

TAUNTON'S

October 2017 No. 263

# Fine Woodworking

Cabinet is a lesson in curves • Clever tips for lipped drawer fronts  
Bleached finish for oak • Build a handplane for curved panels



Side table with no-glue joinery, p. 28

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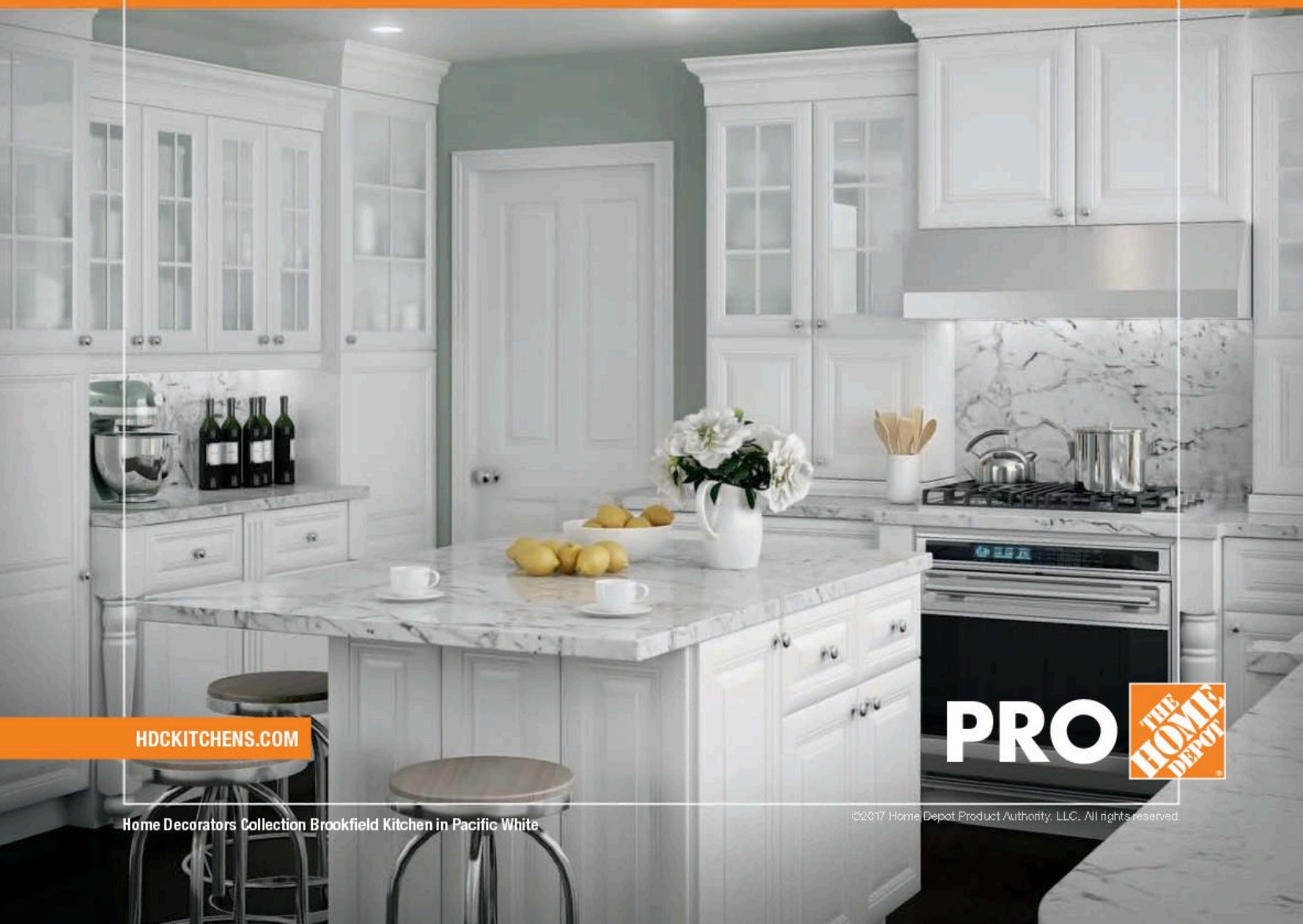


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# on the web

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## VIDEO

### Family Business

Gary Franklin is a fifth-generation nailer at the Tremont nail factory (p. 60) in Mansfield, Mass. His great-great-grandfather started working there shortly before the Civil War, and he carries on the tradition to this day.



## VIDEO

### Tools of the Trade

If you're going to carve a bowl, you're going to need a good carving hatchet and an adze. David Fisher (p. 64) shows you what to start with.

## VIDEO

### Winning Workshop Tip

Tom McKenna gives our winning workshop tip (p. 12) a try, squeezing his way to a perfectly fitting tenon.



## VIDEO

### That's a Wrap

To make the wrapping of the handle on his table (p. 28) flawless, Mike Pekovich uses some tricks borrowed from his days building fly rods in California.

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## VIDEO WORKSHOP

### Arts and Crafts Bed

Modeled after a Stickley bed, Kevin Rodel's version features a Glasgow-style inlay, pierced carving, and tapered posts. As you build it, you'll learn how to:

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- Create curved inlay using bent lamination
- Inlay with pewter
- Create a decorative piercing with a carved relief



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[FineWoodworking.com](http://FineWoodworking.com)

Web Producer **Ben Strano**

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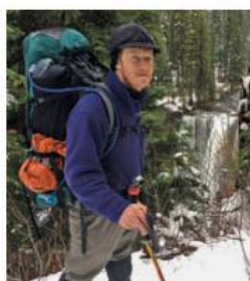
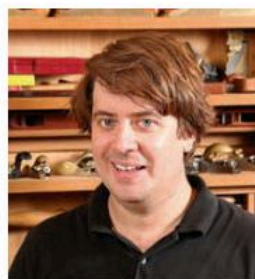


# contributors

In about 40 years of woodworking, some things have changed around **Christian Becksvoort's** shop and some haven't. For example, Becksvoort ("2 Options for Lipped Drawers") has had 40 years of huskies, all named Spirit. But this past summer was his last spent teaching and lecturing. From now on, he's saving summers for himself. He has also taken on an indispensable shop assistant, his 5-year old grandson, Riley, whose main duty is spreading shavings and sawdust around the shop with a bulldozer. Recently, Becksvoort has found relaxation in metalwork. He says, "Unlike woodworking, if you mess up, just re-heat and try again." But don't worry. He promises he's not switching occupations any time soon.



**Clark Kellogg** ("Wall Cabinet with Curves") has been woodworking since 1994, when he built a scale model of a guillotine for a high school English project. He's now a professional furniture maker, but before getting there, he was a printmaker, a designer for an offshore engineering firm, and a bus driver. Along the way he earned a degree in studio arts from the University of Virginia and completed programs at the Center for Furniture Craftmanship and the College of the Redwoods.



**Michael Robbins** (Finish Line: "Try a bleached finish") developed a love of the outdoors early in life, working several seasons for the Adirondack Mountain Club building and maintaining trails, bridges, and rock staircases at remote sites using only hand tools. This led to a job on an off-grid timber-framed house in Vermont, accessible by foot only. Robbins lived in a tent on the site for a year. Today, he operates his woodshop out of a former garment factory in Philmont, N.Y., and still spends a lot of time outdoors.

**Gareth Neal** (Back Cover and How They Did It) found his way into woodworking at 14 when he took an evening course in carving "with a group of elderly gentlemen and ladies." Inspired by that experience, he studied furniture design and craftsmanship at Buckinghamshire New University, and then worked in two prominent shops before opening his own workshop in London's East End in 2002. Neal has conducted experiments in producing furniture without a carbon footprint, which he describes as "a hippie sustainable dream."



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## Fine Woodworking®

Publisher **Renee Jordan**  
rjordan@taunton.com

Director,  
Advertising Sales  
& Marketing **Alex Robertson**  
203-304-3590  
arobertson@taunton.com

Director of Digital  
Advertising  
Operations **John Maher**  
jmaher@taunton.com

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## Spotlight

### Where to find affordable used tools

Jonathan V. was right on target with his request for affordable tools in his letter in the August 2017 issue. One answer is the used tool market. Over the years, I have purchased a Delta 12-in. miter saw,

a Craftsman professional 10-in. tablesaw with the XActa fence and rails, a DeWalt 12-in. planer, a Makita jigsaw with a metal case, and numerous Japanese chisels for half or less of what they'd cost new. A little tweaking and careful setup and they work beautifully. Just had to put new brushes in the miter saw.

They don't have all the bells and whistles of the new products, like laser guides, but for those of us who are time rich and cash poor, it is a fair trade. If one is not in a larger urban area, the market may be limited. Getting to know local woodworkers can help, as they may want to upgrade and sell their used but useful tools to finance a new item. Also check Goodwill, Habitat for Humanity stores (often called "ReStores"), and other thrift stores. I'm sure other readers have more and better ideas.

—DON RIES, Tucson, Ariz.

### Improvement to workshop tip

I found Andy Olerud's Workshop Tip on using grooved pliers to set brads (*FWW* #262) interesting. I have used this method for many years in picture framing. However, I suggest one change: The pliers should be reversed; that is, the lower jaw should be on the inside of the frame. Because of the length of the upper jaw, the lever arm tends to angle the brad as it's pulled in. Reversing the pliers allows the brad to be kept straight as it enters. This method is also useful for driving glazier's points when reglazing windows.

—DON LODGE, Southwest Harbor, Maine

### Give Porter-Cable jig more credit

The Porter-Cable 4212 is much more flexible than given credit for in your recent review ("Dovetail Jigs," *FWW* #262). It is neither "fixed" spacing nor limited to a stock width of 12 in. In addition to the standard set of instructions from Porter-Cable, there is an advanced instruction manual in PDF form that explains variable spacing, unlimited width, and other uses ([portercable.com/jigs/dovetail/SupplementalManual.pdf](http://portercable.com/jigs/dovetail/SupplementalManual.pdf)). The manual also discusses slanted sides, inlaid dovetails, and other options.

—JOHN F. O'CONNELL, Worcester, Mass.



**The key is knowing what to look for.** In *FWW* #218, Roland Johnson offers expert advice for picking a good used machine, as well as tips on avoiding a bad one.

### Shaker tip

Without taking away from Christian Becksvoort's expertise and his excellent "Shaker Sewing Stand" article (*FWW* #261), I want to add that when cutting the dovetails and the top wedge slot in the post, just turn those areas first and leave the middle square. It makes it much easier to hold the post in the vise to cut the joints. Then return the blank to the lathe.

—KONRAD PLACHTA, Bridgenorth, Tasmania, Australia

### Outstanding video workshop

The North Bennet Street School Tool Chest series with Matt Wajda was absolutely top-notch (*FineWoodworking.com*). I would cheerfully watch more from him. He does lovely work and is a very clear teacher. (Also, we can never get enough of Mike Pekovich.)

—JON BATES, Portland, Ore.

### Mid-century credenza

I quite enjoyed the article "Mid-Century Credenza" by Libby Schrum (*FWW* #261). However, I draw your attention to one small detail (in other words, a giant mistake I made on a similar project). Ms. Schrum used Dominoes measuring 8 x 40 mm. Half of 40 is 20. Her cabinet sides are  $\frac{5}{8}$  in., which converts to just under 16 mm, let's call it 15 mm, which up here in Canada is less than 20 mm. Therefore, if you would prefer not to have your Dominoes sticking 5 mm ( $\frac{1}{4}$  in.) proud of your case sides, then you have to either cut each Domino shorter (a pain, and occasionally unsafe) or drill the cabinet sides at the 12 mm setting and the tops and bottoms at 28 mm. I have used the Domino system for many years and love it, but you have to keep your wits about you.

—ANDY LOCKHART, Calgary, Alta., Canada

**Editor replies:** You are correct. Libby Schrum does indeed cut her Dominoes down a bit, and you definitely do need to keep your wits about you when using the Festool system.



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Fine Woodworking  
The Taunton Press  
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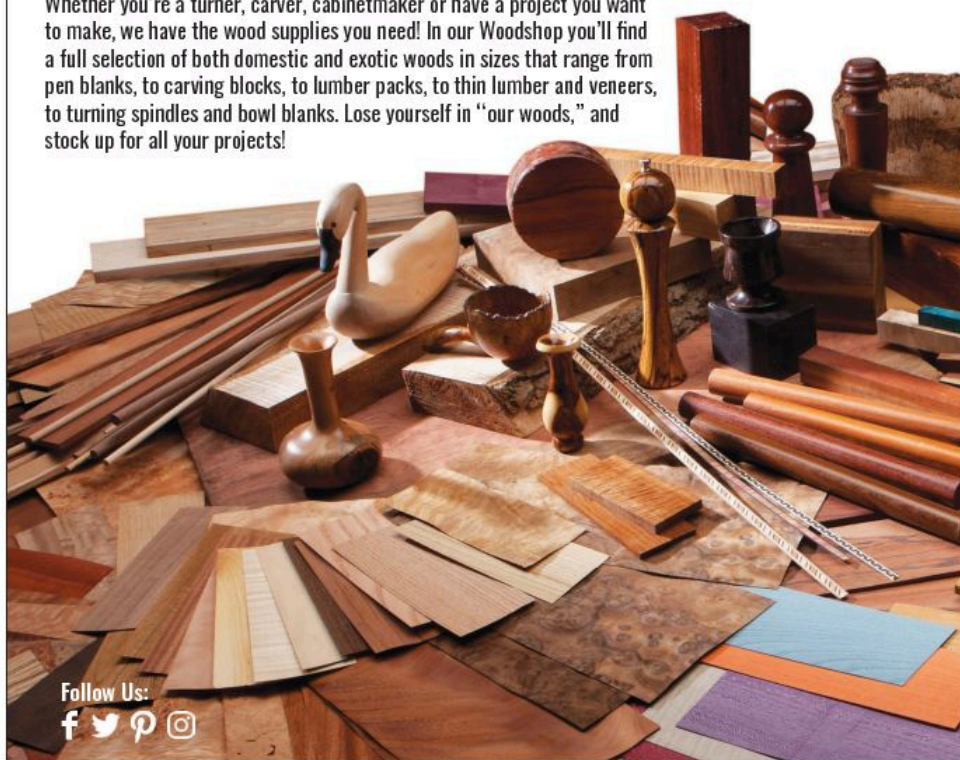
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# workshop tips

## Best Tip



**Todd Bradlee grew up in New England, where he began remodeling homes at age 18. About 10 years ago, after a move to California's Sierra Nevada mountains, he transitioned into studio furniture making. His advice for new pros is to have professional photos taken of everything you build, for your own website and for all the other places your work will appear.**

## Peen your tenons for easier assembly and a locked joint

Compressing tenons with a hammer and vise makes assembly easier and prevents the mortise from scraping off all the glue during assembly, which can starve the joint. I learned this amazing technique from my friend and mentor, Steve White, who studied with a master joiner from Japan. You'll need a Japanese hammer (\$30 at [HidaTool.com](http://HidaTool.com) for a 13-oz. version with one flat and one crowned face) and a small steel anvil (inexpensive used or new).

Cut the mortise first, then the tenon. Make the fit a bit snug, so it requires some pressure to get the joint together. Next, use the flat side of the hammer to peen (slightly compress) both sides of the tenon, resting it on the anvil and making sure not to hit the shoulder. Then use the flat jaws of a metal or hardwood vise (I prefer metal) to squeeze the part of the tenon next to the shoulder. The tenon should slide in and out fairly easily.

Having planned out your clamping beforehand with a dry-fit, use a brush to apply glue to both mortise and tenon. Slide the joint together (it will be easy now) and close it tight with clamps. Moisture from the glue will swell the tenon back to its original size for a tremendously strong joint. One note of caution: If the mortise walls are thin, clamp the sides of the joint to stop it from expanding outward.

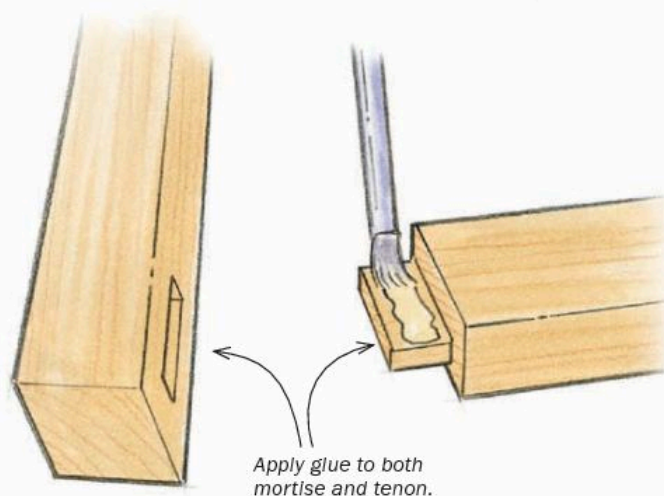
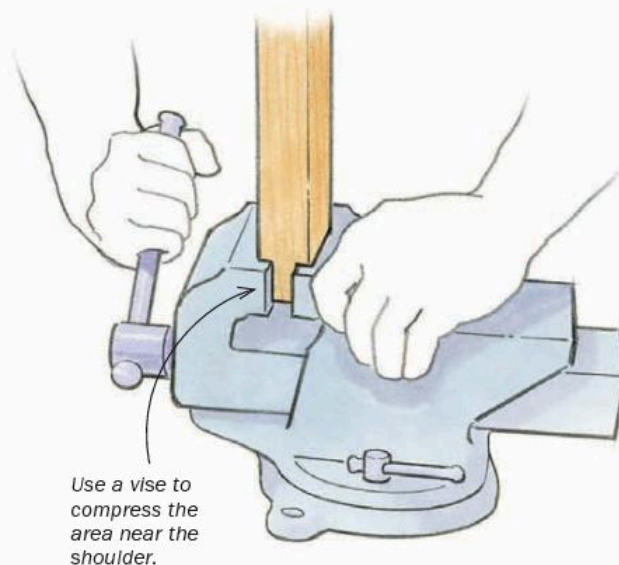
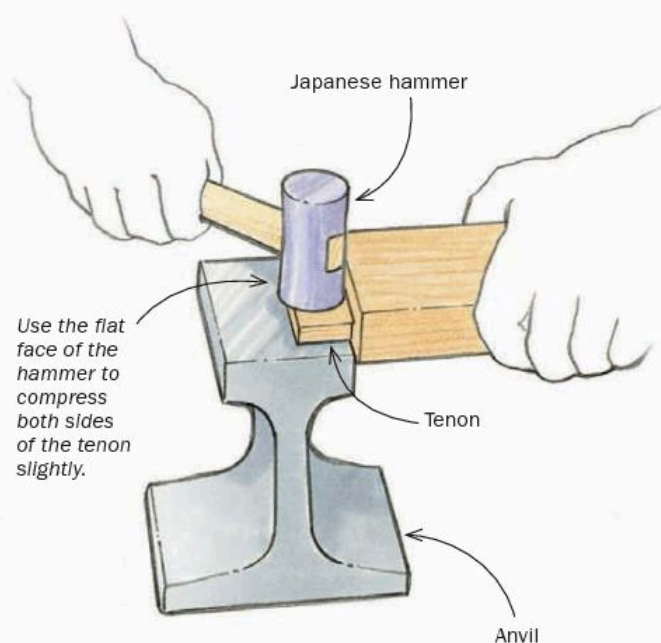
—TODD BRADLEE, Bishop, Calif.

### Online Extra

To watch editor Tom McKenna give this tip a try, go to [FineWoodworking.com/263](http://FineWoodworking.com/263).

### A Reward for the Best Tip

Send your original tips to [fwtips@taunton.com](mailto: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 set of IBC's new bench/paring chisels.

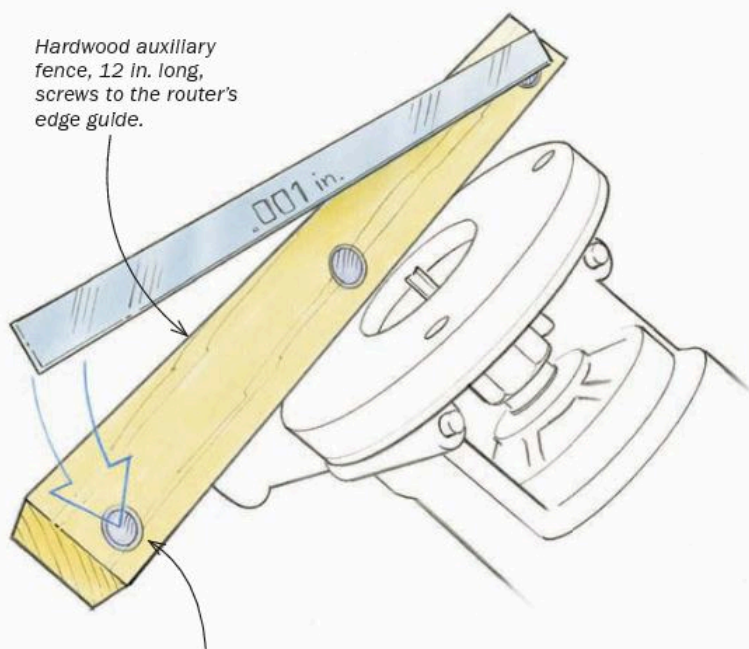




## Feeler gauges deliver accurate grooves for banding

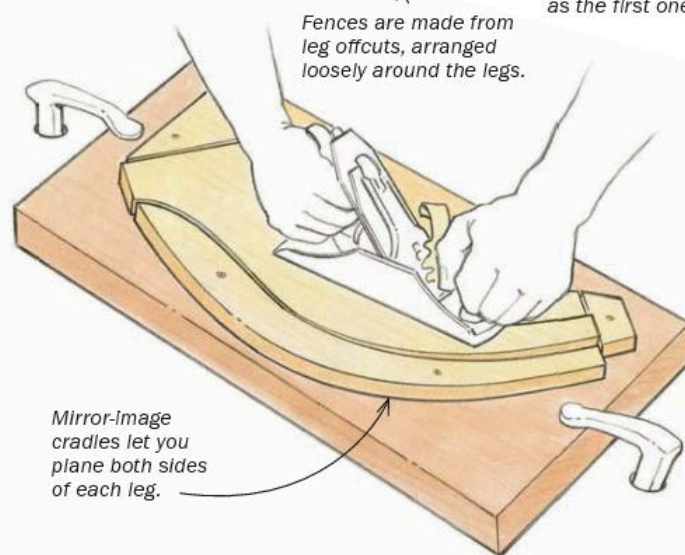
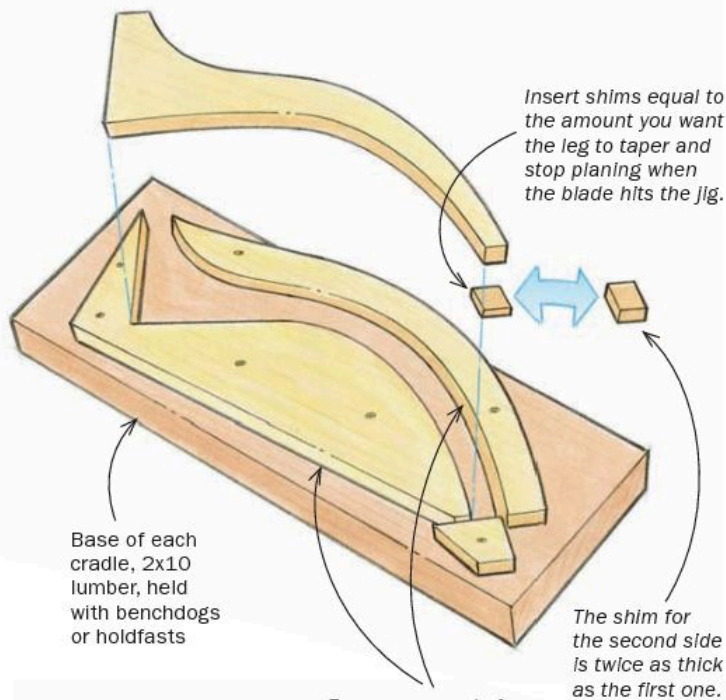
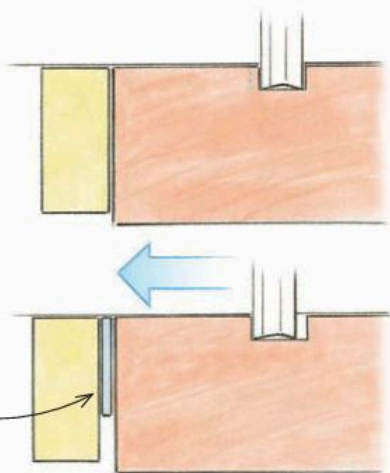
I like to use bandings in my work, but they seldom come in the same width as a router bit. That means I have to cut the grooves in multiple passes. It's hard to make precise adjustments to my router's edge guide, so I came up with this simple fence. Rare-earth magnets are set just below the surface, which lets me attach standard 12-in.-long feeler gauges. The feeler gauges come in 0.001-in. increments up to 0.040 in. and larger, and they are available at most auto parts stores or online at MSCdirect.com. To make a perfect-fitting groove, I start with a bit that is a little smaller than the banding and make a pass. Then I measure the groove and the banding, pick the feeler gauge that represents the difference, and add it to the edge guide for the second pass.

