



Sturdy, Knock-Down



Clever construction makes
small work of big joints

BY BARRY NM DIMA

Workbench

When designing this bench, I pulled on old clichés: big, beefy, bombproof, versatile, stout, smart workholding. I shamelessly took from what came before, especially the Moravian workbench and its angled legs. But I wanted something heartier, so I turned to Roubo benches for proportions. Timber framing then lent a hand with the big knockdown joint. The result is a heavy, portable bench that works so well because, at its core, it's so unoriginal. I even took the top from my old bench.

This article will focus on building the base and vise. The base's thick parts are built up by laminating two pieces of 8/4 stock milled as little as possible. The benefit of this lamination isn't just the lower cost and extra weight, but easy mortise-and-tenons as well, removing some of the pain of working thick parts and adding efficiency instead. The top is just a top, so I won't spill much more ink on that.

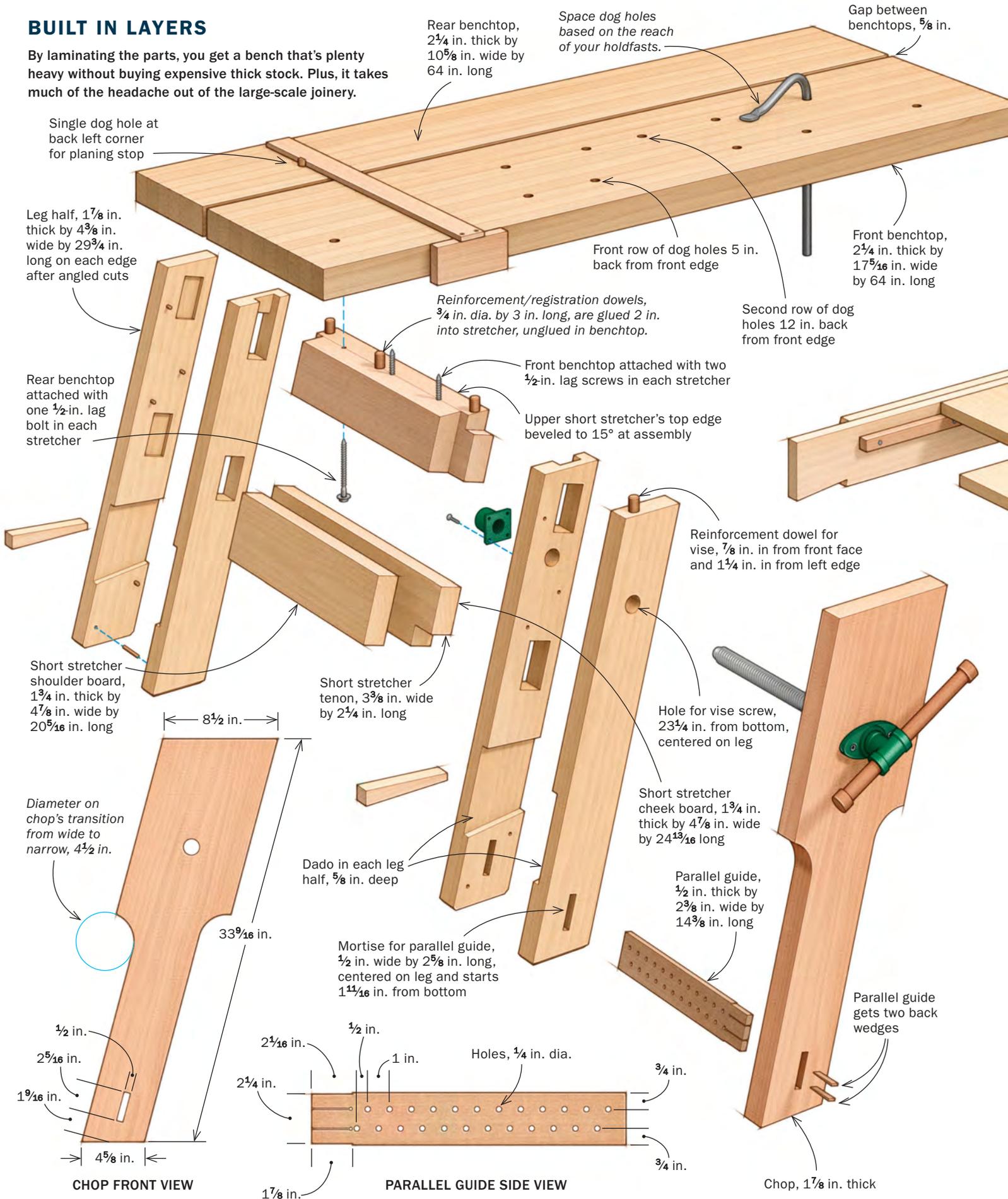
Wood selection

The lumber species are all over the place—white pine, oak, ash, and cherry—but with reason. First, much of it was free, so the price was right. But even if I had bought all the boards, they're