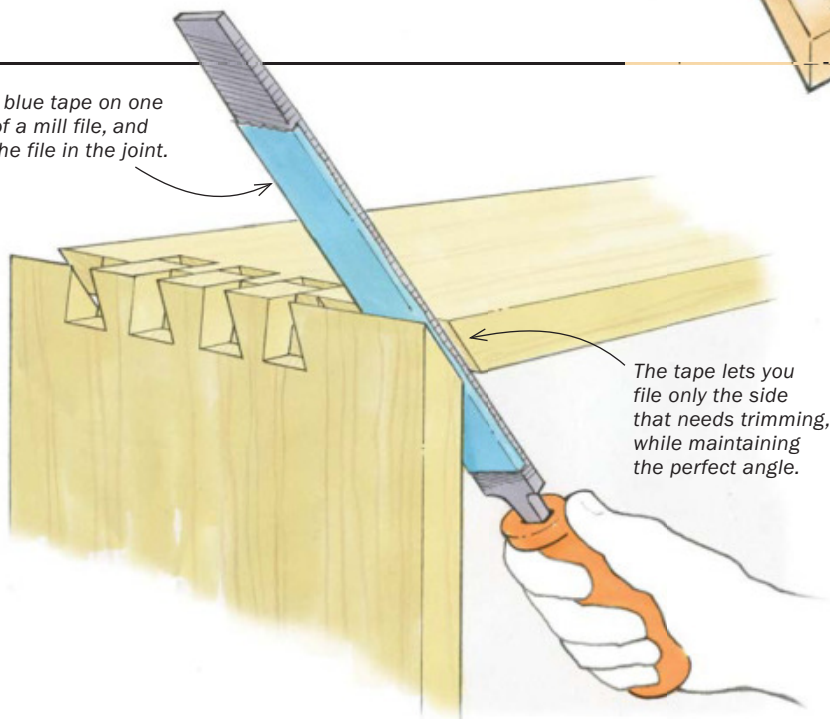
In order to leave a raised section between the sitter's legs, you'll be making two sets of plunge cuts in the front half of the seat. You may also want to decrease the depth of cut as you approach the front edge, leaving the back of the seat a bit deeper. Last, make a series of radial plunge cuts around the back edge to create an even slope there too. Make a lot of cuts in the back area so the waste is easier to chip out.

With the sawcuts as your guide, it's easy to pop out the waste blocks with a wide chisel and then go to work smoothing the seat.

—DAVID GRIFFITHS, Santiago, Chile



Place blue tape on one side of a mill file, and trap the file in the joint.



Foolproof way to fit mitered dovetails

I recently needed to make a slight adjustment to the angled part of a mitered dovetail. I opened the joint enough to get a mill file through it, and then applied a strip of blue tape to the side of the file that I didn't want to cut. Next I inserted the file and pushed the joint against it. The tape let me trim just one side of the miter while maintaining the perfect angle, producing a flawless fit.

—ANDREW KOSIBA, Gloversville, N.Y.



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■ ACCESSORIES

Miter gauge has it all

MITER GAUGES ARE CRUCIAL for precision work, and many have a handful of important features. But I'd never found the complete package until the JessEm Mite-R-Excel II. Over the past few weeks, I used the gauge while building furniture in my shop. I've made square cuts, a range of miters, and used the fence and flip stop to cut multiple parts at set lengths. The cuts always came out precise. This is the best miter gauge I've ever used, and I've already purchased one for myself.

The gauge has a quick and easy method for fitting the guide bar precisely to your table saw's miter slot. This means the gauge can be recalibrated if necessary for continued accuracy. The face of the protractor head can be adjusted square to the table and also square to the guide bar. This ensures accurate cuts, and it, too, can be readjusted if the need arises.

The protractor head has stainless-steel knobs and fittings and high-contrast, easy-to-read white numbers and increments.

Setting the protractor head is a breeze. A spring-loaded indexing pin locks the head at nine different positions. You can retract the pin to rotate the protractor freely. Another impressive feature of the protractor head is its vernier scale, which lets you accurately and easily measure to a tenth of a degree. The extruded aluminum fence, which telescopes, is quality. The measuring scale that sits atop the fence and telescoping arm is easy to read in both inches and centimeters. There are also set screws for micro-adjustments.

When using any miter gauge you frequently need to move its fence for clearance (to use a dado blade or to cut miters, for example), and resetting it exactly can be a challenge. A unique feature of the JessEm is a patent-pending fence-locating knob that allows you to reset the fence to the same spot after you've had to shift it. This ensures the accuracy of cuts made using JessEm's flip stop and the measuring scale atop the fence. The fence and flip stop can also accommodate a user-made sacrificial fence.

—Chris Gochnour is a contributing editor.



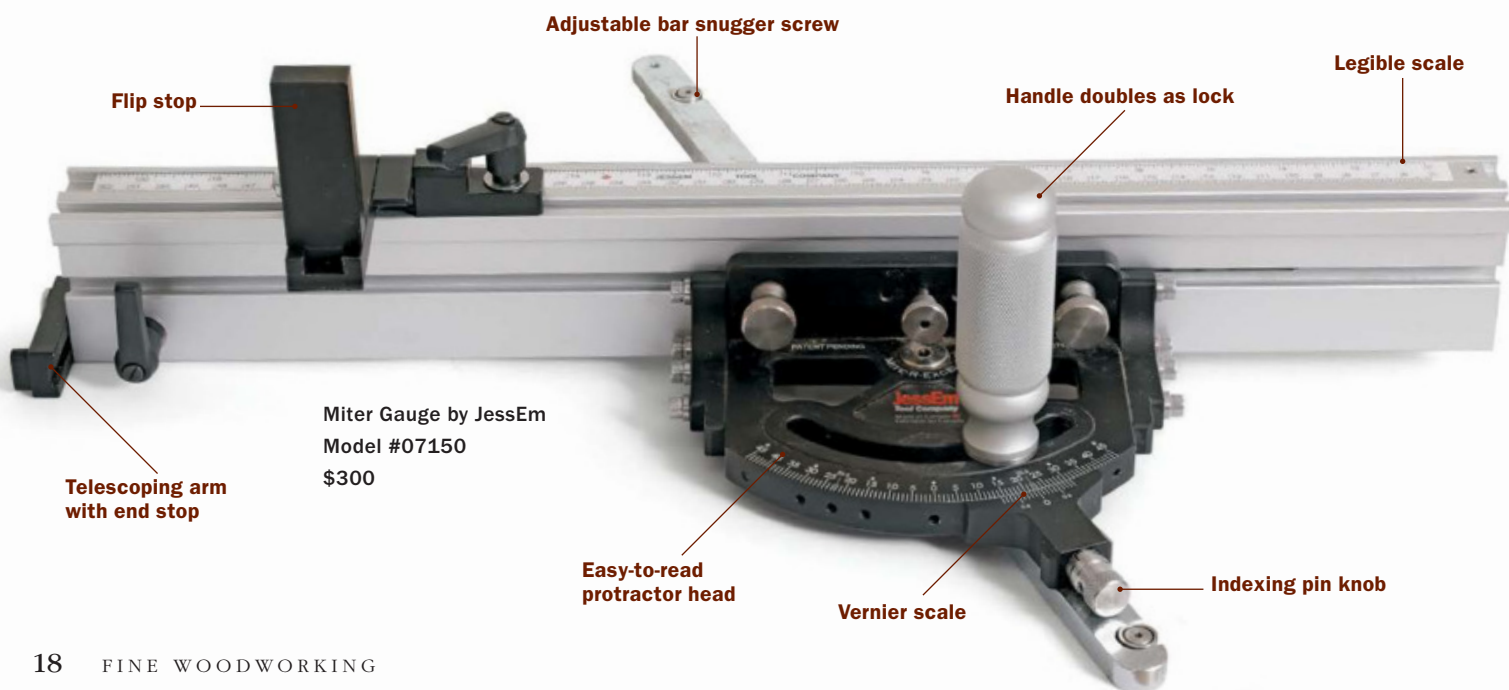
The stretch arm's strong. The fence's main section is 20 in., but its telescoping arm extends it to 36 in. The stops work equally well with the main and telescoping sections.



Fast, reliable protractor head. There are nine positive detents: one at 90° and four at common angles to the left and right. It can also rotate freely and lock wherever you want along the protractor.



Sacrificial fences don't sacrifice function. The fence can accommodate a user-made sacrificial fence that is secured using T-nuts and screws.



Flip stop

Adjustable bar snigger screw

Handle doubles as lock

Legible scale

Telescoping arm with end stop

Miter Gauge by JessEm
Model #07150
\$300

Easy-to-read protractor head

Vernier scale

Indexing pin knob

Veritas Bevel-Up #1 Plane
\$200-\$210



■ HAND TOOLS

Handy bevel-up bench plane

ALTHOUGH VINTAGE STANLEY NO. 1 PLANES ARE SCARCE and very costly, enough of them exhibit signs of wear to suggest that these little planes were well-used tools and not novelties. Veritas's newly released version continues the tradition, but with a bevel-up configuration to help with tasks that benefit from the plane's small footprint.

Much like a block plane, the Veritas No. 1 excels where its small sole allows for finesse and control in fitting, sizing, and shaping smaller parts. Tasks like chamfering or rounding over edges, fine-tuning miters, or fine-tuning the reveal on doors and drawers become easier. The plane has a sole $5\frac{3}{16}$ in. long and $1\frac{25}{32}$ in. wide. The blade, $1\frac{7}{32}$ in. wide, is available in 01 or PM-V11 steel. The bed angle is 15° .

Like a block plane, the No. 1 can be held with one or two hands. But because it's taller than a block plane, it's easier to hold and control. (In comparison, I find my original Stanley No. 1 difficult to grasp.) Any bevel-up plane has the advantages of having fewer parts (no chipbreaker or frog) and ease of changing the bevel angle. But the No. 1 benefits in particular from the extra finger space provided by the low-profile blade and absence of a frog.

Also, unlike the Stanley version, whose mouth is inconvenient to alter, the Veritas has a moveable shoe in front of the blade, which makes adjusting the mouth a snap. The shoe is moved by loosening and tightening the front knob. A mouth-adjustment screw regulates the positioning of the shoe and prevents it from striking the blade.

Blade adjustment is also convenient. The Norris-style adjuster moves the blade both vertically and laterally, although I prefer gentle taps with a small hammer for precise lateral settings.

—C.G.



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■ NEW TOOLS

Tools to look out for

Capable bandsaw

South Bend's new 16-in. bandsaw was designed with resawing in mind. It has 14 in. of resaw capacity paired with a 3-hp motor and a two-position fence that can switch between low and tall profiles. It has ball-bearing blade guides, a foot-actuated blade brake, and a quick-change blade release and tensioner. To tilt the table, there's a micro-adjustable rack-and-pinion mechanism.



Self-adjusting pocket-hole jig

Armor Tool's latest pocket-hole jig self-adjusts the guide and drill bit's depth stop. It does this via a pair of calipers. As the calipers measure the thickness of the stock, they also change the settings of the block and depth stop. It can measure stock up to 1½ in. thick. A flip stop sets the jig's appropriate distance from an edge. It also has a magnetic clamping pad.



A pair of planers

Two new 2-hp benchtop planers have entered Grizzly's lineup. One, the G0939, has a three-knife cutterhead and a stainless-steel table. The other, the G09340, has a helical head, a granite table, and a depth stop. Both can plane boards up to 13 in. wide and 6 in. thick. The dust ports on both have a 4-in. adapter. Each model also features handles for portability.



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SPLINTERS AND SLIVERS are an occupational hazard in the shop—particularly if you're working with roughsawn lumber. If not removed, or if only partially removed, those tiny pieces of wood can be a huge pain (and lead to infections). Recently, I purchased a splinter removal kit from Gramercy (Toolsforworkingwood.com). The kit contains professional medical-grade tools for this very job: a beautiful set of tweezers—or, forceps, as the professionals call them—and a sturdy, sharp, steel probe that stores in its own handle.



Splinter removal kit by Gramercy
\$20

These two small additions have been a major upgrade to my tool kit. The forceps have small, pointy tips and are grooved for extra grip. Unlike a needle, which can bend, the probe is rigid as well as sharp, making those particularly hard to remove splinters more accessible. These tools definitely make

extraction easier. But you should still follow my mom's advice: soak your hand in warm water for 10 to 15 minutes before going in with the tools. I'm not sure why it works, but trust me, sometimes mother knows best.

—Adam Godet is a woodworker in Washington, D.C.

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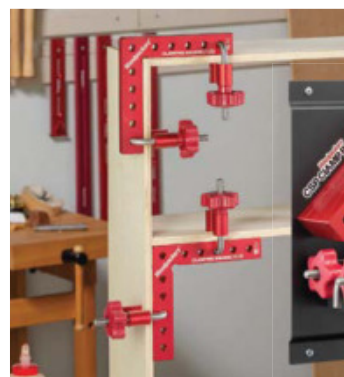
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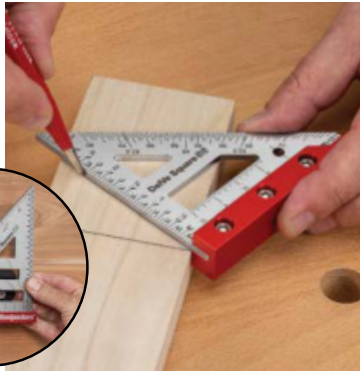
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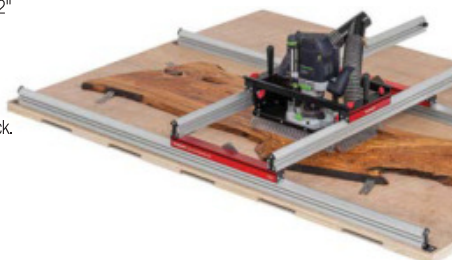
- Bring your rip fence back to the same spot each & every time you need it.
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George Wurtzel sees things differently

BY ASA CHRISTIANA



If you want to pay George Wurtzel a compliment, he'd rather you didn't use words like "amazing" or "inspiring." Good luck with that.

Born with a genetic eye disease that left him completely blind in his 20s, Wurtzel has been a full-time cabinetmaker, countertop builder, and fine furniture maker ever since. Along the way, he ran a large millwork shop, and he once designed a triangular box to hold veterans' interment flags, more than a million of which were sold by the company that bought his design. Now in his 60s, he is rolling out a new line of

Craftsman-style furniture that fits together like a puzzle, without fasteners or glue, designed to be disassembled easily for shipping or moving.

What Wurtzel wants to be called is a skilled woodworker, and what he wants you to see is his craftsmanship (you can check it out at gmwurtzel.com). There's a beautiful variety of soulful work there, from architectural millwork to kitchen cabinets, lamps, puzzles, furniture, and home decor. You'll also find the piano-shaped coffee table Wurtzel made for Stevie Wonder. And the seaworthy three-foot sailboat he built for a young woman named Maire Kent, who was diagnosed

"No," he said. "There is almost nothing I do differently other than the ruler I use," referring to the Click Rule, which measures in 16ths with audible clicks and is a boon to sight-impaired artisans.

If he wants to cut something out on the bandsaw, Wurtzel makes a cardboard pattern and uses a locator pin on the table to follow it. "It's not efficient but it gets the job done," he said.

"Walk up to a tablesaw and think about the steps required to cut wood," he suggested. "The fence is fixed, the blade is spinning in place, the only thing that moves is your hands. When I need a push stick, I run it against the fence."

What Wurtzel wants to be called is a skilled woodworker, and what he wants you to see is his craftsmanship.



with cancer and visited with him before she died to commission a vessel to carry her ashes from Lake Michigan to the Atlantic ocean. The story is captured in a documentary, "Maire's Journey," and a trailer can be found on George's website.

How George navigates the wood shop

As a fellow woodworker I was amazed by Wurtzel's work, and I had some practical questions: "Are there any machines or tools you don't use?"

As we spoke, I closed my eyes and went through the steps I would take on various machines if my shop were dark, and I started to get it. Still, I was amazed, and inspired. (Sorry, George.)

As for telling woods apart in the lumber stack, Wurtzel uses a combination of touch, smell, and even taste. Touch reveals pore structure. Temperature matters too, with soft woods like pine warming instantly to the touch and hard maple, for example, staying cool longer. Wurtzel draws the

wood closer and smells it. And for a few of the trickiest species, he tears off a splinter and tastes it; turns out some woods are sweet and others bitter.

To check grain direction, he sprays the surface with Windex, which raises the grain long enough for him to feel it, before flashing off quickly. To combine woods in a design, he refers to the mental catalog of looks and colors he built up in his teens and twenties.

Passing it on

These early decades were pivotal in many ways. In his teens, Wurtzel attended the Michigan School for the Blind, where he learned the “soft skills” needed to get through the day and also the technical skills he needed to work wood. “One of my idols was a totally blind guy we called Mr. R, who taught industrial arts,” he said. “There was no piece of machinery he couldn’t run or fix. He taught me how to carve wooden chains, and the little ball in the cage. You name it, the man could do it.”

That description of Mr. R sounds a whole lot like Mr. W, who is inspiring a new generation. In fact, you might already know him. Wurtzel starred in a Subaru commercial called “See the World,” where he takes a young couple on a road trip to his favorite places, helping them see and feel the way he does. It was one of Subaru’s most popular TV ads of all time, and ran for 18 months. It also netted Wurtzel an unexpected windfall of residuals, enough to buy an old industrial building in Greeneville, Tenn., where he lives and works now.

Dream shop in Tennessee

“My dream when I was 19 was to own a building that was big enough to house a woodworking shop, a place to live, and a showroom,” Wurtzel said. To make that happen, Wurtzel and his longtime partner, Sharon Burton, took a long road trip through Tennessee, stopping at any “beat up, run down, decrepit place that had some architectural detail intact,” she said. “If there was an empty building with a great doorway and a for-sale sign, George would look it over.”

They found their new home in the

historic district of Greeneville, which enjoys steady tourist traffic and a mild climate. The old laundry and dry-cleaning building—6,000 square feet on two floors—was a mess, George and Sharon said, with rainwater pouring through the roof and cascading past the electrical panel. “George had to put his shoulder to the door to get it open, and then he kept talking about all the things he liked,” Sharon said.

The first thing he did, with the help of visiting friends, was to build a nice bathroom. Next they turned the room at the front of the store into a showroom so George could house the work he brought from their home in California.

Once moved in, George renovated the big basement level for his workshop, bringing in most of his machines and adding a string of Christmas lights so Sharon could find her way around. Then Sharon wrote and received a grant from Greeneville’s Main Street program to restore the front facade.

