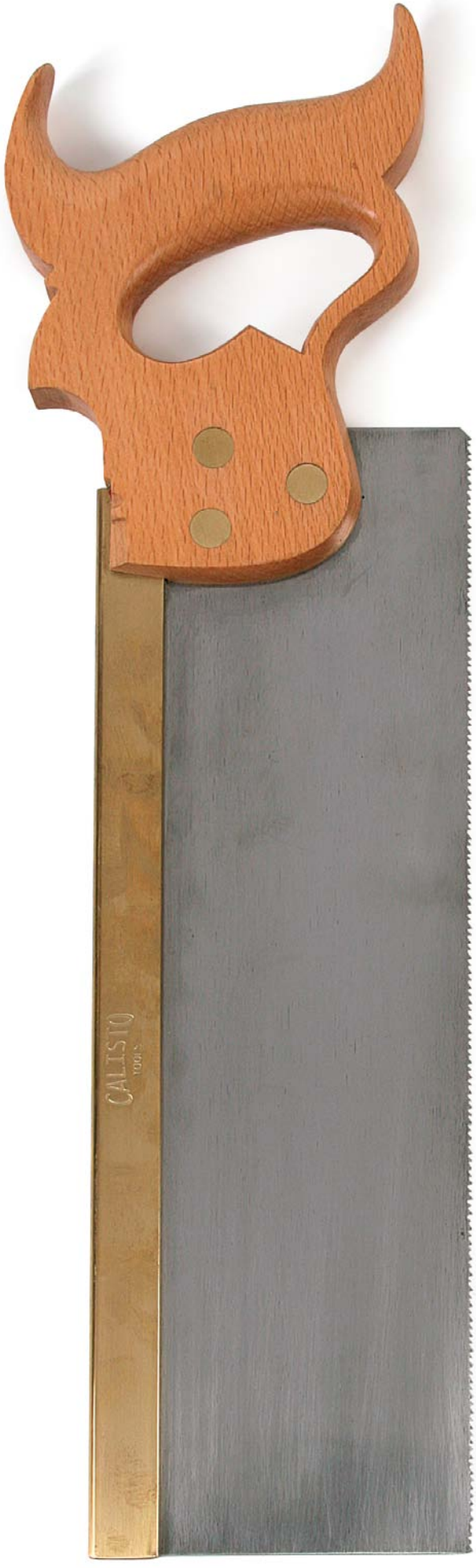
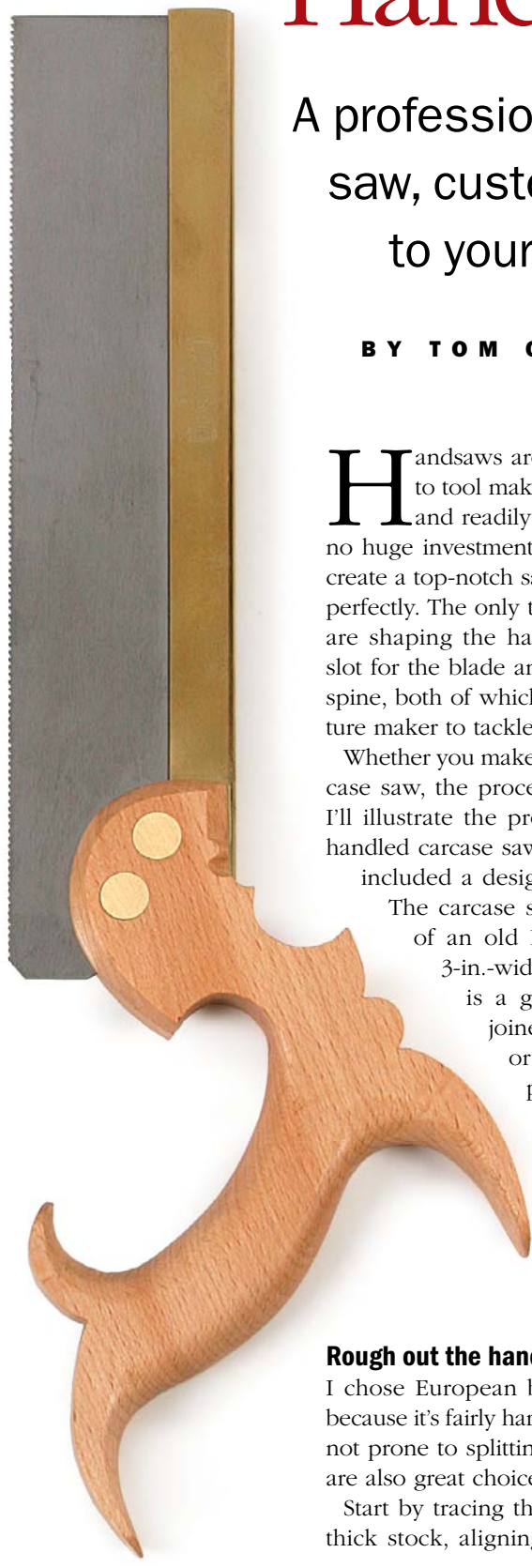
Build Your Own Handsaw