common, affordable North American domestics, so my wallet wouldn't have taken a huge hit. Then there's the second, more important reason: The parts straddle the line between workability and weight. The mortised members are pine, while two thirds of what gets tenoned—an easier process—is heavier oak or ash.

Well, the cherry vise chop may not straddle that line. That board was a perfectly sized off-cut from a coworker. Without that serendipity, cherry feels a little premium. But it sure does look nice.

BUILT IN LAYERS

By laminating the parts, you get a bench that's plenty heavy without buying expensive thick stock. Plus, it takes much of the headache out of the large-scale joinery.



Middle registration dowel, 11½ in. in from back face of front leg and centered on short stretcher

First registration dowel, 9/16 in. from end of tenon and centered on tenon's width

Rear registration dowel, 9/16 in. from end of tenon and centered on tenon's width

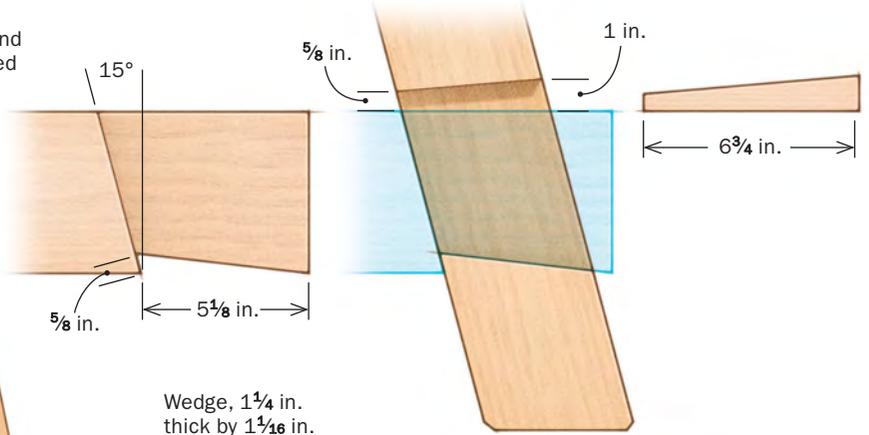
Shelf boards, 1 in. thick by 22 13/16 in. long, all random width

Cleat is glued and nailed on.

Long stretcher cheek board, 1¼ in. thick by 4 7/8 in. wide by 54 5/8 in. long

Long stretcher shoulder board, 1¼ in. thick by 4 7/8 in. wide by 44 3/8 in. at longer edge