A woodworker’s tribute to Helen Keller

Recently, George got approval from The American Foundation for the Blind to launch his most ambitious and meaningful project ever, 100 reproductions of an Arts and Crafts-style desk used by Helen Keller, funded by her many modern admirers. The desks will be built by blind and deaf-blind artisans, who will travel two and three at a time to work with George in his new workshop. Funds raised by the sale of the desks will go in part to create a fellowship for blind and deaf-blind people to study manual crafts.

As their old building and their new life take shape, George and Sharon are recruiting other artist friends to join them in Greeneville. “There are lots of other affordable buildings like ours,” Sharon says.

It’s a tempting offer. □

Asa Christiana is a freelance writer, editor, and woodworker in Portland, Ore.



Pandemic project. When isolation due to COVID-19 kept everyone home and not visiting their gallery, Sharon handed George an antique wooden biscuit cutter and asked him if he could make one. “We live in the South, where everyone eats homemade biscuits—it might be something we could sell,” she said. In the last 10 months George has made over 500 biscuit cutters that Sharon has shipped all over the country.

Contemporary Wall Cabinet

Kerf-bending: an elegant solution for curved case sides

BY PHILIP MORLEY





A few years ago, I built a long cabinet with tapered sides that curved outward at the top. I made extra parts, planning to build a second identical cabinet. But when I happened to see the extra sides flipped around on my bench, I envisioned instead a smaller wall cabinet with sides that curved inward at the top. I did a rough sketch, working out the asymmetrical arrangement with one section left open, and went right to building it. Since then I've returned to build it a number of times, altering the design slightly with each version.

I usually design things and then figure out how to build them. That's what happened with the curved tapered sides. Kerf-bending them came right to mind because as an apprentice I had built stairs with curved risers, and we kerf-bent those. Then I remembered an article by David Haig ("Curved Panels for Furniture," *FWW* #231) that discussed the technique. I followed his method closely and found it very effective; the main change I made was in blocking up the tapered core to make kerfing simpler.

I think of this cabinet as having a slightly Japanese teahouse feeling: as something to make you feel good when you walk into the room. It's a place you might want to display or store favorite pieces of craft or other keepsakes. With that in mind, I leave the drawers without stays, so you can pull them right out of the case to examine what's inside (and perhaps even get a closer look at their dovetails).

Philip Morley builds furniture in Wimberley, Texas.

All parts are ash, except where noted.

Single row of
six dowels,
 $\frac{3}{8}$ in. dia.

KERFING THE CORES

The heart of this cabinet's design is its curved and tapered sides. I make them by kerf-bending a core of solid poplar and then veneering over it with shopsawn ash. Because I use some of the same veneer for edging, the finished sides really have the look of solid ash. And because the core is solid wood, I can make the other case parts from solid wood and they'll all move together.

Before I begin kerfing, I make an overwide poplar blank and taper it on a jig in the planer. Then I rip two strips off the blank, turn them end for end, and adhere them to the blank. Doing this takes a lot of fussiness out of the kerfing process. Typically, when kerf-bending a tapered part, you need to readjust the blade height after every kerf you cut. But with the two tapered strips beneath the workpiece, I can cut all the kerfs with the blade at the same height, then just remove the strips.



First taper the core. Morley runs his poplar core stock through the planer on a ramped jig. The blank is overwide both in length and width.



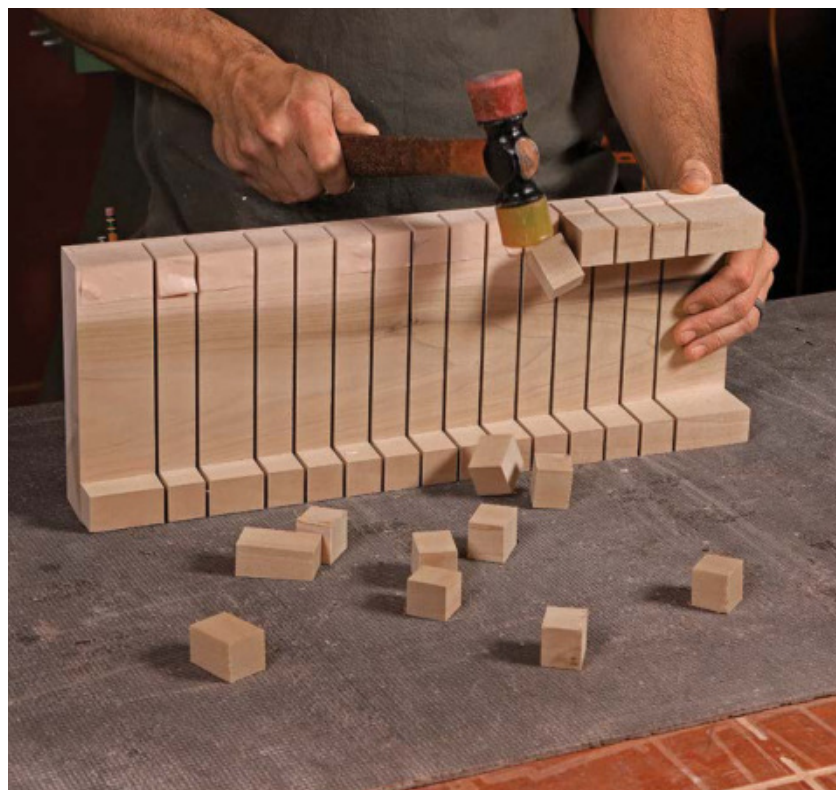
Rip a pair of wedges. To simplify the kerfing process, make your core blank overwide and, after tapering it, rip a wedge-shaped strip off each edge.



Reverse the wedges and tape them to the blank. Using double-sided tape, attach the tapered strips to the tapered core with their thick end at the core's thin end. Apply clamp pressure briefly along the strip to be sure the tape's grip is firm.



Cut kerfs in the core. With the inside face of the core facedown and the blade raised to within $\frac{1}{8}$ in. of the outside face, Morley uses a dedicated sled to cut the slots that will allow the core to bend (above). After cutting all the kerfs, remove what remains of the wedges (right) and scrape off any residue from the tape.



BEND AND VENEER THE SIDES



Veneering the core. Morley glues shopsawn ash veneer to both the inside and outside faces of the poplar core. He sliced the veneers from a riftsawn ash board and milled them to $\frac{3}{32}$ in. To get the full width of the side, he edge-glued two veneers.



Clear clamps. Bind the veneer tightly to the core with stretch wrap, and then wrap the whole thing to the bending form.

Once the core is kerfed, it's super flexible, so bending is a breeze. I made the bending form from $\frac{3}{4}$ -in. plywood. It has six ribs that are curved along one edge; I used small plywood blocks at each end to space the ribs apart. To make the ribs identical I first made a master rib by sawing and sanding to a line, then used that to template-rout the other ribs. After gluing and stapling the ribs and spacer blocks together, I covered the curved face of the form with a piece of $\frac{1}{4}$ -in. Masonite.

When I was ready to do the bend, I used stretch wrap to clamp my front and back veneers to the core and then used more of it to clamp that sandwich to the bending form. Then I put the whole package into the vacuum bag.

Once it was cured, I cut the core to width and glued on the edge veneers. Crosscutting the completed sides to length was a little tricky, since there were no flat reference surfaces to work from. I laid out the cuts in pencil and used support blocks to elevate and stabilize the workpiece at just the right position for the cut.



Gaining an atmospheric advantage. Morley puts the wrapped package—core and bending form—into his vacuum bag to apply final, even clamping pressure.



Clean the curved edges. Once the kerfed bend is cured, joint one edge (left). With the convex side down and the jointed edge against the tablesaw fence, rip the side to width (above).



Size up the edging. With the pencil's tip spaced away slightly, Morley traces the curves of the side onto a sheet of veneer. Before gluing on the edging, he cuts to the lines at the bandsaw.



Trim the perimeter. After gluing, Morley cuts off the excess edging at the router table with a flush-trimming bit. He'll tune up that trimming later with a handplane or scraper.



Custom crosscuts. With scrap blocks tucked underneath to support the side, Morley adjusts the blocks and the workpiece until his layout line is parallel to the square and aligned with the path of the blade, then makes the cut.

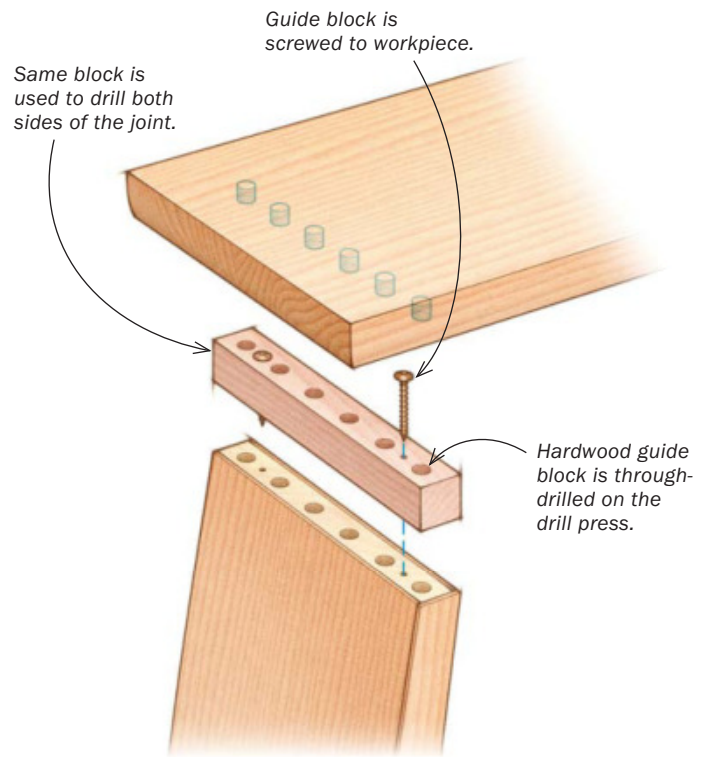


THE CASE COMES TOGETHER

Drilling for dowels. After screwing the guide block in place on the bottom end of the side, Morley drills two lines of six holes with a $\frac{3}{8}$ -in. titanium twist bit. Afterward he removes the jig and uses a chamfer bit to break the edge of each hole. To drill for the dowels in the top of the side, he uses a different guide block, with just one row of holes (see drawing at right).



DOWEL BLOCKS GUIDE THE DRILLING



Spacer aligns the jig. To cut mating holes in the cabinet bottom, Morley uses the block with two rows of holes, aligning it with a long spacer (which is centered on the bottom) and an additional small spacer (left). To cut holes for the dowels that will link the side with the cabinet top (above), Morley uses the narrower guide block. He uses the same long spacer but does not need the small spacer.



Dominos, not dowels. Where the horizontal divider meets the curved sides, Morley uses Domino joints instead of dowels. For mortising into the side, he builds a right-angle platform to support the machine (left). And since the curved top of the Domino's fence won't seat squarely against the curving cabinet side, he attaches a straight scrap to the fence with double-sided tape. For mortising into the ends of the horizontal divider (right), a long piece of stock beneath the workpiece provides easy registration.



Suss out the assembly sequence. Using just a few dowels in each joint, Morley does a dry assembly, first connecting the drawer dividers to the horizontal divider, then adding the sides, and then the bottom.

Bringing it all together. After the dry-fit, Morley disassembles the case, masks off the joinery with tape, sprays finish on the parts, and advances to the glue-up.

Used dowels for nearly all the case joints, making three different doweling blocks to guide the drilling. Where the horizontal divider meets the case sides, however, registering doweling blocks would have been complicated because of the curve, so I chose to cut Domino joints there. For the cuts into the side I built a quick L-shaped riser to hold the Domino level and at the right height. I also taped a straight scrap to the Domino's fence so that it would seat squarely against the cabinet side.



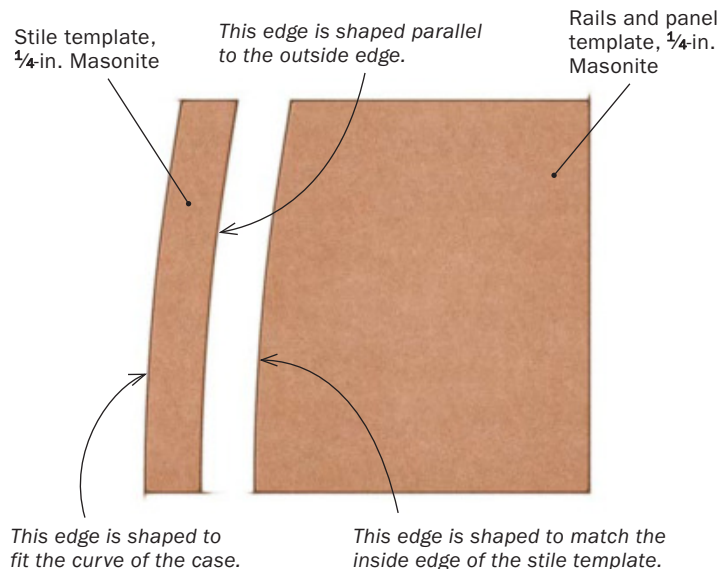
Route a rabbet for the back. To simplify rabbeting for the back, Morley waits until after final assembly and does the job with the whole cabinet riding on the router table. Before routing, he flushes up all the joints on the back of the case.

CURVED DOOR AND DRAWER MATCH THE SIDE



Marking the rails. Using the narrow template, Morley lays out the curved crosscuts on the left end of the rails.

TEMPLATES SHAPE THE DOOR PARTS



Template-route the stile. After routing mortises for slip tenons and then bandsawing the door stile's curved inner edge, Morley template-routes the curve to finished shape.



Rails get a trim, too. After cutting the mortises in the rails, Morley routes the ends to a curve, following the wide template. The rails are attached to the template with double-sided tape and firmly clamped to the sled.



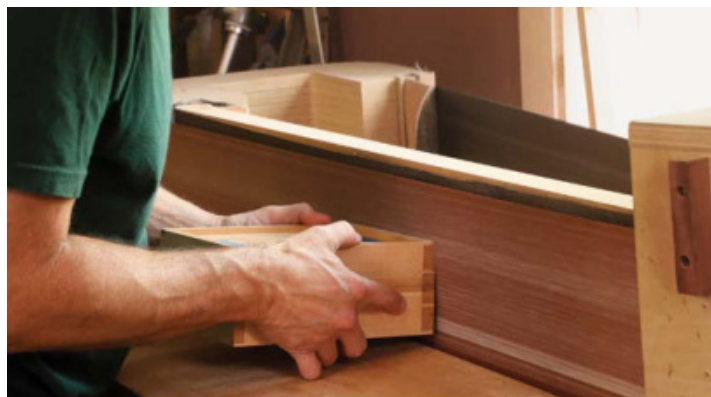
Curve the panel. The door panel, a 1/4-in. Baltic-birch plywood substrate veneered with ash on both faces, gets trimmed to final shape with the large template. The template is adhered to the panel with double-sided tape.



The door's last curve. Having parallel edges is a clamping advantage, so Morley waits until after the door is glued up to bandsaw out the door stile's outer curve. He'll dial in its fit to the cabinet side with a stationary belt sander and hand tools.

Intentional asymmetry.

Morley builds the cabinet's left drawer with its left side overthick. Having shaped a piece of $\frac{3}{4}$ in. MDF to the curve of the drawer pocket, he transfers the curve onto the drawer. He does the same with the right drawer.



Shape to the line. Rocking the drawer side against a belt sander does a smooth job of creating a curved side to match the cabinet.

Getting the frame-and-panel door, with its curved left stile, to fit snugly to the curve of the cabinet side takes a little doing. I use a pair of nesting Masonite templates to guide the process.

First I make a template to the shape the left stile will be. I cut a piece of Masonite to the full height of the door opening and set it in place. Then I use a compass, opened a couple of inches, to follow the curve of the cabinet side while tracing onto the template. After sawing and sanding to the line, I cut a parallel curve 2 in. away on the right edge of the template. Then I make the second template, with a convex curve that is a perfect mate for the concave curve of the first template. These two templates guide the layout and trim routing for the left stile, the two rails, and the door panel. It's important to note that the mortises for the slip tenons that join the door frame are cut while the rails and stiles are still square.

Making the left and right drawers match the curve of the sides is far simpler. I make the drawer boxes with one side extra thick and then shape that side to the curve at a stationary belt sander, or else with a handplane.



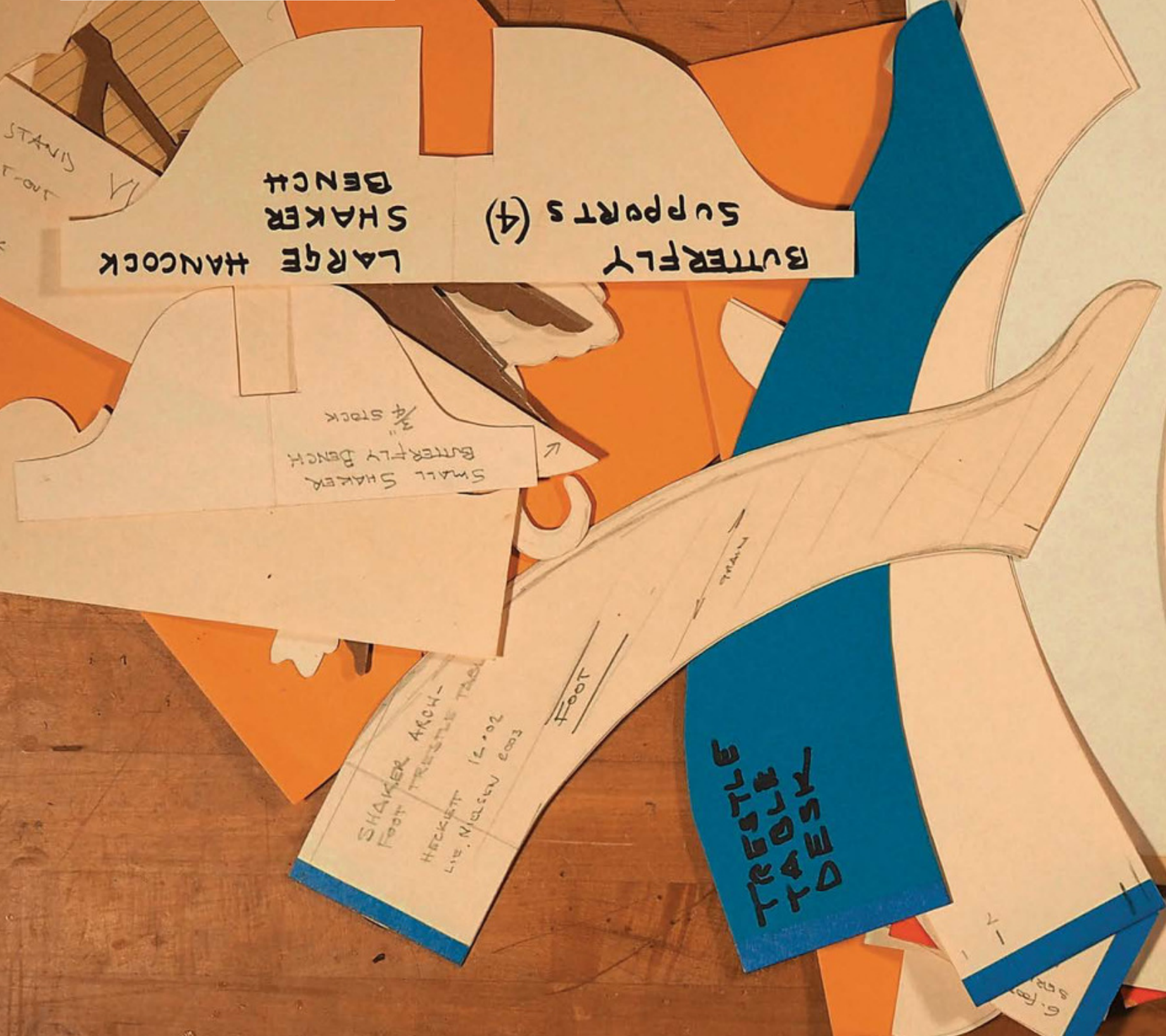
Half-blind dovetails, after the fact. Once the drawer side is fitted to the curved drawer pocket, Morley glues a piece of ash veneer to the front, converting through-dovetails into half-blinds. He builds the other two drawers the same way.



