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Split-Mortise Bench

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- Step by Step construction instruction.
- A complete bill of materials.
- Exploded view and elevation drawings.
- How-to photos with instructive captions.
- Tips to help you complete the project and become a better woodworker.

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A modest number of parts and through tenons on the stretches of this bench give it an honest, rock-solid stature. Aside from being a fun project to build, this bench will make a fitting place to don those winter boots.

Split-Mortise Bench

Timber framed joinery in the author's 100-year-old Minnesota smokehouse provided the inspiration for making the split-cut mortises on this bench. The rest of the styling is straightforward and easy to reproduce with a band saw and drum sander. Then throw in a dash of contrasting wood to add a bit of flair to this sturdy and useful project.

There's something special about mortise and tenon joinery. Lots of woodworkers feel dovetails are more romantic, but when our author stands in his 100-year-old smokehouse, especially during one of our infamous Minnesota snowstorms, the immense strength of the structure's mortise and tenon joinery quite reassures him.

The pegged timber frame joints in the building were, in part, the inspiration for this bench. Though the design is simple, its execution may be a little more demanding than it looks. For example, there are some tight tolerances on the pegged tenon joints that hold the stretcher to the legs. And the leg tops are angled slightly to make the seat more comfortable.

We've always believed that fine craftsmanship should be so in tune with design that it takes a while to notice that you're looking at something special. That's what we'd like you to experience when building this bench.

Figure 1: *The split mortise in each leg is created by ripping stock down the center, dadoing half the mortise out of each piece, and regluing.*

Choosing a Wood Species

We chose hard maple for this bench because its understated grain and texture complement the simple lines of the design. In addition, the bench should appear sturdy and functional, hence the thick stock used throughout. If you have difficulty finding 1½"-thick material, face-gluing 3/4" boards together will work equally well. If you choose to go the latter route, make sure the grain patterns along the edges are fairly similar: Visible joints may detract from the finished piece. Also, use clamps with long jaws and start clamping from the center out, to prevent leaving voids in the glued-up panel.

Once you've settled on your wood species, it's a good idea to store the stock in your workshop for a week or two, just to let it acclimate. With the precise tenons you'll be milling, it's better that you don't have to deal with too much shrinkage or expansion. Also, cut all the parts 1/8" oversize, then wait another week before jointing them to the exact dimensions in the *Material List* on page 75.