KNOCKDOWN JOINT DETAIL



Wedge, 1¼ in. thick by 1 1/16 in. wide 6 3/4 in. long

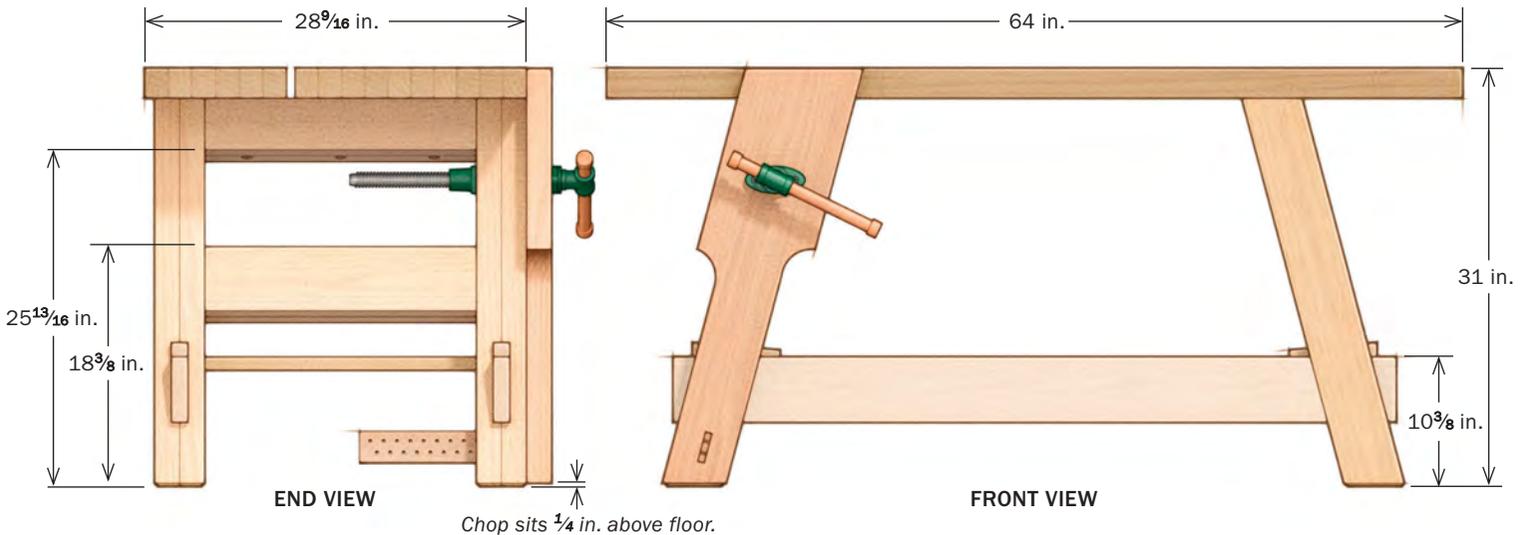
Cleat, 1 in. square by 41 in. long

Ends of long stretcher's shoulder board cut at 15°

To purchase expanded plans and a complete parts list for this bench and other projects, go to FineWoodworking.com/PlanStore.

SOURCE OF SUPPLY

LEG VISE HARDWARE
 Lee Valley Tail-Vise Screw
 Item 70G0152



Through-mortise easy in laminated legs

Dowels keep legs aligned from layout to glue-up.

The two halves of the laminated leg get mirroring through-joinery. Dima routs these parts separately, and uses dowels in each half to keep the parts from slipping during layout and assembly.



To keep the parts as heavy as possible, I kept milling minimal. As long as my glue surfaces were good, I didn't stress about roughness elsewhere.

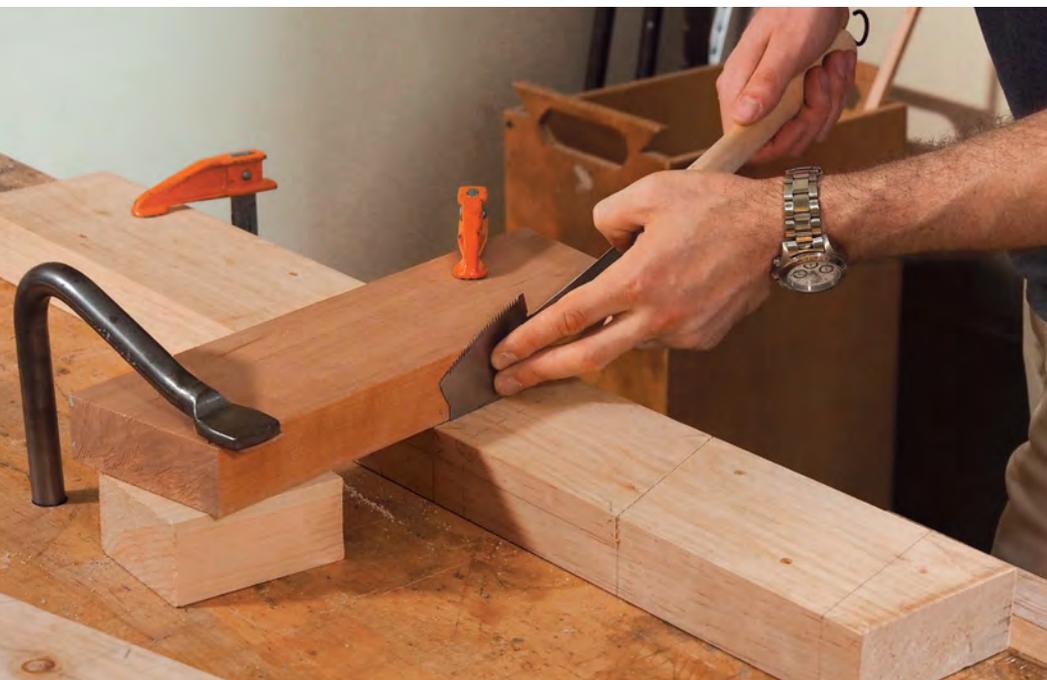
Laminated joinery

Cutting joinery in parts this large can prove tricky, if not unsafe. This is where lamination comes in; it let me shape each half of the glue-up to create the joinery.