A professional-quality saw, custom-fitted to your hand

BY TOM CALISTO





Handsaws are a great introduction to tool making. The parts are few and readily available, and there's no huge investment in time or money to create a top-notch saw that fits your hand perfectly. The only tasks that require care are shaping the handle and cutting the slot for the blade and the mortise for the spine, both of which are easy for a furniture maker to tackle.

Whether you make a dovetail saw or carcase saw, the process is the same. Here I'll illustrate the project using a closed-handled carcase saw (far left), but I have included a design for a dovetail saw. The carcase saw is my adaptation of an old Disston pattern. The 3-in.-wide by 12-in.-long blade is a great size for cutting joinery—tenons, notches, or miters—and cutting parts to final length. I tweaked the handle design and some dimensions to end up with a classic-style saw that fits the hand better than the original.

Rough out the handle

I chose European beech for the handle because it's fairly hard, closed-grained, and not prone to splitting. Cherry and walnut are also great choices.

Start by tracing the pattern onto 7/8-in.-thick stock, aligning the grain so that it

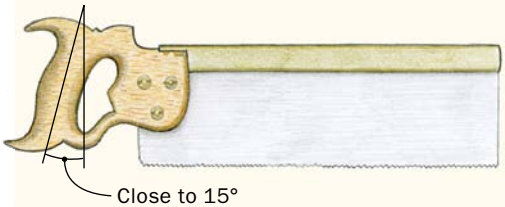
Photos, this page, and drawings: John Tetreault

TWO HANDLE ANGLES

A saw's hang refers to the angle of the grip in relation to the tooth line. It plays a critical role in the way the saw handles.

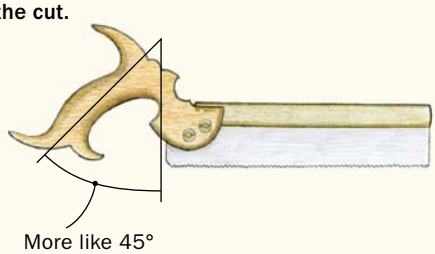
CARCASE SAW

A carcase saw has a low handle angle that directs most of the cutting force forward along the tooth line and relies on the saw's weight to apply pressure.