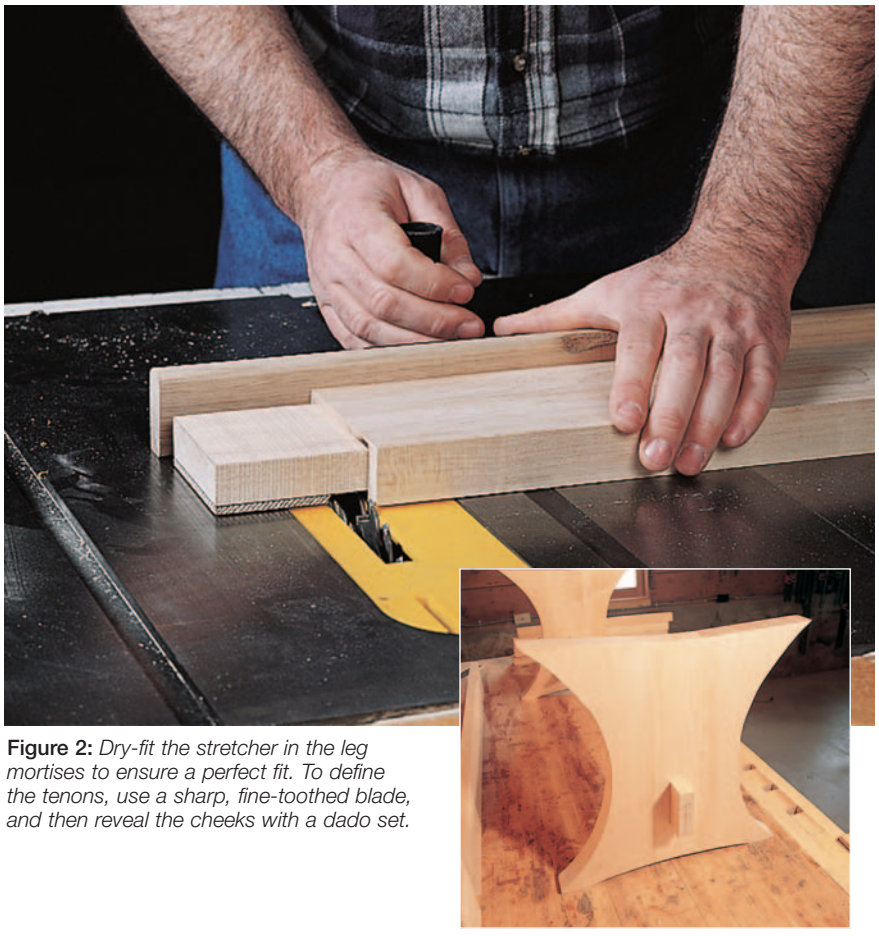


Figure 2: *Dry-fit the stretcher in the leg mortises to ensure a perfect fit. To define the tenons, use a sharp, fine-toothed blade, and then reveal the cheeks with a dado set.*

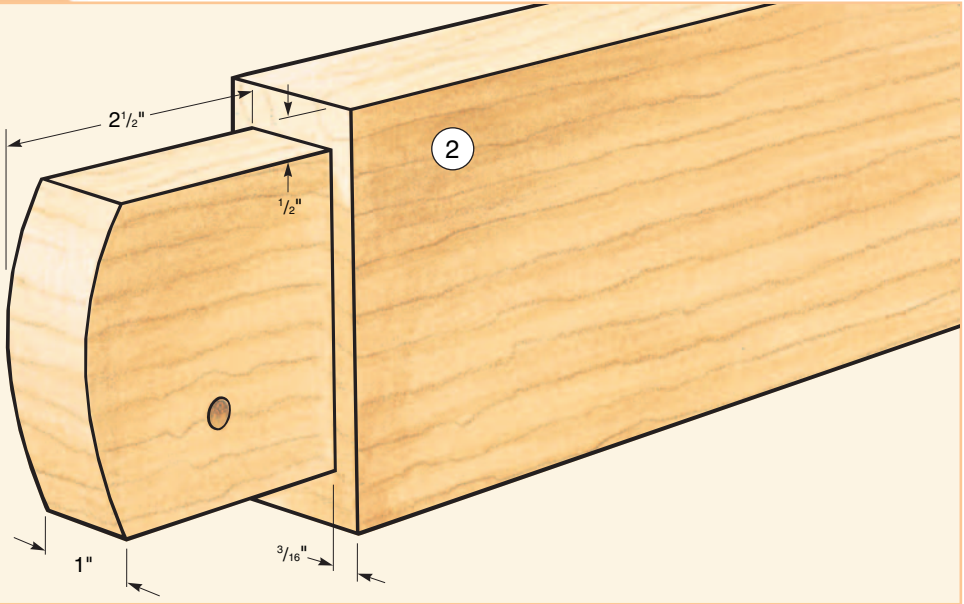
Making Mortises the Easy Way

When our author started this project, he figured that the biggest challenge would be making the large through mortise in each leg (piece 1). With visions of sharp chisels cracking the 1½"-thick hard maple along its grain, he began searching for a better method than drill-and-chisel. What he came up with was a technique appropriately borrowed from timber framers (see *Figure 1*). He simply ripped each leg's middle board down the center, removed half the mortise from each side using a dado blade on the table saw, then reglued the board.