Take the tenons on the short stretchers: Each rear board in

Lay out the through-mortise on an edge before bringing it across an inside face.

The joint lines are square on the edges but have two different angles on the inside. When laying out the edge, clamp the leg halves together to close any gaps.



Saw the ends using a saw guide. To saw accurately, Dima clamps a block along his angled layout lines and presses the saw against that block, which has a jointed edge and face. He uses an azebiki, but a Western saw would work as well.



Bash out most of the waste. Dima kerfs the joint before using a mallet and chisel. He works in from both edges to avoid blowout.



Rout the joint to depth with a short pattern bit. The bit's bearing lets you clean up the joint's floor without going past the sawn ends. Because the joint is wide, Dima mounts his router on a long auxiliary base.

the lamination is the cheeks, and each front board creates the shoulders. The result is huge, fast, bareface tenons. Just be sure to cut all the front boards—the shoulders—to the exact same lengths. Otherwise, the shoulder-to-shoulder dimensions will be off, and your assemblies won't be square.

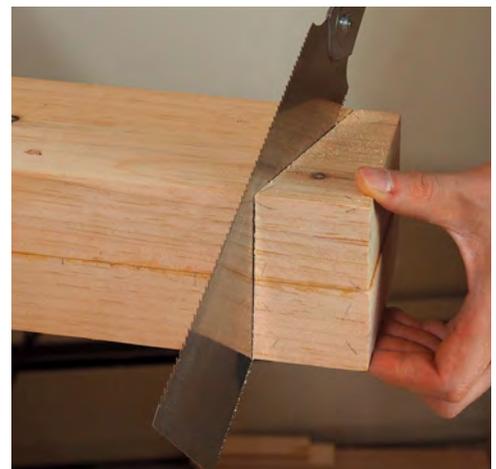
First, though, make the legs. Each gets three mortises, two stopped ones for the short stretchers and one through-mortise for the long stretcher. Here's another benefit of lamination: Instead of cutting this big, deep through-joint in solid stock, you can just form it in each half before glue-up.

To start, clamp the halves together. Then drill for and install alignment dowels. Doing this when the halves are clamped together guarantees the dowel holes line up. Next, lay out the through-mortises on an edge. The dowels make sure the legs go back together exactly as they are now, letting you pull apart the halves to complete the layout.

Keep the dowels clear of this joint, and don't glue them in until you glue up the leg halves. They'll get in the way



Glue up the legs. There is a lot of glue surface, so use plenty of clamps. Be judicious with the glue to avoid squeeze-out, especially in the mortise.



Cut the legs' stopped mortises and saw their angled ends. The stopped mortises are wide and deep, so Dima removes most of the waste with a drill press or plunge router before squaring up their ends with a chisel. The legs' ends, angled 15°, are then cut carefully with a handsaw.

Finish the end assemblies



Cut the short stretcher's tenons to width. These stretchers are also laminations. The shorter front board forms the tenons' shoulders, and the longer rear board forms the cheeks.



of the router's long auxiliary base when cutting the mortise.

Despite the angles, the layout's simple provided you make a full-size drawing of the joint. The bottom angle corresponds to the rise-over-run of the long stretcher's dovetail. What that angle is, I have no idea, so I use the drawing to set my bevel gauge. The top angle needs to match the wedge's taper.

After cutting the mating dados that create these through-mortises, glue up the legs. Next, cut the stopped mortises. Bore for the vise screw and mortise for the parallel guide. I cut this mortise with a little play in its length so the parallel guide won't get hung up in use.

I then cut the legs to length at 15° top and bottom. Angling the legs means you'll need to bevel the top edge of the upper stretcher too. Before gluing up the end assemblies, drill holes in the upper stretcher for the bolts that will secure the top.