—WADE CURRAN, Longmont, Colo.



Set rare-earth magnets just below the surface of the fence. Epoxy them into their holes or use steel cups that can be screwed into place to hold them.

Add 12-in.-long automotive feeler gauges to the fence to change its setting in precise increments.



## Offcuts create a planing cradle for tapered legs

A while back I built a Shaker-style round stand but wasn't sure how to plane accurate tapers on both sides of each leg. I found the answer in the curvy offcuts left over from bandsawing.

To hold the legs firmly for handplaning, and also guide my plane for precise tapers on both sides of the legs, I used the offcuts to create two simple cradles. I screwed them to a couple of pieces of 2x10 lumber, which are held on the bench with dogs or holdfasts. Attach the offcuts to hold the legs loosely and be sure to countersink the screw heads below the surface. The last step is to shim the end of the leg for the taper that you want. To taper a  $\frac{3}{4}$ -in.-thick leg down to  $\frac{1}{2}$  in., start with a  $\frac{1}{8}$ -in. shim under the foot in the first cradle, and then flip the leg and use a  $\frac{1}{4}$ -in. shim in the second cradle. Plane each leg until the sole of the plane starts to make contact with the top of the cradle, and the taper should be perfect.

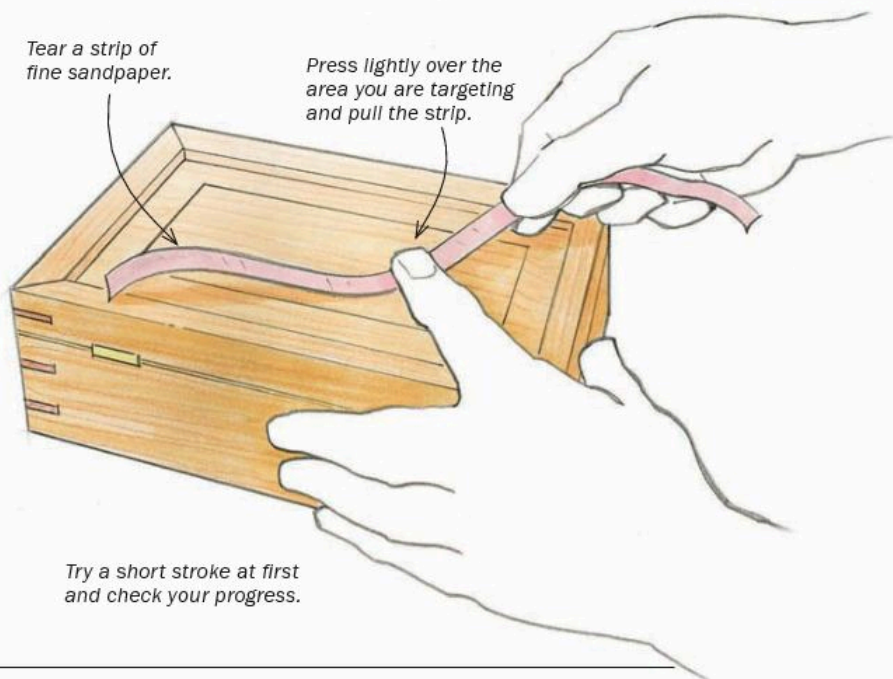
—MATT CZEGAN, Greensburg, Pa.



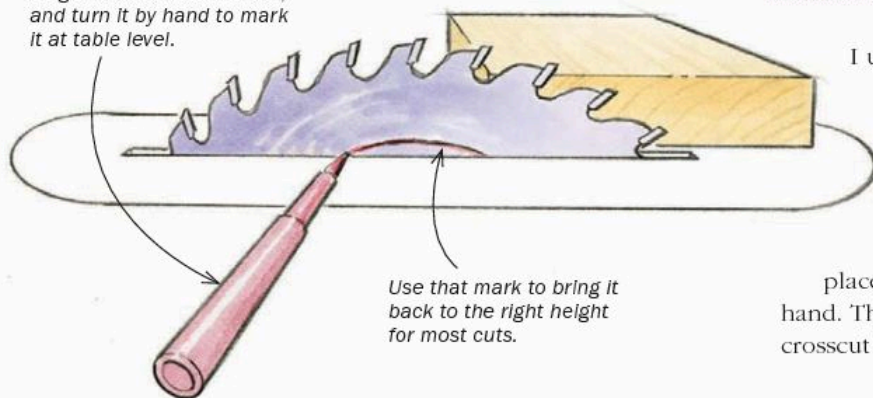
## Use sandpaper strips to target tiny areas

When you need to sand a small area without damaging the surface around it, strip-sanding is a great method. Cut a long strip of sandpaper and trap it between your finger and the offending area, and then pull the strip with your other hand. This works wonderfully when you are removing the last remnants of a drip in a finish, or a stubborn, hard-to-reach detail. Be careful: Strip-sanding is more aggressive than it seems. Start with fine sandpaper and short strokes to avoid creating a new problem. I never use anything coarser than 220-grit paper, and most often use 400-grit on drips.

—DEAN LAUGHREN, Winnipeg, Man., Canada



Set the blade to the right height for  $\frac{3}{4}$ -in.-thick stock, and turn it by hand to mark it at table level.



## Mark a tablesaw blade for its most common height

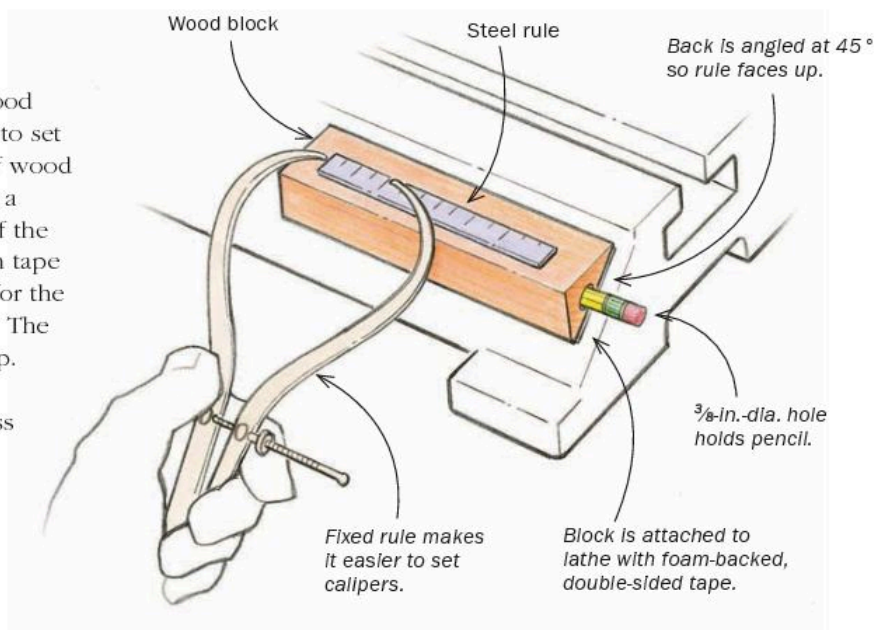
I use my tablesaw most often to cut  $\frac{3}{4}$ -in.-thick stock. To set the blade to the proper height without measuring, I mark both sides of the blade with a Sharpie at table height. Just raise the blade to the optimum height for your average workpiece (the best balance between safety and efficient cutting is to have the bottom of the gullets just above the top of the stock), place the marker on the throat plate, and spin the blade by hand. The mark will work just as well when you are using a crosscut sled.

—DAVID GLEASON, Houston, Pa.

## Handy holder saves turning time

Which tool do I use—and lose—most often while wood turning? It's my favorite 6-in. steel rule, the one I use to set my calipers. It usually ends up buried under a pile of wood chips. I solved this problem by mounting the rule on a hardwood block, which I attached to the front side of the lathe bed. I use double-sided tape for both tasks, thin tape for the rule and the thicker type with the foam core for the block, which keeps it secure on the irregular surface. The back of the block is angled at  $45^\circ$  so the rule faces up. While I was at it, I drilled a hole into the end of the block to hold a pencil, the tool I lose only slightly less often. The block has saved me a lot of time digging through curly shavings, and having the rule fixed in place leaves both hands free for adjusting the calipers.

—BILL WELLS, Olympia, Wash.







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## Try a bleached finish

IT TAKES THE COLOR OUT  
WITHOUT MUTING THE WOOD'S  
PERSONALITY

BY MICHAEL ROBBINS

### Surface prep



**Before you bleach.** After sanding up to 220 grit, wet the wood to raise the grain. Then smooth it with 220-grit paper.



**W**ith my work I often avoid the warmth of oiled oak, maple, or ash and instead apply a bleaching process that effectively takes the color out of the wood. It may sound like heresy, but done properly, a bleached finish can provide a pleasant contrast and a new context to the wood. The bleaching process allows a wide range of control. Depending on the extent of application, you can achieve results ranging from a subtly muted color to a brilliant white.

I'll show you my method using one of my cabinets. For this example, I am using quartersawn white oak fronts. This wood bleaches out to an almost paper white, while still allowing the silver ray fleck to shine through. These fronts will be paired with a natural oiled white oak carcass, creating a nice contrast between the two palettes.

### Prep the surfaces and mix the solution

Before bleaching, prepare the wood by sanding up through the grits to 220. Then wet the wood to raise the grain, and sand it with 220-grit paper. Now mix and apply the bleach. I do this with the work faceup and on stickers, using a two-part bleach product made by Daly's Wood Finishes in Seattle. I order mine directly from Daly's in gallon containers, but you can find pint-size containers on Amazon.





Mix equal parts A (sodium hydroxide) and B (hydrogen peroxide), adding an extra splash of part B (approximately 10% to 15% of the 1:1 mix). This produces a whiter result, with less green and yellow and an even color. When parts A and B are mixed, a chemical reaction begins. The solution is active for about 30 minutes, so mix only what you need for two to three generous coats.

## SOURCES OF SUPPLY

**DALY'S WOOD BLEACHING SOLUTION**  
Dalyswoodfinishes.com

Amazon.com

**OSMO WOOD WAX FINISH**  
osmona.com



### Apply the bleach solution

Apply the bleach, making sure to avoid puddles or drips. Once you have covered all the surfaces, let the bleach sit and do its thing for about 10 to 12 minutes. When the bleach has started to dry, use the remaining mixture to quickly add another coat. Then allow the wood to sit and dry thoroughly.

Once it's dry, assess the color. I apply three coats of bleach to achieve a clean, white look. Each successive coat is applied

### Bleach the wood



**Mix equal parts A and B.** Use a disposable brush to generously coat the wood with the bleach solution. When the wood is almost dry, add another coat of bleach solution, and then allow it to dry completely.



### Heat and sand



**Make it whiter.** After the second coat, each successive coat is applied after a light sanding with 220-grit paper and dried with a heat gun for a consistent bleaching effect and a whiter result.



## Adjust color and neutralize



**Part B only.** After achieving the desired whiteness, if there are any green or pink tints in the wood, Robbins applies a coat or two of just part B and heats it to remove any tinting.



**Neutralize the bleach.** A 2:1 solution of water to vinegar will stop the bleaching process. Apply the vinegar and dry it with a heat gun.

after a light sanding with 220-grit paper and dried with a high-temperature hair dryer or heat gun. The heat helps to maintain a consistent bleaching effect and also helps to produce a whiter result. After the wood is close to the whiteness I'd like, I look again for any greenish tint. If any is present (it often is, especially with maple), I apply a final coat or two of just part B (the hydrogen peroxide) and then apply heat again. This removes the tint and produces an even, near paper-white effect.

When I am satisfied with the tone, I apply a weakened vinegar mixture to neutralize the wood, usually a 2:1 ratio of water to vinegar. Apply a coat of this, dry it with heat, and then apply a final coat of water and allow it to dry thoroughly. Finally, lightly sand to knock down any grain or rough spots.

## Add a topcoat

One of the difficulties of bleaching wood white is keeping it white. Finishing a bleached surface can be tricky; a hand-rubbed oil will quickly amber the wood, making it yellow. A water-based polyurethane keeps it white, but I've never been a

## Add a finish



**Apply the topcoat.** Robbins uses Osmo Wood Wax finish in white over the bleached surface. He rags on a coat using a circular motion, waits 10 to 15 minutes, buffs it out with a clean rag, and repeats.

fan of the look and feel. In certain commercial applications I've used a water-based polycarbonate on bleached surfaces that works quite well, but it has a bit of a plastic look.

For cabinet fronts like these, where I don't need as much protection as I would on a horizontal surface, I use Osmo Wood Wax White 3111 finish. This product is a satin color finish that works beautifully to keep the bleached wood white while providing an acceptable level of protection. If additional protection is required, such as on a tabletop or desktop, I apply Osmo Polyx-Oil High Solid over the wax. □

*Michael Robbins makes custom furniture in Philmont, N.Y.*





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## ■ ACCESSORIES

### A riving knife for old cabinet saws

**I**HAVE A 1969 DELTA UNISAW, and I use it all the time. It runs smoothly, cuts well, and has a great rip fence (the Unifence). I love it, but I've been saving up to replace it for several years. Why? Safety. When I bought it, the saw did not have a splitter and blade guard. At first I made do with shopmade splitters and then a Beisemeyer splitter. But even a good splitter can't compete with a riving knife.

A riving knife follows the blade's movement, tilting when it tilts, and changing height along with the blade. It is never more than a fraction of an inch away from the blade, which is why a riving knife is so effective at preventing kickback.

I'm happy to report that I can put off that new saw for a bit, because I just installed the ARK Shark Guard from Leeway Workshop. "ARK" stands for adjustable riving knife. Technically, it's a splitter, but effectively, it's a riving knife because you can adjust the height to follow the blade's height. A quick turn of a ratchet handle loosens the knife so you can move it up or down. It takes less than 30 seconds. A great benefit of the adjustable height is that you can lower it to be under the blade's crown and leave it in place for non-through cuts.

The ARK Shark Guard comes with a fantastic blade guard. It's clear, so you can keep an eye on the workpiece as you cut, and it moves easily up and over the workpiece as it's fed through the blade. There is a dust port on top of the guard that is available in several sizes to accommodate different hose diameters.

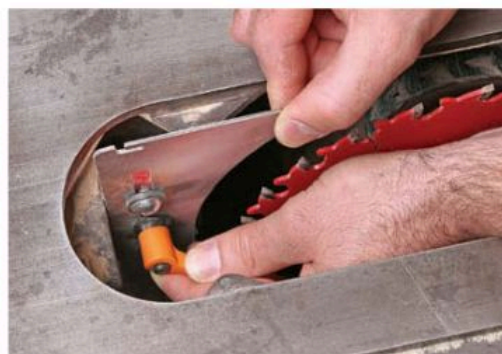
Installation requires installing a new bracket to the saw's trunnions, but this was not difficult and took me less than 10 minutes. I was able to align the riving knife to the blade in about the same amount of time. To remove the knife completely, you must remove the ratchet handle and a second bolt. For most folks, this won't be an issue, but if you ever use a blade thinner than a thin-kerf blade (I use a 7/4-in. circular-saw blade when making kumiko), it can be a hassle.

The ARK Shark Guard fits many older Delta Unisaws, some older Grizzly cabinet saws, and other saws that are clones of the Unisaw. It's a great replacement for the factory splitter and blade guard, and a vast safety improvement over nothing at all.

—Matt Kenney is the special projects editor.



**Safety and visibility.** For through-cuts, the riving knife's blade guard allows for a perfect view of the cut and will fit different dust-hose diameters.



**Quick height adjustment.** A quarter turn of the ratchet handle loosens the knife so you can adjust it to match the blade's height.



**Low profile.** The knife can be set just under the blade's height, so it can remain in place for non-through cuts like those needed for drawer-bottom grooves.

Delta ARK Shark Guard by Leeway Workshop  
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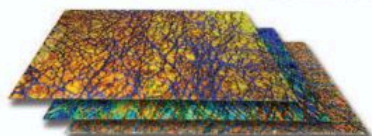
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## ■ ACCESSORIES

### Tablesaw jig makes accurate dados with minimal setup

**THE BIGGEST CHALLENGE** of cutting dados and half-lap joinery with the tablesaw is dialing in the width of the cut. What makes it tough is that you need to account for the width of the blade, and that usually takes a little trial-and-error to get right. The Matchfit dado stop from Microjig claims to simplify the process, so I gave it a try.

The jig clamps to the rip fence and has three stops. The first is set to the right side of the blade, the second is set to the left side, and the third is set using the workpiece itself to determine the dado's width. After a quick scan of the directions, I set up for a dado cut in less than 5 minutes. The fit turned out to be slightly loose, so I tried it again with a little more care. The result the second time was about as perfect as I could hope for: a nice, tight fit that needed just a little persuasion to fully seat.

—Michael Pekovich is the executive art director.



**Matchfit dado stop by Microjig**

\$70 for the stop and two clamps  
\$25 for the stop

#### **No-hassle setup.**

After setting the back and middle stops to account for the blade's thickness, the front stop is set directly from the workpiece's thickness, using the back stop as a reference.



#### **Define the width.**

Use the middle stop to make the first cut, then the front stop to make the second one. Nibble out the waste in between.

## ■ POWER TOOLS

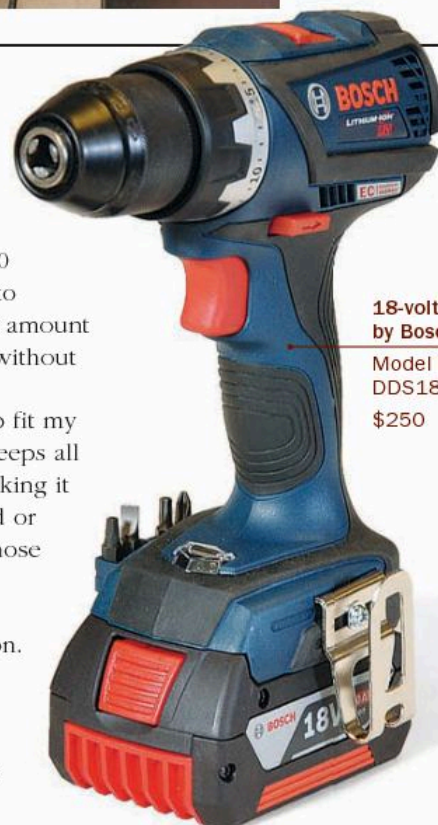
### Great drill powered by brushless motor

**BOSCH'S NEW 18-VOLT**, ½-in. capacity cordless drill has several features that make it one sweet workbench companion. To start, the two-speed brushless motor (0-600/0-1900 rpm) has 531 in./lb. of torque delivered in a silky-smooth power band that is very easy to modulate with the comfortable and accurate trigger. I was especially impressed with the amount of controlled power at very low speeds, making it easy to drive a bunch of tiny screws without stripping a single one.

The drill has more great features. A bright LED light points right at the bit, and the grip fit my hand perfectly and had just the right amount of stick to it. Electronic kickback control keeps all that torque tamed by simply stopping the motor if impending bit lockup is detected, making it easier on the hands and wrists. Electronic motor and battery protection prevent overload or overheating when you're pushing the power. The all-metal chuck has a spinner on the nose to keep the spinning chuck from damaging surfaces, and 20 + 1 clutch settings provide a range that will allow a person to bore big holes or drive very delicate screws without damage. The compact head provides comfortable balance, which also enhances precision.

The drill comes as a kit with a charger, two batteries, a magnetic bit holder with four assorted bits, and a huge belt clip. It's a gem of a drill, and one that I'd love to have in my shop.

—Roland Johnson is a contributing editor.

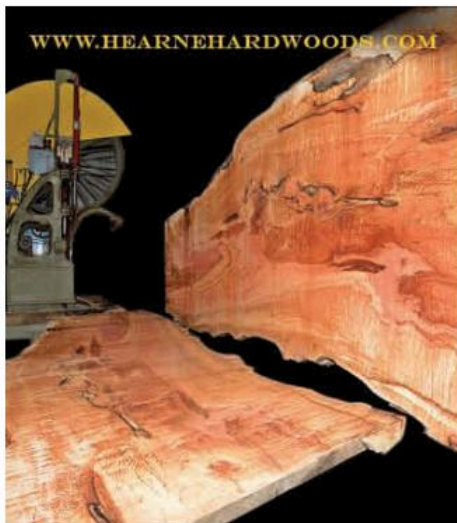


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handwork

# Make a coopering plane

BY CLARK KELLOGG





I love using coopering planes. The long, curling scoop-shavings they make, and the slightly burnished, rippled surfaces they leave are incredibly satisfying to the touch.

They can be used for a few different tasks, such as texturing a panel or creating a profiled molding, but their raison d'être is making curved surfaces across the width of a board. And, more often than not, they are the best way to create such a curve.

Although using a coopering plane, with its curved blade, can seem intimidating at first, in practice the tool is not different from an ordinary smoothing plane. If anything, I find coopering planes easier to use, because I don't worry about obtaining an absolutely glass-smooth surface. I'll show you how I build a wooden coopering plane: shaping the sole to match the curve of the blade, and grinding and sharpening the blade.

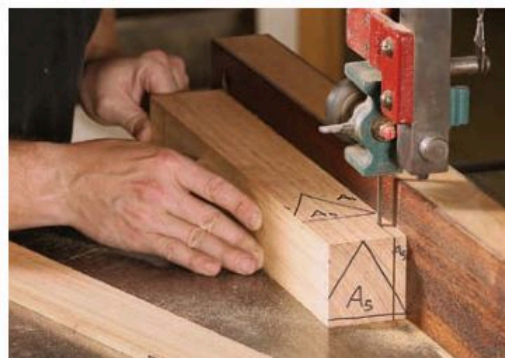
The coopering planes I make are based on James Krenov's classic bench plane design. Indeed, all of the geometry is essentially the same; the only difference is a slightly thicker sole to account for the curve of the blade.

#### Make a bench plane, then shape the sole

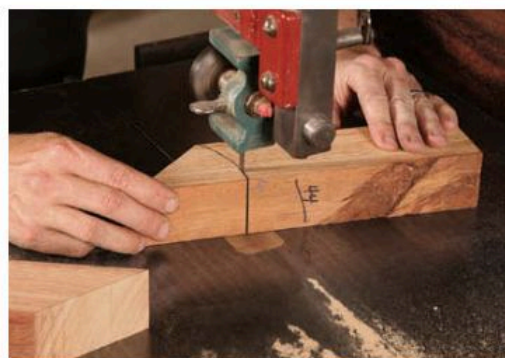
Start by building the body using the technique popularized by Krenov (see David Finck's "Wood Planes Made Easy," *FWW* #196). Start with a blank, cut off the cheeks, and

## Plane sandwich

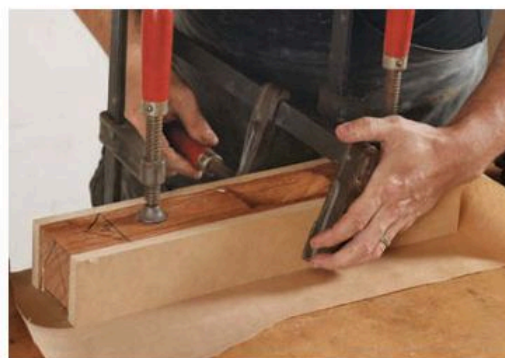
Cutting apart the plane body greatly simplifies the process of making the throat and mouth, but be sure to glue the parts back together accurately.