Final trim. Once the glue has cured, the front veneer can be flush-trimmed to the drawer box.



Tame Curved



Parts with Patterns

Make multiples more easily using simple templates

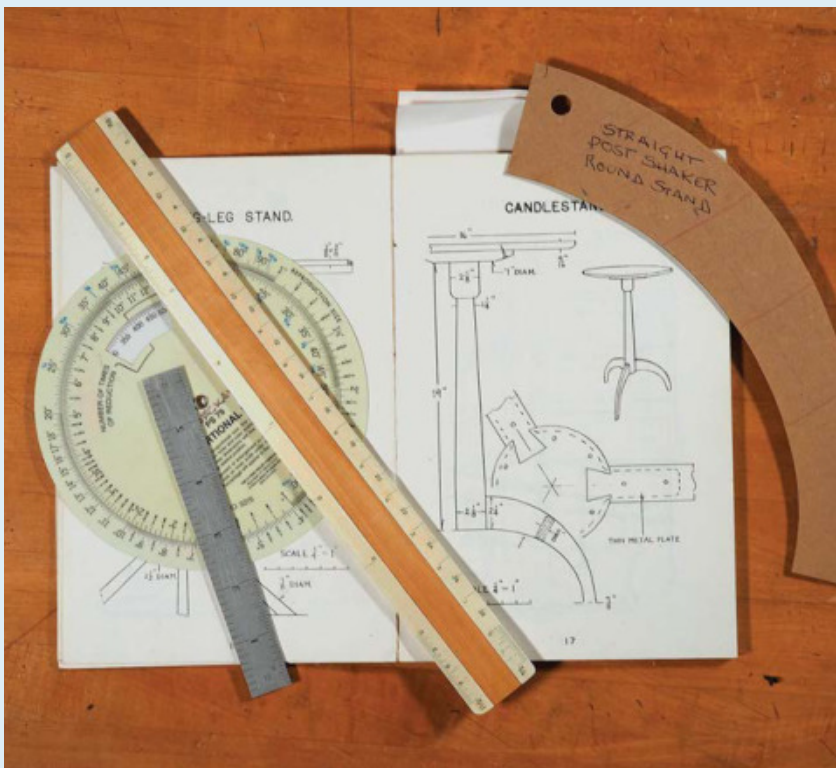
**BY CHRISTIAN
BECKSVOORT**

If you make furniture that you plan to re-create in the future, a good set of patterns will make your life a lot easier. Boatbuilders have known this for years, taking their layout lines from half hulls. Back in the day, shipwrights would build half hull models to scale. They only needed to build one side since the other side is a mirror image, then they'd take all the measurements from that for both sides. I do the same thing with my symmetrical patterns. After all, if someone commissions a set of four chairs, then a few years down the road wants two more, they expect them to be identical. The same with historical reproductions or limited edition gallery works.

Most of my patterns are made of stiff paper: poster, manila, tag, or 110–180 lb. card stock. It needs to be stiff enough for a pencil to follow its outline, yet thin enough to cut with scissors. In a few cases I have made thin patterns of solid wood or plywood, but these aren't as light or as easy to store as the paper templates.

Here I'll discuss four pieces of furniture where I use patterns to make multiple parts: a lamp, a Shaker trestle table, a stool, and a Shaker round stand.

*Longtime contributing editor
Christian Becksvoort makes furniture
in New Gloucester, Maine.*



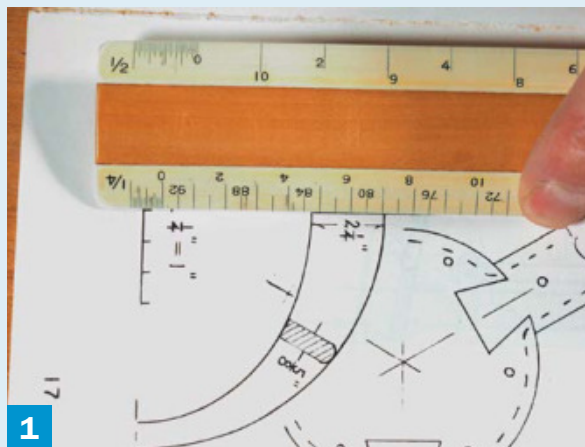
Making the pattern

Patterns can be made directly from an existing object, drawn freehand, or scaled from a drawing or photo. When working from a photo or drawing, it's handy to have a proportion scale (available from drafting- or art-supply stores). If a drawing is your source, you'll also want an architect's scale. By comparing the dimension of a part on paper with the part's intended full size, you can find the necessary percentage of enlargement. Go to a copy shop and have the photo or drawing enlarged to give you a full-scale image.

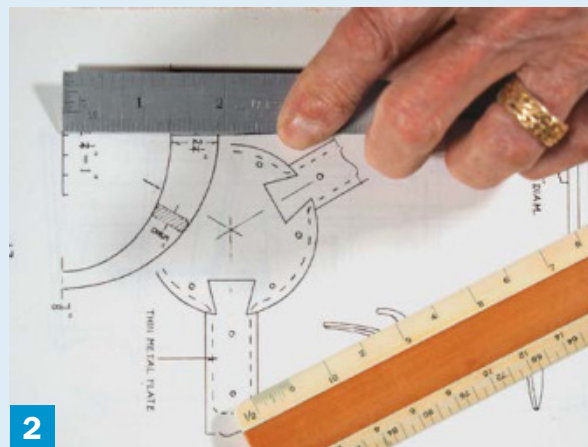
Patterns for symmetrical components are best created by folding paper in half, drawing half the image, stapling it (to prevent the paper from shifting), cutting the double paper, removing the staples, and unfolding the pattern. Asymmetrical components can be drawn directly on paper. For curved pieces, you can use flex curves, French curves, or drafting weights with battens.

CREATING A FULL-SIZE PATTERN FROM A PLAN

Start by finding the intended full size of the part. On a scale drawing, an architect's scale can determine the size quickly (1). The next step is to measure the size of the part on the page (2). With those two pieces of information, use a proportion scale to determine the amount of enlargement needed to create a full-size copy of the part. Adjust the outer ring so the size on paper and the desired size of the part are aligned (3). The number in the window of the scale tells you by how much you need to enlarge the drawing (4). The enlarged copy can be glued or traced onto heavier stock to create the pattern.



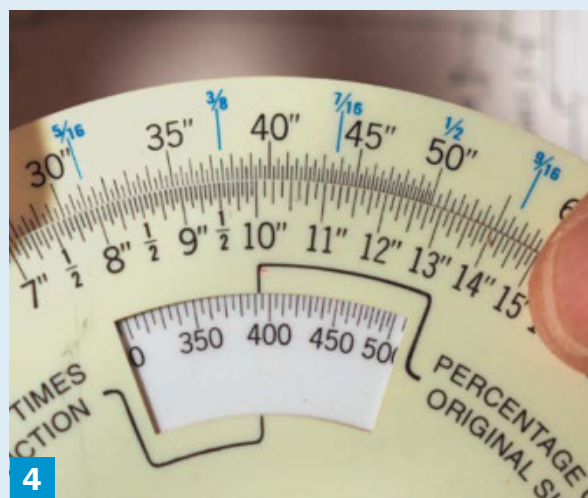
1



2



3



4

SYMMETRY UNFOLDS

When you're working with a symmetrical pattern, you need only draw and cut half the template on a folded paper. Both sides will be exactly the same when you unfold the paper.

SHAKER TRESTLE TABLE

This is one of the finest examples of Shaker design. It requires three patterns. The first is for the turned post, and I don't cut it from paper. It is one of the few patterns that I have drawn on thin wood. The next two are for the arch foot and the brace. I have built the table a number of times and have a few different patterns, the difference being mostly in length, depending on the width of the table. Both patterns are symmetrical, and are drawn and cut from folded paper.



Half the work. With symmetrical patterns, Becksvoort draws and cuts half the pattern on a folded paper. He staples the two halves together to keep the paper from slipping, and then through precise scissor work cuts out half the pattern, pulls the staples, and unfolds the whole pattern.



Transfer to the workpiece. With tacks securing the pattern to the workpiece, use a pencil to trace the pattern. Then carefully cut to the line at the bandsaw.



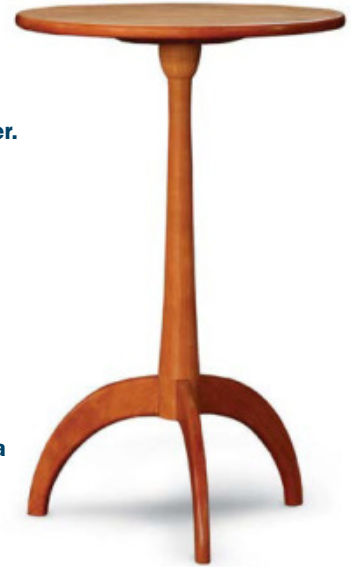
APPROACH ASYMMETRY A LITTLE DIFFERENTLY

Rather than drawing half a pattern on folded paper, draw the whole pattern.

SHAKER ROUND STAND

The turned posts on round stands, like those on the Shaker trestle table, don't lend themselves to drawn patterns. They are better done with calipers and a ruler.

The stand's feet are a different matter. Some plans will feature the profile drawn on a small grid pattern, which you can enlarge to actual size by drawing on a 1-in. grid. However, most historical pieces don't have plans or patterns. Years ago, I solved the problem by taking a photo (slide), at mid height, and 90° to the leg profile. I then blew the slide up to full size on the wall and traced the leg onto paper pinned to the wall. You can update this method with a digital photo, and a laptop and projector if you have that setup.



Cut and sand. Saw close to the line at the bandsaw, and then sand to the line, smoothing out any sawmarks. Becksvoort uses a sanding drum attachment on his lathe to sand curved parts.



Efficient layout of parts. For an asymmetrical part, draw out the whole pattern and cut it out. Then tack that onto the workpiece, keeping an eye on the grain direction and how it falls in the pattern. Making multiple patterns allows you to arrange parts more easily and make the best use of your stock.

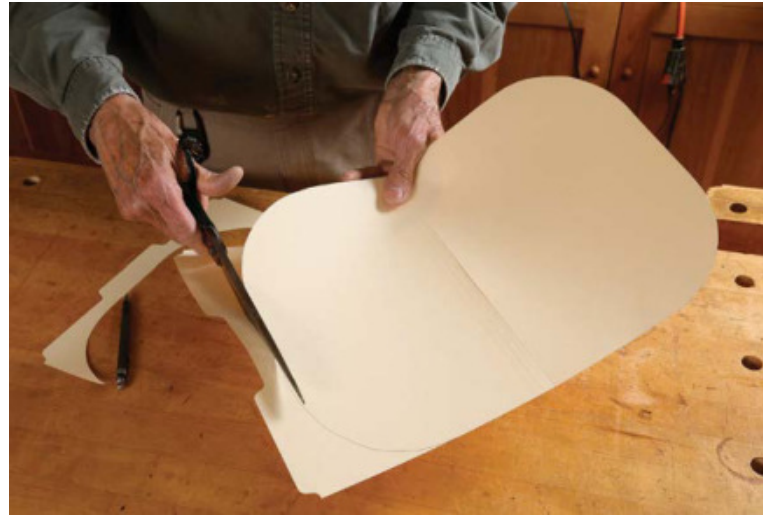
MULTIPLE CURVES AND ORIGINAL DESIGNS

Flexible patterns are key for laying out on curved surfaces, and new designs can evolve from the first pattern.



CURVED STOOL SEAT

The stool looks fairly simple, mostly rectilinear. But I laminate the seat out of bending plywood over a curved form. Consequently, the seat needs a pattern for the correct length, width, and corner radii. Just to be on the safe side, I also have a pattern for the length and width cross-sections. The templates are handy when knocking out six stools at a time.



Conform to a curved surface. One of the reasons Becksvoort uses thick stock paper for his patterns is it can easily flex into shape on a curved workpiece. For this curved stool seat, he cuts out the pattern, tacks it to the seat, traces it, and saws out the shape before sanding it smooth.



SWINGING ARM LAMP

I've made about a dozen of these, and I want them all to look the same. Using a pattern keeps me from having to recalculate the angle, length, width, and curve at the bottom. With both a side and a top pattern, I can pin the first pattern to the stock, trace it, bandsaw, and then pin the other pattern to the piece to give me the final shape. This original design started out with this pattern, and I've duplicated it a dozen times. I've also used it as a springboard to evolve the design further, creating new designs and patterns.



Lightweight Crosscut



Sled for Big Panels

Clever design includes a steel runner and a thin, honeycomb base

BY STEVE FIKAR

I cut out large plywood parts pretty regularly for a variety of woodworking projects, including cabinets for the house and shop. Ripping these big pieces on the tablesaw is easy enough, but crosscutting them accurately is a challenge. A tablesaw crosscut sled will do the trick, of course, but if you stick to the usual design, a large-capacity sled tends to be very heavy. So I decided to start with a clean slate and engineer something unique.

My solution is an extralarge sled that runs along one side of the blade—instead of straddling it—guided by a single runner in one of the miter slots. To add size and capacity to the sled without adding weight, I borrowed a common engineering solution—torsion-box construction—to create a $\frac{3}{8}$ -in.-thick base that is very lightweight yet remarkably stiff and strong.

As they are on all crosscut sleds, the fence and base on this sled are trimmed by the blade, creating zero-clearance support for chip-free cuts and easier alignment. An advantage of a one-sided sled is that only one fence is needed, attached at the front edge.

Steel runner ensures accuracy

The main disadvantage of a one-sided sled, especially a large one with heavy cargo, is the single runner that guides it. If it were made from wood, it would tend to wear and get sloppy over time. So I used a steel bar for this sled—“cold-rolled” at the factory to precise dimensions—which will deliver a lifetime of accurate cuts.

Most tablesaw miter-gauge slots are milled to fit a straight bar exactly $\frac{3}{4}$ in. wide by $\frac{3}{8}$ in. thick. You can buy a steel bar with these precise dimensions

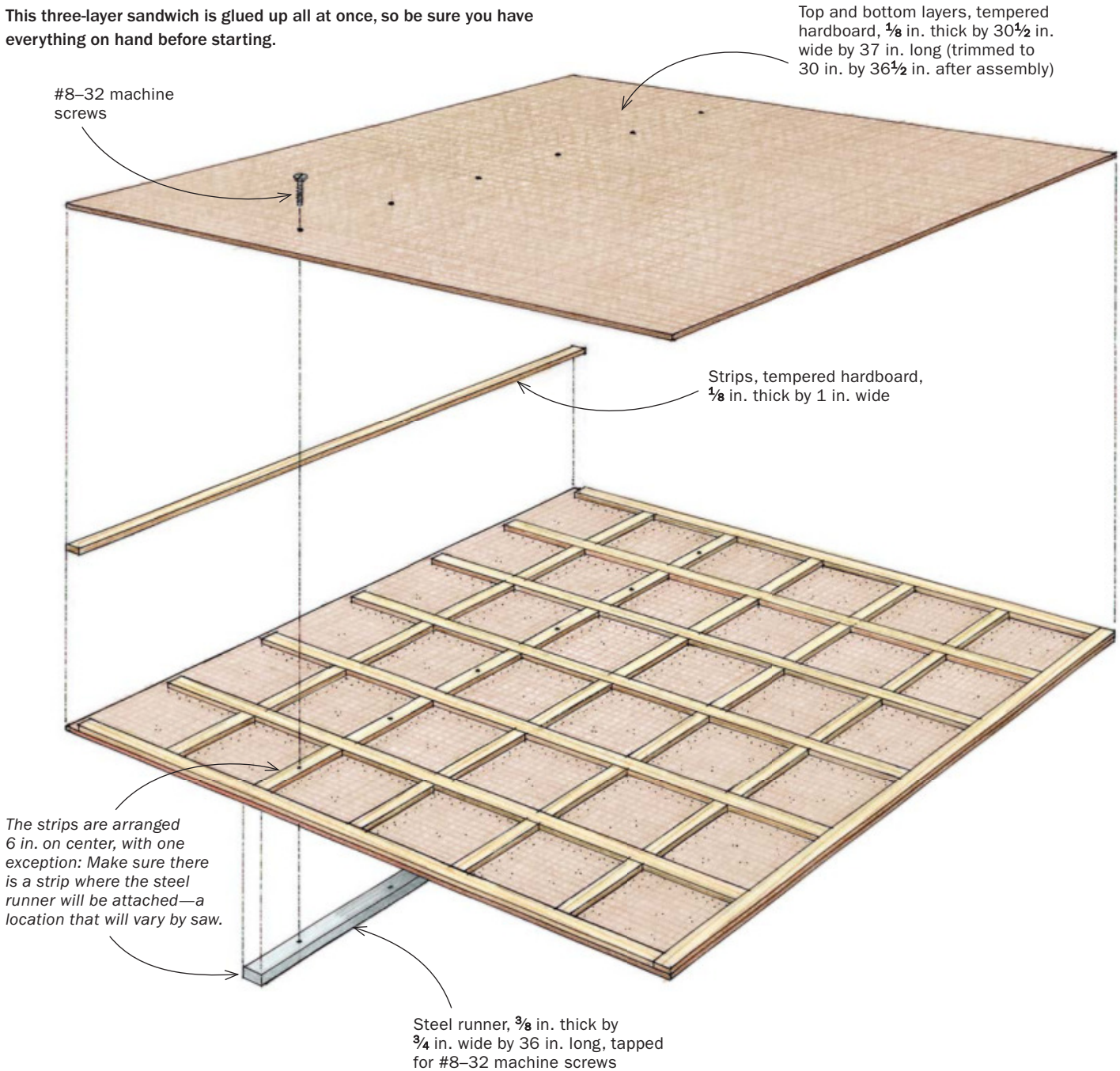
Torsion box base is the key

Fikar used three layers of $\frac{3}{8}$ -in.-thick tempered hardboard—two full outer layers with a grid of strips between—to create a large base that is both stiff and lightweight. The resulting three-layer sandwich is much lighter and more rigid than a comparable sheet of plywood.