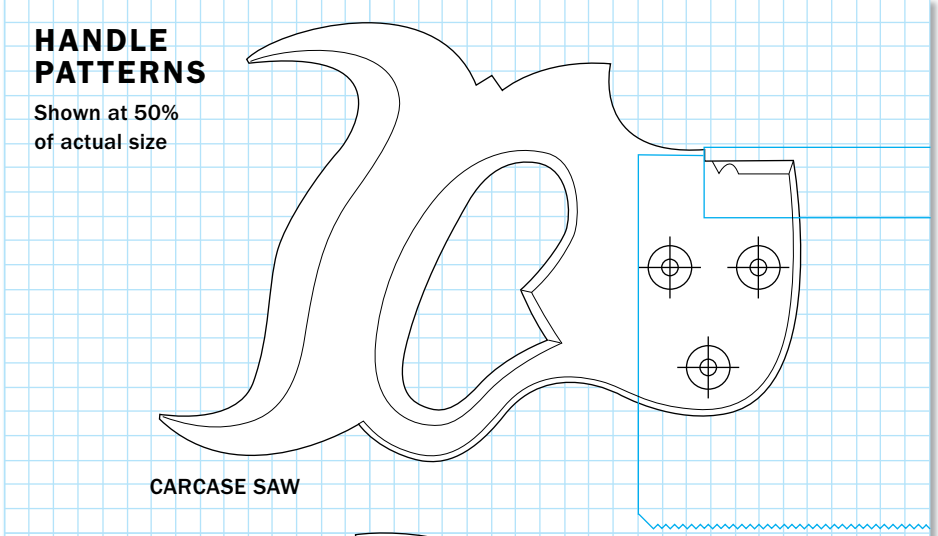
DOVETAIL SAW

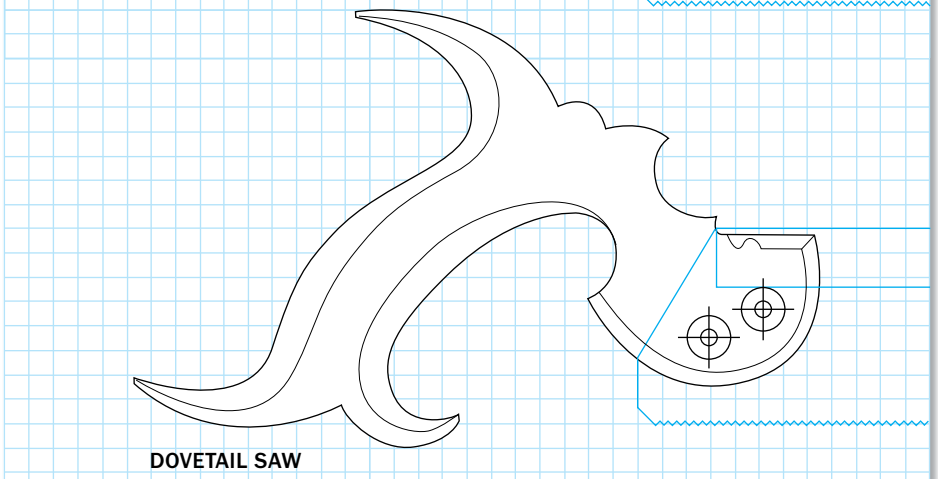
A dovetail saw has a more severe handle angle, which helps the lighter-weight saw direct more pressure downward and into the cut.



HANDLE PATTERNS

Shown at 50% of actual size





CUT THE HANDLE TO SIZE

Saw and file. *After laying out the handle's shape on the blank, saw out the exterior at the bandsaw and the interior at the scrollsaw (above). Fair the edges (right), using a rasp to clean up the mill marks left by the bandsaw. Be sure to keep the faces perpendicular to the sides.*

MAKE WAY FOR THE SAW PLATE AND SPINE

Lay out the slot depth. *Set the plate on the handle, and mark both sides of the handle where the slot will end. Transfer these marks across the edges as well.*

Mark a cut line. *Set a marking gauge to half the thickness of the handle, and score a line between the two edge marks.*

Online Extra

For a demonstration on how to cut a perfectly straight saw slot, go to **FineWoodworking.com/258.**

Saw the slot. *Clamp the handle upright and saw the slot into the handle following the marking-gauge line. It's vital that this slot is straight and doesn't waver.*

runs in line with the saw plate. Make the exterior cuts at the bandsaw and the interior on the scrollsaw. After the pattern has been cut out, remove the milling marks with a rasp, but don't start shaping yet.

Cut the slot for the saw plate

Sawing an accurate slot is a critical step, and I always saw the slot for the plate and mortise for the spine before doing any shaping. This way, you can use the flat and parallel sides to mark for the joinery.

Start by establishing the plate's depth in the handle. Assemble the plate and spine and place the assembly on the handle with the spine parallel to the flat on the nose of the handle blank and roughly ⅛ in. above it. Mark the depth of the plate along the sides and the top and bottom edges of the handle. It is important to have enough room for the saw nuts to engage the plate without having them right on the edge of the handle.

After marking the depth of cut, set up a marking gauge to scribe a line marking the slot for the saw

TIP

ERROR-PROOF SLOTTING OPTION

If you don't own a saw yet or aren't confident in your sawing skills, clamp the blade to the bench between two pieces of hardwood. The bottom piece must be milled to half the thickness of the handle, which will place the slot exactly where it needs to be. Draw the handle against the blade until the slot is cut.