**Cut the cheeks.** A consistent feed rate and smooth motion produce the cleanest cut. The sides should be  $\frac{3}{8}$  in. thick.

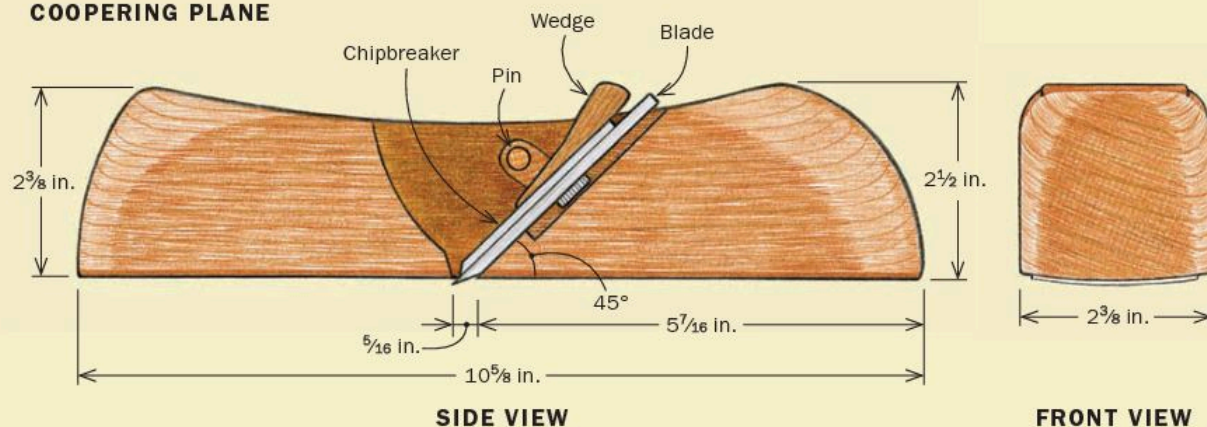


**Clear the throat.** After cutting the back of the throat, or bed, at  $45^\circ$ , cut the front side. Kellogg prefers a sweeping arc here to a straight cut.



**Glue it back together.** Clamp the plane's center to the bench to keep it and the sides in alignment on the bottom. A bit of paper prevents the plane from getting stuck to the bench.

#### COOPERING PLANE





## Curve the sole

Accurate layout removes most of the difficulty. Careful and judicious planing takes care of everything else.



**Mark a centerline.** Scribe centerlines on both ends of the plane body, and then connect them along the length of the sole with a pencil line.



**Lay out the curve.** After aligning the template with the centerline, trace the curve onto the end grain. Repeat at the other end.

**Add a reference mark on the side.** This line helps you keep the curve constant along the entire length of the sole.

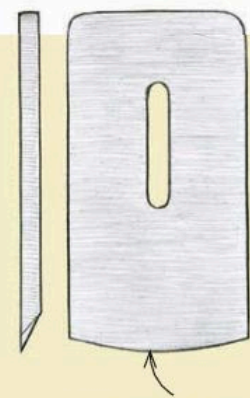


**Shape the sole.** Plane along the edges of the sole first, where there is more material to remove (below). Move to the center last, working toward the centerline from both sides.

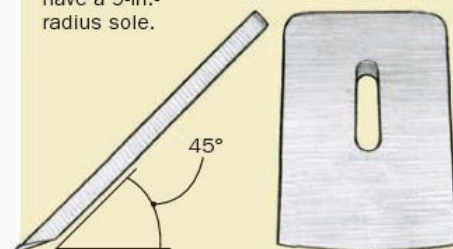


### BED ANGLE CHANGES BLADE RADIUS

When angled at 45°, the blade's effective radius is about 1½ times its actual radius. So a plane with a 6-in.-radius blade should have a 9-in.-radius sole.



6-in. radius at 90°



9-in. effective radius at 45°

### SOURCE OF SUPPLY

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create a throat. Then glue the parts—minus the throat waste—back together. After the glue is dry, it's time to shape the sole.

Begin by laying out the sole's curve on both ends of the plane body. This curve is flatter than the curve of the blade, because the blade projects through the sole at a 45° angle. The 45° bedding angle creates an effective radius that's larger than the blade's actual radius. To find the effective radius without breaking out a geometry textbook, a good rule of thumb is to multiply the radius of the blade by 1½.

Make a template of the sole's curve on card stock. After cutting a centerline into both ends of the blank, and connecting the two lines with a pencil line along the sole, trace the template onto both ends



# Hone the blade by hand

Sharpening a blade with a radius can be tricky, but a hollow grind is a big help. Scooping out the bevel leaves two points of contact, making it easier to register the blade on a sharpening stone.



**Honing with a swing.** The action is similar to the pivot used at the grinder. Start at one corner (left), and pivot your wrist as you move the blade down the length of the stone. You should be honing the blade's trailing corner when you reach the end of the stone (right).



of the body. Complete the layout with a marking gauge line along the body's side that connects the ends of the curves.

Now clamp the plane body in a vise, sole up. Use a block plane or small bench plane to shape the sole down to the layout lines. Start at the edges, and slowly work toward the center. Finally, use a hard sanding block, sanding with the grain, to remove any facets. When that's done, sharpen the blade.

## Go low tech to get sharp

Hock blades come hollow grind, but at some point you'll need to regrind the bevel. I do it with a bench grinder. Center the blade on the tool rest and then swing it through a curve with the bevel always on the wheel. Don't worry too much if the grind isn't perfectly symmetrical or the arc fair. As long as you are in the neighborhood of the radius, you should be fine.

The blade is thick enough to balance easily on the two points created by the fresh hollow grind, so hone freehand. The idea is to swing the blade from one side to the other like a pendulum as you move sideways down the length of the stone. I begin with a 1,000-grit stone, move to 4,000-grit, and polish on an 8,000-grit stone.

Now set the blade for a light cut, tap in the wooden wedge, and take a test cut. Adjust the blade as you would on any other wooden plane. □

*Clark Kellogg is a professional furniture maker in Houston, Texas.*

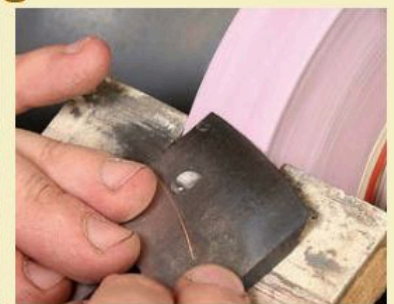


**Even shine along the edge.** You are done honing when there is an even polish along both the top and bottom of the bevel. At that point, remove the burr on the back of the blade.

## When it's time to regrind



**Hollow-grind the bevel.** Begin with one corner of the blade in contact with the wheel (left), and then pivot the blade so that the bevel runs smoothly across the wheel, stopping when you reach the other corner (right).





# Floating-Top Table

Creative joinery adds spark to this versatile piece

BY MICHAEL PEKOVICH

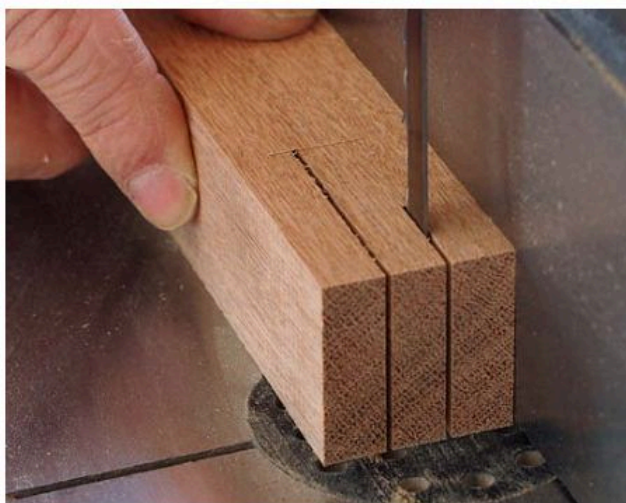




This is one of those projects that almost wasn't. Rachel, my wife, had asked for a small, portable table for her sewing machine. My first thought was to make something quick—just legs, aprons, and a top—so I could move on to something “more important.” Fortunately, I stopped and took a minute to think about how I could make this table a little more interesting to build and a little more enjoyable to use. The result is a unique little table with a quiet personality that brightens our home every day. While Rachel puts it to use most often as a sewing table, it serves very well as a side table, a small writing desk, or even a TV tray.

Building the table is straightforward, though the joinery is a little unusual. There are some bridle joints and through-tenons, all of which are left proud of the surface. Drawbore pins pull everything together for a clamp-free glue-up. If you'd like, you can leave out the

## Quick bridle joint at the bandsaw



**Start with the slot.** Scribe the baseline of the slot, then cut the sides at the bandsaw. Set the fence for one face, then flip the stock to cut the opposite face.

**Drill out the waste and square the end.** Use a  $\frac{1}{2}$ -in. Forstner bit to drill a hole at the baseline, which frees most of the waste (right). Then square the base of the slot with a chisel (far right). Chop halfway, then rotate the stock to finish squaring from the opposite face.



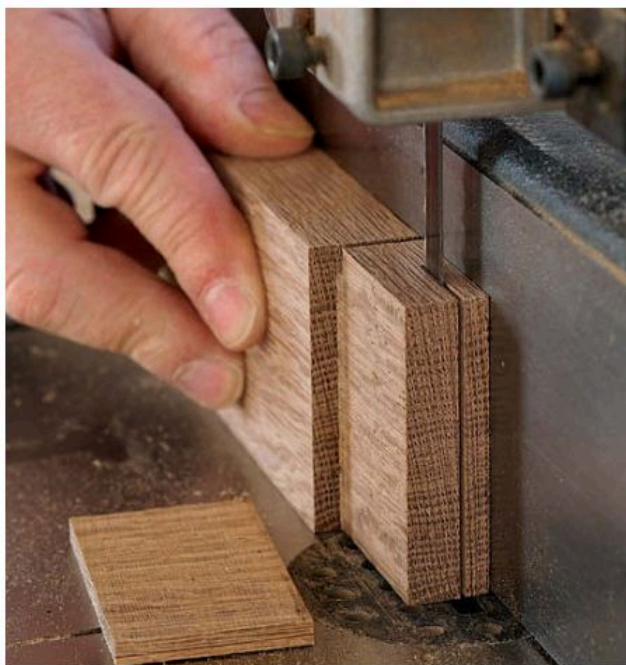
glue altogether. Arched rails and a beveled tabletop add lift, but the table remains a stout little thing.

### Begin with the base

I used white oak for the table, but I stayed away from the dramatic ray fleck of quartersawn oak on the base, instead turning to the quieter straight grain of riftsawn stock. It helps to reinforce the simple lines of the base.

Start by milling the stock and cutting the parts to final length. Leave the curved rails square for now to make cutting the joinery easier.

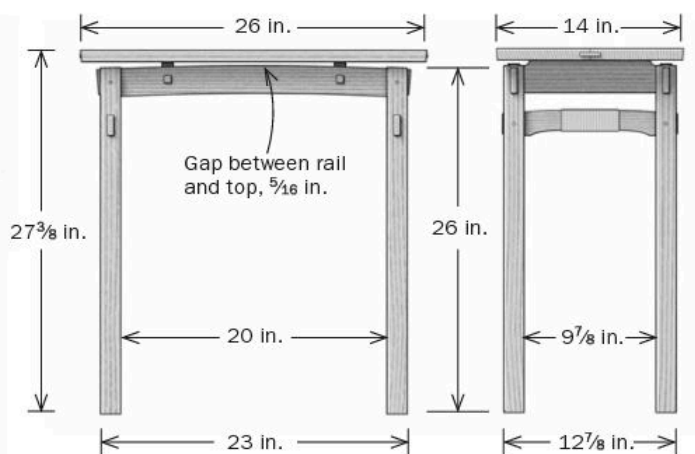
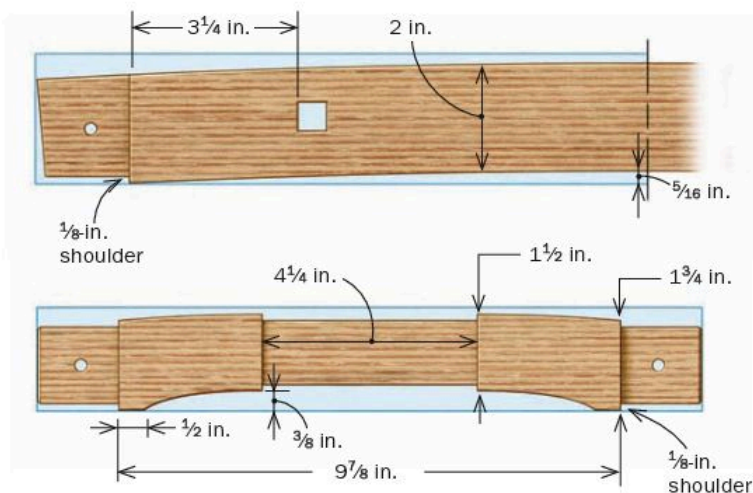
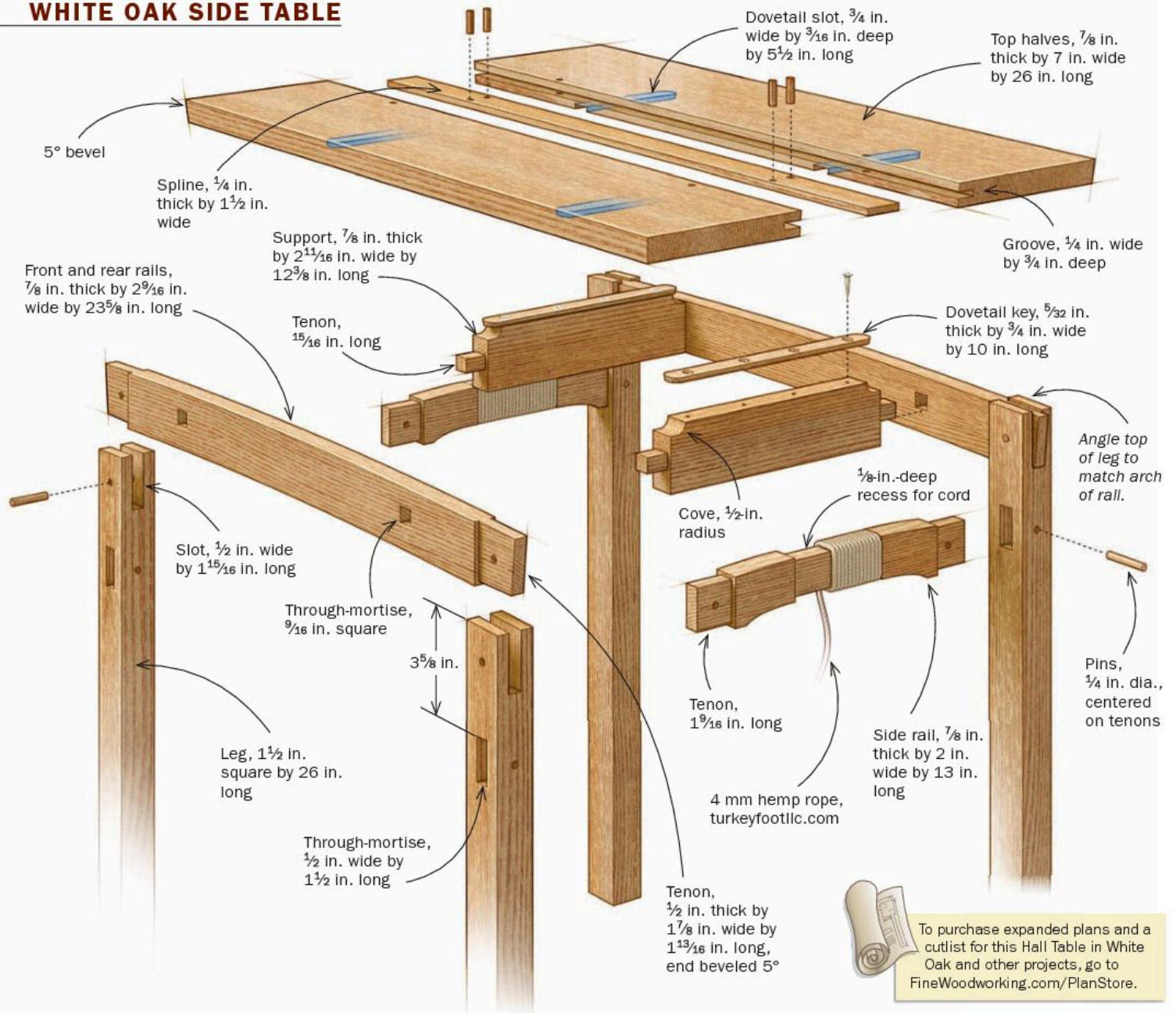
The legs are connected to the front and back rails with a bridle joint and that's a good place to start. I normally turn to the tablesaw and tenoning jig to slot the legs, but when making the original, I worked quickly and intuitively at the bandsaw. That's the technique I'll show you here. Set the fence to one face of the slot, and make the first cut. Then flip the leg for the second cut to ensure a centered slot. For a smooth, accurate cut, make sure your blade is sharp



**Then cut the tenon to fit.** Establish the shoulders at the tablesaw, then cut the tenon cheeks at the bandsaw, using test pieces to set the fence precisely. A sharp blade and a slow feed rate should yield a glue-quality surface right off the machine.

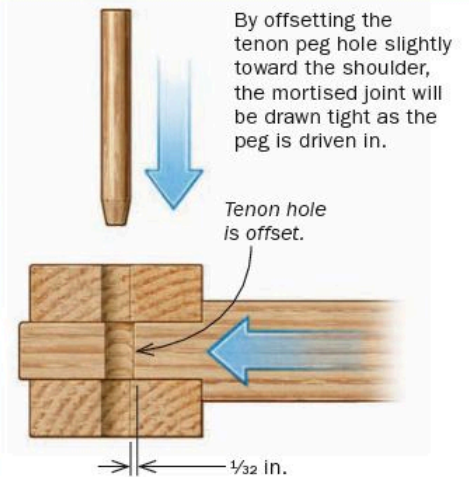


# WHITE OAK SIDE TABLE

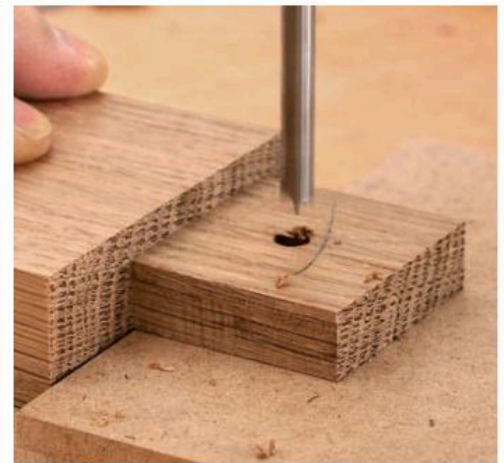
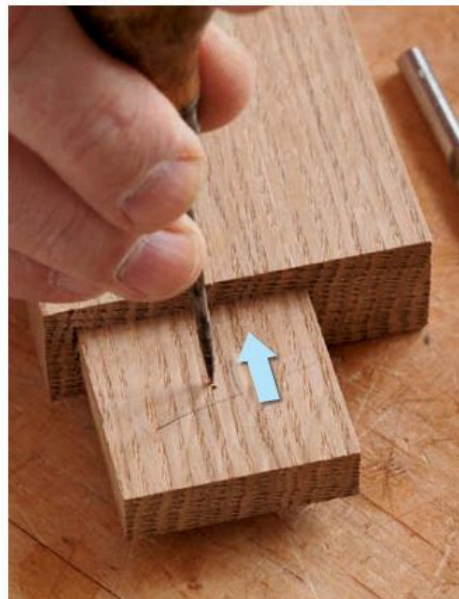




## Drawbore pins lock the joints



**Locate the center.** After drilling through the slots and mortises in the legs, dry-fit the joint and use a drill bit to mark the center of the hole on the tenons.

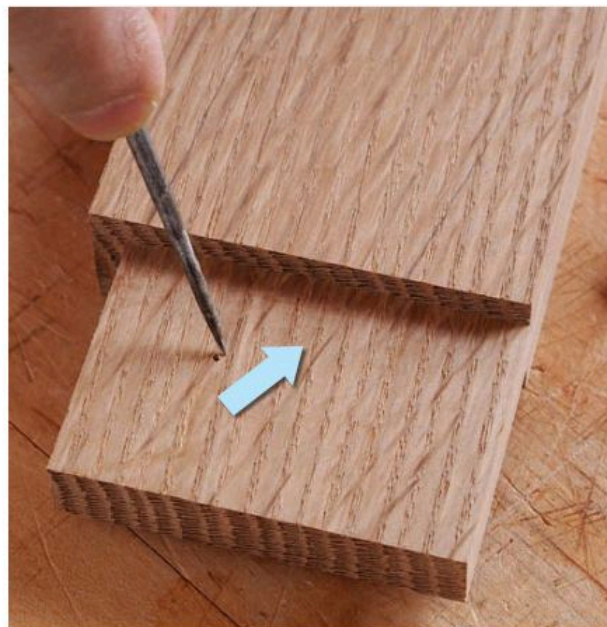


**Mark the offset.** For the mortise-and-tenon joints, offset the hole toward the shoulder of the joint (left). This will pull the joint closed when the pin is driven in. Then drill the tenon using a scrap underneath to prevent blowout (above).

and aligned to the rip fence. Also, it helps to go slow. If it's done correctly, you should end up with a surface almost as smooth as a cut from a tablesaw. Drill out most of the waste using a 1/2-in.-dia. Forstner bit, which matches the slot width. Then square the slot with a chisel, working in from each face. Undercutting the joint in the center guarantees that there won't be any material to keep the tenon from fully seating in the slot.

To make the tenons, first make the shoulder cuts at the tablesaw. Then head back to the bandsaw to cut the cheeks. Use a test piece to sneak up on a snug fit. When making fine adjustments to the bandsaw fence, be sure to cut off the end of the test piece to prevent the blade from wandering into the previous cut and giving you a false reading.

With the bridle joints complete, turn to the through-mortise-and-tenons that connect the side rails to the legs. This completes the leg joinery and allows the base to be dry-fitted, which is necessary to determine



**Angled approach for the bridle joints.** This joint needs to be pulled together in two directions, so offset the holes slightly in toward the shoulder and up from the bottom edge of the tenon.



## Add the tabletop supports

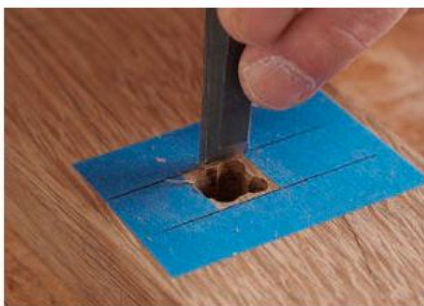
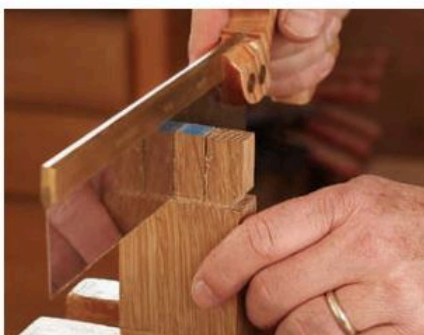


**Measure for the supports.** Dry-fit the base and measure between the front and back rails to determine the shoulder-to-shoulder distance for the supports. Then cut the tenon cheeks on the supports.

**Lay out the mortises and tenons at the same time.** Tape the mortise areas on the rails as well as the tenon ends on the supports. Then use a marking gauge to scribe the top and bottom edges of the mortises on both faces of the rails (right). Mark the tenons using the same gauge settings (far right).



**Cut the joinery.** Use a backsaw to cut the tenon sides. Remove the waste by sawing along the baseline and clean up with a chisel. Drill out most of the waste from the mortises and square the recesses with a chisel (bottom). Work in from each face to avoid cutting past the scribe lines.