BASE IS A LIGHT, STRONG HONEYCOMB

This three-layer sandwich is glued up all at once, so be sure you have everything on hand before starting.



Gluing up the base. Start by clamping two long strips along adjacent edges, and build out the grid, applying a bead of glue on each piece. Run a bead along the top of the strips and drop the top in place. If you don't have a vacuum bag, you can clamp this big glue-up by laying a piece of plywood on top to distribute pressure, and then piling on every heavy object you own, spread out as evenly as possible.



Attach the steel runner

To resist wear and ensure accuracy for years to come, Fikar uses a steel bar to guide his one-sided sled. Here's how to drill and tap it for machine screws, and fit it precisely to your miter slot.

Drill and tap the screw holes.

Start with a smaller drill bit before stepping up to the full-size #29 (or $\frac{9}{64}$ -in.) bit. Lubricate a #8-32 tap and twist it slowly until it starts to cut, trying to keep it square to the bar as you go. Twist until you encounter stiff resistance, then reverse the tap to break off the chips and continue. Then test the threads with a screw. If it's too tight to turn by hand, run the tap through once more. Then deburr the holes with a countersink or deburring bit.



TIP Adjusting the fit of the bar

If the steel bar is loose in the miter slot, improve the fit by dimpling the sides at regular intervals, using a center punch, then filling the dimples as needed. You can check to see which dimples are rubbing by putting ink on them before trying the fit.



from a variety of online retailers, in a 3-ft. length that's perfect for this project.

Just to be sure, though, measure your miter slots with a dial caliper and read the specs carefully on the bar you're considering. The one I found at McMaster-Carr is perfect for my saw, with a tolerance range from a few thousandths undersize up to 0.750 in. on the nose. If there's any doubt, err toward a slightly undersize bar and dimple it to fit, as shown above.

Offcuts are supported too—The other disadvantage of a one-sided sled is the lack of support for cutoff workpieces. Whenever this might be an issue, I place a simple $\frac{3}{8}$ -in.-thick support piece on the right side of the saw table.

Start by building the torsion-box base

The top and bottom layers of the base are full sheets of hardboard, while the middle layer is a grid of 1-in.-wide strips with open spaces between, making the base somewhat hollow yet extremely stiff.



Screw the bar in place. After clamping the bar to the base, drill through each tapped hole with a bit that just clears the threads, then remove the bar and enlarge the holes with a $\frac{9}{32}$ -in. bit. Flip the base over, and countersink the holes on the top side. The #8-32 machine screws pull the bar tightly to the base. If they stick out past the bottom of the bar, grind or file them flush.

Squaring the fence

To square the fence, create a pivot point by driving a screw through the base and into the fence at the right end. Then simply clamp the left end while you make test cuts and dial in the fence position.

Start by trimming the base. Drop the runner into the miter slot, and cut the edge of the sled flush to the blade. Then use a circular saw and guide fence to trim the front edge square. The other edges can be ripped parallel on the tablesaw.



Test cuts ensure squareness. Drive a screw through the base into the right end of the fence, and clamp the left end. Using a large piece of plywood with its two long edges ripped parallel, make a test cut (above). Then flip the piece so the opposite long edge is against the sled's fence and feel along the blade side of the base to see if the sled and test cut still align (above right). If they don't, adjust the clamped end of the fence and make another cut. Once the fence is square, drive the full row of screws.



To get ready for the glue-up, cut the top and bottom pieces slightly oversize, and cut up all of the strips, both the full-length and 5-in.-long ones. Now lay out the grid on the lower layer.

The grid is 6 in. on center with one exception: You need to make sure there is a hardboard strip where the steel runner will be mounted, based on your particular saw design. To keep track of the bar location, I place a strip of blue tape under that area, which I wrap over the edge of the glue-up later. When locating the bar, make sure the right side of the base will bypass the blade by at least $\frac{1}{8}$ in., so the blade will trim that edge.

The glue-up is straightforward but you have to do it all at once. So make sure you have everything ready to go beforehand, including the plywood and weights for the top layer, and a full bottle of Titebond III (allows 15 minutes of working time).

Find or create a firm, flat surface large enough to support the pieces, and start by gluing the gridwork of strips to the bottom layer. A wide bead of glue on each strip is all it takes.

To keep the pieces from sliding around as you press them into



place, start by clamping two full-length strips along two adjacent edges. Then push the others against those as you build out the grid from there. None of the rest require clamping.

Once the strips are all down and aligned, lay another bead of glue along their top edges, and wait a few minutes to let the lower glue lines stiffen a bit. Now lay down the top sheet of hardboard carefully, making sure that all the strips stay flat with no overlaps. Lay a piece of plywood on top as a clamping caul, and then add as much weight as you can, keeping it even and well-distributed.

Fit and attach the bar and fence

The only good way to attach the steel runner to such a thin base is with machine screws that pass through the base and thread into the bar. So you'll need to drill eight evenly spaced holes down the center of the bar and cut #8-32 threads in them. See photos, p. 47, for how to tap and fit the bar.

Before attaching the bar, check that it's at least $\frac{1}{2}$ in. shorter than the front-to-back length of the sled. That's important because you'll cut the base to final size only after the bar has been attached. Once the bar is screwed on you'll trim the edge of the

Using the sled

Here are some techniques and accessories that will ensure clean, accurate cuts..



Align and clamp. After the tablesaw blade cuts through the fence, it becomes a zero-clearance indicator for lining up cuts. To make sure large workpieces don't shift, Fikar clamps them to the fence.



Keep the sled from tipping. This long, straight board clamps to the left, front edge of the saw table, supporting the sled and keeping it level when it overhangs the front edge of the saw.



base that passes the blade; then you'll use a circular saw and a fence to trim the front edge square. You can rip the other edges parallel on the tablesaw.

Attaching the fence perfectly 90° to the path of the blade is easy if you follow the directions in the photos on p. 48. I applied a clear oil finish to my sled for looks and durability, and I wax the bottom and the runner periodically.

Get the most from your new sled

Since the sled starts well in front of the saw table for large workpieces, I add a special support board to my saw, to help keep the sled level. It clamps to the left edge of the table, extending back several feet toward the user.

To maintain the zero-clearance base and fence, I always use the same blade with this sled. But if the edge ever needs refreshing, you can cut it back a little, add a solid-wood strip, plane it flush on the top and bottom, and re-cut the edge. The fence can also be renewed or replaced if necessary. □

A former fighter pilot and retired software engineer, Steve Fikar lives in Shalimar, Fla.



Support large offcuts. Fikar uses this simple jig—equal to the thickness of the sled base—to keep offcuts from dropping off the sled and chipping.

A photograph of an older man with glasses and a mustache, wearing a blue shirt and a dark apron, working in a workshop. He is using a hammer to secure a piece of brown leather onto a seat frame. The seat frame is covered with a patterned webbing material. The workshop is filled with various tools and furniture parts, including a wooden chair frame in the background and a sign that says "Old Guys Rule".

Upholstering a Slip Seat

Which tools to use and what techniques work best

BY MICHAEL MASCELLI

Perhaps the most common task in furniture upholstery is the familiar slip seat, so named because it often slips into a rabbeted recess in the chair frame. Some slip seats, like the one I'm upholstering here, for Mike Pekovich's Arts and Crafts side chair, sit on top of the frame and get secured from underneath through glue blocks. Despite their simple form, slip seats offer a number of options for both the look and feel of the finished chair.

Frame it out

The success of the upholstery depends on a well-made upholstery frame, and here I used common poplar; other good choices are medium-density woods like soft maple, birch, or white ash. I prefer

air-dried wood for upholstery frames, as kiln-dried stock can case harden, making the surfaces difficult to tack or staple. The frame members are $\frac{3}{4}$ in. thick and joined with sturdy glued half-laps at each corner. This seat has a traditional angular look with a 45° beveled edge on top. A rounded edge would be fine, too. All the sharp sawn or planed edges and corners are eased with sandpaper or a block plane to ensure that nothing cuts through the cover material.

Webbing provides support

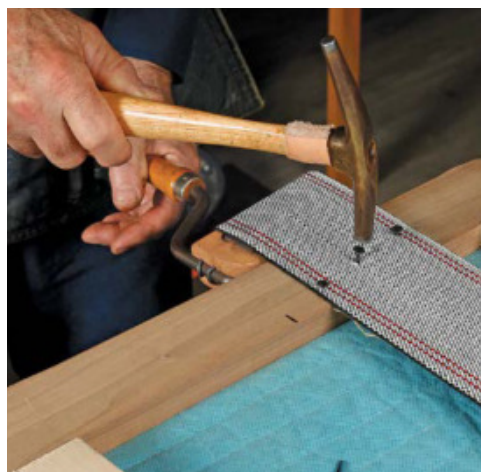
The support system for the seat is upholstery webbing. You can use either traditional red-stripe jute or a modern synthetic webbing, both of which are $3\frac{1}{2}$ in. wide. After 40 years of using red

WEBBING IS THE FOUNDATION

Tacked or stapled to the upholstery frame, webbing supports the layers of padding and the coverings on top of the padding. Attaching the webbing to the bottom of the frame, as Mascelli does on this chair, allows for an additional layer of padding inside the well of the frame. Attaching it to the top of the frame is traditional for doing very flat and hard seats with just a thin layer of padding under the show cover.



Secure the first end. Fold the end of the webbing over, so a neat end is showing. Attach the strip either with upholstery tacks and an upholstery hammer (left) or an upholstery stapler (above).

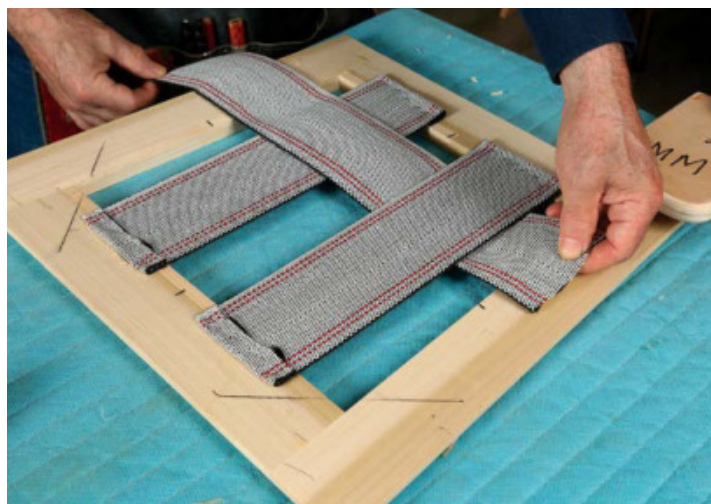


Stretch and secure the second end. Simply pulling the webbing by hand won't make it sufficiently taut, so use a webbing stretcher with metal teeth to tension it. Lever downward on the webbing (far left), and tack it in place (left). Cut off the excess, fold it neatly over, and tack or staple it. Mascelli uses a stepped block clamped to the work surface to secure the frame while he installs the webbing.

stripe, I have come to appreciate synthetic webbing as another good option. The synthetic does not stretch out and rot as the jute does over many years. Either choice will provide years of good service. Here, I am using the red stripe.

On this chair, the webbing is placed on the bottom of the upholstery frame, allowing for an additional layer of padding inside the frame. This makes for a much more comfortable seat. Install the webbing with a proper webbing stretcher, tacking or stapling it to the bottom of the frame near the inside edge. The webs are alternated over and under in a simple basket-weave pattern.

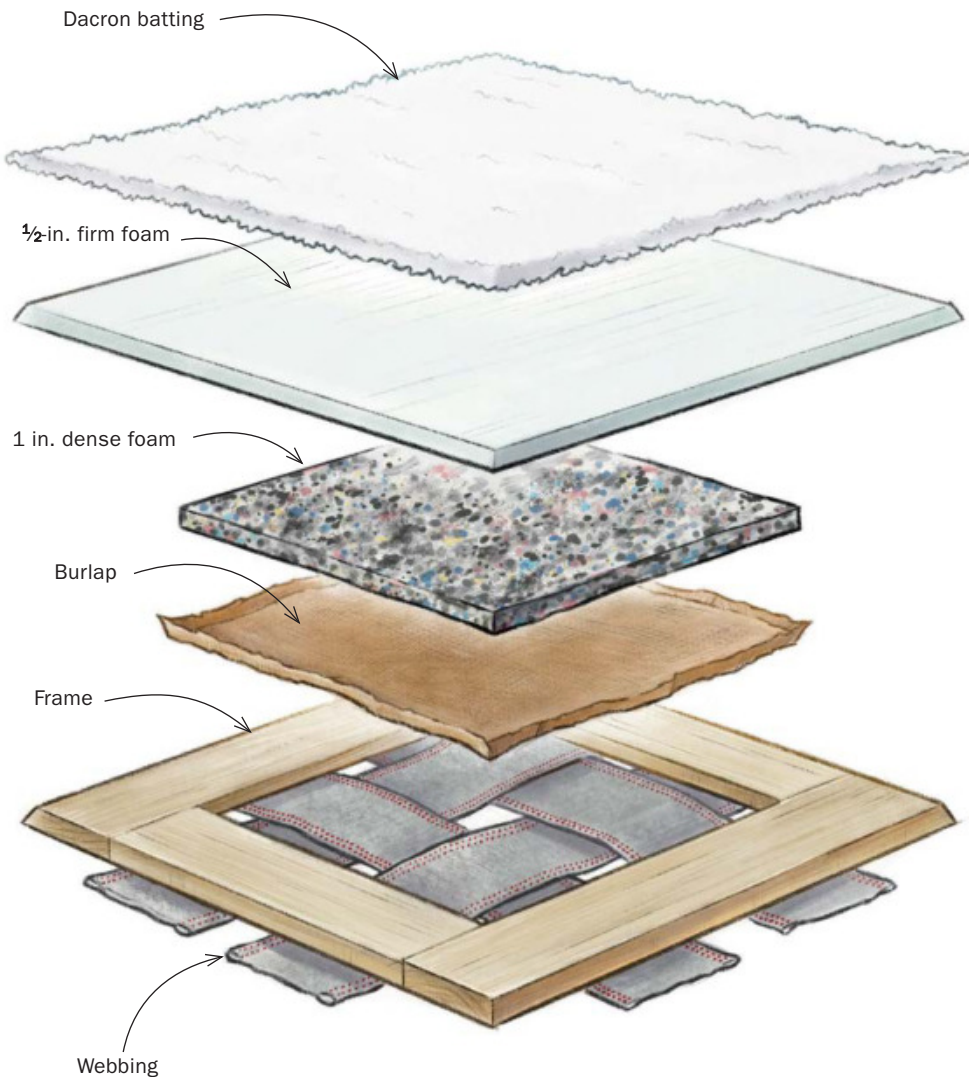
The staples are fine wire #7 (or C wire) with a $\frac{3}{8}$ -in. crown and a $\frac{1}{2}$ -in. leg length, applied with a pneumatic stapler. Although heavier than common paper staples they are much lighter than construction framing staples, which could split the frame. Five or six staples are placed on each web at a roughly 45° angle. Stapling at a 45° angle to the perimeter of the frame provides for better holding power than putting all of the staples in a straight line along the edge, which could also cause the frame to split.



Basket weave the webbing. A simple over and under pattern is perfect for the webbing. Repeat the steps carefully so that the tension is close to even on all four webs.

PADDING IT OUT

Once the webbing is secured, tack in a layer of burlap, and then you can begin adding the layers of padding. By varying the density of the foam layers you can combine good support with a soft seat. The best way to know which foam to choose is to mock up a couple of versions and see which one feels the best. For this seat, the layers are 1 in. of the densest foam available, a second layer of ½-in. firm foam, topped off with Dacron batting.



Online Extra

For list of sources for all of the tools and materials, go to FineWoodworking.com/292.

When using webbing tacks on light frames, the #8 or #10 are safer than typical #12 webbing tacks. Stagger the pattern so the tacks do not create a fault line and cause the frame to split.

Add the burlap, foam, and batting

With the webbing in place, flip the frame over, lay a piece of upholstery burlap into the well of the seat frame, and secure it with just enough ¼-in. staples or small #4

tacks into the inside edge of the frame to hold it in place. The burlap ensures that the foam does not sag between the webs.

The first layer of foam is usually the firmest foam available in a 1-in. thickness, the multicolored rebond foam. Rebond is very similar to carpet padding, which is what I used here. This 1-in. layer is a bit thicker than the ¾-in. well formed by the frame, and that extra height will become part of the loft or shape of the seat. The foam

1. A BURLAP LINER



Before you add any foam, staple or tack upholstery burlap (not the same as garden center burlap) into the well of the frame. Mascelli sets a temporary upholstery tack in the center of each side, and then goes back to staple the burlap before removing the tacks and trimming off the excess.

2. A BASE OF DENSE FOAM



Rather than using 1-in. rebond upholstery foam, Mascelli uses two layers of ½-in. carpet padding, joined with spray adhesive. It's less expensive and it's easy to get. Cut the padding to size for a friction fit in the well. An electric carving knife works best, but you can also use heavy scissors or a serrated bread knife.



3. A SECOND LAYER OF FOAM



Glue the second layer in place. Using spray adhesive, glue the $\frac{1}{2}$ -in. firm upholstery foam to the top of the 1-in. dense foam and the frame. Then use a knife, riding on the bevel of the frame, to cut the same bevel on the foam as you trim off the excess.

is cut to size and then simply sits in the well. The best way to know which foam to choose is to mock up a couple of versions and see which one feels the best.