Knockdown long stretchers

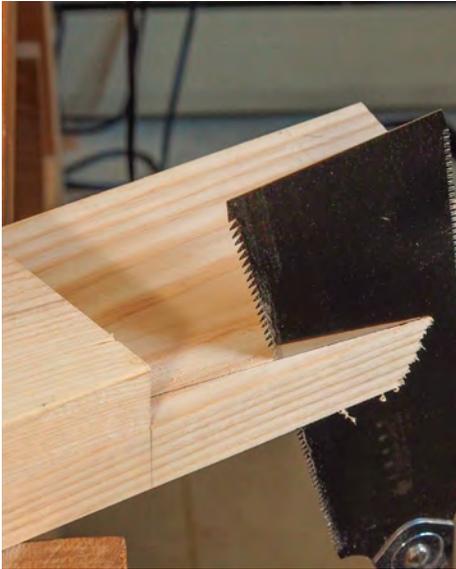
The long stretchers, with their half-dovetailed tenons wedged in place, make this bench easily portable, yet the half tail and wedge form a secure, rigid, full dovetail that locks the bench in place. Unlike tusk tenons, which exert pressure against a tenon's end grain, these wedges press against its edge grain. I can smack them into place without fear of blowing out the mortise.

Like the short stretchers, the long ones are laminated. After cutting the angled ends on the shoulder board, glue it to the cheek board. I cut the cheek board to length only after cutting the half tail. This is for two reasons. First, it takes the stress out of the glue-up, because if the shoulder board shifts along its length, I don't worry about losing necessary tenon length. Second, it's tricky to start a cut on a corner, and an overlong tenon spares me that. In thickness, these tenons should fit like a slightly subpar glue joint.



Dry-fit end assembly to mark the angle on the upper short stretcher. This waste is removed so the stretcher's upper edge lies flush with the legs. Bandsaw close to the line and, after gluing up the assembly, refine the cut with a long plane.

Bring the bench together



Long stretcher's cheek board gets a half tail on the bottom. Dima keeps the cheek board long so this cut is easier to start. He trims it to length afterward. These stretchers also use laminations to form the tenon.



Assemble the bench's base. After putting the long stretchers into one end assembly, lift and shimmy them into the other end. Seat the joints with a heavy mallet. Chamfers on the feet help prevent splitting at this stage.



Fit and install the wedges. These wedges lock the dovetailed long stretchers in place. Leave them long at this point so there's plenty of room for adjustment. When they fit nicely, trim them to length.



Add the top. The top's front edge is flush with the front faces of the legs. The top itself is two pieces with a $\frac{5}{8}$ -in. split between.



Dowels register the top on the base, and lag screws keep it there. Install two dowels by the leg vise. These are insurance against the leg vise pushing the top away from the legs. Half-inch lag screws lock down the top.

Leg vises are easy



Install the parallel guide and vise screw in the chop. After drilling the holes in the guide, glue and wedge it into the chop. The vise screw mounts to the chop via standard wood screws.



Put the chop, parallel guide, and vise screw in place to locate the vise flange. Don't try to find this location by measuring. Instead, slide the chop against the bench and thread on the flange. When the flange seats flush against the leg, screw it in place.



Mark the chop to length. By tracing the length off the top, you're guaranteed to have a chop that matches your bench. Dima saws the piece along the pencil line, letting the chop sit slightly below the benchtop, keeping it out of the way.

USING A LEG VISE



Leg vise pivots against pin in parallel guide to pinch workpiece at the top. To secure work in the vise, Dima inserts a drift pin in a hole just beyond the dimension he wants to clamp. He then tightens the vise screw with the workpiece in place. The chop should be slightly farther from the bench at the bottom than at the top, where it needs to pinch the stock.

The front long stretcher should be flush with the front faces of the front legs. The top's front edge will sit in the same plane, yielding plenty of clamping surface. So, this joint is worth checking with a long straightedge after assembling the bench. Now's also a good time to nail on the cleats that support the shelf boards, which for me are just random-width scraps from the build, the ugly stuff that didn't make the cut. Finally, drill for the registration dowels that locate the top on the base.

Leg vise

The vise needs five things to work: a chop, a parallel guide, a screw, a flange, and a handle.