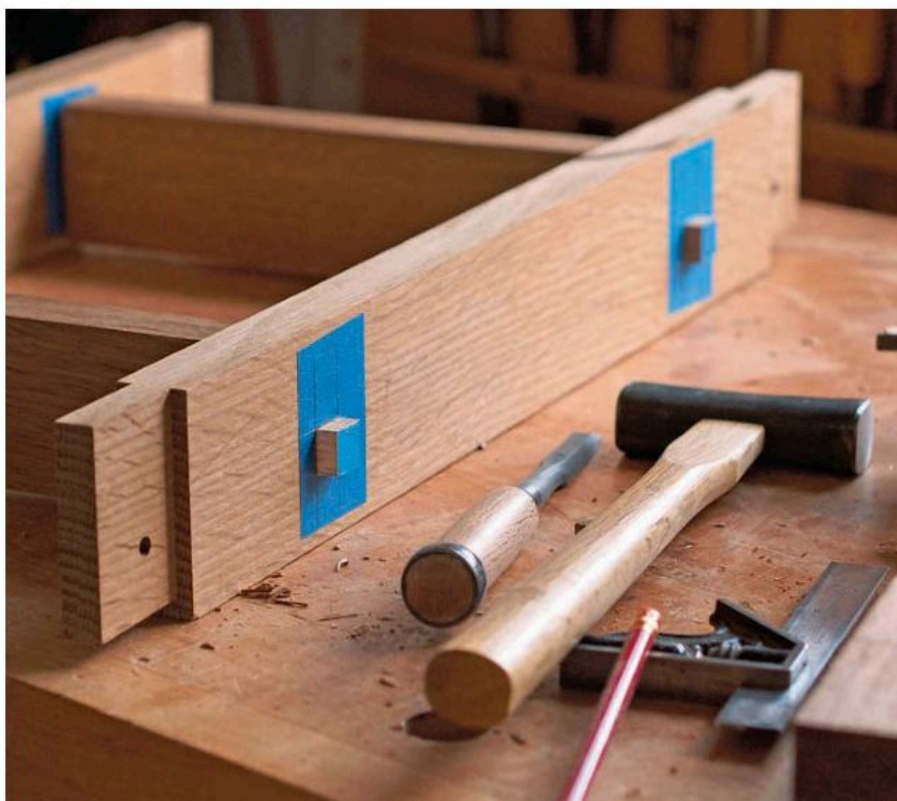


the shoulder length of the tabletop supports. To do that, you'll first have to drill for the drawbore pins that hold everything together.

### Drawbore pins pull it together; rails give it a lift

The bridle joint is a difficult joint to clamp because it must be pulled together in two directions. The protruding ends of the parts only complicate the situation. So I turn to drawbore pins, which pull the joint together as they are driven in. I used the technique for the side rail mortise-and-tenons as well. The trick is to drill slightly offset holes through the parts. For the mortise-and-tenons, offset the mark roughly  $\frac{1}{2}$  in. toward the shoulder of the tenon. For the bridle joint, which needs to be clamped both across the joint and down, offset the hole at a  $45^\circ$  angle. This way, the joint is pulled in both directions as the pin is driven in. I use a dowel plate to make the pins, starting with straight-grained stock to keep the pins from breaking under the stress of pulling the joint together.

With the base dry-fitted, measure between the front and back rails to determine the shoulder-to-shoulder length of the support rails. Start by cutting the tenon cheeks, sneaking up on the







## Side rails get a rope handle



**Get a handle on it.** The side rails are wrapped with hemp cord, essentially transforming them into handles for lifting the table. The handle area of the rail is recessed for the cord at the tablesaw (top right). Pekovich mounts stop blocks on the crosscut sled fence and slides the rail from side to side while slowly advancing the sled. The recesses on the top and bottom are cut at the bandsaw.

shoulder inset until the rail fits snugly in the dry-fitted base. Now you can continue with the rest of the joinery.

The supports are wider than the rails, so register the layout from the bottom edges of the parts. Use a marking gauge to scribe the top and bottom edges of the mortises as well as the tenons, using the same settings to ensure a gap-free fit. One thing to keep in mind when laying out those joints is that an arch will eventually be cut in the rails. So center the mortise on the finished profile, rather than on the square blank. Drill and chop the waste from the mortises and use a handsaw to cut the tenon ends.

### Shaping brings the table to life

Once the joinery is complete, cut the parts to final shape. I cut the arches in the rails using a steady hand at the bandsaw and a quick cleanup with a spokeshave.

Trim the tops of the legs to match the arch, and cove the ends of the supports that extend above the rails. The last step is to angle the ends of the front and rear rail tenons. This slight flair acts as a small corbel and complements the underbevel on the tabletop. It's a subtle detail, but on a quiet piece like this, it has a big effect.

I prefinish the parts with shellac before glue-up. I also take the time to wrap the cord handles at this point. It's much easier now than when everything is together.

### A unique tabletop

On the original table, I simply glued up a top and attached it with screws to the supports. That's a perfectly good solution, but I tried a little different approach this time around. I made the top in halves and joined them to the supports with a dovetailed cleat. Each half has a stopped dovetail slot that slides along the cleat. To keep the halves aligned, I grooved each half where they meet for a full-length spline. Rather than glue the halves together, I pinned them through the spline on both sides of the joint. A light chamfer along the joint highlights the pair of boards.



**Tie up loose ends.** Prefinish the rail before adding the cord. Start by making a few wraps over the end of the cord to secure it in place (1). Make sure the end is on the inside face of the rail, and trim it after four or five wraps. As you near the opposite end, insert a loop of wire under the cord for the last few wraps (2). Trim the end of the cord, leaving an extra 2 in., and feed it through the wire loop. Use a pair of pliers to pull the loop under the wraps to secure the cord (3). Trim off the end between the wraps with a sharp knife.



### Online Extra

To see a simple way to add cord to a project, go to [FineWoodworking.com/263](http://FineWoodworking.com/263).



## A two-part tabletop



**Make way for a spline and dovetail keys.** Start by ripping a groove along the inside edge of each half (above). Then clamp a half to the base and mark for the dovetail socket locations (right).



**Rout the dovetail sockets.** Clamp the top halves together with the mating edges facing out. Use a two-sided edge guide and rout in from each outside edge (above). Set the depth of cut to leave enough material above the spline groove (right).



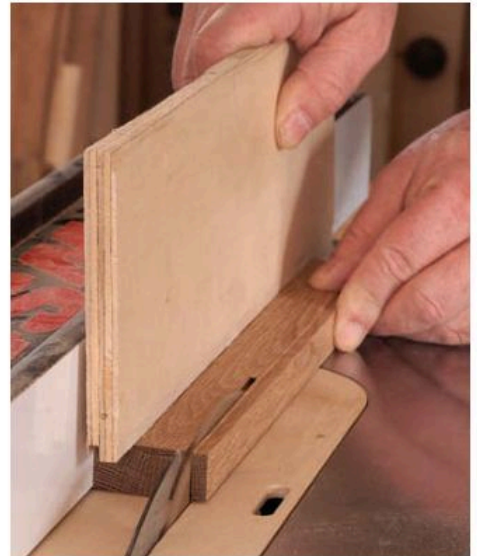
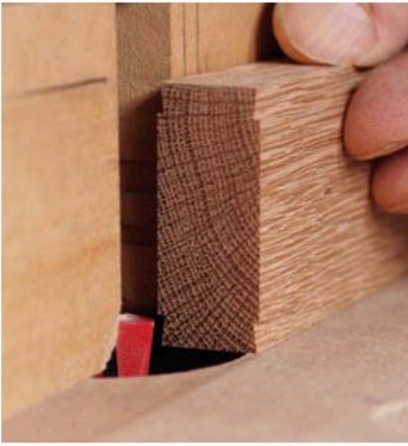
After cutting the spline grooves, clamp the top halves together and rout the dovetail slots at the same time to ensure that they are aligned. With the mating edges facing out, use a two-sided fence to guide the router. This lets you rout safely in from each end, stopping short of the center. Use the same dovetail bit to make the keys at the router table. Rout the profile along the edge of a wide piece of stock. This keeps your fingers away from the bit and makes for less stressful routing. Dial in the width of the key by moving the router fence. Once you get a nice, tight fit, rip the keys off the strip.

To attach the keys, slide them into one of the tabletop halves, and clamp it in place. Then drill and screw the keys to the supports every 3 in. or so. Cut a slight underbevel on the edges of the top, and use a block plane to run a light chamfer along the center joint. Rather than trying to hide the fact that there are two boards, a small shadowline highlights the joint and hides any offset that may occur in the future.

For final assembly, slide the halves onto the cleats, inserting the spline between them, and clamp them lightly together. Then drill through the top and spline on either side of the joint near each end of the top. Drive in pins to lock the top in place without glue. That's one rather involved way to avoid squeeze-out! □

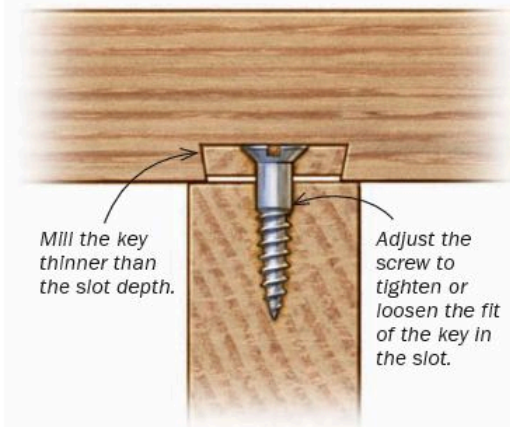
*Michael Pekovich is a furniture maker, instructor, and FWW's executive art director.*





**Make the dovetail keys.** Using the same dovetail bit, rout a dovetail profile on the edges of the key stock (left). Dial in the fit by adjusting the router table fence until the key fits snugly in the slot (center). Finally rip the keys off the stock (right) and plane for a final fit. The finished keys should slide easily in the slot because they can be adjusted for a tighter fit later during assembly.

#### ADJUSTABLE DOVETAIL KEY



**Installing the top.** Clamp one half to the base, slide the keys into place, and screw them to the support rails (above). Tighten or loosen the screws to adjust the fit. Remove the first half to drive the remaining screws, then replace it, insert the spline, and slide the second half of the top in place. Clamp them lightly together and drill and drive in pins through the spline to secure the top (right).





# Add Bushings

These inexpensive accessories increase control and make the router even more versatile

BY JEFF MILLER

Routers are among the most versatile tools in the shop once you learn to control them, and one of the most versatile ways to gain this control is with guide bushings. These surround a router bit and provide a bearing surface that works with all kinds of shopmade templates and commercial jigs, making it easy to cut mortises, tenons, pockets for inlay, dovetails, dadoes, and sliding dovetails. More complex templates can include multiple joints, so you can rout all of the mortises in a chair or bed leg at one time.

The bushing itself is a metal tube attached to a plate. The predominant style of bushing is the one originated by Porter-Cable,





# to Your Router Kit

which can be used in a number of different brands of router. A few companies have base designs that require their own bushings. Some routers allow for adjusting the guide bushings to be sure they are perfectly concentric to the router bits. Mine don't, so I make sure to keep the orientation of the router consistent as I work.

The key to working with guide bushings is understanding the offset between the bushing and the bit. A straight router bit must be smaller than the inside of the bushing. Calculating the difference between the outside diameters of the bit and the bushing and then dividing that number in half gives you the offset. For example, with a 1/2-in. bushing and a 3/8-in. bit, the offset is 1/16 in. Pay attention, though, because in many cases, you need to subtract this offset from both sides of a cut.

## The art of template-making

There are many kinds of templates and many good ways to make them, depending on your tools, the materials you have lying around, and the task at hand.

I'll cover two of my favorite methods in this article. The first method is building up the template from separate pieces of solid wood, glued together and guided by the bushing size. I also sometimes cut slots in plywood or MDF. Because MDF is softer, you may want to toughen up the reference edges by painting them with thin cyanoacrylate glue.

The first step in designing your template is to calculate the offset. Then you'll want to determine the overall size of the template. It needs to be large enough to fully support the router base. Figure in a little

## BUSHING BASICS



**Most bushings need a trim.** For the bushing to work with thin templates, you should saw off some of the excess length. Leave 1/4 in. to 3/8 in. to engage the template.



**Attachment varies by router.** The most common style is the Porter-Cable, which is held in the base of the router or an adapter by a threaded ring (left). Bosch's bushings are even easier to use, dropping into a spring-loaded holder (right).



## Two options for straight bits

Normal straight bits (far left) are less expensive and work fine for most tasks, but I prefer spiral bits. They cut more cleanly, draw chips out of deep mortises, and have bottom cutters that extend to the center point, so they can plunge more easily.

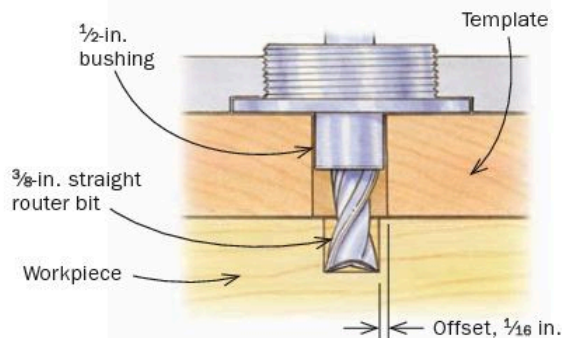
—J.M.



# Fast, accurate mortising

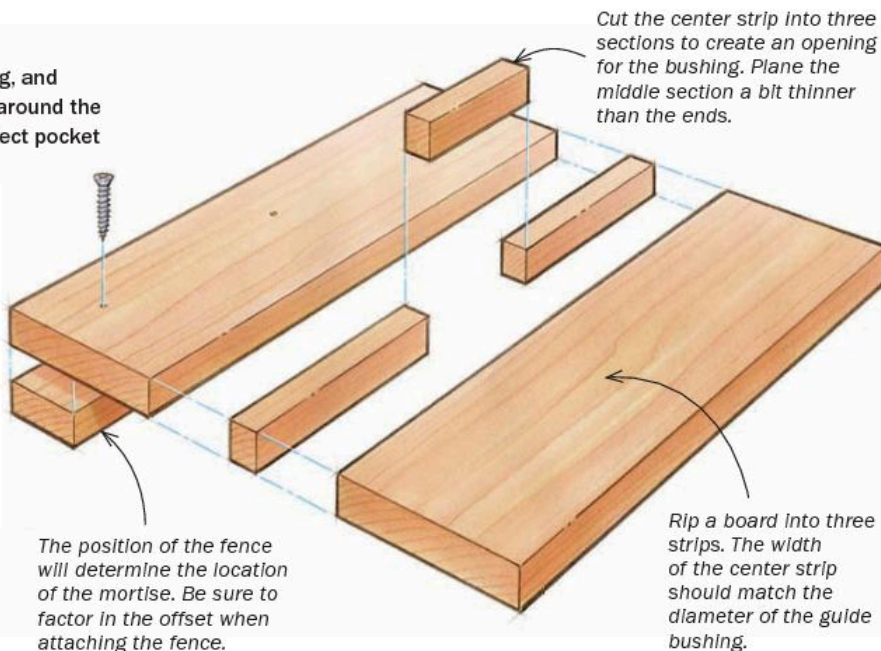
## EASY-TO-MAKE TEMPLATE

Mortising is one of the best tasks for bushing-guided routing, and there are many ways to make a template. This one is built around the bushing from individual pieces of solid wood, leaving a perfect pocket in the middle to guide the bushing.



### FACTOR IN THE OFFSET

The bushing diameter is larger than the bit, so the cut will be offset from the edge of the jig. The difference in diameters divided in half is the offset.



### Build the base.

Rip a strip from the center of a flat board, chop that strip into shorter pieces, and re-assemble the parts to leave a pocket in the middle. The goal is a slot that fits the bushing perfectly, so clamp the parts together to check. Use a spacer when gluing up the base to be sure the pocket is the right length, but don't glue it in.



**Add the fence.** Make the fence wide enough to extend from the edge of the template to the edge of the workpiece (don't forget the offset). Clamp it in place, feeling with your fingers to keep the outside edges flush (left). Then flip it over and drive screws (right).

extra width and/or length so that you can clamp the template to the workpiece without interfering with the router.

### Mortising is job one

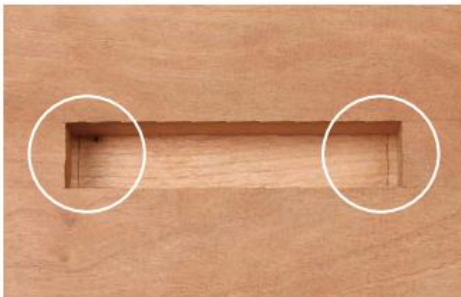
Mortising with a guide bushing is almost foolproof. It's useful if you need to cut mortises in the same location on various workpieces, and it is an excellent option for parts that are oddly shaped, such as chair components. Mortising is also a good way to learn the basics of bushing-guided routing.

I'll start with the mortises in a table leg. In this case I'll build the template from



## MORTISES 101

With the template built, the mortising is almost foolproof. Just take shallow passes and pause to remove the chips.



**Set up for mortising.** Bring the edge of the template to the edge of the workpiece, then extend the bit down to a line that represents the desired mortise depth and lock it there (top). You only have to mark the ends of the mortise to locate the jig accurately on the workpiece (above).

separate solid-wood pieces to show how easy that is. Let's use a  $\frac{3}{8}$ -in. straight bit with a  $\frac{1}{2}$ -in. bushing, a typical combination for mortising, yielding a  $\frac{3}{8}$ -in.-wide mortise at any length you need.

**A template built in pieces**—Start by ripping all the pieces from a single flat board. Rip a  $\frac{1}{2}$ -in. (or slightly wider) strip from the middle, and then plane it to the same size as the bushing. Cut this strip into three pieces, with the center portion  $\frac{1}{8}$  in. longer than the desired mortise to account for the offsets on either end. Plane this middle piece a little thinner; it will be a spacer strip to control the length of the mortise opening in the jig.

Now glue the two big side pieces to the two outer middle strips. Put the thinner middle strip in place, but don't glue it (you might even wax it a little). When the glue



**Mortising tips.** Plunge the router  $\frac{1}{8}$  in. or so between passes. Deeper plunges will cause the bit to wobble slightly and cut an oversize mortise. Also, be sure to keep the router oriented the same way throughout the process. If the bushing is slightly out of line with the bit, the offset will vary when you twist the router, changing the path of the cut.

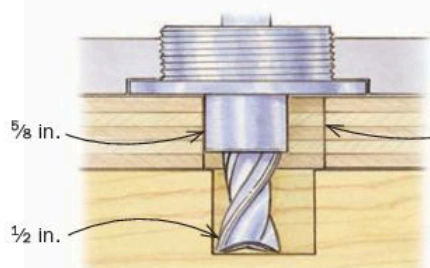


**Keep it clean.** Mortises will become packed with chips, so pause occasionally to vacuum or blow them out. For the final pass, vacuum out the last chips, and clean up the mortise, pushing the bushing along each wall in case there is a little slop in the slot.

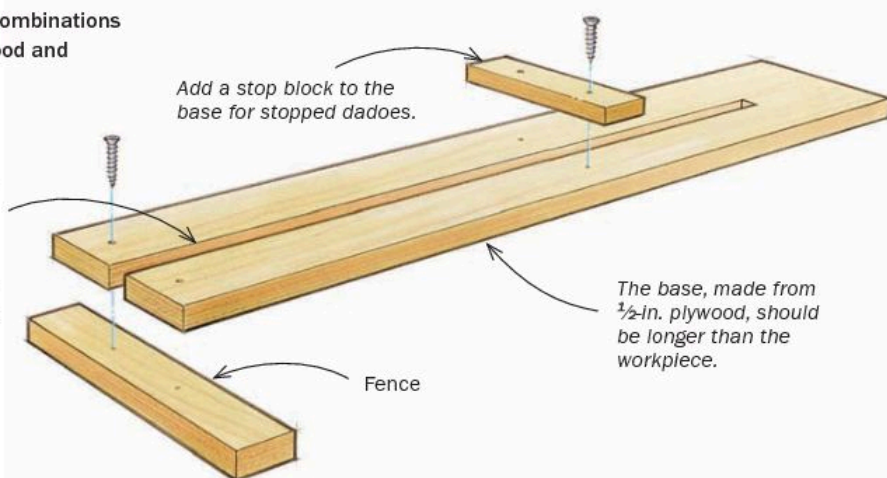


# Jig for dados and dovetails

This template makes flawless dados, sliding dovetails, and combinations of the two. Make it by sawing a partial slot in a piece of plywood and attaching a fence at the open end.



The  $\frac{7}{8}$ -in. slot is wider than the bushing in this case, in order to let a  $\frac{1}{2}$ -in. bit cut a  $\frac{3}{4}$ -in.-wide dado.



## MAKING THE JIG



**Cut the slot and add a fence.** Make long cuts, turning off the saw at the end of each cut, and then remove the waste with a jigsaw. Clamp the fence square to the slot and screw it in place.



**Stops are easy to add.** For stopped dados, screw down a block to stop the router in the right spot.

## ROUT A STOPPED DADO

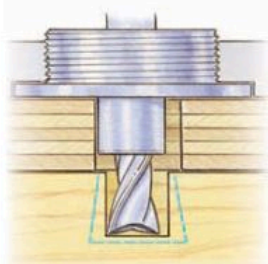


**Up and back.** Use the notch in the fence to line up the jig with your layout marks (above). Push the router up the left side of the jig and then pull it back along the right side to keep the bushing tight to the walls of the slot on both sides (right). Square the ends of a stopped dado with a chisel.





## ROUT A DOVETAIL SLOT



Use a straight bit to remove most of the waste before dovetailing.



**Start with a straight bit and follow with a dovetail.** Plow out a dado just narrower than the narrow part of the dovetail you'll be cutting (above). Follow with the dovetail bit. It helps to have a second router set up with the dovetail bit, so you don't have to change bits and lose your depth settings for each (right).



is set, push the spacer strip out of the jig. Then joint and/or plane the template to make it flat.

Next, attach a fence on the bottom of the template. Account for the bit offset when locating it, and clamp it in place before screwing it down, to keep it from shifting. I don't use glue, so I can re-locate the fence as needed for other mortising jobs.

### Tips for bushing-guided mortising

Clamp the template in place where needed and set the depth limit on the router. You can do this by measuring, or by placing the router on the template so that it hangs over the edge and allows you to set the depth directly from the workpiece.

Take multiple shallow passes and the work will go quickly.

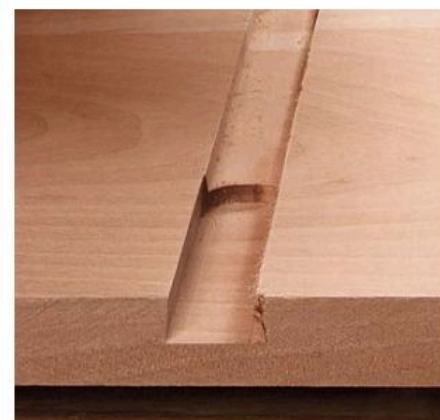
Unless your mortise is quite shallow, you'll soon find that the bit is trapping wood shavings, limiting the router's movement. Stop to clear away the chips with a shop vacuum or a blast of air as needed.

When you get to the bottom of the mortise, clear the chips one more time and make a last clean pass at full depth, pushing gently against all sides of the template opening. Don't lift the router off the template until you've raised the bit up out of the cut and it has come to a complete stop.

Now you can move the template onto any part of your table leg to make identical mortises wherever you need them.



## COMBINE DADOES AND DOVETAILS



**Another handy stop.** After plowing the dado, drop in a strip to set the length of the sliding dovetail (left). This stop goes in and out easily between dadoing and dovetailing. The jig ensures that the sliding dovetail is perfectly centered on the dado, and accurate in length (above).