Mark for the spine mortise. *Put the spine on the plate, slide it all the way to the back of the slot, and lower it onto the top of the handle. Mark the mortise length. Then mark the depth of the mortise by placing the spine on the front edge of the handle.*

Chisel out the mortise. *A thin chisel will quickly clear out the mortise for the spine. When that's done, pare the walls and test for a snug fit.*

Photos, except where noted: Dillon Ryan

SHAPE THE HANDLE

Pencil lines guide the work. *Mark a centerline along the entire outside edge of the handle and mark chamfer lines in the grip area so that you can evenly remove the bulk of the material for shaping.*

Rasp removes the waste quickly. *Start with a rasp and work down to the chamfer lines (above). Work with the grain to avoid tearout.*

Ease the transitions. *Use the rasp to ease the chamfers into complete curves. Be sure to check the grip with your hand to make sure the shape is a good fit.*

Round the hard edges. *The horns at the top and bottom of the grip are rounded off with a rasp. The remaining interior profiles and lower edges of the handle's exterior can be lightly pillowed.*

plate. Scribe all the way along the edge of the handle between the layout marks.

The quickest way to cut the slot is to use another backsaw with a similar kerf. If you're a little shaky with a saw or this will be your first saw, I have a simple trick to make this task painless.

First, you'll need the toothed and sharpened saw plate and some hardwood scraps. Mill a piece of scrap to half the thickness of the handle material; this will space the plate off the bench to cut a perfectly centered slot. Lay the saw plate on top of the spacer, put another piece of scrap over it, and clamp it to the bench with the teeth pointing away from you. Lay the handle flat on the bench and draw it back over the saw plate until the slot reaches the depth marks. When you're done, you should have a perfectly straight slot for the saw plate.

Mortise for the spine

To mortise the handle for the spine, insert the spine and saw plate as a single assembly into the slot with the back of the plate flat against the slot in the handle and the spine against the top edge of the handle. Pencil around the spine to mark the mortise length (see photo, opposite). Then reposition the assembly so that the spine is against the front of the handle to define the depth, and remember to leave the back about ⅛ in. proud of the handle.

Carefully chisel out the mortise. Check the fit to make sure the entire assembly sits straight in the slot and mortise. Once it's perfect, you can move on to shaping the handle.

Handwork for the handle

Getting the handle symmetrical and comfortable can seem daunting, but with careful layout it's simple.

DRILL THE HANDLE

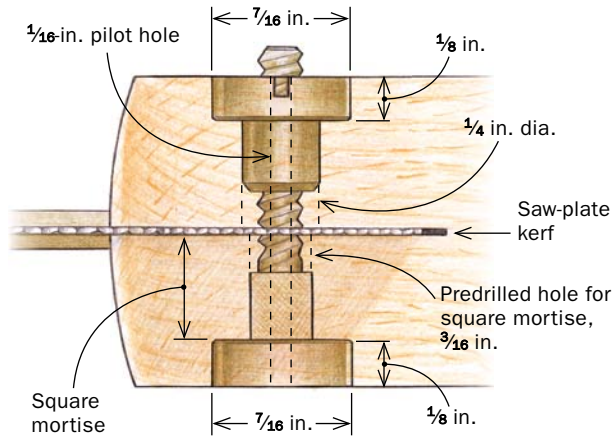
Start with pilot holes. *After marking the locations of the saw nuts, drill a 1/16-in. pilot hole for each one. This will ensure the multiple holes and bores are aligned from side to side.*

Counterbore for the heads. *Use a Forstner bit in the drill press to counterbore for the head of the saw nuts on both sides of the handle. Set the depth stop to leave the saw nuts just proud of the handle. The nuts will be leveled flush later.*

Drill for the shank and shoulder. *The shoulder of the saw nut is square and one side of the handle needs to be bored—and later chiseled—to match. Drill the bore for the square shoulder and stop at the saw plate slot. Flip the handle and drill for the shank of the saw nut.*