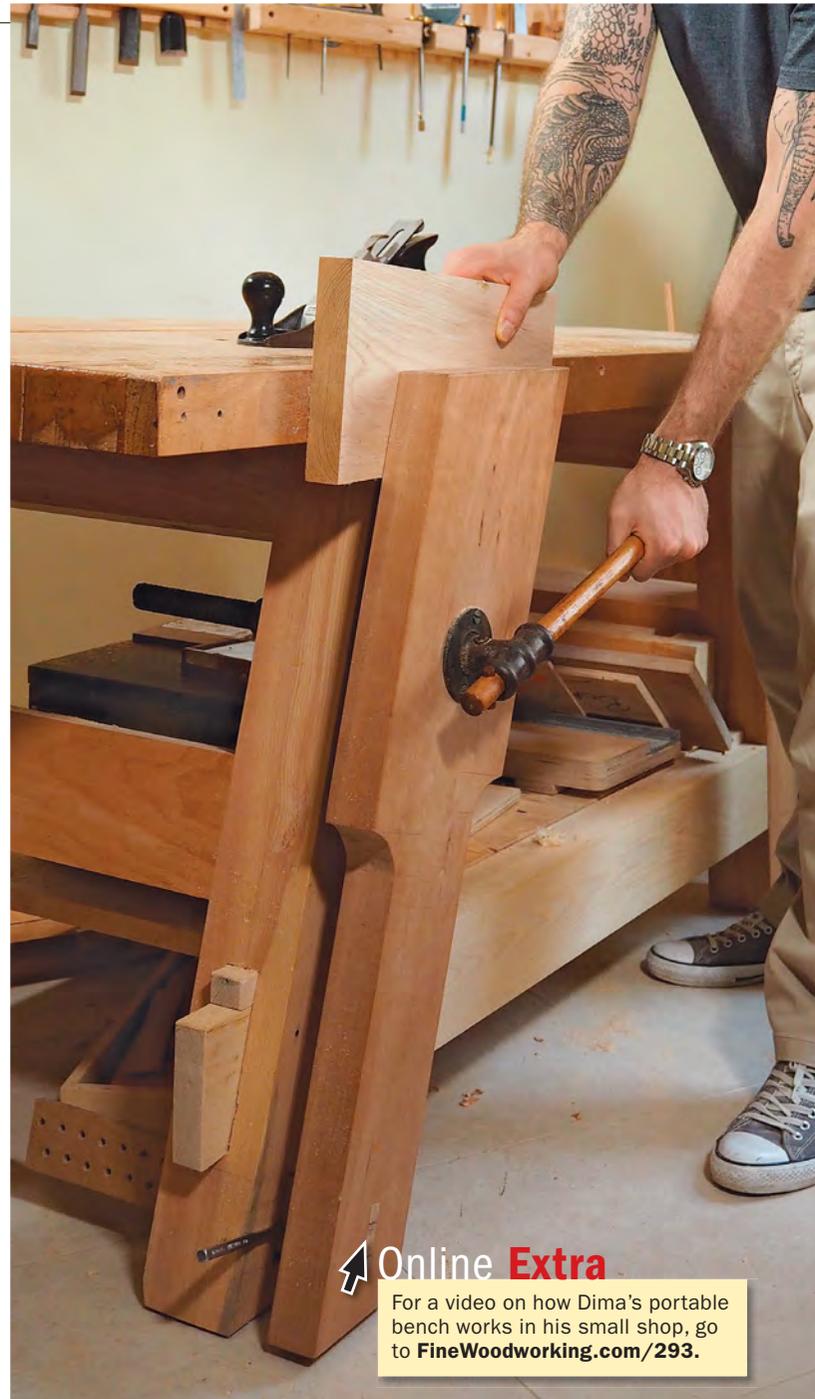
To lay out the chop, I draw a centerline and the 15° bottom end. Almost all other layout comes from these two marks. Cut and shape the chop accordingly, but leave it long at the top for now.

The parallel guide, next, has two jobs. First, it prevents the chop from spinning as you tighten and loosen the screw. Second, it lets the chop pivot against a pin to pinch the work. This is what all those holes are about: You can easily pick the one that lets the chop pivot in to clamp at the top.

The penultimate step is installing the hardware. I use an antique set in the pictures, but modern versions are readily available. Finish up by cinching the chop against the bench to mark its length.

A tidbit on the top

OK, I will spill some ink on the top, but mainly to emphasize that you should build it to your taste. For example, the split top is nice for storing chisels, saws, and other tools, and it provides



Online Extra

For a video on how Dima's portable bench works in his small shop, go to [FineWoodworking.com/293](https://www.finewoodworking.com/293).

purchase for shorter clamps when I clamp something wide to the benchtop's front edge. But it's also a space for shavings and tools to fall into, and it allows the two tops to move independently. To be honest, I'm a little split on it myself.

Then there are the dog holes. I originally drilled mine to work around the repurposed top's old base, and the locations work just as well on this one. The drawing on p. 40 places them where I would. Or just drill yours as you need them. That's cool too. □

Barry NM Dima is FWW's associate editor.