### Dadoes without do-overs

To cut consistent dadoes without worrying about variations in size or any chance of the bit wandering, I use a two-sided fence that captures the bushing on both sides. This leaves the bit nowhere to go but straight. For this type of template, I usually use a single piece of plywood, making long stopped cuts on the tablesaw until I have the exact width I want (the width

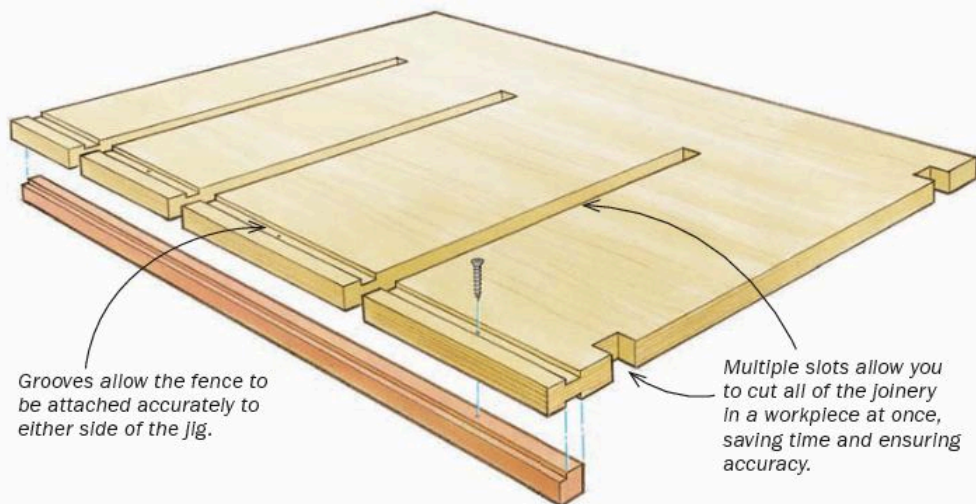
of the desired dado plus the two offsets). Then I cut out the waste piece with a jig-saw. At the stopped end of the slot, I leave enough plywood to keep the whole template stable. At the open end, I screw on a fence, being careful to keep the fence perfectly square to the slot.

The first time you rout a dado with this jig, the router bit will cut into the fence, and that notch will give you an exact



# One jig to do it all

You can combine multiple joints into a single template for anything from a chair leg to an entire case piece. The one shown here is for the sides of a small chest of drawers with three drawer dividers and two rails dovetailed into the top edges.



**Dadoes and dovetails.** This jig lets Miller cut a combination of long, shallow dadoes and short dovetail slots in three different spots on a solid-wood case side.



**Make it reversible.** The fence on this big jig has a shallow tongue that fits into matching grooves on either side, so it can be flipped for two opposite sides of a case.



indication of where to align the jig. Just line up the cut in the fence with your layout marks.

You can add stops anywhere along the opening by screwing down blocks to stop the router base.

The dado jig is perfect for sliding dovetails, too, with the same advantages over a single fence. The dovetail bit will cut more easily and accurately if you first plow out most of the waste with a straight bit. Then switch to the dovetail bit and finish up the cut.

## Multi-joint template tames complex projects

Once you get the hang of working with guide bushings, you'll be able to work out your own ways to take advantage of the accuracy and control they give.

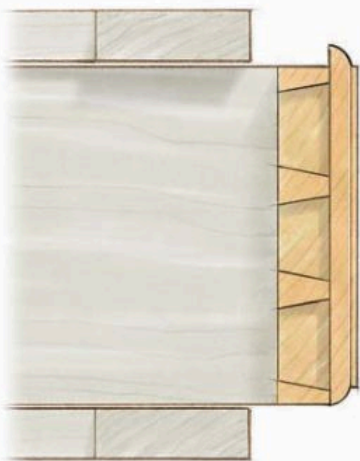
One of my favorite techniques for complex workpieces is to make a large template with multiple joints included in it. This locks in the joint locations. I use these multi-joint templates for the sides of case pieces (for dadoes, sliding dovetails, and half-blind dovetails) and the back legs of chairs (multiple mortises), among other tasks.

Master the basics of guide bushings, and you'll find many other applications for this indispensable router technique. □

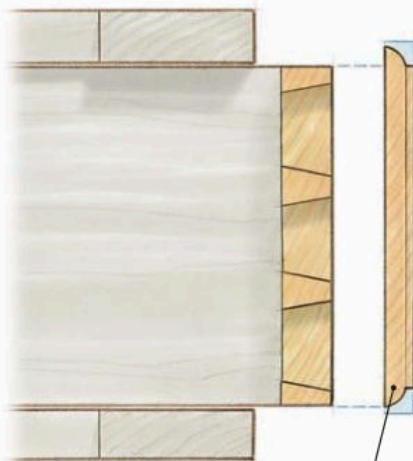
*Jeff Miller builds furniture in his storefront shop in Chicago, and teaches woodworking classes there and around the country.*



# 2 Options for Lipped Drawers



ONE-PIECE FRONT



APPLIED FRONT

## Clever construction tips for both

BY CHRISTIAN BECKSVORT

Lipped, or half-overlay, drawers have a distinct appeal. They are more decorative than flush drawers, with a molded profile on all four edges. And they cover the gaps on the sides and top of the drawer. Just as half-blind dovetails are more involved to make than through-dovetails, so lipped drawers require more work than flush drawers. I'll show you two approaches to this elegant method of drawer construction. In one approach, you make the lip integral to the drawer front. In the other, you create the lip by first building a drawer box, then gluing on a thin, oversize false front.

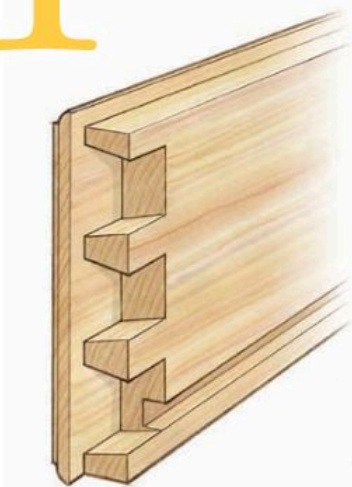
### The more traditional method

Traditionally, lipped drawers were built by first rabbeting and molding the drawer front and then dovetailing the parts. Assuming the drawer front is  $\frac{3}{4}$  in. thick, you would cut  $\frac{1}{2}$ -in.-deep by  $\frac{1}{4}$ -in.-wide rabbets on the two ends and the top. The bottom does not get rabbeted because a lip there would be vulnerable to breaking if the drawer were removed and set down. However, a decorative profile, whether quarter-round or thumbnail, is cut into all four edges. The rabbeted portion of the drawer front should fit tightly into the case opening, just like a flush drawer, with appropriate room at the top to allow for wood movement. As an aside, when making drawers taller than 9 in., the width of the top lip should be increased to cover the greater amount of seasonal wood movement.



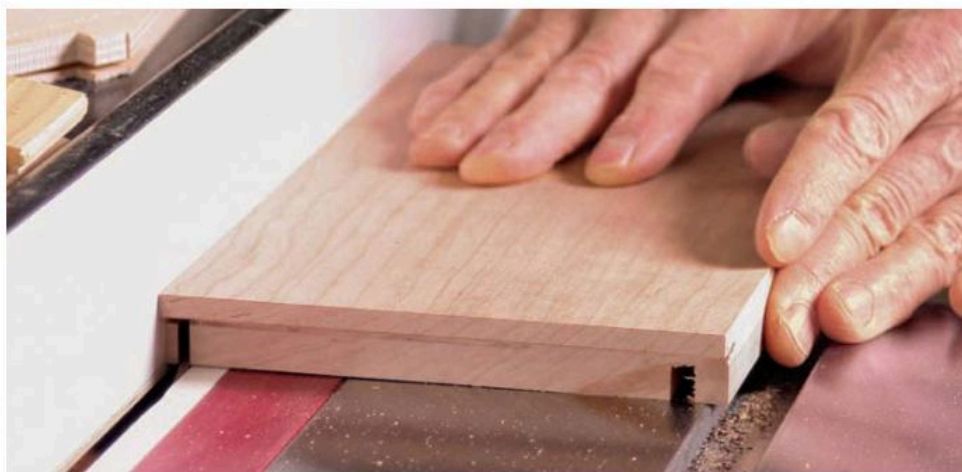


# 1 Solid front



## RABBET AND ROUT THE DRAWER FRONT

**Cut the rabbet.** Two cuts on each end (right) and along the top (below) of the drawer front blank create the rabbet, leaving a lip on three edges.



**Add a profile.** Rout all four sides of the drawer front to create a decorative profile.



After you have cut the rabbets and molded the profiles, the dovetailing can begin. To establish the baseline of the tails, transfer the depth of the rabbet to the drawer side. Then scribe a line representing the thickness of the drawer side onto the inside of the drawer front. Because of the lip, this is difficult to do with a marking gauge and is best done by laying the pieces on each other and using a knife to scribe the lines. Once the tails are laid out, sawn, and chiseled, transfer them to the ends of the drawer fronts. With the end of the drawer side held tightly against the lip, you'll need a very narrow knife to get into the tail cut-outs (see photo, opposite page).

Sawing the pins for these half-blind dovetails is more difficult than with flush drawers, because the lip gets in the way. To avoid sawing into the lip or past the scribe mark, you have to stop after cutting only about a third of the sides of each pin. The rest needs to be chiseled out. To get into the corners, a fishtail chisel comes in really handy. The waste gets wider at the bottom and needs to be split to avoid breaking the top edges of the pins.

When the half-blind dovetails and the back through-dovetails are fitted, the drawer can be glued. Once the glue has



## TAILS FIRST

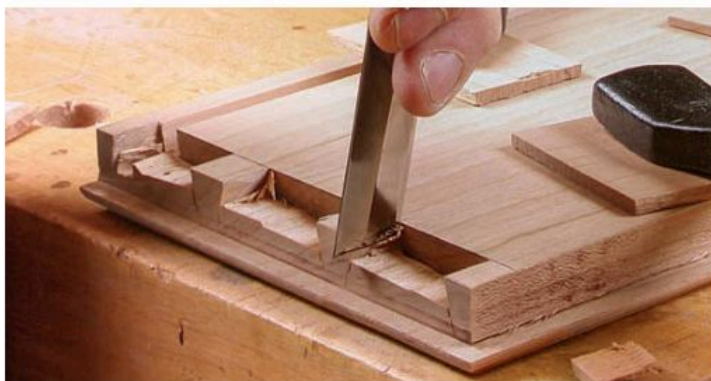


**Accurate transfer is the key.** Transfer the depth of the rabbet to the drawer side (top). Also transfer the side thickness to the inside of the drawer front (above). A marking gauge won't work with the lip in the way, so put the side in place and use a knife to scribe the location.



**Transfer tails to pin board.** Becksvoort uses a spacer in the drawer-bottom groove to align the tail board to the pin board. Slide the tail board up to the lip on the drawer front and scribe the tails onto the pin board.

## PINS ARE A LITTLE TRICKY



**Lip gets in the way.** You can saw only about a third of the side of each pin before you saw into the lip. You'll have to chisel the rest.



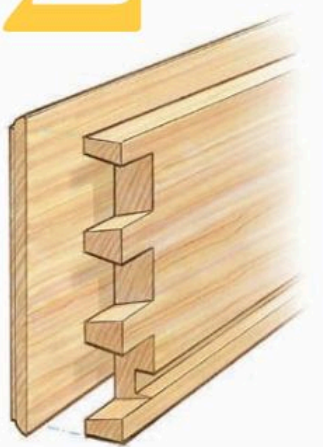
**Getting at the rest of the pins.** As with regular half-blind dovetails, chisel in from three angles: Chop to the scribe line, pare to the sides, and clean out between the pins to the level of the lip. To get into the corners, a fishtail chisel is really handy.

**Tricky trimming.** Neither plane nor sander can trim the pins while leaving the lip intact. Instead, pare them flush with a chisel. A cranked neck or offset chisel is best (below), or you can use a regular chisel with the bevel side down.





## 2 Applied front creates the lip



### APPLY THE FALSE FRONT



**Make it oversize.** After building a drawer box with through-dovetails, glue on an oversize false front, matching it to the drawer-front wood.

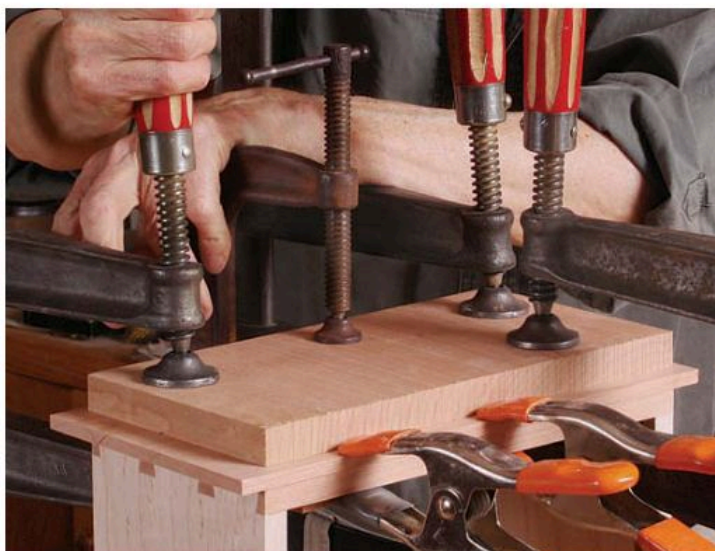
dried, the pins must be trimmed flush. This is the trickiest part of the procedure, since neither plane nor sander can trim the pins while leaving the lip intact. Even a bullnose plane is not the answer because the lip is quite fragile. The time-honored method is to pare the pins with a chisel. A cranked neck or offset chisel is best, although you can carefully pare using a regular chisel with the bevel side down.

### An applied front

The second method for making a lipped drawer is simply to apply a thin, oversize false front to the completed drawer. The drawer box, made from 1/2-in.-thick parts, is fitted to the opening the same way you'd fit a flush drawer (tight or slightly oversize on the sides, with the appropriate gap at the top). You can use secondary wood for



**Position the applied front.** Center the applied front left to right on the drawer box. Use spring clamps to hold the front so that it only slightly overhangs the drawer bottom.



**Clamp it down.** Use a caul on top of the applied front so you don't mar it, and tighten the clamps lightly.



**Remove the spring clamps.** When the bigger clamps are holding the front in place, take away the spring clamps, add more big clamps, and tighten it all down.



## TRIM TO SIZE AND ROUT THE PROFILE

**The front is flush on the bottom.** Use a block plane to flush the bottom of the applied front to the bottom of the drawer box.



the sides and back; the front needs to be primary wood. You'll make all four corners as through-dovetails, so use the marking gauge to scribe the corners, and make the drawer. What could be easier? Fitting the drawer is the best part; the plane or sander glides right over all four sides.

Once the drawer box is fitted, mill the wood for the false front to  $\frac{1}{4}$  in. thick and make it a good bit more than  $\frac{1}{2}$  in. wider and  $\frac{1}{4}$  in. taller than the drawer box. Now carefully glue on the false front, reducing the amount of glue along the edges to avoid squeeze-out. Use tape or spring clamps to align the false front, and use a thick scrap, about the size of the drawer front, as a caul to prevent clamp marks. Clamp it up and allow it to dry.

Then flush the bottom of the front to the bottom of the drawer box. Trim the top and side lips to final size. And finally, rout a quarter round or thumbnail profile into all four edges (sides first, then the top and bottom). You now have a lipped drawer that required much less work than the traditional method. □

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



**Cut it to size.** On the tablesaw with the bottom of the drawer front against the fence, rip the top lip to size (above). Then crosscut the two side lips to size (left).



**Add the profile.** On the router table, profile the perimeter of the newly applied front.









# Wall Cabinet with Curves

A combination of old techniques and new machinery makes working with curves less painful

BY CLARK KELLOGG

This cabinet was my first big project as a student in the Fine Woodworking program at the College of the Redwoods. My inspiration was a cabinet-on-stand made by James Krenov, which I was fortunate to see in person. Although the cabinet is modest in size, I was struck by its subtle details, flawless proportions, and balanced exploration of form: a restrained exterior matched with a playfully arranged interior. So, when I was told to build something “small, simple, solid, and sweet,” I built this little wall-hung cabinet, which I hope captures what I admired in Krenov’s cabinet but expresses it in a slightly different manner.

There are a few elements of this cabinet that seem tricky—curved doors, tapered dividers, and an intricate frame-and-panel back—but building it is fairly straightforward. The carcass is joined with slip tenons, and the back is made with bridle joints and slip tenons. The doors, which are made from slabs of solid wood, have a subtle curve created with handplanes. A matching curve is cut into the cabinet’s top and bottom.

## Use planes to curve the doors

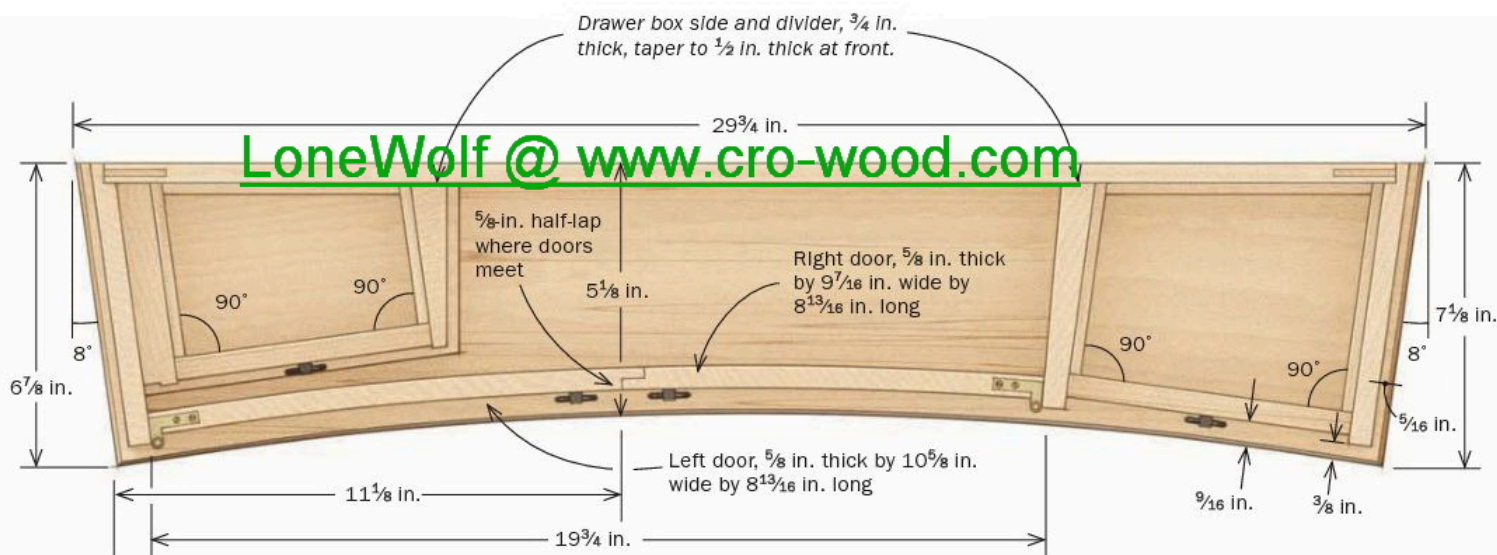
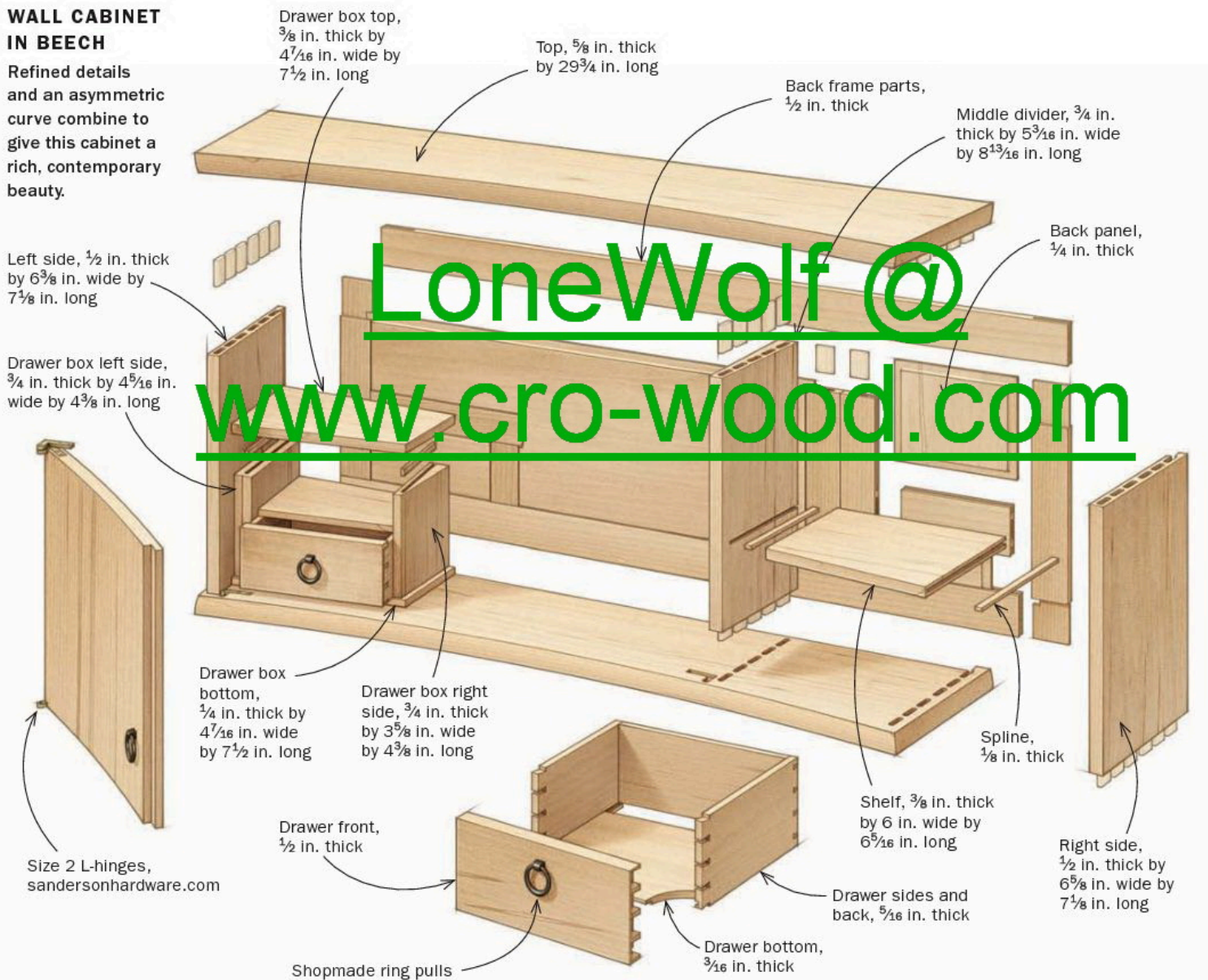
I began with the doors rather than the cabinet, and there’s a good reason for it. It’s much easier to adjust the curve on the front edge of the cabinet’s top and bottom to match the doors than it would be to adjust the doors to match the cabinet.

The doors are made from solid wood, and because they are wider than they are tall, you might think that they could warp into pretzels or expand to the point of locking themselves shut. But don’t worry. They’re made from quartersawn boards (riftsawn works, too), so there’s very little seasonal movement. Also, the doors are fully inset into the cabinet, which means that they don’t need to lie flat against a frame. And the little warping that will occur won’t be noticeable because both the front and back faces of the doors are curved.



## WALL CABINET IN BEECH

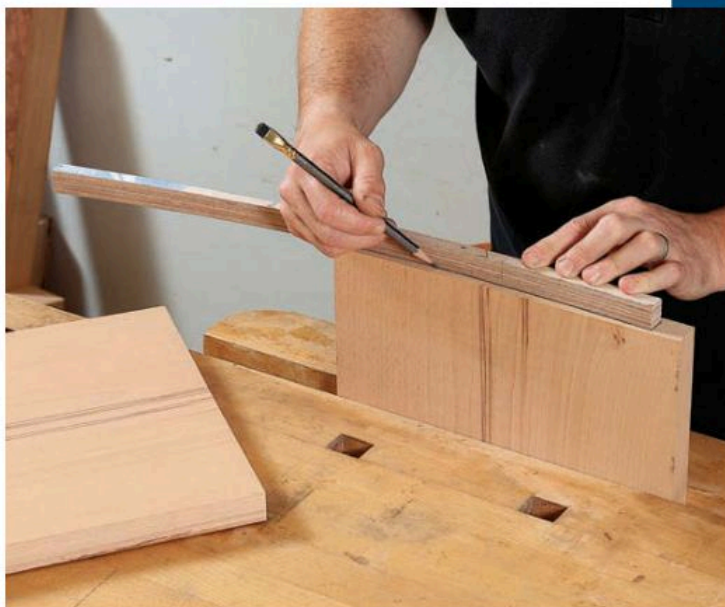
Refined details  
and an asymmetric  
curve combine to  
give this cabinet a  
rich, contemporary  
beauty.