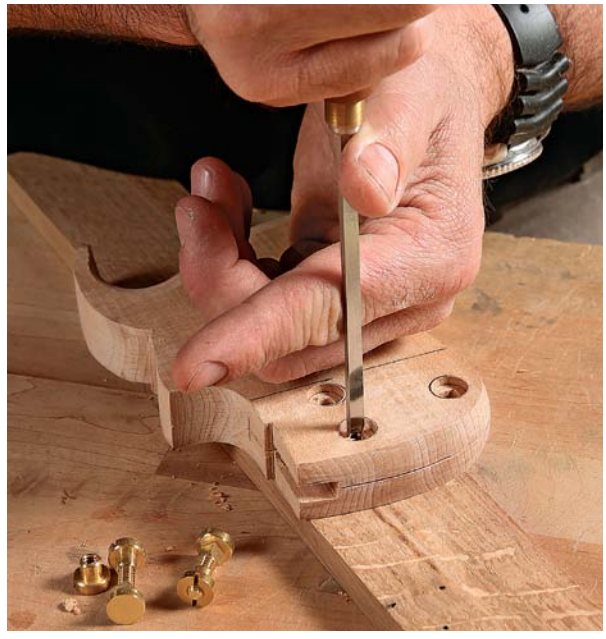
SAW-NUT HOLES MUST ALIGN PERFECTLY

Each saw-nut hole has counterbores for the heads on each end, a standard hole for the shank, and a square mortise for the square shoulder.



Begin by drawing a centerline down the handle and adding some chamfer lines along the edges. The chamfer lines are guides for removing the bulk of the material equally. Start the shaping process with the grip area. Rasp off the corners to the chamfer lines and round over this section with a file and sandpaper. The shape should be elliptical in the grip area and flow nicely into the other sections of the handle, and most importantly feel good in your hand.

The sharp-edged horns on the back of the handle also get rounded, and the underside of the handles and other inside faces of the grip cutout can be pillowed with a soft roundover. After roughing things out with rasps, move on to files and finally sandpaper.



Square up the hole. *Chisel the round hole square to match the shoulder on the saw nuts. The fit doesn't have to be perfect, but it must be snug to keep the nut from spinning.*

DRILL THE SAW PLATE

One hole at a time. *With the spine attached to the plate and seated full in the slot, mark one of the saw-nut locations with a transfer punch.*

Drill the first hole. *For the greatest accuracy, use a straight-fluted carbide bit in the drill press to make the first hole. Clamping the thin blade to the table and against a fence is a must.*

Drill the handle and plate for the saw nuts

The brass fasteners that hold the saw plate to the handle are called saw nuts. To make these fit and function, the handle must be bored for the shoulders, heads, and shanks of the nuts. All these bores need to align on both sides of the handle, so start at the drill press, drilling a 1/16-in. pilot hole through the handle at each saw-nut location. The pilot hole will guide subsequent bits from either side of the handle. Drill the counterbores for the saw-nut heads with a Forstner bit, leaving the holes slightly shallow so the head will be slightly proud of the handle. Next, drill one side for the screw shank and square it with a chisel to accept the screw's square shoulder. Drill the opposite side slightly larger to accept the shoulder of the nut.

There are several ways to make the holes in the saw plate, but the best I've found is a straight-fluted carbide drill bit in the drill press. Just make sure that the teeth are going in the right direction before you drill. I have seen a few push saws morph into pull saws.

Assemble all the components, line everything up, then mark one hole with a transfer punch. It's important to start with only one hole first to prevent misalignment. Pull the saw apart and drill the first hole. Drilling thin sheet stock can be dangerous, so make sure everything is clamped down; otherwise, you risk having a saw plate swinging around at 1,000 rpm.

Once the first hole is drilled, remove any burrs with a file and reassemble the saw. Place a saw nut into the first hole, mark the others, and drill those in the

SOURCES OF SUPPLY

Blackburn Tools
blackburntools.com

Two Guys In A Garage Toolworks
tgiag.com

Calisto Tool
windwardwoodworks.com

Reinstall the saw plate. *Clean up the burrs from the drill press and install the plate with one saw nut. Then transfer the locations of the remaining two holes to the saw plate and drill those as well.*

ADD THE SPINE

Pinching the spine. *A few good smacks with a dead-blow mallet will tighten up the spine. Calisto uses a log as an anvil, but a sturdy bench works too.*

Round over the spine. *A shopmade scraper rounds the spine to look like a traditional folded spine. The same effect can be done with files and sandpaper.*

Soften the end. *A file quickly and effectively gives the end of the spine a slightly rounded profile.*

same way. If the holes don't line up perfectly, adjust them by opening the holes slightly with a round file.