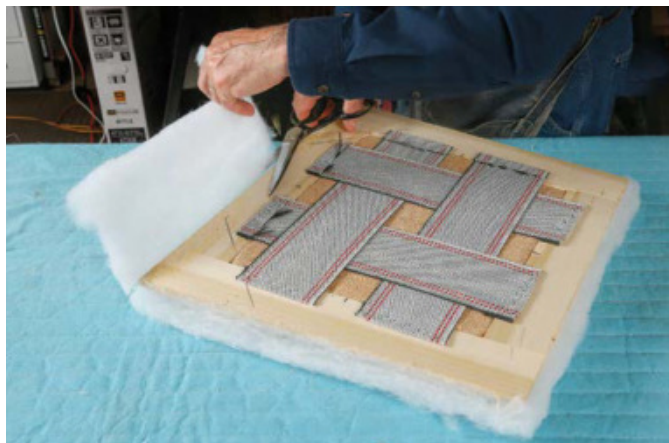
For the second stuffing layer I used a $\frac{1}{2}$ -in. firm foam to keep with the low-profile look. This foam comes from upholstery supply companies. With this layer in place, try the seat again to make sure it will be comfortable and have the right look. Additional foam layers can be added. I install the foam with Albany Foam & Supply Ultra Foam Bond Adhesive Spray, which I buy locally, but 3M 90 also works well. To add to the gently tapered look, I beveled the foam edges to the same 45° bevel line of the frame.

Next, I wrapped everything with a Dacron batting to give a bit of loft to the otherwise flat surface of the foam. This is a nice option especially under delicate show covers. The Dacron is cut oversize, spray-glued in place, and trimmed at the bottom edge. Do not wrap the Dacron around the bottom of the frame, as it will only get in the way of the show cover and prevent the seat from sitting neatly on the frame.

Putting the covers on

The next steps are to cover the frame and padding with a cotton muslin sub-cover and then the show cover, whether it is

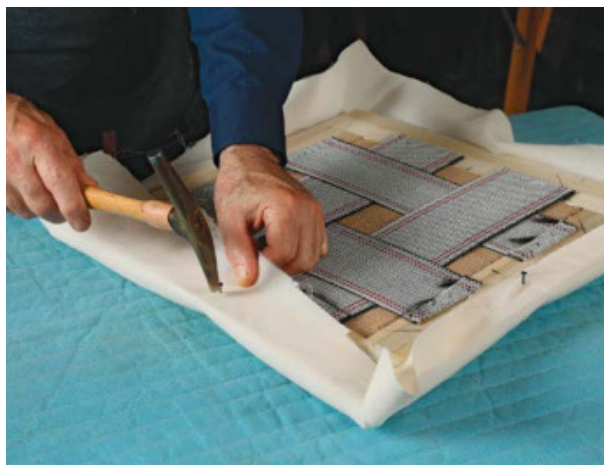
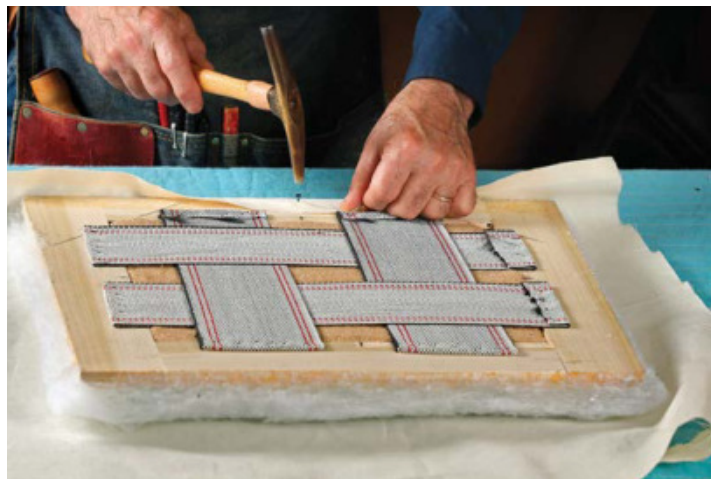
4. FINISH WITH DACRON BATTING



Again using spray adhesive, glue the batting to the foam underneath it. Do not wrap the Dacron around the bottom, because it will prevent the seat from sitting neatly on the frame. Once it's glued in place, turn the frame over, holding the batting around the edges of the frame. Use the bottom of the frame to guide the scissors while trimming the batting.

COTTON MUSLIN IS A SUB-COVER

The muslin offers two advantages. It allows the upholsterer to rehearse the cuts needed for the show cover, and it makes it much easier to change the show cover later. The process for installing the sub cover and the show cover is the same.



Wrap and tack the sides. With the muslin (or leather) cut 2 in. to 3 in. oversize in all directions, place it facedown with the frame on top of it, padding side down. Tack one side down at the center and wrap the material around gently but taut to the bottom of the frame, and half tack it in place at the midpoint of each side.



Work from the center out. Working from the midpoint to each corner, pull excess material evenly toward the corners. Do one side from the middle to each corner, tacking near the corners but clear of the fold area. Then move to the opposite side, then the other two sides. Once the material is even and taut without folds or gathers on all four sides, permanently tack or staple the sides, leaving the corner areas unstapled. Remove the temporary tacks.



It's corner time

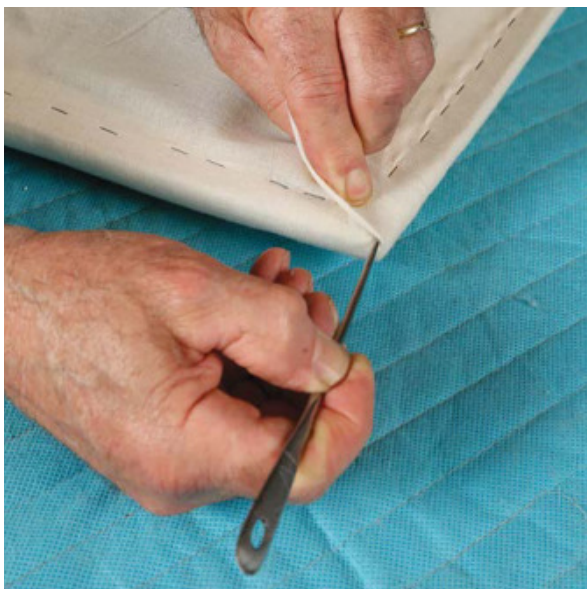
The corners are the main challenge to installing the subcover and show cover. In all cases there will be excess material there. Most of the time it is necessary to have at least some small pleats showing, and the goal is to make them as unobtrusive as possible. While seats can be done with two folds at each corner, which is sort of like making a bed, Mascelli prefers the cleaner look of a single fold.



Staple one side of the corner. On the back edge, pull any extra material taut toward the side, creating a natural fold, and staple or tack along a roughly drawn 45° line.



Mark and cut. Hold up the rest of that fold and draw waste marks to guide your cuts. Use scissors to cut away the excess material, which will be in the shape of a triangle.



Tuck and secure the fold. As you pull up on the remaining material in the corner, use a tool called an upholstery regulator to tuck and smooth the fabric in the corner. Then staple the smooth, folded corner into place. Trim off any excess material and repeat on the other three corners.



BRING OUT THE SHOW COVER

Approach the show cover the same way as the muslin subcover. With every step, but particularly with the final covering, the thing you see most you tackle last. For example, for each step, work on what will be the front of the seat last. This gives you more rehearsal time on less apparent spots before moving to the most visible corners.



Wrap, pull taut, and tack in place. Just as you did with the muslin subcover, patiently wrap the leather around the frame. Working on opposite sides of the frame, pull the leather taut and even, and temporarily tack each side in the center. Work excess fabric toward the corner and add another temporary tack near the corner. Once all four sides have been temporarily tacked, inspect the final look to make sure it's smooth. Then permanently secure the sides, leaving the corners open.

fabric or leather as on this chair. The process for installing the sub cover and the show cover is the same.

First, cut the muslin and the leather. It is helpful to make a paper or cardboard pattern that is about 2 in. to 3 in. larger than the seat, all the way around. For the muslin, just cut around this pattern. For the leather, place the pattern on the hide, put a chalk dot at each corner, and then lift the pattern to be sure there are no defects, holes, scars, or bad wrinkles in the area to be cut.

Install the muslin following the steps on pp. 54 and 55. Then place the cut leather facedown on a table padded with a clean, soft surface like a blanket. Set the frame on it and gently pull and tack the leather at the midpoint of each side. Use a #8 tack and only half set it, as it will likely have to be moved. Work from the mid-points to each corner in separate stages, so you keep control of the material and pull as much of the excess as possible toward the corners. It often helps to draw a pencil line at 45° in each corner and use it as the boundary for tacking each side.

With all the sides temporarily tacked, check the top to be sure the leather is stretched evenly with no folds or gathers. Then set the tacks or replace them with staples up to the corners. Start on a back corner and fold the excess material from the back around to the side. Working carefully, use scissors to remove the triangle-shaped piece of excess leather in the fold.

Now the fold can be closed along the 45° line and temporarily tacked. With the two back corners done, move to the front, wrap the side leather around to the front to create the natural fold, and trim out the excess. This takes a bit of practice, so don't be afraid to remove and reset the tacks as needed.



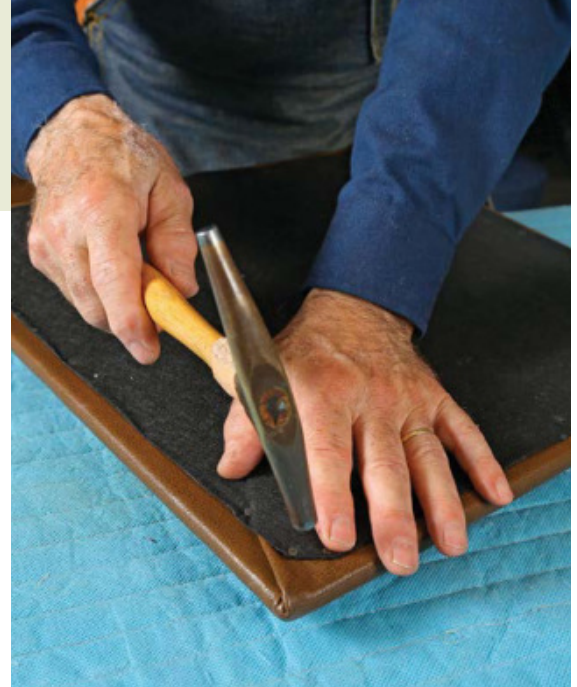
Cutting corners. Staple the 45° line on one side of the corner, then fold the other side of the corner down. Pull the extra leather away from the stapled line and cut out the waste material. Fold the corner over, smoothing it with the regulator. When the fold is smooth and taut, staple it in place. Do the same with the other three corners.



DUST COVER AND INSTALLATION

The dust cover is an optional step, but it adds a clean, professional look.

A clean finish. Cut the dust cover material about 2 in. oversize all the way around, and neatly fold it under itself, working from the middle of each side toward the corners. Use #3 or #4 tacks and space them a couple of fingers apart. The corners can be just folded under and tacked. Though Mascelli uses staples everywhere else, he prefers to see hand-tacked dust covers, as they are the only fasteners that show. It does not take long to do.



Install the seat in the chair. In most chairs the slip seat is attached using screws up through corner blocks. Make sure that you choose screws of the right length. Too long, and they'll pop out of the top of your newly upholstered seat.

With all the folds tacked, flip the seat over one last time to be sure everything is as it should be, then tack or staple the leather permanently. You must establish different staple lines for securing the subcover and show cover to the frame. The muslin should get stapled or tacked next to the webbing, and the leather show cover should get stapled closer to the outside edge, leaving room for the dust cover. Trim the excess material from the inside of the frame.

Dust cover gives a professional look

The last step is the addition of a dust cover, which is optional, but does provide a clean, professional look. Commercial upholsterers use a light black fabric called Celestra, but any light material is fine. I prefer to see hand-tacked dust covers, as they are the only fasteners that show, and it does not take long to do it. Cut the dust cover material about 2 in. oversize all the way around, and neatly fold it under itself working from the middle of each side toward the corners. Use #3 or #4 tacks and space them so that there are an equal number on a side. The corners can be folded under and tacked. Finally, attach the seat to the chair. □

Mike Mascelli teaches finishing and upholstery all over the United States.



Japanese Joinery in Practice

A privileged look at this historic art in today's context

BY EMI SHINMURA



My aunt, Harumi Shinmura, is a traditionally trained residential carpenter working in Japan's western island of Kyushu. She is a guiding figure in my life, and I've been fortunate to regularly learn a sliver of her craft while working on-site with her.

Part of my good fortune is because my aunt practices a disappearing craft. *Tekizami*, hand preparation of timber by craftspeople rather than entirely by machines, is unfortunately not common in Japan nowadays. Most houses are built with material precut in factories, including the joinery;

the carpenter's job is to assemble all the premade parts on-site. Sometimes, though, there are clients who value the quality of the long-established methods practiced by my aunt and others like her.

So was the case with my aunt's recent project, a simple, single-story bunkhouse about 13 ft. by 26 ft. intended for cooking enthusiasts. The whole structure was made with cypress and cedar, which are ideal for Japan's hot and humid climate. Timber buildings in general are particularly good at regulating moisture in these climates and have been developed over

many centuries to survive adverse weather and earthquakes. Traditional buildings in Japan were built with longevity and repairability in mind. With careful maintenance, these buildings can last for centuries. Today, even traditional buildings in Japan, once all wood, are required to have metal fasteners and brackets (much to the despair of some traditional carpenters).

Knowing that my aunt's carpentry knowledge was accumulated through many strict years of observing her master, I'm in a unique position to ask my aunt about her craft, something that is not allowed in a

traditional apprenticeship. I feel honored to have a direct glimpse into this world, but it feels somewhat intrusive at the same time.

The following illustrations grew out of working with my aunt on the bunkhouse. To practice layout and conduct self-guided research, I sketched the joints that were used.

The joints in this article are a mix of common, well-understood ones and alterations my aunt made for this particular build. The appearance or complexity of a joint is not most important; instead, its function is foremost. There are numerous variations of a joint type, and the basic types can be mixed and altered depending on the purpose. I often asked my aunt about the construction, and quite often the answer was that her master did it a certain way and she'd adapted it for this build.

Emi Shinmura is a U.K.-based artist and woodworker. To see more of her work, go to Instagram at @emi.shinmura.

OFF-SITE PREP

Emi Shinmura and her aunt, Harumi Shinmura, readied their workpieces at the aunt's workshop before taking them to the build site.



Set out to dry. Master carpenters in Japan are traditionally responsible for most of the tasks an architect would undertake in the West as well as all the timber preparation, including the stock, joinery, and construction.



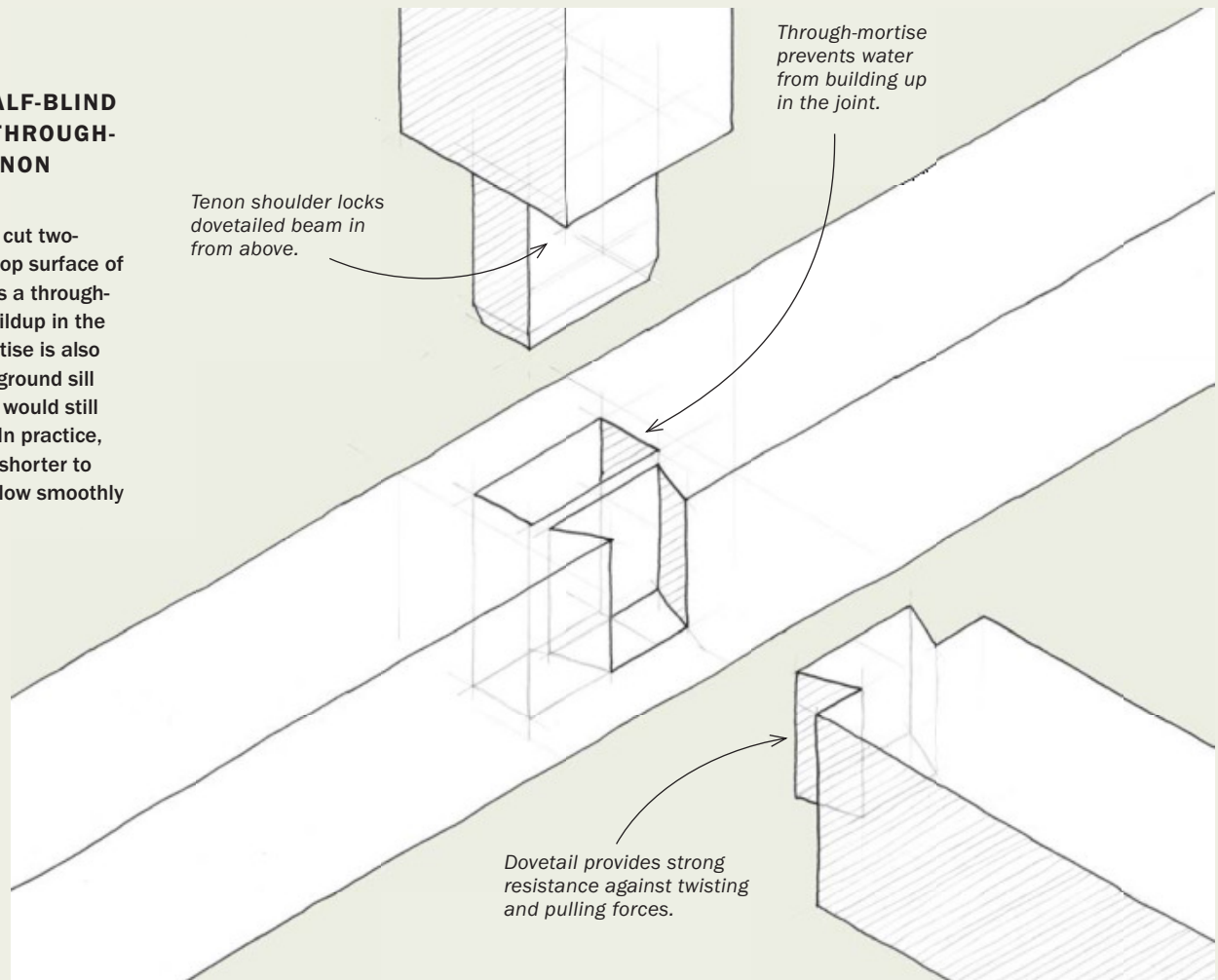
A human touch, but machines still have their place. Modern home-building in Japan, like many other places, has become increasingly mechanized. In contrast, Emi and her aunt got more hands-on, from joinery to finish planing. While they often picked up a chisel, plane, or saw when necessary, the two turned to machines for the more back-breaking efforts, like the many wide and deep mortises.