## MAKE THE DOORS FIRST

It's far less work to adjust the curve on the cabinet's top and bottom to match the doors than it would be to adjust the doors to match the cabinet.



**Use a template for the curve.** Trace it onto both ends of the door blank. Because it changes radius over its length, Kellogg uses a complete template of the curve. The other half is for the second door.



**Hollow the front.** With the help of a coopering plane, dish out the door's outside face, working with the grain.

To begin making the doors, create a full-size pattern. Next, mill two door blanks, leaving them about  $\frac{1}{4}$  in. longer than their final dimension, and a bit wider, too.

Plane the front of the first door to create its concave curve. I use a shopmade coopering plane for this (see *Handwork*, p. 24). Work your way across the door's face, checking your progress against the curve drawn on the end grain. Keep an eye on the door's thickness at the top and bottom to keep it consistent. When you plane the second door, check it against the first door to ensure that the transition from one to the other is smooth. Don't worry too much if the curve is not perfect. As long as it's a gentle, fair curve, they'll look great.

After the fronts of the doors are complete, flip them over and shape the backs. Because the curve is convex, the shaping can be done with any normal bench plane. As the blanks start to get thinner, you may need to make some curved supports to keep the doors from flexing as you plane them.

Next, cut the rabbets on the doors. You will need to prop up the doors as you run them across the router table to accommodate their respective curves. Sneak up on the fit, sliding the doors together after each pass. The rabbets should overlap so that there is no break in the curve as it travels from one door to the other.



**Curve the back.** Working with a coopering plane, cut across the grain first to remove material quickly (shown), then use a flat-sole plane along the grain to refine the door's shape.

### Build the cabinet around the doors

The cabinet's top and bottom are curved along their front edges. The drawer box side and middle divider are tapered in thickness, being thicker at the back of the cabinet than at the front. This allows them to be parallel to the ends of the top and bottom on the outside face, but square to the back on the inside face. The joinery that holds the case and drawer box together is cut before these parts are shaped, which makes the construction far simpler than if the joints were cut afterward.

Mill the parts to their final dimension, leaving the top and bottom long, and the sides about  $\frac{1}{8}$  in. wider than their final width. Next, lay out the mortise locations on the sides and divider. Because I



**Doors meet with a rabbet.** One door gets a rabbet on its front, the other on its back. Use a block to raise the door so that the rabbet is square to the door's edge.



## SLIP TENONS JOIN THE CASE

Plenty strong enough for this wall cabinet, slip tenons also make it easy to join sides to an overhanging top and bottom.



**Mortise the sides.** Kellogg uses a Festool Domino joiner, which speeds up and simplifies the joinery. A doweling jig and dowels can be used instead of Dominoes.



**Use the side as a guide.** Place the side down parallel, but inset from, its location in the assembled cabinet (above). After clamping it down, use it as a fence for the Domino joiner, aligning the tool with the layout lines on the cabinet side to create mating mortises (right).



used a Domino joiner to cut the mortises for this project, I marked only the centerline for each mortise. I marked the centerlines on the end grain and then transferred them to the panel's face. After cutting the mortises, assemble the case dry, using a few slip tenons per joint.

### Fit the doors

The doors swing on offset knife hinges (L-hinges, size 2, sandersonhardware.com), and the space between the hinges and the cabinet sides is extremely narrow, the thickness of a piece of blue tape. So, put a piece of tape on the cabinet side. The center of the hinge pin should line up with the front edge of the cabinet side.

When you have the hinge leaf in place, scribe around it with a knife. Repeat for the other three hinges. Disassemble the cabinet and rout away the waste freehand, using a trim router and  $\frac{1}{8}$ -in.

straight bit. Set the depth of cut so the hinges sit about  $\frac{1}{32}$  in. below the surface to allow for planing or sanding the surface. Carefully pare to the scribe lines with a sharp chisel.

Next, reassemble the case (still without glue). Plane the doors to fit. Remove material from the top, bottom, and outside edges, but not from the inside edge. Across their width, they should just fit inside the case. Mortise the hinges into the top and bottom of each door. After transferring the mortise location from the cabinet to the door, rout and pare the mortises in the same manner as before.

After the doors are swinging and the rabbets are overlapping correctly, clamp a pair of sticks inside the cabinet to act as stops. Then, with the doors closed, trace a line  $\frac{1}{2}$  in. offset and parallel to the doors' curve onto the carcass top and bottom. Because the curve of the two doors may differ from your original drawing, it is better to adapt the shape of the cabinet to the doors you have

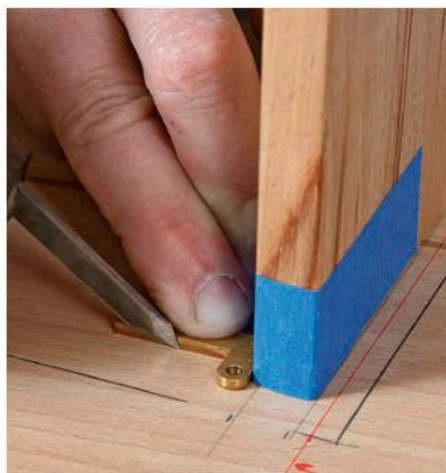


## THE DOORS SWING ON KNIFE HINGES

Barely visible when installed, knife hinges are perfect for a cabinet with modern lines. Use offset, or L-shape, hinges so that the inset door swings open as far as possible.



**Locate the hinge.** Blue tape on the cabinet creates a perfect gap, while a combination square ensures that all the hinges are in the same plane.



**Knife the layout.** Holding the leaf in place with a finger, cut around the perimeter to define the mortise.



**Pare to fit.** After routing out the waste, use a chisel to clean up to the layout lines.



**Mortise the door.** Locate the door in the cabinet. Clamp scraps in the cabinet to keep it in place (left). Slide the door over and transfer the mortise (center). Hold the hinge in place and cut around it (right).

made, rather than trying to go back and re-shape the doors. Band-saw and spokeshave the case pieces to shape. I use a spokeshave to give the edges a slightly elliptical profile.

Now it's time to taper the right-hand face of the middle divider. I scribe a line on the front edge of the divider marking its final thickness, and then use a handplane to remove the waste. Work back and forth across the grain, taking more shavings where it's thinner, until the divider is tapered to its final dimensions.

### Make a drawer pocket, then assemble the case

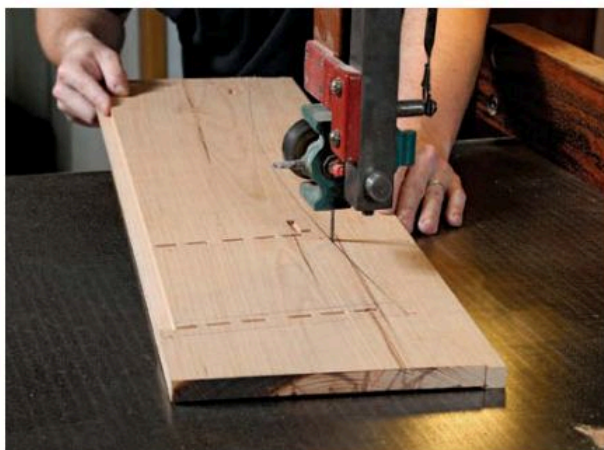
The shelf that serves as the top of the right-hand drawer pocket is held in place with splines, which means that the middle divider, the case side, and the shelf need dados. I start with the stopped dados in the case parts, using a straightedge clamped to the workpiece to guide a small router that's spinning a  $\frac{1}{8}$ -in.-dia. spiral bit.



## COMPLETE THE CASE

The curve along the front edge of the cabinet should match the arc of the doors, so take care when cleaning up after cutting the curve at the bandsaw.

**Cut out the top and bottom.** Do the curve along the front edge first, staying close to the layout line (left), then cut both ends (right). There is no need to do this at the tablesaw because the cut will be cleaned up in the next step.



Next up are the grooves in the shelf. It's important that the shelf fits without gaps between the case side and middle divider, so cut it a bit long and then sneak up on the fit, using a shooting board and block plane to carefully trim the length until it just slides into place. After the shelf has been fitted, rout grooves in the ends using the same  $\frac{1}{8}$ -in.-dia. bit used to rout the dados.

I do this at the router table, standing the shelf on end and pressed against the fence. Next, mill up some  $\frac{1}{8}$ -in.-thick spline stock using the same material you used for the cabinet. Note that the grain of the splines runs parallel to the grain of the shelf. This may seem counter intuitive, as you will end up with splines that are  $\frac{1}{4}$  in. long by 6 in. wide; however, if you were to run the grain lengthwise you would run into serious wood movement issues.

Now cut the rabbets that will accept the back panel. I use a rabbeting bit in the router table, then cut the top and bottom to length, and do any shaping and smoothing necessary. I also pre-finish all the parts—once the case goes together, getting a nice finish in the corners is tricky.

When gluing up the cabinet, use clamping cauls to distribute pressure evenly across its depth. After the glue is dry, use a chisel to square up the stopped ends of the rabbets in the cabinet.

### Elegant back encloses the cabinet

The frame-and-panel back has an outer frame held together with bridle joints and inner frame members joined to it with slip tenons. I cut the bridle joints on the band-



**Take a spokeshave to the edge.** It's a quick way to remove the machine marks, refine the curve, and create the edge profile. Do the same for the end grain.

saw and with a crosscut sled on the table-saw. Make the frame about  $\frac{1}{16}$  in. oversize in total height and width. The internal frame members are joined with Dominoes.

Next, shape the end of the short horizontal frame piece to match the profile on the outside of the cabinet. I used a block plane, but a disk sander would also work. Disassemble the frame and cut the grooves for the panels into the frame pieces with a  $\frac{1}{8}$ -in. three-wing slot-cutter (Whiteside Machine Co., No. 1906) on the router table.

Reassemble the frame and trace the inside of each section (there should be four) on a piece of  $\frac{1}{4}$ -in.-thick solid stock. Remove the frame and draw a new set of lines outside the traced lines, offset exactly  $\frac{3}{16}$  in. Cut out the panels. Next, use a straight bit to rabbet the panels. Again, sneak up on the fit—you don't want the panel to crack the frame, but you don't want it to rattle around, either.

Cutting the rabbet on the notched section of the larger panel can get a little tricky, because you need to replace your





**Spline joins the shelf and cabinet.** The side needs a dado. Cut it with a router guided by a straightedge (top). Use the same bit at the router table to rout a groove in the shelf's end grain (center). The grain of the spline should run in the same direction as the grain of the shelf to prevent problems from wood movement (bottom).

normal fence with one that comes to a point so that you can get into the tight corners. However, because the bit won't get all the way into the corner, you will need to use chisels to square up the round left by the router bit. Do your best to maintain the rabbet's radiused corner. Reassemble the frame and install the panels to check how everything fits, then smooth and pre-finish the panels before gluing up the assembly.

Once the glue has dried, plane or sand the joints of the frame flush, and use a

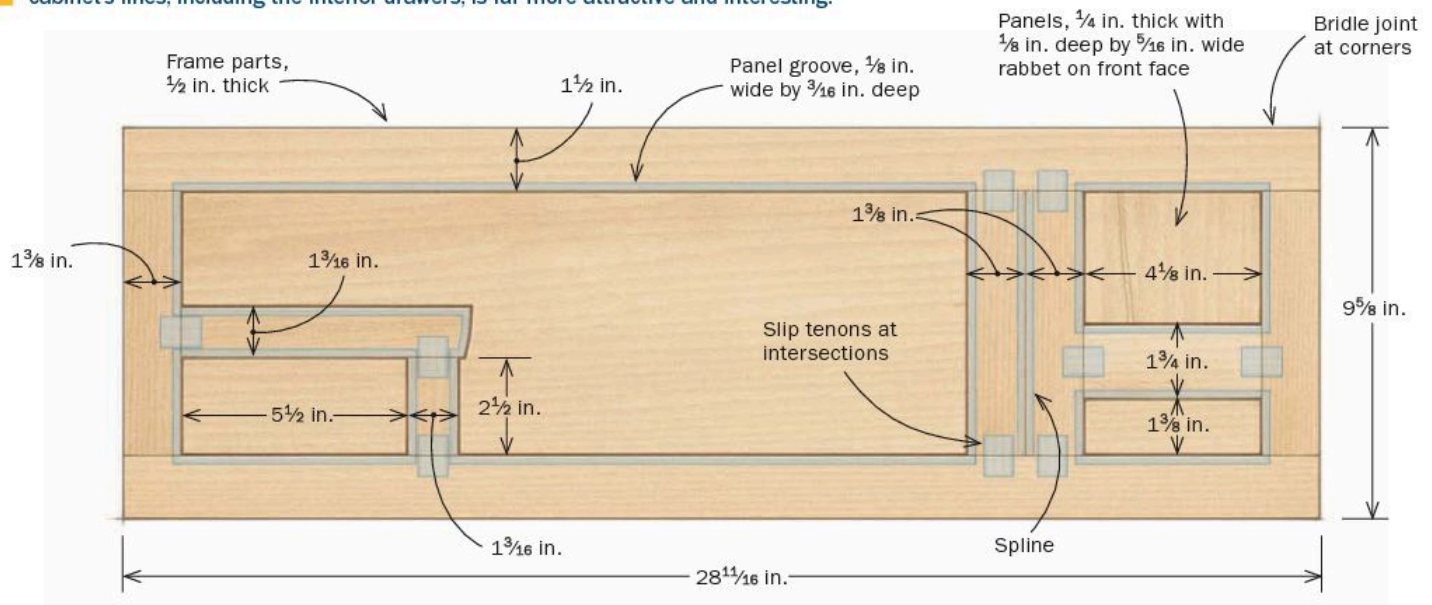


**Glue up the case.** Glue the sides and middle divider into the bottom, then add the top. After gluing the splines into the shelf, spread glue in the dados and push in the shelf from behind.

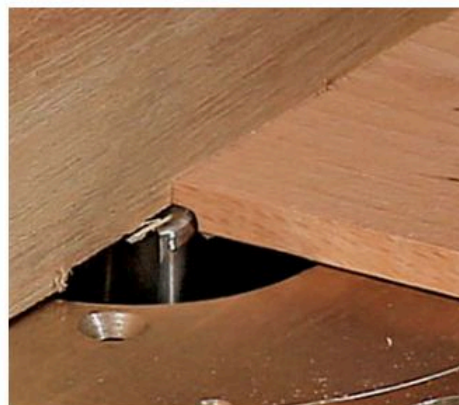
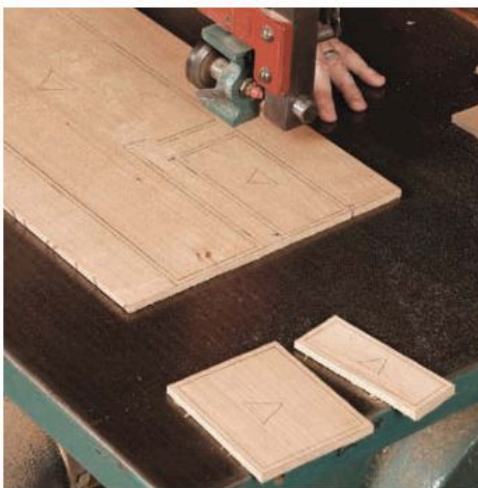


## FRAMED WITH A FLOURISH

Sure, you could use a simple frame-and-panel back, but making one that follows the cabinet's lines, including the interior drawers, is far more attractive and interesting.



**Trace the frame.** Assemble the frame dry and lay it down (front face up) on an oversize blank. Transfer all of the inside edges to the blank. Then lay out offset lines to account for the tongues that fit into the frame groove.



**Cut out the panels and rabbet the edges.** Cut out the individual panels at the bandsaw. Kellogg uses a straight bit to create a rabbet with a soft corner. A pointy fence gets into the tight corner. The fence's point is offset from the bit's outside edge.







**Three parts at once.** Join the two small frame parts, and then hold them in place beneath the panel. Slide the panel into the groove, guiding the slip tenon on the small rail into its mating mortise (top). The last panel fits in from the side (above). Finally, glue the last frame part in place (right).

block plane to begin fitting the frame to the back rabbet.

If the cabinet or frame is out of square, plane the frame to fit by starting in one corner of the frame, then working out along the two adjacent edges until the corner of the back panel fits into its respective corner of the rabbet. Next, plane the remaining two edges to fit. The fit of the back panel should be snug, but not overly tight. You really don't want to break your cabinet apart at this point (or at any other point, for that matter.)

Next, sand and finish the frame, then glue the back panel assembly into the case. You don't need much glue, or much pressure on the panel, and you don't want to damage the profiled front edges of the cabinet. Wooden cam clamps, with their moderate grip and forgiving jaws, work great for this job. □

*Clark Kellogg is a professional furniture maker in Houston, Texas.*







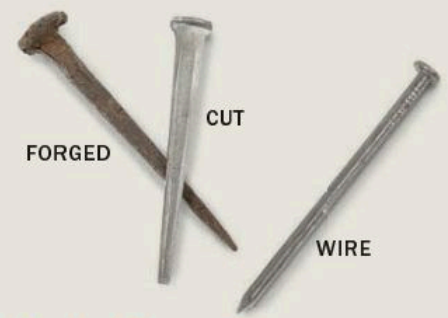
# Furniture, Nailed

Old-fashioned cut nails make furniture that's strong, stylish, and a pleasure to build

BY ANDREW HUNTER

For me, joinery is right at the heart of furniture making. The type of joinery I choose determines not only the strength and appearance of a piece, but also the satisfaction I find in building it. And I like exploring all sorts of joinery. I often use traditional Chinese joints, which are beautiful and intricate and demand tight tolerances and extreme patience. But I'm also drawn to building with cut nails. I love the freedom and speed of working with nailed joinery, the great strength this time-tested approach delivers, and the





## Nails through the years

**F**rom the time of Tutankhamun to Thomas Jefferson, all nails were hand forged, hammered out one at a time by blacksmiths. They were so precious that when a house burned down, the nails were salvaged. Forged nails were made from wrought-iron rod and their shanks tapered on all four sides to a point.

Then came cut nails, developed at the dawn of the 19th century. They were sheared by machine from sheets of iron and could be made quickly in large numbers. The same machine that sliced the tapered nail from the sheet also whacked the wide end of the nail to create the head. Economical and effective, cut nails soon displaced forged ones.

But by the late 1800s, wire nails appeared and almost immediately eclipsed cut nails. Wire nails, clipped from a spool of steel wire, suddenly made nails dirt cheap. They may have been somewhat less effective and aesthetic than cut nails, but no one seemed to notice.

rustic beauty of exposed iron nail heads against a gleaming, hand-planed wood surface. While complex joinery is always respected, using nails for furniture making got a bad rap somewhere along the line. We need to change that! In this article, I'll lay out what you need to know to get started working with cut nails.

### Why cut nails?

When using nails in my furniture, I choose cut nails. They come in a wide array of interesting head shapes, and they easily

outperform wire nails. Their square tips cut through the wood instead of wedging it apart like the pointed tip of a wire nail. This reduces the risk of splitting. And the shanks of cut nails are tapered in one dimension—which you align with the grain—producing better grip. As cut nails puncture the wood, their taper bends the cut wood fibers like so many tiny fish hooks, locking the nail in place. As a bonus, the distinctive heads of cut nails add a historic character even to modern designs.

### Driving lessons

We've all been hammering wire nails successfully since we were little, but driving cut nails properly for fine furniture might require some retraining. The most important difference is that before you drive a cut nail you need to align it with the grain of the wood. The tapered dimension of the shank should be parallel with the grain of the top board. That way, the wedging action is exerted against end grain, which can take substantial pressure without splitting. It's also best to pre-drill for cut nails,



## HOW TO DRIVE A CUT NAIL

Cut nails are a different beast. Yes, you whack them with a hammer like ordinary wire nails, but all sorts of special tactics apply.

### How much nail?

Hunter selects a cut nail long enough so two-thirds of it protrudes from the top board.

### Align the taper with the grain

To avoid splitting the top board, turn the cut nail so that its wider, wedged face is parallel with the grain.

### Well set

To set the cut nail's head just below flush, Hunter makes the last few hammer blows with the slightly convex face of his double-ended hammer.

### Drill before driving

Especially when nailing near the end of a board, drill pilot holes to prevent splitting. Select a bit whose diameter equals the thickness of the nail shaft's narrow, untapered side.

### You can steer while driving

If the nail twists as you drive it in, use pliers to bring its wide face back into alignment with the grain.

### Water does wonders

You can bring a shallow ding back to the surface by dabbing it with a wet rag.

## The skinny on cut nails

There's just one company left in the United States that makes cut nails, and that's the Tremont Nail Co. in Mansfield, Mass. Founded in 1819, the firm was among the first anywhere to produce cut nails, and they make them now with machines they've been using since the 1860s. Tremont's cut nails come in dozens of sizes and styles. Some, such as flooring nails and masonry nails, are hardened, but most are made from softer lower-carbon steel, which makes them suitable for clinching. The many head shapes offer

options for aesthetic expression. Rose-head nails have a dome surrounded by a small flat fringe. Hinge nails have a head large enough that you can create your own shape by grinding and filing. Clout nails, with their large, flat heads, provide extra purchase when joining thin boards. Fine finish nails have the most discreet head. And forged-head nails replicate earlier wrought nails.

### Online Extra

Head on over to [FineWoodworking.com/263](http://FineWoodworking.com/263) to get a 360° view of the Tremont Nail Co. factory.



FLOORING

ROSE HEAD

HINGE

CLOUT

FINE FINISH

FORGED HEAD



using a bit sized to the nail shank's untapered dimension. Not only does this help prevent splitting, especially when nailing close to the end of a board, but it also helps you drive the nail straight.

I swing the hammer differently when nailing furniture. Rather than using a wrist action as with carpentry, swinging the hammer in an arc, I involve more of my arm in the swing and aim for an action that takes the hammer head nearly straight up and down over the nail. I also use a Japanese hammer. It has a flat striking surface on one end of the head and a crowned striking surface on the other end. I use the flat side to drive the nail, since it gives me more control. When the nail is nearly home, I switch to the crowned surface, allowing me to drive the nail slightly below the surface of the wood without damaging the surrounding material.

For nailed furniture I often use white pine, which is historically appropriate, a breeze to work, and simply beautiful with cut nails. To keep it beautiful I wipe my hands often as I work so the iron in the nails reacting with the oils in my skin doesn't stain the wood; you could also wear thin cotton gloves to keep things clean.

Proper support of the workpiece is critical when nailing. Whenever possible I align the work so that the force of the hammer blow is directly over a leg of my workbench. If I'm nailing up a large cabinet, I'll lay it down on the bench or on horses and push it up against a wall, using the wall to back up the hammer blows.

If I have a number of nails to drive across a single joint, I tap the nails at each end partway in before driving home the rest. This prevents the workpieces from shifting as I drive the nails. Sometimes I glue and nail a joint. If so, I'll glue it first and do the nailing after the glue has dried.

### Nail joint strategies

Just like glue, nails hold best in face grain. If all you have is end grain to nail into, you can add boards that offer face-grain nailing. If you do so, it may still be worth driving a few nails into the end grain; they will add some strength to the joint and through triangulation with the other nails provide racking resistance.

## GRAPPLING WITH END GRAIN

End-grain nailing is inherently weak, but there are various ways to avoid or augment it.



**Employ corner blocks.** When building boxes, one way to avoid end-grain nailing is by adding interior corner blocks to provide face-grain surfaces.



**Battens for side grain.** Battens added to the end panels provide side-grain nailing. For extra grip, he also drove some nails into the end grain.



**Squeeze me.** If you need to nail close to the end of a board, applying clamp pressure while you nail can help avoid splitting.



**Trim after nailing.** To keep from splitting a top board when nailing near its end, leave it overlong and trim it afterward.



## THE SINGLE CLINCH

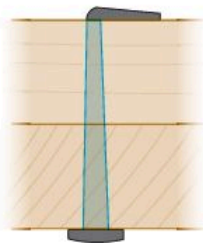
When face-nailing two thin boards, you can maximize strength by driving a long nail through both boards and clinching its end.