Pinch the spine

The spine is the last major component and is attached to the plate with a friction fit, which means the slot in the spine is squeezed to clamp the saw plate in place. The spine comes fitted loosely to the plate. While building a saw, I take the spine on and off many times, so I find it easier to pinch them together as a final step.

The most effective way to pinch the spine is to use a dead-blow hammer to close the gap. Angle the hammer and concentrate the blows on the slotted side, taking the time to sneak up on the fit. It should be tight enough that a few light mallet blows will seat the plate on the back, but not so tight that it is impossible to start.

As a final touch, I use a small, shopmade scraper to round over the spine and give it a more traditional look. Once you've shaped the whole top of the spine, smooth the roundover and either sand the spine to a uniform luster with 320-grit paper, or polish it fully.

Put it all together

Final assembly begins with joining the saw plate to the handle. Slide the plate into the handle and insert the saw nuts. Don't force the saw nuts into the handle; the steel plate can easily strip the brass threads. Lightly tighten the saw nuts, as the spine must be installed before fully torquing the fasteners.

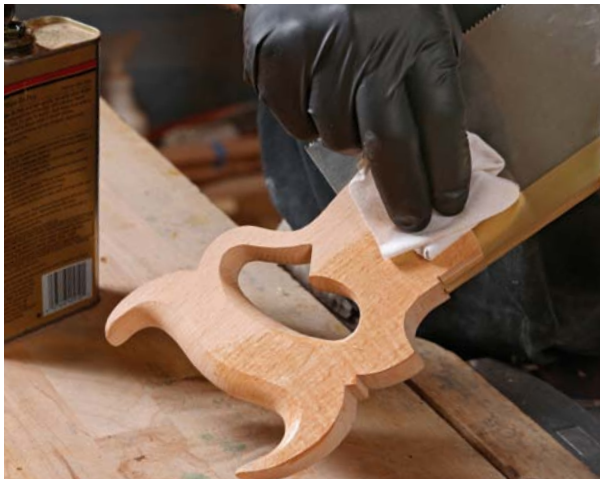
A quick polish. *Whether it's a uniform sanding with 320-grit sandpaper or a full polishing, clean up the spine to get it ready for installation on the plate.*

Slowly seat the back. *After installing the plate in the handle, line up the spine with the mortise and tap on the spine gradually until it is seated fully on the plate.*

FINISHING TOUCHES

File down the saw nuts. *Take down the threaded portion and head on each saw nut until it's just shy of flush.*

Lap the sides flat. *Sandpaper glued to a sheet of Baltic-birch plywood is flat enough to level the brass saw nuts and handle sides to a uniform plane.*



Finish when fully assembled. *Calisto uses wipe-on polyurethane to finish saw handles because it is durable and easy to use. Use mineral spirits to clean off any finish that lands on the saw plate.*

Align the spine flush with the back wall of the mortise and place the sawteeth on a soft wood block. Gently tap the spine with a soft mallet or dead-blow mallet to drive it onto the plate. Work your way along the spine, driving it deeper with each pass. Do this gradually to avoid bending or twisting the saw plate.

With the spine seated, tighten the fasteners and flush the saw nuts to the handle—first with a file, then with sandpaper on a flat surface. Last, give the handle a final sanding and polish the metal parts with fine steel wool. I finish the handle with wipe-on polyurethane, a durable and easy-to-apply finish. I apply it to the assembled saw and use mineral spirits to clean up anything that gets on the saw plate or spine. After three coats, lightly rub out the surface with a non-woven abrasive pad and apply some paste wax to the entire saw. □

Tom Calisto is a saw maker and teacher from Apex, N.C.

Wax the whole thing. *When the finish is dry, a layer of wax over the entire saw will protect the handle, blade, and spine from dirt and moisture.*