Foundation joints

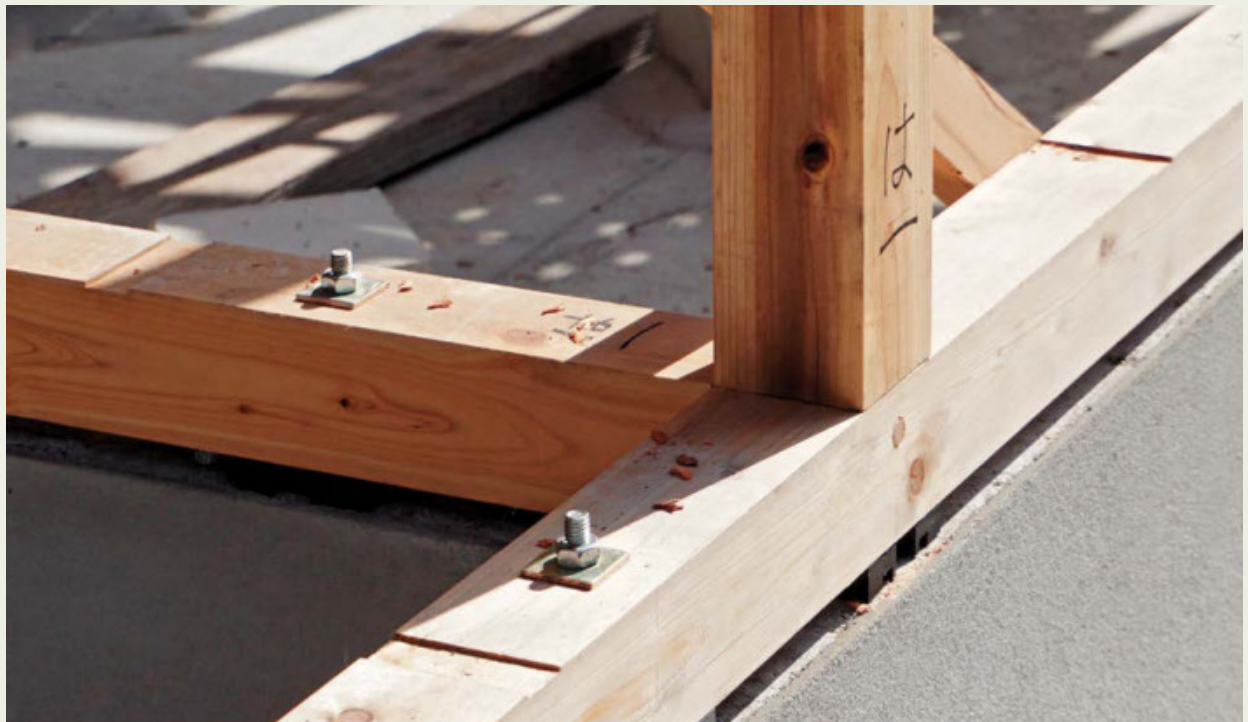
ARI OTOSHI

HALF-LAPPED, HALF-BLIND DOVETAIL WITH THROUGH-MORTISE-AND-TENON

The dovetail joints are cut two-thirds down from the top surface of a beam. The mortise is a through-joint to avoid water buildup in the joint. The through-mortise is also insurance in case the ground sill rots, since the column would still touch the foundation. In practice, the tenon is cut 5mm shorter to allow construction to flow smoothly on-site.

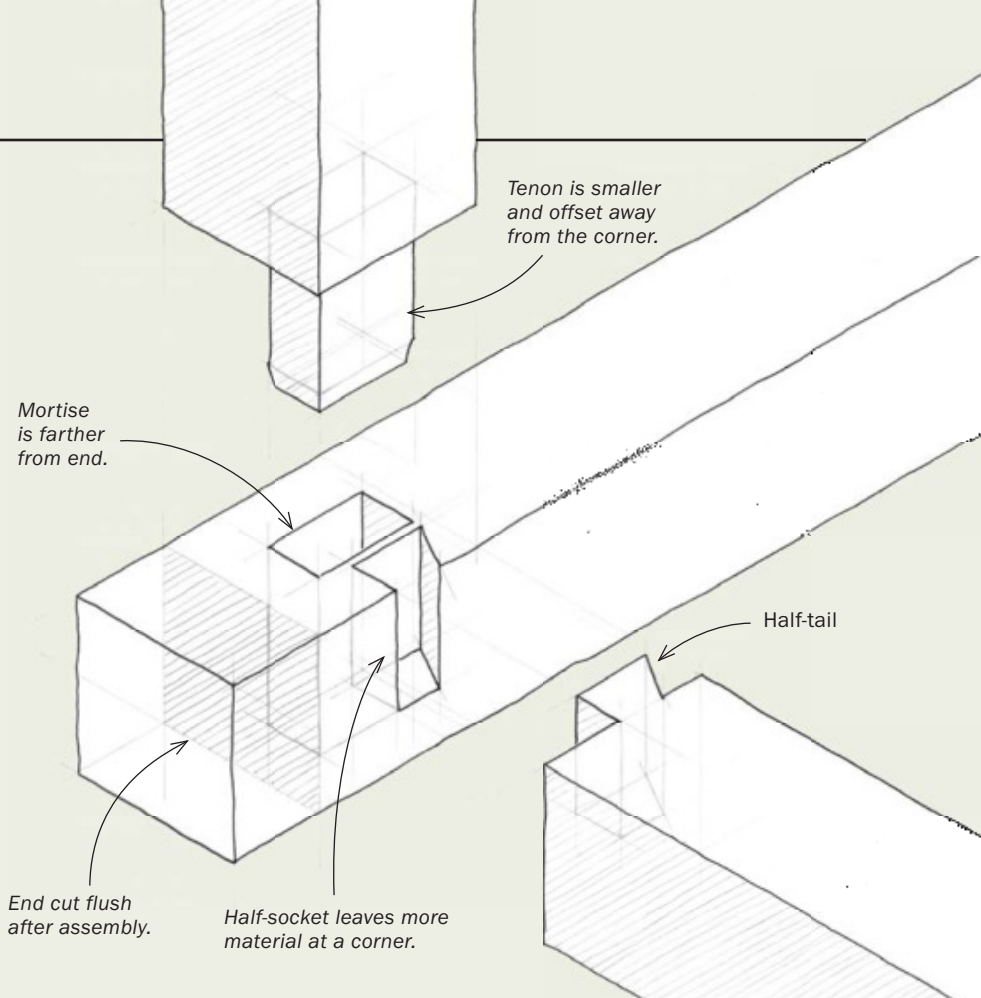


Ground-level joint.
The mortised beam sits on a solid foundation wall, and the dovetailed beam may be on a solid foundation or supported on posts to the ground.



ARI OTOSHI IN A CORNER

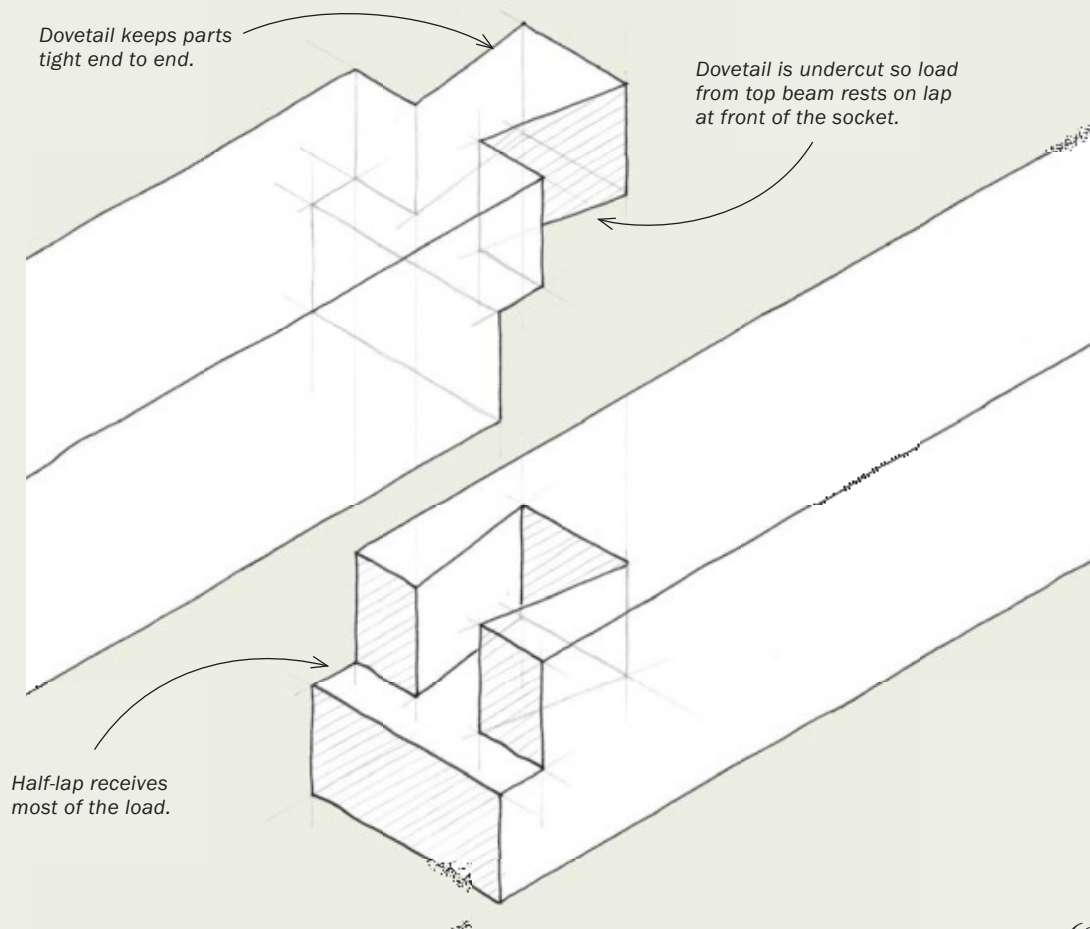
In high-quality builds, the corner joint would not expose the end grain but would consist of a cleaner, mitered option. However, taking into account the fact that the corner of the building would be clad and the length of time required to make a mitered joint that ties the beams together and accepts a column, we used an adaptation of the ari otoshi. To allow for enough material at the outer edge of the building, the dovetail has only one angled cheek and the tenon is smaller and offset away from the corner.



KOSHIKAKE ARI TSUGI

LAPPED DOVETAIL SCARF JOINT

This typical ground sill joint consists of a dovetail and a half-lap. The joint fits into place from above. The dovetail is undercut so the half-lap receives much of the load. It is necessary to place this joint where the least stress will occur. Also, because the joint allows twisting, it is mainly used to join ground sills on a continuous foundation wall. A high quality, water-resistant timber such as cypress is typically used because these beams are likely to be exposed to heavy rains and flooding.



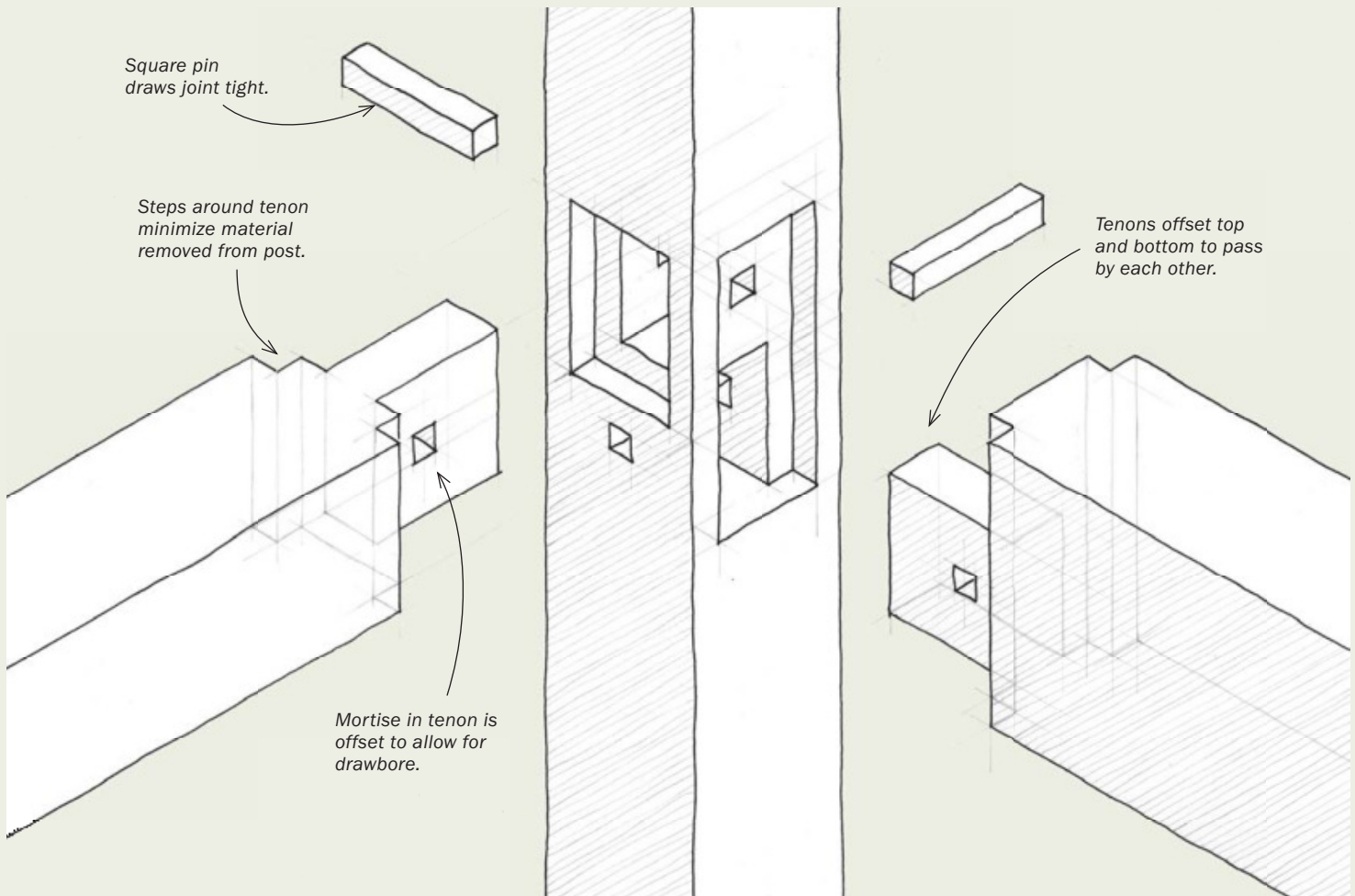
Post-and-beam joints

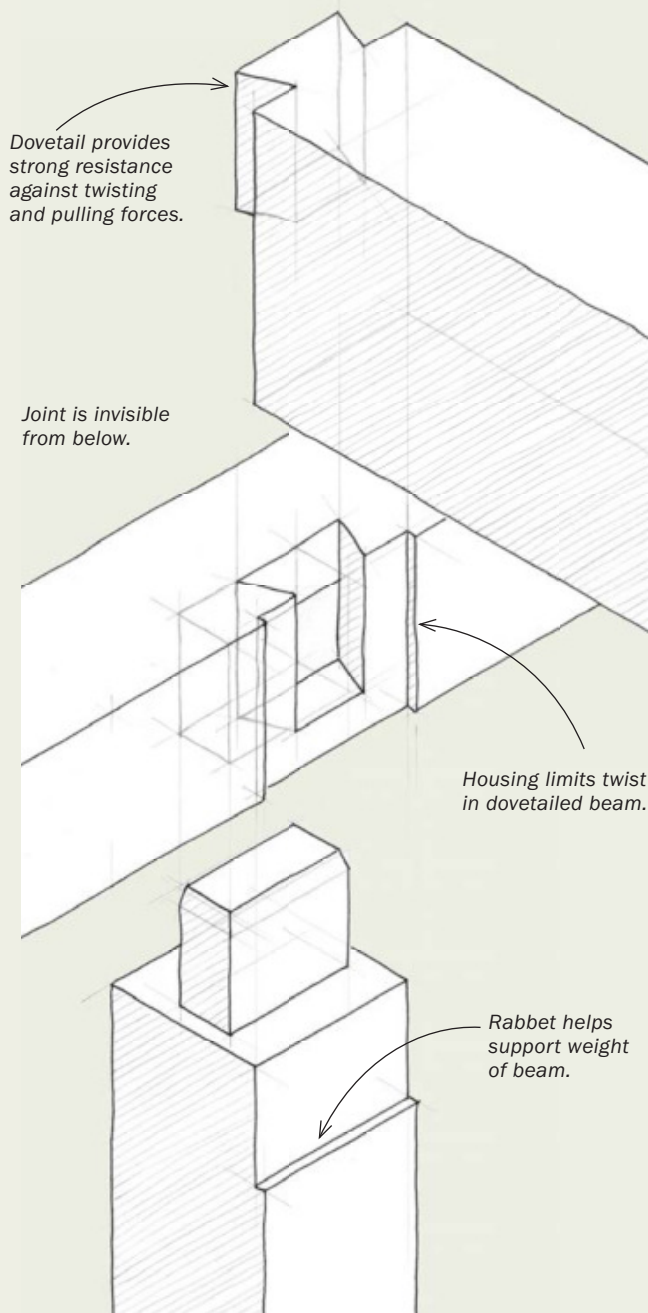


ERIWA TSUKI DOTSUKI KOMISEN UCHI

HAUNCHED, HOUSED, AND PINNED MORTISE-AND-TENON

This joint is commonly found in corners of a two-story house or in places where a post extends past the ceiling beam and to the roof. The post's housing eases some of the weight on the tenons. The stepped tenons reduce the amount of material removed from the post, keeping it more intact for strength. Both tenons are secured with square hardwood pins. The corresponding square holes in the tenons are offset 1.5mm to pull the beam in tight against the column during assembly.