**Start the clinch.** Hammer extralong nails through both workpieces and into a sacrificial backer board below.

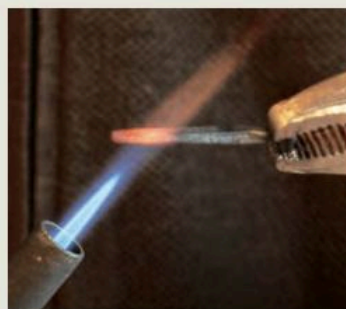
### Clinch time.

After flipping the workpiece and prying off the backer board, hammer over the tips to create the clinched joint.



### Cinch the clinch.

If necessary, Hunter tightens the clinched nails by resting the bent tip on an anvil and hammering on the head.



### Fired up

Most cut nails are soft enough for clinching. If yours aren't, you can quickly anneal their tips with a baptism in a gas flame. Let them cool slowly; quenching them in water will reharden them.

In situations where you must rely on end-grain nailing alone—as with shelves nailed through a case side—it's best to house the shelf in a dado for extra support, and to drive the nails in at opposing angles to resist withdrawal. You can also add great rigidity to such a case piece by nailing on the back boards.

Clinch nailing is used to secure two face-nailed boards as tightly as possible. Select a nail long enough to go through both boards and protrude about  $\frac{1}{4}$  in. If the nail is too long, snip it with linesman pliers. Using a backer board, predrill through the top board, and drive the nails all the way. Then pry off the backer board and hammer the protruding tips over. For a cleaner look, try a double bend. Using slightly longer nails, drive them in and pry off the backer board as before. Next, use pliers to bend the very tips at  $90^\circ$ . Then clinch the nails, burying the tips below the surface.

When it comes to cross-grain joinery, nails are more forgiving than glue, allowing the wood to give slightly under the pressure of seasonal movement. For joining wide boards across the grain, however, you might enlarge your predrilled holes. Alternately, you can reduce movement issues by using multiple narrow boards instead of a single wide board or glued-up panel.

Hardware can be attached with nails, and if possible I clinch the nails. Not only is clinching extremely strong, but the nails can always be tightened in the future if necessary. If it's not possible to clinch-nail the hardware, I angle the nails slightly in different directions to make pulling them out together nearly impossible. When I use this technique, I pre-bend the heads of the nails so that they sit flat when driven home against the hardware. □

*Andrew Hunter builds furniture in Accord, N.Y.*

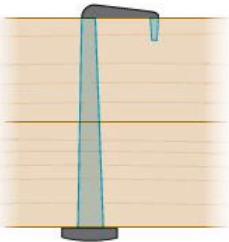


## THE DOUBLE CLINCH

For a cleaner-looking clinch, add a second bend.



**Bend the tip.** After driving the nail, bend a short section at the very tip with pliers (above). Hammer the protruding portion down until the bent tip punctures the surface (right), then hammer the whole thing flush.

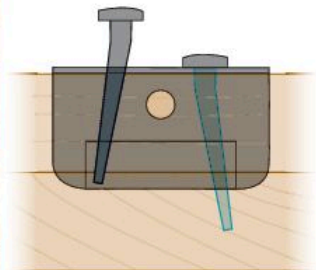


## A NAILED HINGE

Bend the heads and angle the nails.



**Angle power.** When nailing hardware, Hunter drives the nails in at contrasting angles for extra resistance to pulling out. Before driving a nail he cocks the head (above) so it will lie flat when driven home against the hardware. For maximum strength, hinges can be clinch nailed.



## Nail salon

Hunter often touches up the heads of cut nails with a grinding wheel and a file. Then he darkens them with a torch and finishes them, after cooling, with a dab of tung oil.

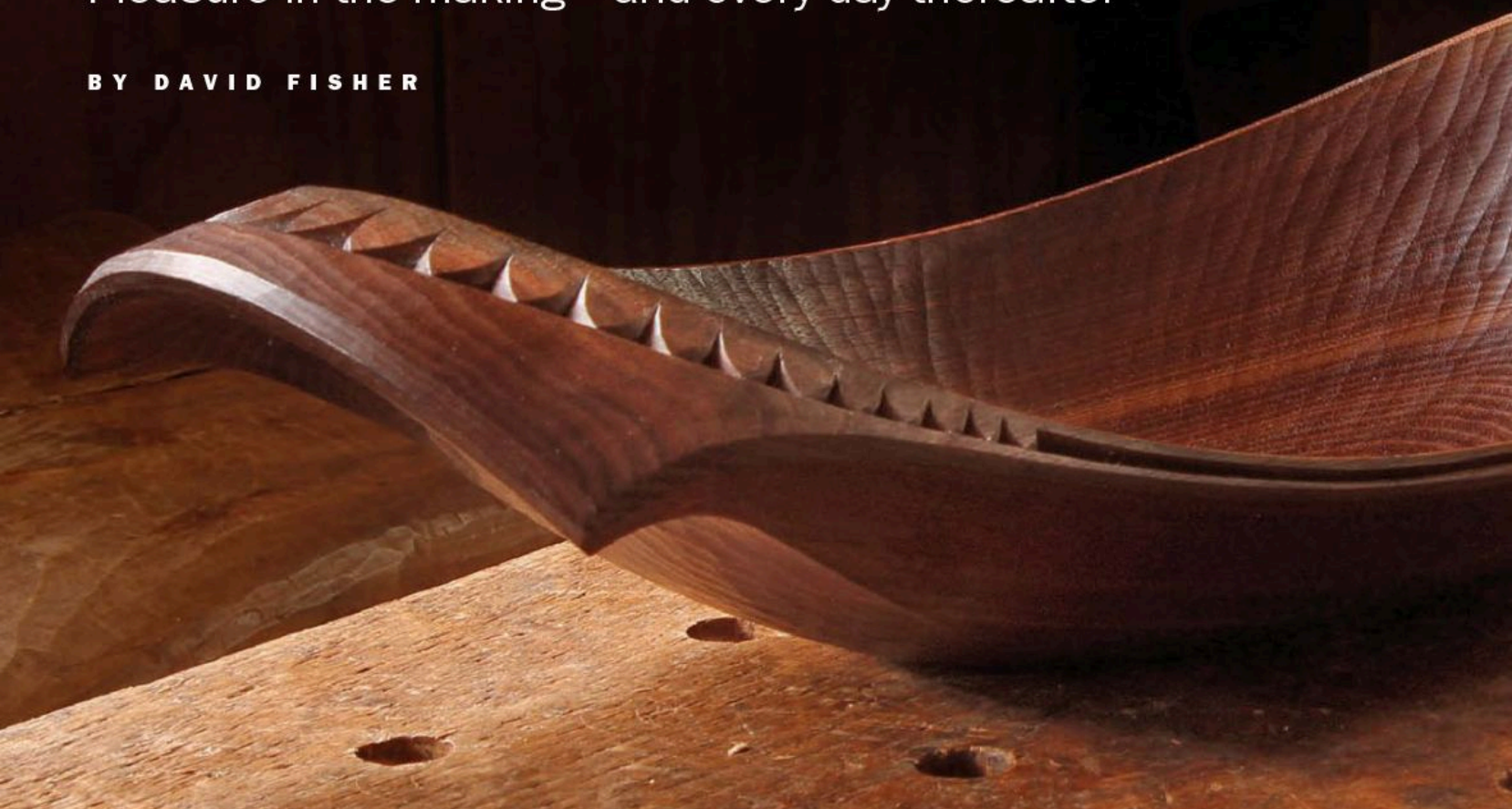




# Carve a Greenwood Bowl

Pleasure in the making—and every day thereafter

BY DAVID FISHER



## A BOWL FROM A LOG

Fisher's elegant bowl starts as a raw billet of green wood. Orienting the foot of the bowl toward the pith of the log lets him create dramatic, upswept handles.



END VIEW



SIDE VIEW

Carving a bowl is like hiking through the woods: Your body is moving, your blood is flowing, and your senses are alive with pleasure. Grab an ax and an adze, a drawknife and a spokeshave, and follow me on a journey from log to bowl.

The first step is to find a green log with a cooperative disposition. A good size log for this bowl is around 10 in. dia. and 18 in. long. Bowls can be carved from just about any species, but some woods are more agreeable than others. Soft, tight-grained hardwoods without a persistent aroma are traditional for bowl carving—woods like birch, poplar, soft maple, and willow. Harder woods require a bit more work, but they take a beautiful finish and are less

absorbent; cherry, hard maple, and fruitwoods are all excellent. Don't limit yourself, though. I've carved bowls from walnut, butternut, sassafras, oak, chestnut, and more. Look for a log that is free of knots and other defects. If you read the bark and the end grain carefully, you can often avoid trouble down the road.

Split the log through the pith with a maul and wedges and feel the coolness of the newly revealed surface with your hands. Breathe in the aroma, and consider the gift you have been given. Then sharpen your hewing ax.

### Lay out and rough out the blank

Before you dig in with sharp steel, take time to make some marks with a pencil. Traditionally, bowls were made by splitting a log in half and hollowing it out. But a





## Prepare the blank



**First layout lines.** After hewing a small, rough flat on the pith side of the blank, Fisher strikes lines on both ends for the bottom of the bowl.



**Flatten the foot.** Hew to the layout lines (left) to establish the flat for the bottom of the bowl. Then refine the flat (right) with a drawknife. Fisher designed and built a bowl horse, which uses foot pressure to pin the workpiece while he carves.



**An arc on each end.** To ensure that the curves on the ends coincide, Fisher marks a centerline on the blank and matches it to a square line on his bench apron. He places the point of the compass on the apron line.



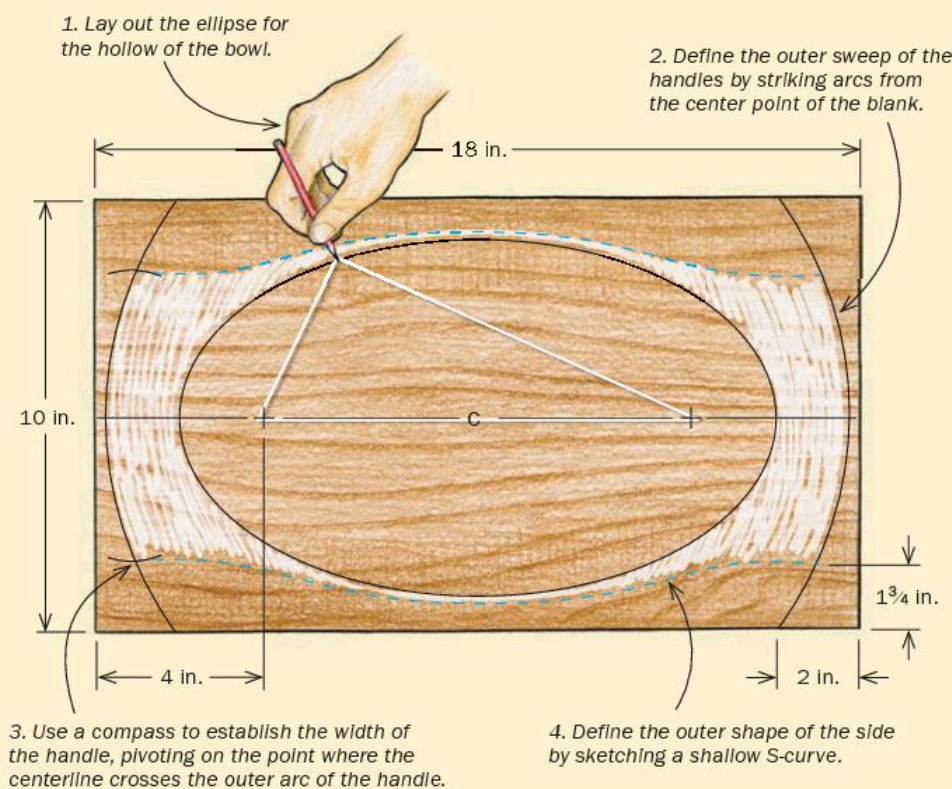
**Create the curving plane.** With a drawknife, Fisher trims the blank to the arced lines. You can rough out this curve with an ax, or do all the work with a drawknife.





## THE OPENING IS ELLIPTICAL

Fisher uses a string and two brads to draw the ellipse that defines the hollow of his bowl-to-be. He uses the compass for the next layout steps, ensuring symmetry without measuring anything.



bowl can also be made using the opposite orientation—so the split face of the log is the foot of the bowl. With this approach you can achieve often dramatic sweeping forms with high handles. I used the “upside-down” orientation for this bowl.

Hew a rough flat on the pith side of the blank. Then set it on the bench and use shims as needed to stabilize it. Using the workbench as a reference, strike a line with a compass across each end of the blank. Now hew to those lines with an ax. I refine this hewn flat with a drawknife, but you could use a handplane instead. The next step is to lay out the arched top lines

on both ends of the blank. Then it's back to the drawknife to shave to the curved lines. You could remove a lot of the waste with an ax, but the drawknife does the job quickly all by itself. In fact, it's so effective, enchanting, and fun that you may get carried away and discover that the whole blank has disappeared amid the shavings. Self-control can be elusive!

After you have a smooth cylindrical surface, strike a line on the upper surface that connects the end centerlines; then do the same across the flat bottom surface. These lines will help you maintain symmetry in the rest of the layout. I lay out the ellipse for

the hollow of the bowl using the two-nails-and-a-string method (see photo, left). Then I define the outer sweep of the handles by striking arcs from the center point of the blank. After I decide how wide I want the handles to be, I use the compass to mark all four corners, pivoting on the intersection of the centerline and the end of the handles. To establish the sides of the rim, I sketch a shallow S-curve from the widest part of the bowl to the corners of the handles.

## Grab an adze

Now it's time to make the chips fly: Out comes the adze. I don't secure the bowl blank for hollowing. Instead, I simply set it on a sturdy bench about 2 ft. high and brace it against my thigh. The weight of the blank keeps it from jumping around too much, and having no restraints allows me to flip it around easily. If you prefer to secure it, you can do so with a simple arrangement of pegs and wedges.

If you're new to the adze, think of flicking, almost throwing, the adze head into the wood, while you maintain control of the handle. Wield it just as you would a framing hammer—swing it, don't push it. Let the adze head do the work. Start in the central area of the blank, striking a few blows in a line across the hollow, then flip the blank around to do the same again. This second round should remove chips, creating a V-notch across the blank, maybe 1 in. wide and as deep. Widen and deepen that V-notch by working back progressively toward the handles. Pause a moment to recognize that you are having a blast boldly swinging a sharp tool.

You may be surprised by how fast the hollow begins to form. These tools are both powerful and sensitive, and removing the bulk of the material goes relatively quickly. I spend about 10% of my time removing 90% of the material, and 90% of my time removing the final 10%.

Once I am within 1 in. or so of the sides and bottom, I use an adze to cut a channel, or trench, across the bowl. This cuts a fair curve and establishes the final depth. At this stage, I'm aiming for a thickness of about 1/2 in. to 5/8 in.

As you cut “downhill” from the rim to the bottom, the trench serves as a landing zone for the final strokes of the adze. When you near the layout line on the rim, your strokes should be much more controlled to achieve subtle refinements and



## Shape the inside



**On to the adze work.** Chop out the hollow with an adze, beginning at the middle and working outward, frequently flipping the blank end for end. Swing the adze like a framing hammer, keeping your torso fairly stationary for greater control.



**Cut a trench.** When you've cleared out most of the waste from the hollow, cut a transverse channel across the bowl, working just shy of your intended final depth.



**Depth gauge.** To assess the bottom thickness of the bowl, lay a stick across the rim and compare a measurement from the stick to the bottom of the trench with a measurement from the stick to the bench.



**Why a trench?** Cutting a trench generates a fair curve across the bottom of the bowl. It also breaks the grain, forming a safe landing zone for the adze strokes from either end of the bowl.



## Shape the outside



**Ax work on the exterior.** To rough-shape the outside of the bowl, Fisher alternates between hewing the sides and the back of the blank. Then he cuts right to the perimeter line.

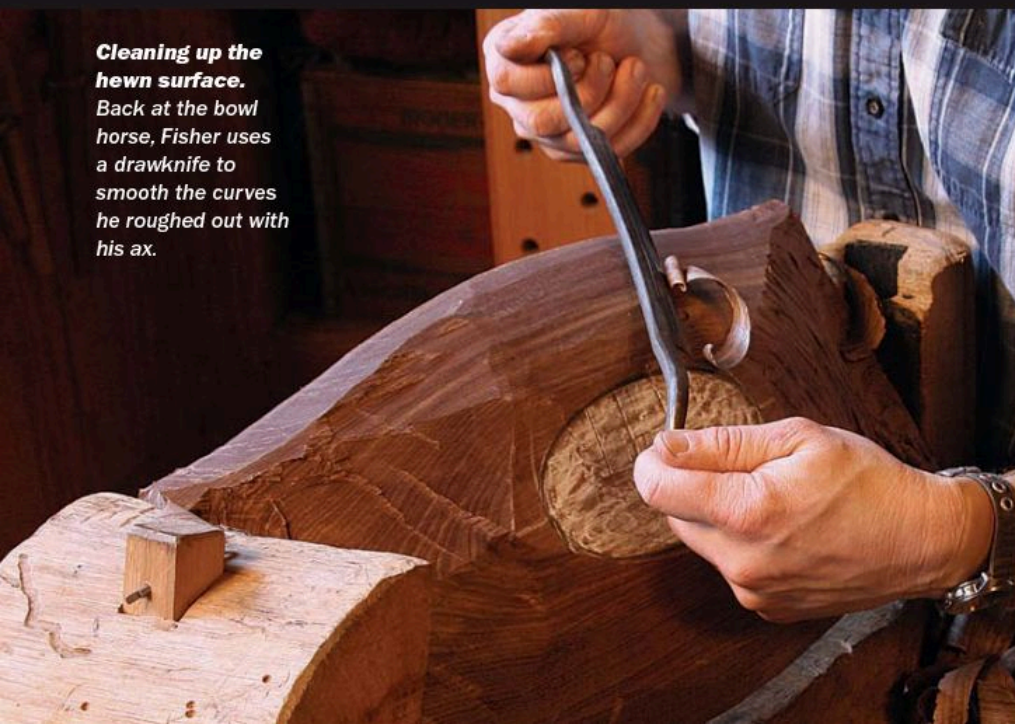


**Shave the end grain.** With the rest of the exterior nearly shaped, Fisher hews the handle, paring to the curved end line.



**Hollow the handle.** Switch to the adze and work cross-grain to create the concave underside of the handle.

**Cleaning up the hewn surface.** Back at the bowl horse, Fisher uses a drawknife to smooth the curves he roughed out with his ax.



wispy chips. Trust your hands and eyes to judge the fairness of the hollow's form. If you don't feel comfortable going right to the line with the adze, you can use a gouge to complete the hollowing.

### Move to the exterior

Before you begin working the outside of the bowl, lay out an ellipse on the bottom for the foot of the bowl. I usually make it a little over one third of the dimension of the top ellipse. Using the ax, hew the outer form of the bowl, removing material between the boundary of the foot and the perimeter at the top of the bowl. With full, satisfying swings, hew away the bulk of the outer corners first. Once you've reduced the thickness at the edges, it will be much easier to hew right to the perimeter line.

Continue hewing away the bulk under

*"I spend about 10% of my time removing 90% of the material, and 90% of my time removing the final 10%."*

the handles. Then you can shape the handle ends with chopping slices across the end grain. Continue with the ax as far as it will take you. Then, scoop out the area under the handles by working across the grain with the adze. Further shaping of the exterior can then be done with a drawknife and/or spokeshave. The sides, with the strength of longer grain, can be made quite thin, say around  $\frac{3}{8}$  in. or less. The ends, with the weaker end grain, should be a little heavier—depending on the design, around  $\frac{3}{4}$  in. thick.

### Dry carving

Now that the bowl is essentially formed, it's time to set it aside to dry before refining the surfaces. Up to this point, the bowl-in-progress should be kept in a plastic bag between carving sessions. But now the bowl is thin enough that it should lose



moisture evenly and move without cracking. Usually I just set the bowl in a corner of the shop out of the way and out of any sun and wind. You want to strike a balance between drying too slowly and drying too quickly. Too slowly, and mold can develop that may stain the bowl to a depth beyond what will be removed with the final cuts. Too quickly, and the bowl will crack. If I'm concerned that the bowl might dry too fast and crack, I wrap it in an old sheet or towel. The cloth acts like a partial vapor barrier, slowing down the drying.

Whether I've wrapped the bowl or not, within a couple of weeks it is dry and ready for final carving. If you work carefully enough during the green stage, you can call the bowl finished after drying. But I carve in two stages, because paring the surface after drying results in a cleaner, almost burnished surface.

The foot will now likely be slightly warped. Flatten it with a finely set block plane, and then turn your attention to the surfaces inside the bowl. I find holdfasts indispensable at this stage. With two holdfasts a bowl can be held with unmatched rigidity while you pare the hollow, refine the exterior, or add decorative carving.

For power and control when paring the interior, hold a bent gouge in a dagger grip, registering your thumb against the right side of your chest. Use your left hand to keep the edge in the wood. Bend your knees and let the weight of your upper

## Finish the surface



**Final fairing.** A spokeshave works well for removing irregularities in the curved exterior surfaces.



**Accentuate the surface.** Fisher uses a gouge to scoop out an all-over pattern of shallow facets, giving the bowl its distinctive texture.



**Gouge makes it gleam.** On the interior, too, a sharp gouge creates the characteristic pattern of highlights and shadows that distinguishes Fisher's bowls.



## Final touches



**Chamfers on the rim.** Fisher uses a drawknife to cut a strong, clean chamfer along the bowl's rim. This work can also be done with a pocket knife or a sloyd knife.



body push the edge of the gouge smoothly through the wood. Enter and exit in a series of overlapping strokes to leave a beautifully textured and polished surface. I compare the stroke to an airplane touching down and lifting off.

The last bit of shaping involves some delicate chamfering of the sharp edges. This can be done with a spokeshave, drawknife, or sloyd knife. Breaking these corners not only protects them, but also creates another interesting facet to catch the light. Keep the chamfers crisp and confident. If you want to add some decorative carving to your bowl, now is the time. (I explain my techniques for the carving on the rim in *Master Class*, pp. 76-82.)

At this point you could use sandpaper to smooth the surfaces, but I don't recommend it. A well-honed tool leaves a gleaming surface and prevents raised grain, since the fibers have been cut, not abraded.

Now rub some oil into your bowl. Flax seed oil, or food-grade linseed, is a good choice. Heat speeds the curing of the oil, so in the summer, I set oiled bowls in the hot sun, and in the winter I pop them in a small light-bulb kiln. For a little extra protection and luster in the final coat, use a combination of flaxseed oil and beeswax.

Every time you pick it up, your finished piece will remind you of the rich and satisfying journey from log to bowl. □

*David Fisher carves bowls and spoons, lettering, and block prints in Greenville, Pa.*



 **Online Extra**

Ready to carve a bowl? To learn what you'll need to get started, watch the video at [FineWoodworking.com/263](http://FineWoodworking.com/263).



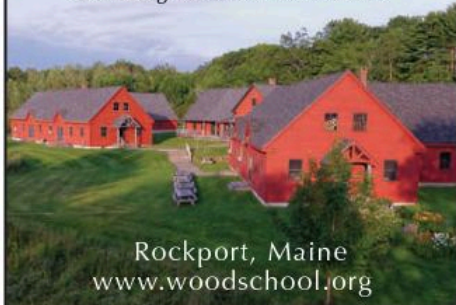
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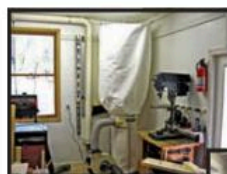
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## DEREK McDONALD

Rochester, N.H.

The basswood carving on this cherry frame is a hibiscus. McDonald made it for his wife after learning traditional carving at the Furniture Institute of Massachusetts. "I stumbled across the work of Grinling Gibbons, a 17th-century English carver famous for his intricate lifelike cascades of flowers, fruits, and animals. I was taken aback by the beauty and skill of his work and after some practice, decided to try a project in his style."

BASSWOOD AND CHERRY, 16W X 24H



## JIM MILAM

Sandy Springs, Ga.