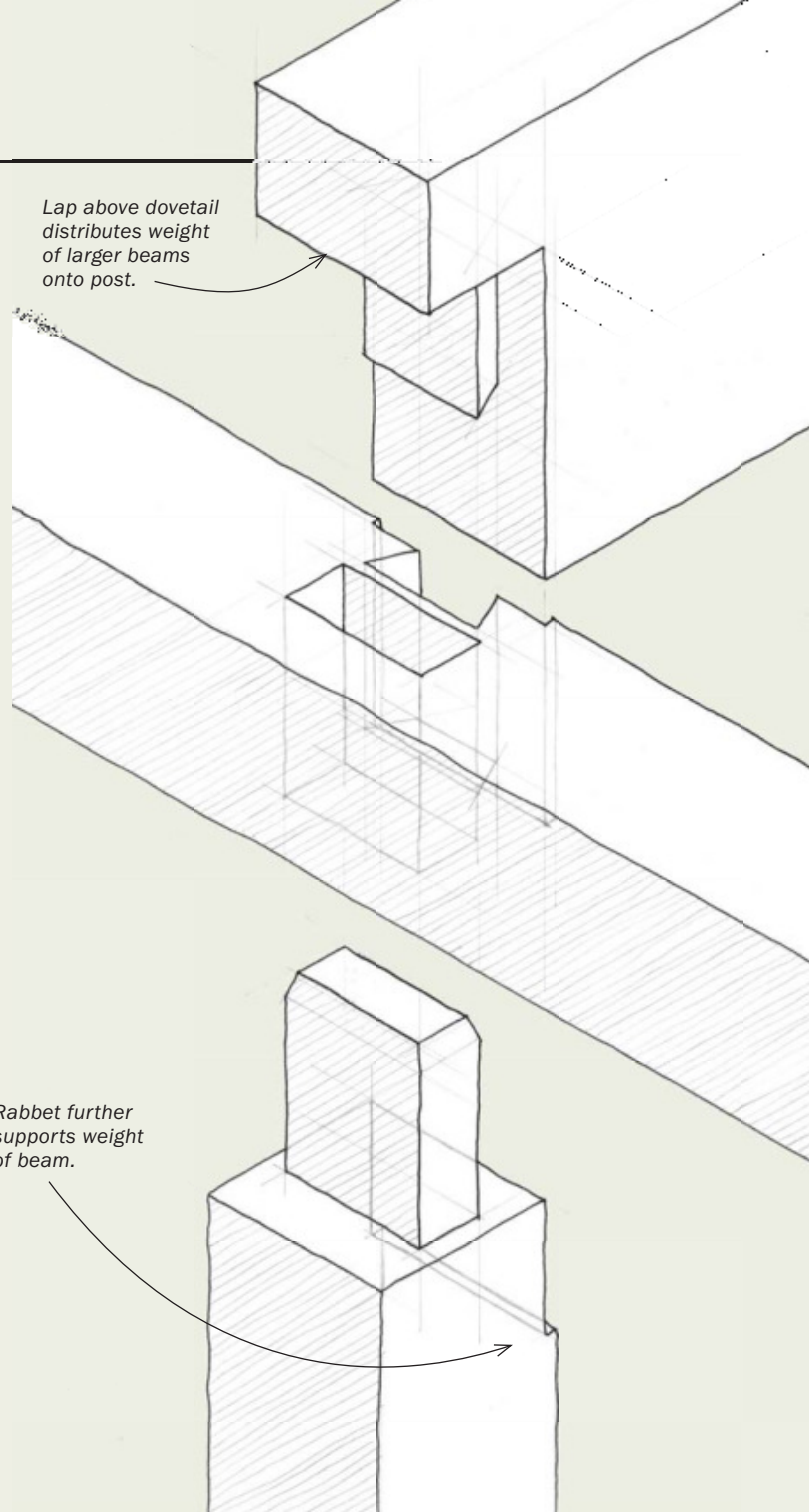




OOIRE ARI OTOSHI

HOUSED, HALF-LAPPED, HALF-BLIND DOVETAIL WITH STUB MORTISE-AND-TENON

This joint is very similar to the ground sill ari otoshi except for the 5mm-deep housing in the mortised beam and the corresponding rabbet in the post, which have several benefits. For one, the rabbet takes some of the beam's weight off the dovetail. The housing, meanwhile, reduces the amount of twist in the beam as it ages. Third, the pair ensures the joint will be completely hidden, including any gaps.



OOIRE KABUTO ARI KAKE

END LAP JOINT WITH A THROUGH-TENON AND HOUSED DOVETAIL

This is very similar to the koshikake ari tsugi. It is used when the transverse beam is particularly large, as it displaces some of the weight to the top of a post. There is also a housing in the mortised beam, and a rabbet on the post to further support the dovetailed beam's weight. When this joint is used without a post to support it, the dovetail should be smaller to avoid over-compromising the beam at this connection.

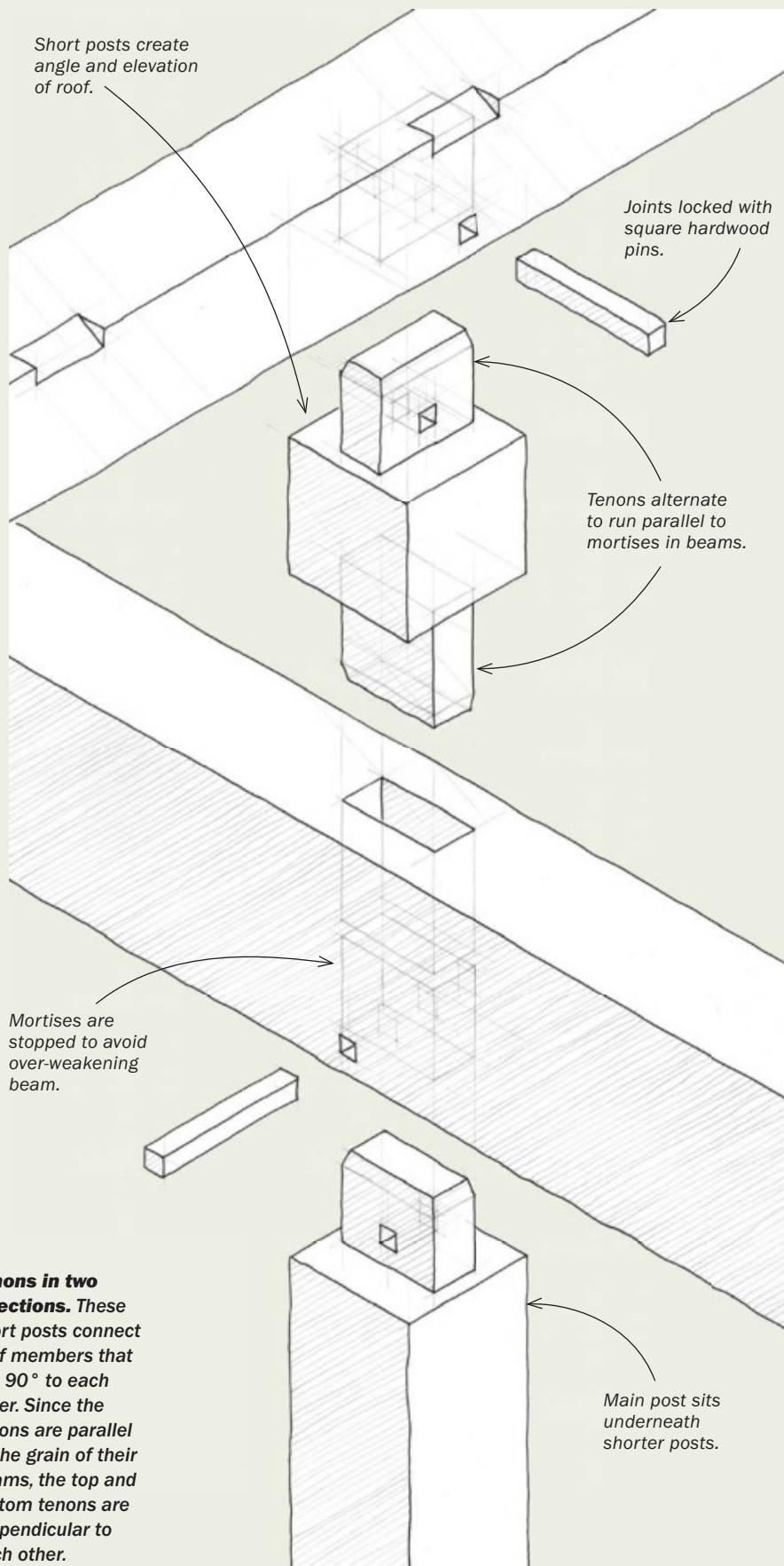
Post-and-beam joints

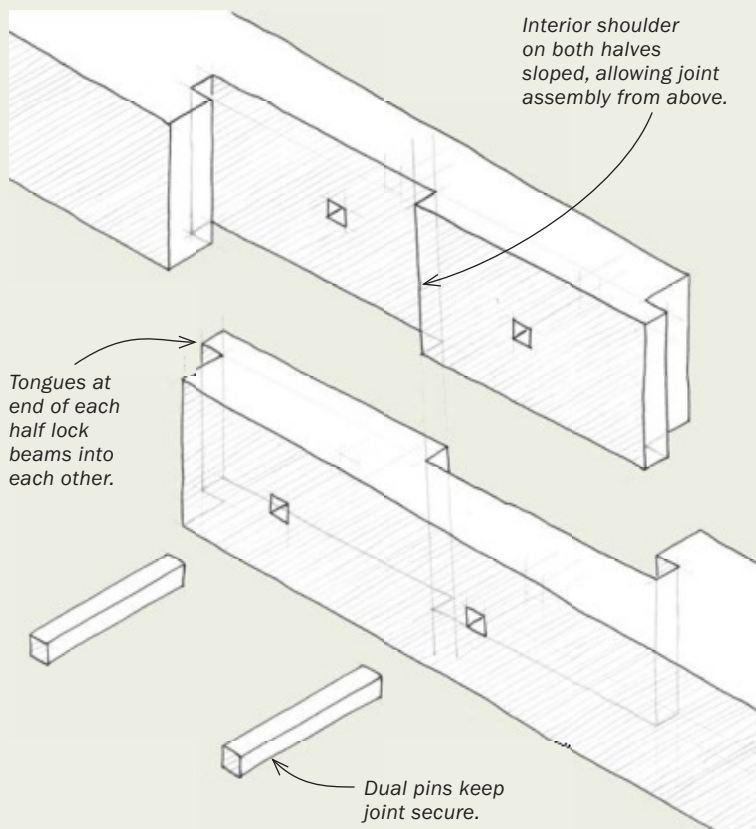


KOYAZUKA

END POST

Short posts of varying heights are used to achieve a certain angle of roof. These posts are installed on top of the girders and support the transverse beams and ridge beam. Tenons on both top and bottom run parallel to the corresponding beams so the beams are not weakened in their width. The thickness of the tenons is half to two-thirds of the beam's width. To maintain the strength of the beam, it's better not to connect the mortises between the tenons. The tenons are secured in place by hardwood pins.





OKKAKE DAISEN TSUGI

DADOED AND RABBETED SCARF JOINT

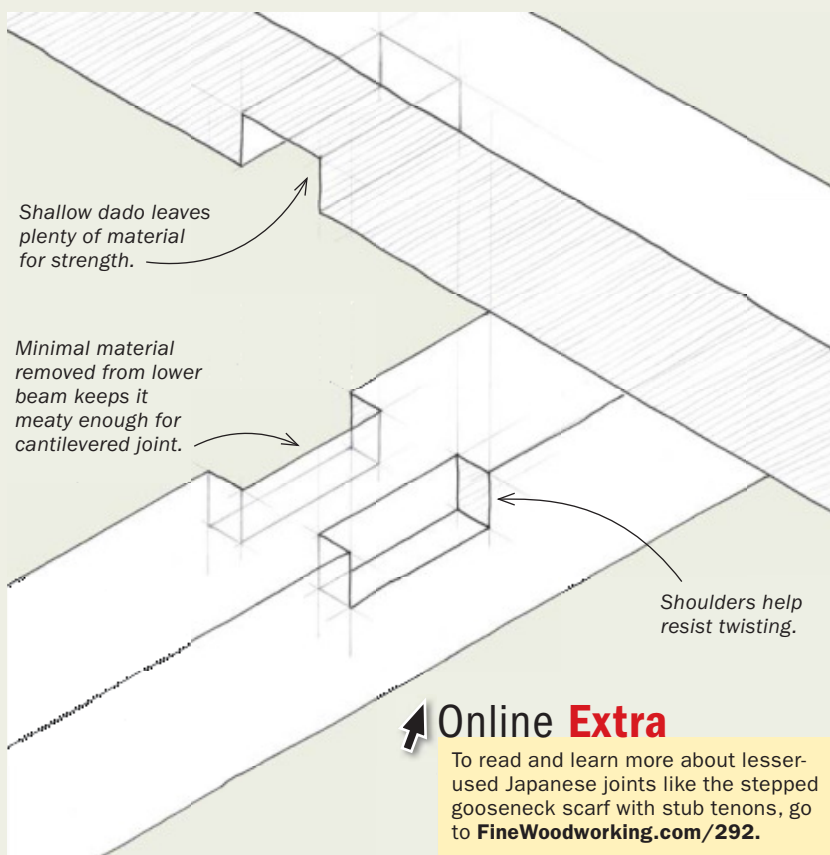
This splice is typically used to join ground sills, girders, and beams. This is a very reliable and stable joint that resists tension and bending stresses well. The two sides of the joint are mirror images of each other. The middle shoulder has a 1:20 slope, meaning the joint can be assembled only by sliding the top piece onto the bottom. The slope also stops the upper member from passing the bottom of the beam. The lower, receiving part of the joint needs to be near a column for support. The wooden pins strengthen the joint and prevent movement.



WATARI AGO

DADOED CROSS-LAP

In this joint used for cantilevered beams, the upper member typically overlaps the lower by one third. So, unlike a full lap joint, the lower workpiece is not halved but has only small mortises cut into it, resulting in a stronger beam. The shoulders add strength against twisting compared with a half-lap joint. The joint is also used to connect floor joists to beams and is commonly secured by nailing. It is less used today, giving way to strong screws and brackets.



Online Extra

To read and learn more about lesser-used Japanese joints like the stepped gooseneck scarf with stub tenons, go to [FineWoodworking.com/292](https://www.finewoodworking.com/292).



TIM ARNOUX

Lagunitas, Calif.

Since his retirement, Tim has really gotten into exploring patterns with beautiful woods. This lingerie chest was inspired by 18th-century French furniture. It won Best of Show for three-dimensional art and design at the Marin County Fair in 2019.

CALIFORNIA BUCKEYE BURL, PURPLEHEART, WENGE, CURLY MAPLE, QUILTED MAPLE; 15¼D X 23W X 49½H

Photo: Mario Canela/Megg Arnoux



MONICA McCLEARY

Rogers, Ark.

This bench was designed to live in a client's 1850s home in coastal New England. "I am drawn to and inspired by the beautiful simplicity of the Shaker style, which is very popular in New England," Monica said. "I especially enjoyed shaping by hand the seat and arms of this piece with my drawknife and spokeshave."

BLACK WALNUT, 19½D X 52W X 32H (SEAT IS 18H)

Photo: Ridgelight Studio



R. EVAN MILLER

Sequim, Wash.

Evan made this music box as a gift for his sweetheart. The box sides are quartersawn walnut veneer laminated over curved molds. The box top and bottom, which is also a sound board, are made of ¼-in. honeycomb panel used in the aircraft industry. The sunburst design on the top is made using a radial pattern of mahogany veneer. The parts are held together with long screws so the box can be disassembled if necessary. A large mechanism inside plays Mozart, specifically "The Magic Flute," "Eine Klien Nachtmusik," and "Turkish March."

WALNUT, WITH VARIOUS FIGURED MAHOGANY AND WALNUT VENEERS; 6½D X 17¼W X 5½H

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JUAN-MANUEL PINZON

Richmond, Va.

"This project was all about techniques, pushing out of my rectilinear comfort zone," Juan-Manuel said. It's a reproduction of the Bambi Lounge chair designed by Rolf Rastad and Adolf Relling in 1954 for Gustav Baus. Juan-Manuel extrapolated the design from images, which he described as "a fruitful and informative challenge."

CLARO WALNUT, 26D X 19W X 29H



GAY MEYERS

Sandy, Utah

This cabinet-on-stand is Gay's take on the classic Krenov cabinet, a form that this woodworker has always admired. The project took nine months, and was designed to showcase marquetry in an Asian style.

WALNUT, ASH BURL VENEER, 17D X 32W X 72H

COREY TIGHE

Patchogue, N.Y.

A client wanted a clean, modern-looking dining table made of white oak to match the stair treads in her home, and she wanted it finished with Rubio Monocoat Pure oil just like the stair treads. This table, with its beveled edges and mitered joinery, strengthened by Domino slip tenons, fit the bill.

WHITE OAK, 45W X 108L X 29H

Photo: Rosanna Piazza



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CHRISTIAN SAPP

Chico, Calif.

The top of this modern cabinet is joined with houndstooth dovetails, the bottom with more traditional dovetails. The door is veneered with book-matched curly cherry. "The design is simple on the cabinet," Christian said. "I wanted something that was not crazy but had interesting details. I wanted people to focus on the houndstooth dovetails, custom brass drawer pulls, and the angled base."

WALNUT AND CHERRY, 20D X 30W X 32H

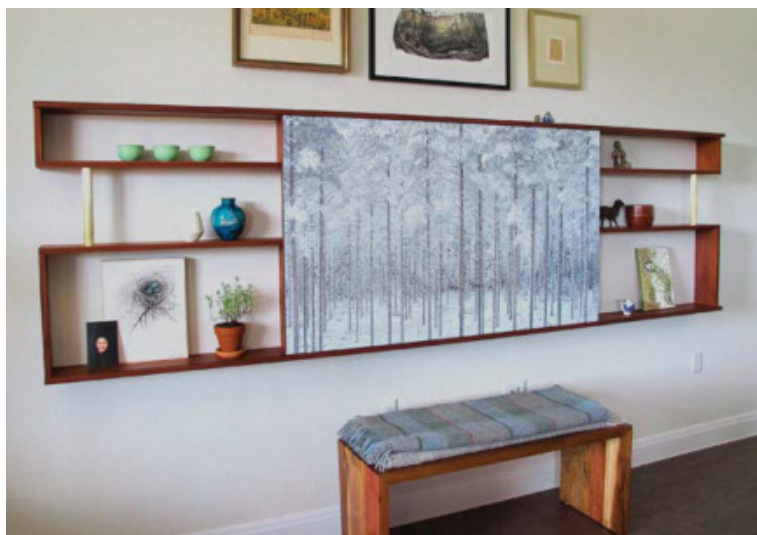


CAMERON TURNER

Englewood, Colo.

"Making this reproduction Federal card table over the past three months was this semester's pandemic-teaching life vest, as I'm a high school English teacher by trade," Cameron said. He used plans from Steve Latta's article in *FWW* #180, modifying some of the wood species and the inlay design.

QUARTERSAWN SAPELE AND MAHOGANY, , WITH HOLLY, MAHOGANY, DYED POPLAR, AND MAPLE INLAY; 17½D X 35W X 30H



KAY SCHNURMAN

Coppell, Texas

"Even a thin TV isn't anything special to look at, not when it's turned off. I wanted to make it disappear," Kay said. That desire inspired this media cabinet. When you slide the doors closed, as shown, you see the image of woods in a gentle snowstorm. That image is a high-resolution decal, sliced down the middle, and adhered to the plywood panels. Surrounding the snow scene are dovetailed boxes of sapele, which support the structure and function as shelves to show off art works and heirlooms. "The best surprise about the piece? Everyone watches a lot less TV," Kay said.