Milam made this dressing table, modeled after one at Winterthur, as a wedding gift. The shape of the legs complicated both the joinery and the inlay. "On most tables with curved fronts, the radius dies into the inside edges of the front legs, leaving the legs square in cross section. On this table, the radius extends to the outside edges of the front legs, rendering the legs trapezoidal in shape."

HONDURAS MAHOGANY WITH KOA, HOLLY, AND BLACK DYED VENEERS,  
20½D X 36W X 32½H

Photo: Rob Milam

## EVAN COURT

Portland, Maine

Court explored the use of shapes and colors when he made this bench. The sides, which are solid basswood, were shaped with a dado set on the tablesaw and then handplanes. He painted the piece and applied decorative paper to the seats. "I chose to include a drawer between the seats as I feel the immediate instinct by us humans is to want to open small drawers or compartments. Why must we know what's inside so badly?"

BASSWOOD, BEECH, HOLLY, AND CYPRUS,  
18D X 60W X 24H

Photo: Nichole Mastroviti and Andrew Jackson



## Show your best work

For submission instructions and an entry form, go to [FineWoodworking.com/rg](http://FineWoodworking.com/rg).



## DAVID GASSON

Westfield, N.J.

Gasson made this table as an auction item for his nephew's school, with a puzzle-piece inlay (the symbol for autism awareness) on the top to reflect the school's work. The drawer boxes are not connected to the sides, but are supported on stretchers and riser blocks and secured to the top with threaded inserts and spacers. "I wanted to create something visually interesting, but also functional."



CHERRY WITH LEOPARWOOD INLAY,  
13D X 22W X 30H



## KEVIN STANTON

Woodside, N.Y.

Looking for a rare piece from the 1950s or '60s to use as inspiration, Stanton found a table he liked in an old photo of an airport lounge. "I liked the guitar-pick top and how the base was the same piece three times." After a few prototypes in plywood, he got the design he was looking for.

SAPELE, 22D X 22W X 18H

Photo: Eric Wolfe



## ROBERT LAPLACA

Charlotte, N.C.

"I always loved the proportions of this piece and thought it would make a wonderful bedside chest," said LaPlaca, who first spied the original Chippendale chest in *Fine Points of Furniture: Early American* by Albert Sack and then saw it again in a newer edition of the book (1993, Crown). He used photos from the book to model the chest in SketchUp, and made two of them as an anniversary present for his wife.

MAHOGANY AND POPLAR,  
20½D X 32¾W X 33½H



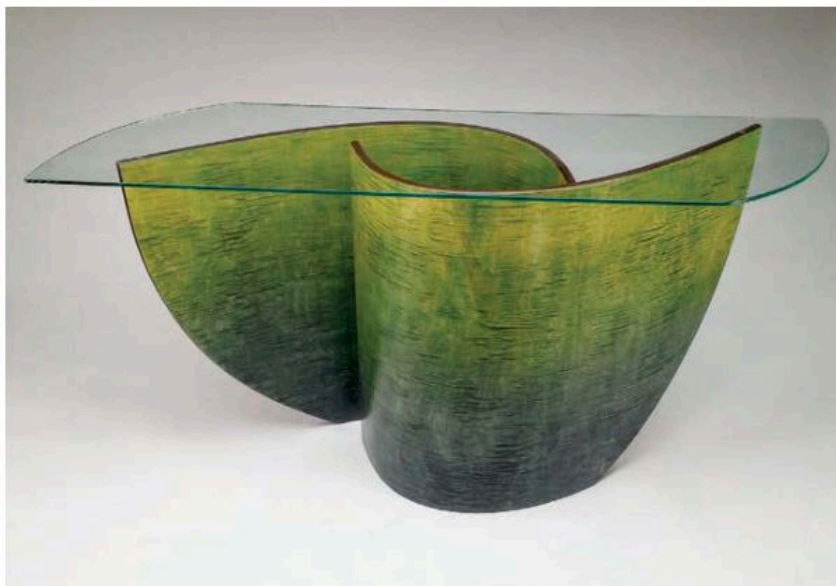


## PETER RODIN

Peterborough, Ont., Canada

Rodin made this table for a client who wanted to place it under a large piece of art with similar colors. He used curly maple over a laminated cherry and bending plywood core to provide a shimmer like sun on the water, and added wenge edging for contrast. "The color and gradient was a challenge. After a couple of months of research and experimenting in (liquid aniline) dyes and mixing my own colors, I came up with something I liked."

CURLY MAPLE AND WENGE, 16D X 48W X 32H



## GEOFFREY McKONLY

Northampton, Mass.

When a client wanted a dresser made of black walnut, McKonly started looking for boards that inspired him. One day he came across a stack of wide walnut boards reclaimed from a church in Williamstown, Mass. They were the backs of pews estimated to be from 1870. "The color of the boards was a rich chocolate brown, with a lot of red and purple tones. No sapwood at all. I realized this was a once-in-a-lifetime opportunity."

BLACK WALNUT, 21D X 37½W X 72H



## GREG BROWN

Deerfield, N.H.

Out fishing one day on a local stream using his grandfather's net, Brown was inspired to design this rocker. He used braided Kevlar fishing line for the seat. "I picked up the *Encyclopedia of Knots* and taught myself how to tie a fish net." Next, he came up with a stretcher system that bypasses the back seat rail. "I call them 'splatchers'—splat plus stretcher."

WHITE OAK, 43D X 24W X 39H

Photo: Bill Truslow



## DESIGN IN WOOD 2017

Each year from the first Friday in June through July 4, the public gets treated to a wealth of woodworking at the annual juried Design in Wood show, sponsored by the San Diego Fine Woodworkers Association and the San Diego County Fair. The huge exhibit averages more than 350 entries each year. Here are three of our favorites. For more, visit [sdfwa.org](http://sdfwa.org).



### BRIAN CARNETT

Escondido, Calif.

This display cabinet evolved from an earlier hanging jewelry case. "Both pieces are asymmetrical with offsetting curves that I find reminiscent of Japanese calligraphy." It won the Robert and Janet Stevenson Award for Best Technical Excellence and Innovation.

CHERRY, CURLY MAPLE, AND EBONY, 7D X 48W X 23H



### KEN COWELL

Yorba Linda, Calif.

This veneered table was inspired by a piece Cowell made a few years ago for a couple celebrating their 50th anniversary. "I liked the design so much that I knew someday I would have to make one for myself. With a change in leg structure and a modification in the marquetry, I now get to enjoy my very own Rose Table." The piece won first place in Veneering and Marquetry – Furniture.

IRONBARK EUCALYPTUS, EBONY, CURLY MAPLE, HOLLY, AND VARIOUS MARQUETRY WOODS, 43 DIA. X 30H

### ROBERT STEVENSON

Chula Vista, Calif.

"I have always admired this piece by John and Thomas Seymour," said Stevenson, who researched the tambour desk in several texts before he made his reproduction. "I have seen examples in the State Department, Winterthur, and other galleries." Among the many awards garnered by this piece were the *Fine Woodworking* Best of Show award and first place for Traditional Woodworking – Furniture.

SPANISH MAHOGANY AND WHITE PINE, 19D X 37W X 44H





## Decorative chip carving

HAND-CARVED BOWL  
DESERVES A HAND-CARVED  
NECKLACE

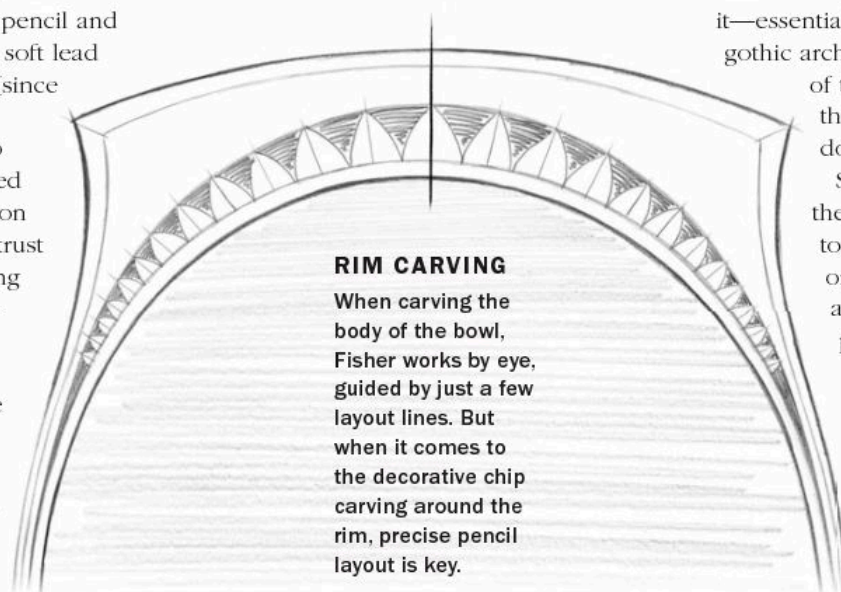
BY DAVID FISHER

**W**hen I carve a bowl, I'm striving to give it graceful lines and pleasing curves. I often enhance the overall curves with decorative carving, fine detail picked out in patterns of light and shadow, which can be a delightful counterpoint to the smooth shape of the bowl. Many times I'll do a carving on the rim, a kind of necklace for the bowl. I'll show you how I lay out and carve one of these.

With this design, much of the challenge is in the layout. You'll be working on a compound-curved surface, and the band of carving tapers as it curves, so the primary chip-carved elements—triangles with curved sides—are graduated in size. A careful, clean layout is fundamental to the success of the carving.

The work begins with a pencil and a pair of dividers. Using a soft lead pencil and light pressure (since you'll want to erase these lines later), sketch the two lines that define the tapered band. Position your hand on the inside of the arc, and trust your eye. The natural swing of your wrist will facilitate drawing fair curves. Look carefully and critically, making adjustments to the lines. Your eye can see very subtle differences.

Once you're happy with the band, it's time to lay out the elements within



### RIM CARVING

When carving the body of the bowl, Fisher works by eye, guided by just a few layout lines. But when it comes to the decorative chip carving around the rim, precise pencil layout is key.

it—essentially a graduated series of gothic arches rising from the inner line of the band to the outer one. As the band's width decreases, so does the height of the arches.

Starting at the centerline of the handle, set a pair of dividers to the width of the band. Swing one leg over to the outer line, and press down to make a prick mark. With a pencil, make a tick mark at the same point. Holding that position, swing the other leg down to a point on the inner line straight across the band. Since the band tapers, the dividers' span





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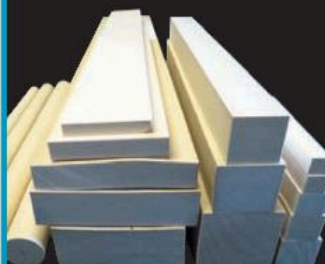
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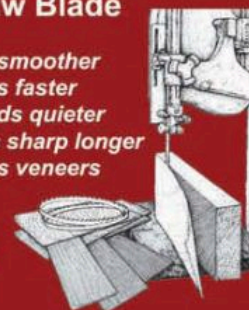
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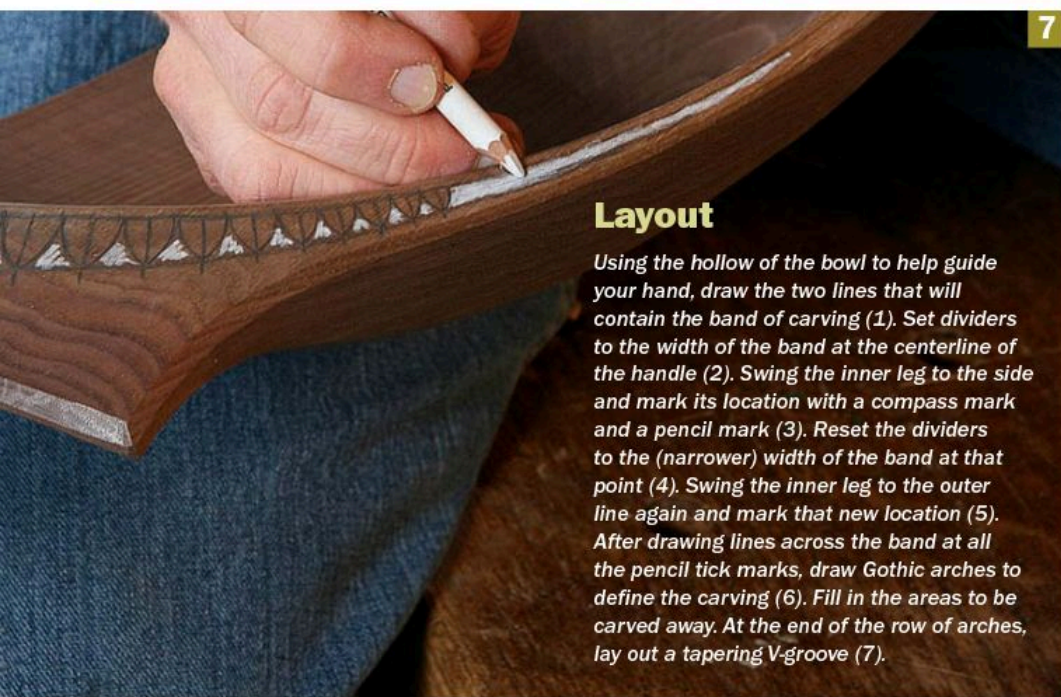
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## Layout

Using the hollow of the bowl to help guide your hand, draw the two lines that will contain the band of carving (1). Set dividers to the width of the band at the centerline of the handle (2). Swing the inner leg to the side and mark its location with a compass mark and a pencil mark (3). Reset the dividers to the (narrower) width of the band at that point (4). Swing the inner leg to the outer line again and mark that new location (5). After drawing lines across the band at all the pencil tick marks, draw Gothic arches to define the carving (6). Fill in the areas to be carved away. At the end of the row of arches, lay out a tapering V-groove (7).

is now wider than the band. Adjust the dividers until the leg meets the inner line, then swing it up to the outer line and make another prick mark and another penciled tick mark. Repeat this procedure until you have a series of points marked along the outer line, getting gradually closer together as they approach the side of the bowl.

Draw a series of lines across the band—one at each tick mark—so it begins to resemble a set of curving (and tapering) railroad tracks. Trust your eye to make these cross lines perpendicular to the curve. Again working by eye, make tick marks on the band's inner line halfway between each pair of cross lines.

Then sketch Gothic arches with their feet on the inner line at the halfway tick marks and their apex on the outer line at the prick mark made by the dividers. If



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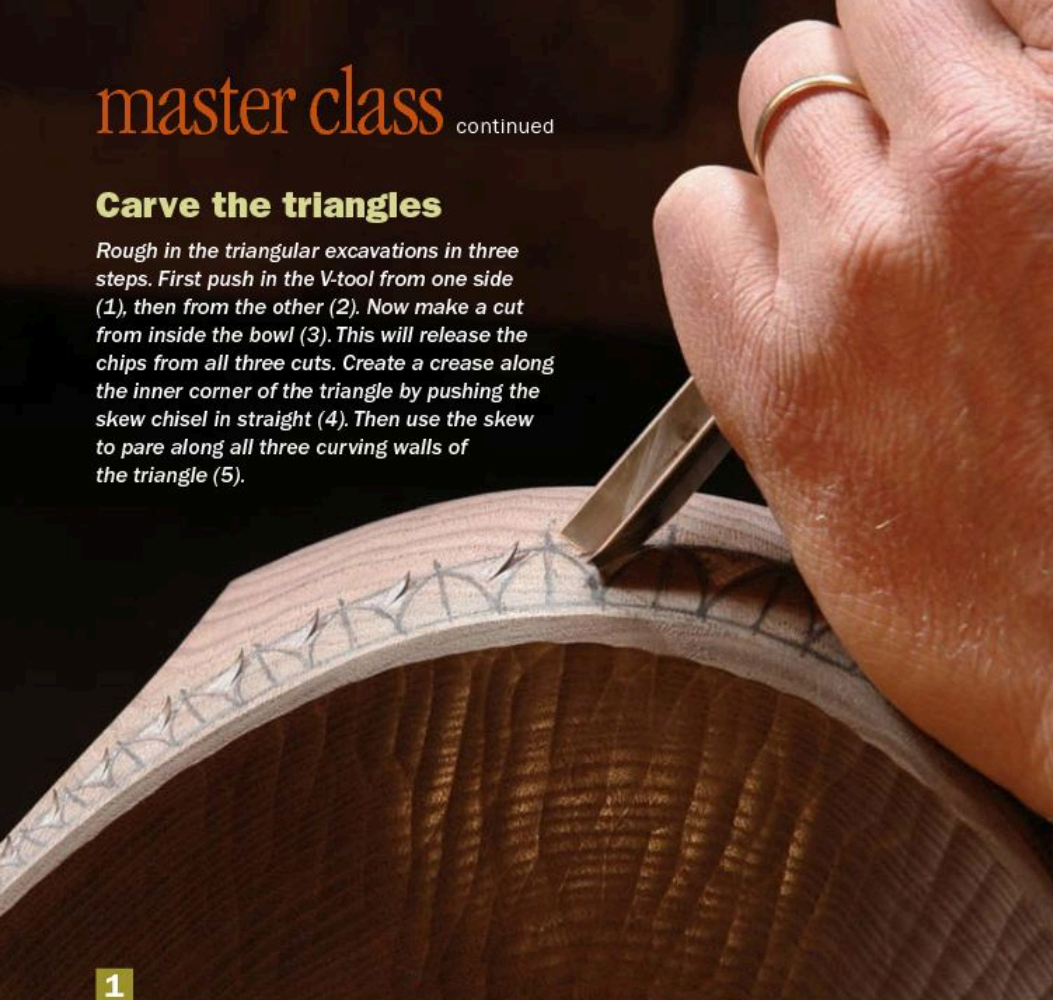
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## Carve the triangles

Rough in the triangular excavations in three steps. First push in the V-tool from one side (1), then from the other (2). Now make a cut from inside the bowl (3). This will release the chips from all three cuts. Create a crease along the inner corner of the triangle by pushing the skew chisel in straight (4). Then use the skew to pare along all three curving walls of the triangle (5).



you don't feel comfortable drawing these arches by eye, a multi-circle template or the base of a small can will come in handy. Using light or dark lead, fill in the triangular areas to be carved so you avoid errors in the heat of the moment. Now trade graphite for steel.

For excavating these large shapes, I use a V-tool followed by a skew chisel. I secure the bowl with holdfasts, repositioning it when necessary as the carving proceeds. I typically use the V-tool (60°, 10 mm) to remove much of the material. First cut in and downward from the outer two corners of the triangle, stopping each cut before reaching the opposite side. Then make a third cut from the inner corner. This will free the chips from all three cuts.

The rest of the work is done with a skew chisel. I find an 18 mm skew ideal, but the exact width is not critical—sharpness is. First, crease the inner corner



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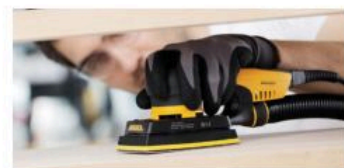
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## master class continued

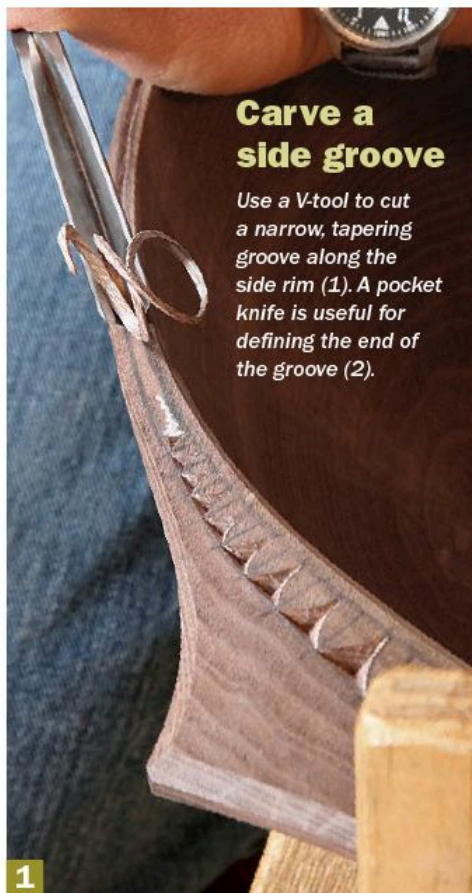
of the triangle by pushing the skew straight into the valley formed by the last V-tool cut. Now, beginning with the heel of the skew at the inner corner, pare one side wall of the triangle. As the cutting edge moves forward, the heel should follow the valley while the upper side of the tool should follow the curved pencil line. Stop the cut at the outer wall of the triangle. Do the opposite side wall next.

Finally, pare the outer wall of the triangle, working in whichever direction gives the cleanest cut considering the grain direction. After tidying up where necessary with the skew chisel, erase the pencil lines with a white polymer (non-abrasive) eraser (see photo, below), and you're done. As you gain confidence in this sort of carving, enjoy experimenting with different design variations. □

*David Fisher carves bowls and spoons in the shop attached to his house in northwestern Pennsylvania.*

### Carve a side groove

Use a V-tool to cut a narrow, tapering groove along the side rim (1). A pocket knife is useful for defining the end of the groove (2).





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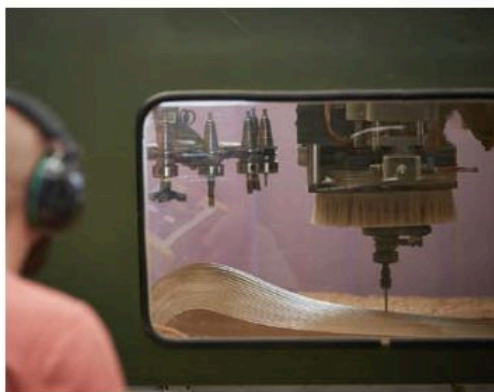
# how they did it

## Design by a thousand kerfs

BY JONATHAN BINZEN

**G**areth Neal (see the back cover) explains that he was using a computer modeling program, working with different layers in the same drawing, “when suddenly by accident I saw one shape inside another, overlaid with all these lines.” Inspired, he was soon out in the shop trying to duplicate what he’d seen on the screen. For his first pair of tables he did all the kerfing himself at the tablesaw, raising or lowering the blade for each new cut. It took five days to make the legs for two tables. Since then he’s sent parts out to be kerfed in shops with CNC machines. Neal’s own workshop is in London’s East End, but he’s worked with CNC operators in various parts of England. “I look at CNC as just another tool,” he says. “There’s good and bad CNC work, just as there’s good and bad hand carving.” Carving is what first drew him into the field, and he still enjoys it. “At home in the evening,” he says, “I’ll whittle a spoon, carving with an ax and a gouge.”

**Digital dexterity.** After milling the blanks for his pieces and cutting joinery—often Domino tenons—Neal sends the blanks and his CAD files to a shop with a CNC machine to have the kerfs cut. The CNC at right is shaping a fluted vessel Neal designed.



**Excavation.** Once the piece is assembled, Neal chisels off some of the fins of wood, creating an erosion-like effect and exposing the 18th-century-style table within.



**The presence of the past.** Viewed at just the right angle, the Queen Anne hall table and side chairs emerge from within their blocky, modern outer forms.





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# Silhouette of the Past within the Present

Growing up in England, Gareth Neal would trail his archaeologist father on digs. He reveled in the search for Roman coins and artifacts, and enjoyed tinkering with the wood and nails available on site. Flash forward a few decades and he's been trained as a furniture maker, and much of his work explores and reinterprets the skills and styles of the past. But Neal also embraces digital technology, doing much of his design work on a computer and some of his making on CNC machines. It was while designing on the computer that he made a mistake—accidentally creating one shape inside another—that inspired this cabinet and a series of pieces like it, rectilinear outside but kerfed to reveal the sinuous lines of a period piece inside. It was a lucky mistake, Neal says, “because I wanted to build furniture that could talk of the past and talk of the now at the same time.” Neal mills the parts for the carcass, then has them kerfed with a CNC machine. After assembly, he takes up a chisel and chops away some of the wafers of wood, more clearly revealing the shape of the piece within. A little like an archaeologist on a dig.

—Jonathan Binzen



**How They Did It** Turn to p. 86 to see how the CNC machine has become a part of Neal's design process.

Photo courtesy of Gareth Neal