SAPELE, BALTIC-BIRCH PLYWOOD, 7D X 120W X 36H

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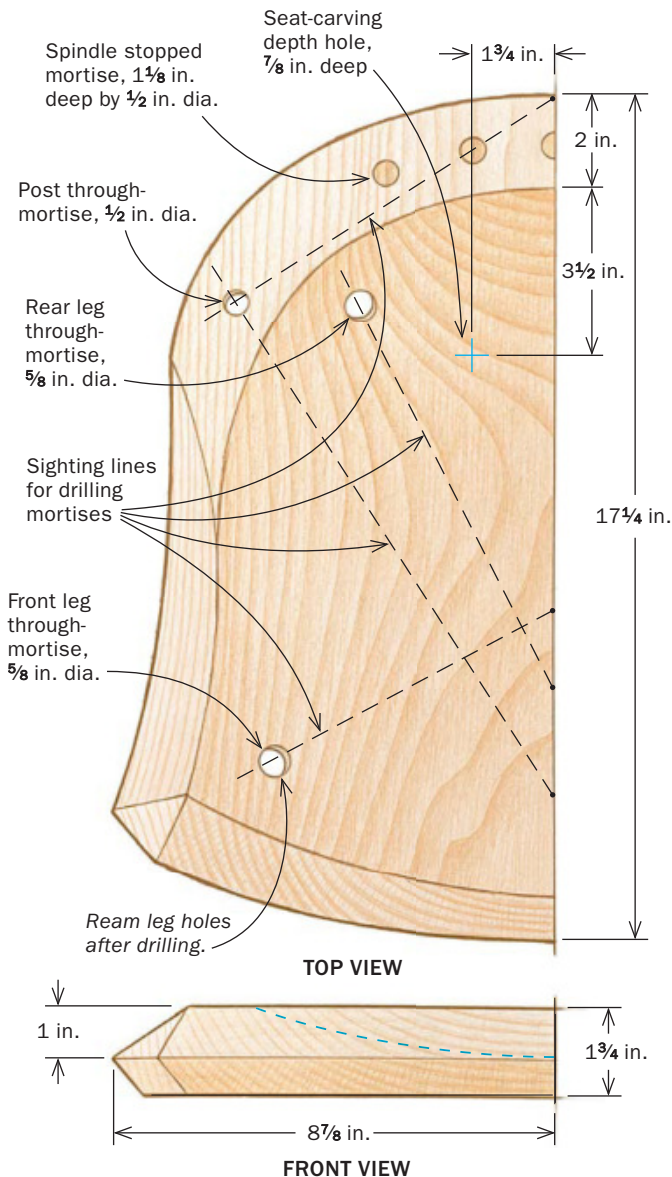
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BY CURTIS BUCHANAN

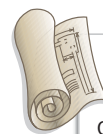
PART 1: SEAT AND UNDERCARRIAGE



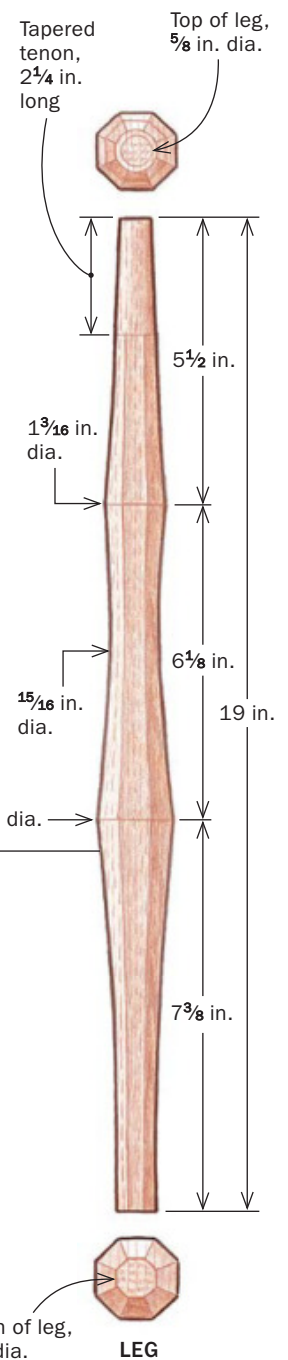
WHITE PINE SEAT



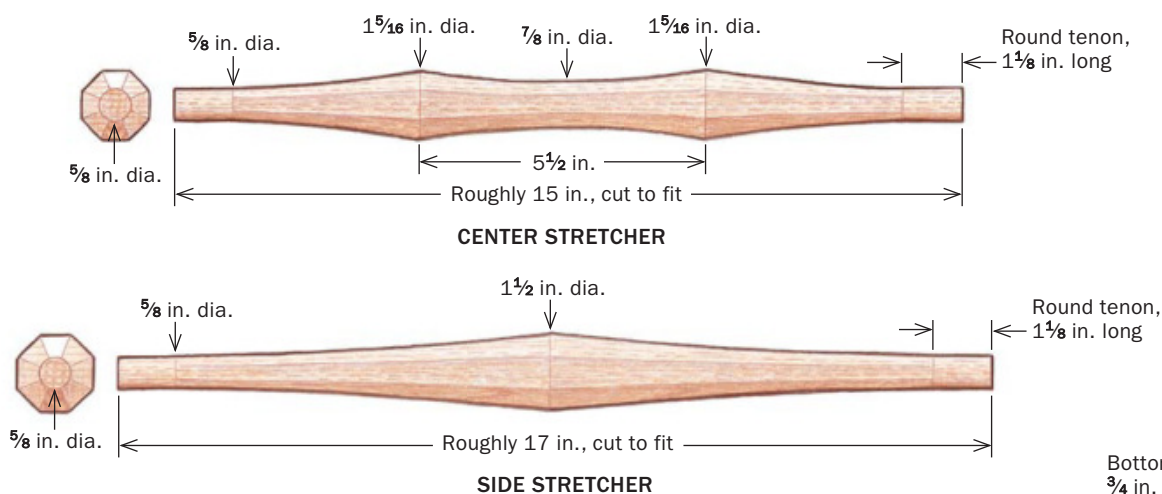
I've heard it said that poverty makes for a good cook. In 1983, I fit at least the first part of this saying very well. Forced to make chairs with only a few basic tools, I pushed those tools as far as I could. With no bandsaw, I learned to use a bowsaw; with no power drill, I used a bit brace. Not having a spokeshave, I pushed my drawknife far beyond the point where I might otherwise have abandoned it for a more refined tool. Taking these tools past what seemed a point of diminishing returns built my skill and helped me maximize the ability of the tools. My work became more efficient, more enjoyable, and of higher quality.



To obtain expanded plans and instructions for the Democratic Chair, go to Curtisbucharanchairmaker.com



RED OAK UNDERCARRIAGE



SHAPE THE LEGS



Lay out the legs. Having split a billet from a red oak log and flattened one face of it with his drawknife, Buchanan uses a simple template to lay out the leg's tapers.



Hewing to the lines. Using a hewing ax, make a series of short swings perpendicular to the length of the blank to break up the fibers; then hew downward with the grain to remove long chips.



Flatten the tapers. Working on the blank's radial plane, which is easier to shave, use a drawknife to create flat planes right to the layout lines.



A second session with the pattern. Once the first tapers are cut, trace the same pattern and then cut the tapers in the tangential plane.



On to the octagons. Next begin shaping the leg to an octagon, making a series of shallow, feathering, stopped cuts.



Feathering. To complete the octagonal facets between the leg's two bobbins, Buchanan reverses the leg and makes a set of shallow cuts back toward the first set of feathers he sliced. The facets in the bottom two sections of the leg are slightly concave.

Apply heat, then shave tenons.

With the legs and stretchers shaped, Buchanan puts them aside for a few weeks to dry. Then he superheats the ends that get tenons, setting them in holes in a light-bulb kiln. To make tapered tenons with the drawknife, first score the top end of the leg with a $\frac{5}{8}$ -in. auger bit. Hold the bit by hand and twist it to give yourself a target for the tenon.



Trial by powder.

Buchanan cuts a tapered test hole in a white-pine scrap and smears it with black milk paint powder. When he has shaped the tenon to near final size, he twists it in the test hole.

Finessing the tenons.

As the tenon nears finished size, take light shavings with the drawknife to remove the black rub marks.

Simplifying your life, or keeping it simple, is not easy with the whole world pushing and pulling you in the other direction. For some, the goal is to climb El Capitan using just your hands and feet. For me, making chairs with the simplest of tools is the ultimate; adding superfluous tools, jigs, and gizmos feels like a reverse evolution.

Slowly, though, we all seem to evolve down the path of more tools, redundant tools, a larger shop to hold the tools. While I still clung to my bit brace, I did find, after 35 years, that I had a plethora of fine spokeshaves, travishers, scrapers, tenon cutters, a Oneway lathe, and two bandsaws. I started to hear students commenting on how expensive it would be to tool up for green woodworking; and I would want to scream, "NO!" But as I stood back and looked at my shop and the shops of other chairmakers, I saw what the students were responding to.

The more I thought about this dilemma, the more I wanted



PREPARING THE SEAT



Fine white pine. White pine makes excellent seat stock: It is light, oblonging under edge tools, and thick planks are usually available. Start by flattening and thickening your blank with a handplane, then lay out the seat's shape, the mortise locations, and the orientation lines for drilling.



Angle block guides the drilling. To drill at the proper angle for the leg mortises, Buchanan aligns his auger bit with the "sighting line" drawn on the seat and with an angle block with its face parallel to the sighting line. Further angle block info is available at CurtisBuchananChairmaker.com.



A turn from below. After boring the mortise from above until the auger bit's lead screw just emerges through the seat, Buchanan backs out the bit and finishes the hole with a twist or two from below.



Ream it. With all the leg mortises drilled, turn the seat upside down and use a reamer to taper them. Ream in a series of steps, inserting the leg repeatedly to check its orientation and adjusting the reaming angle as necessary.



Double-check the leg angles. Once the leg mortise is partly reamed, insert the tenon and use the angle block to check the orientation of the leg. Using the block's 90° edge, sight the tip of the leg, the top of the block, and the sighting angle. Then place the block's angled edge up to the perpendicular sighting angle and sight the leg, block, and sighting angle.

Drilling for depth. Before you begin carving the seat, drill a pair of $\frac{7}{8}$ -in.-deep holes to establish the lowest points in the bowl of the seat.



Carve cross-grain with the scorp. Begin scooping out the seat by carving cross-grain with a scorp. All the primary excavation is accomplished from side to side.



Finish cuts from front to back. When you have established the contours of the seat with cross-grain cuts, create the finished surface with light cuts taken with the grain.



Bold bevels surround the seat. Buchanan says that cutting the bevels around the seat with a drawknife is pure fun. He emphasizes the importance of leaving sharp arrises where the beveled planes intersect. It is those planes and clean corners that create the aesthetic of the chair.

to build and teach a chair that could be made with a drastically scaled-back tool kit. This is that chair. It's a design I made in the 1990s while working with GreenWood, a sustainable forestry initiative in Latin America, where I was often teaching how to build chairs without access to electricity or many hand tools. The goal then—which I've adopted again for this chair—was simple to define but difficult to execute: Eliminate every tool possible and still make a fine chair. Maybe even a better one.

The froe was eliminated; you can split wood with an ax. The adze and travisher vanished, their places in carving the seat replaced by the scorp. Even my simple steambox was exchanged for bending the wood cold. I dropped the lathe from the list, trading turned parts for shaved ones. In place of a spokeshave is a well-tuned drawknife taken further than ever.

CONNECT THE STRETCHERS



Aim for the bobbin. Drill mortises for the stretchers with an auger bit extension added to your brace. Twist the target leg just enough so the bit's two nickers contact it simultaneously. To keep the bit horizontal, use the peak of the bobbin on the near leg as a guide.

How to get the height right. To cut the center stretcher mortise, line up the drill bit with the sightline you drew on the seat. To maintain the correct height, you can support the bit on a scrap block, or use an adjustable setup like this one, made by adding an extra clamp head to a quick-release clamp.



The last stretcher. With the side stretchers nudged into their mortises, and the legs toeing into the seat, Buchanan pushes the center stretcher into place.



Prepare to drill for the center stretcher. After driving the stretchers and legs home, lay a straightedge across the side stretchers from bobbin peak to bobbin peak; lay a second straightedge on the seat, aligning it with the first, and strike a line on the seat. This will guide your drilling.

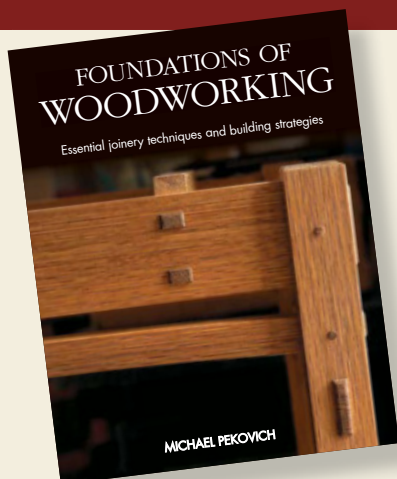
I wanted the chair to announce itself visually as something different, too. Instead of smooth surfaces and refined curved transitions, I chose to express the drawknife shaving with emphatic bevels and facets that meet in sharply defined edges.

I call it a democratic chair, an echo of what writer and maker Bill Coperthwaite called a democratic tool—one that anyone can own and use. I hope that the simple tools and processes required to build the chair will allow more people access to the craft.

In this article I'm building the chair's seat and undercarriage, and in issue #294 I'll add the spindles, posts, and crest rail.

Curtis Buchanan builds chairs in Jonesborough, Tenn. Special thanks to Jeff Lefkowitz, whose drawings of the chair provided the foundation for the ones in this article.

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ASSEMBLY



Lock in the legs. Buchanan first knocks the stretchers tight into their mortises—removing the legs from the seat and using the bench to back up his hammer blows to do so, if necessary—then angles the leg tenons back into their mortises and hammers them all home.



Glueless tenons. You can add glue to the joinery if you wish, but with wedged, superdry tenons, the joints should stay tight through decades of use. To prepare for the wedges, Buchanan uses a chisel to split the tenons.



Wedge it. To prevent splitting, the wedges should be driven in perpendicular to the long grain of the seat.



A dome at the top. Buchanan leaves the leg tenons well proud of the seat, then domes them with his scorp, making the cuts with a slicing action. Avoid levering against the seat, which can create dents in the soft pine.

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Gift of lumber, gift of food

BY ZAL SARKARI

Not everything that came out of the pandemic was bad; I not only got more time in the shop, but also the greatest wood haul of my life—a gift that will benefit many woodworkers and feed scores of hungry families.

During the pandemic, my wife started volunteering at a local food pantry connected to St. Thomas Episcopal Church in Amenia Union, N.Y. Over time, I became a volunteer, too, packing, unloading, and delivering groceries.

Also during this time, a few cherry trees had fallen on my property and I wanted to cut them into lumber. Coincidentally, the church had to cut down some large walnut trees to make way for a new building. I asked the church warden what they were doing with their trees. She said they had been

grapple hook and a flatbed truck meet me at the church. He took one look at the logs and called another flatbed to help move the logs to my property. Instead of 10 to 15 logs, we had close to 40, including my cherry. Twenty hours of milling was not going to cut it.

To do the milling, Jeff needed at least one other person, if not two, to help. I called some local woodworker friends, and we took turns helping Jeff wrangle 2-ton logs, load them on the machine, and unload boards, all the while trying not to kill ourselves or crush limbs. We largely succeeded.

And the boards! We studied each chocolate-colored walnut board with wonder, building magical Nakashima-style benches in our minds. The salmon-colored cherry boards sparked the same kinds of daydreams—of two-piece tabletops that we'd somehow handle

I not only got more time in the shop, but also the greatest wood haul of my life—a gift that will benefit many woodworkers, and perhaps most importantly, feed hundreds of hungry families.

posting them on Craigslist to be taken away for free. It was a good thing I was wearing a mask, because it kept my jaw from hitting the floor. These logs were 30-in.-plus in diameter, perfectly branchless and knot-free, and more than 10 ft. long. Most woodworkers would have been happy with the “small” 12-in.-dia. limbs lying around. I asked her to give me a few weeks to figure out how to move them.

I quickly found Jeff Olsen, a sawyer with a portable mill. Given my estimate of 10 to 15 logs, he thought it would take about 20 hours. I arranged to have someone with a front-loader with a

even though they were too wide for our 12-in. jointers. Even after the 1,000th board was sawn we kept talking and imagining, while Jeff waited impatiently for us to take it off the mill.

After six days of milling, we were tired, up to our knees in sawdust, and had only completed about half of the logs. I realized I needed more help. I called every woodworker I knew—from Maine to Maryland—asking them to come and help, and to see if they wanted to buy some of the walnut and cherry. The deal was simple—pay a quarter of what the wood would cost in a commercial yard and donate the money to the food



pantry. If you didn't help with the sawing and stacking, it was another \$1 per board foot. Either way, a fantastic price for the quality of lumber.

More woodworkers answered the call. I invited them to a “stacking party” and the reverend and others from the church came to watch and help. We moved, stacked, and stickered boards, and the lumber sold itself—although even with hundreds of board feet sold, the piles didn't look any smaller.

That wood made everyone happy. Over time (and it may be years), if I can sell all 10,000 board feet, the church will be able to use that money to feed 50 to 60 families for a year. Some woodworkers, like myself, who might never have purchased boards like that are now going to build larger pieces than they had dreamed.

I am not religious, but COVID-19 has made me believe in karma. I have no insight into how the universe operates—I don't even know how a microwave operates—but I believe if you help others, you help yourself. If you have the ability, and an opportunity to help comes up, go for it. You may even end up with a fantastic pile of wood. □

Zal Sarkari is an amateur woodworker who plans to specialize in cherry and walnut from now on.



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Growing up in the Soviet Union, Alexander Grabovetskiy got his first chisel at age 6. “I stole it from my grandfather,” he said, “and used it on a brick.” At 16, he showed enough promise that a master carver took him under his wing and taught him all he could about carving design and technique. At that same time, Alexander found Christianity and, in a country where owning a Bible was illegal, began preaching in public; he also refused to join the Red Army. These transgressions landed him in a Soviet prison camp, where he survived in part by carving and building furniture in exchange for a potato a day. Once out of prison, he found his way to the United States, and for 25 years he’s been working wood—and preaching—unfettered. For many years he ran large shops producing furniture, cabinets, and millwork, but in 2017

Carving with Conflict

he sold his production machinery and committed to carving full time. This high-relief wall piece in European lime wood, with its peonies and swirling acanthus leaves, might seem a pure expression of botanical beauty, but Alexander’s biography lurks under the leaves. He explains that it’s an allegory about his imprisonment and the clash of communism and democracy. “There is always conflict in my designs,” he says. When he looks at his carving tools, he thinks of them as foot soldiers. “Each one has its own job, but they work together as an army. I look at it like a war. I’m fighting for art.” —Jonathan Binzen



Photo: Alexander Grabovetskiy