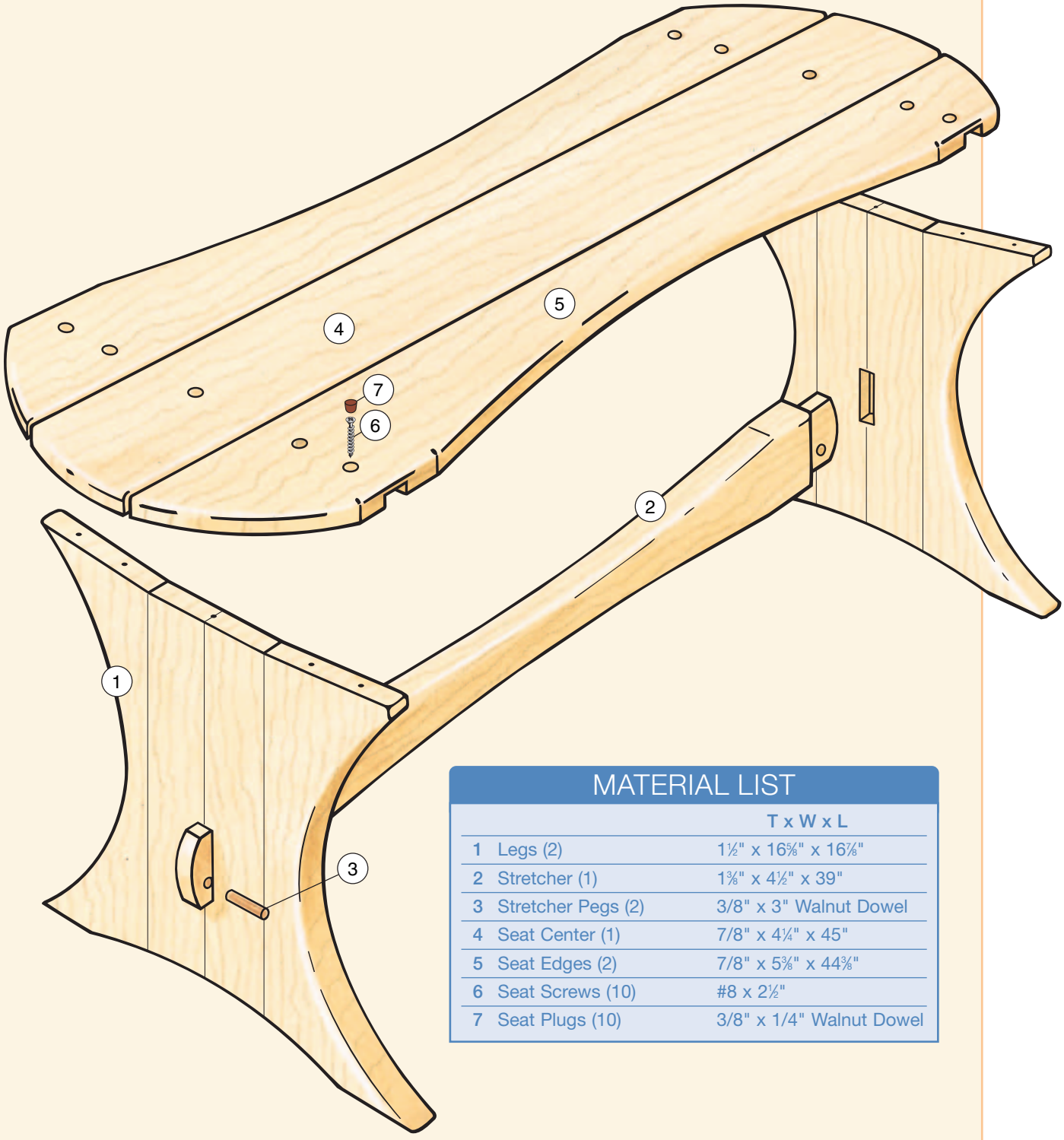
Each of these reassembled middle pieces then became the center of a 16⅝"-wide panel, which in turn served as the blank from which the leg was cut (see the *Leg Pattern* on page 77). Again, pay attention to the grain pattern: Matching grains help make a panel look seamless. Use dowels or biscuits to keep the parts aligned, and apply enough clamping pressure to close the joint tight, but not so much that you end up squeezing out too

Stretcher Tenon Detail

Note that the stretcher's tenons are not quite the full height of the mortises in the legs. This allows the tenons to expand and contract with seasonal changes.



Bench Exploded View



MATERIAL LIST

		T x W x L
1	Legs (2)	1½" x 16⅝" x 16⅞"
2	Stretcher (1)	1⅜" x 4½" x 39"
3	Stretcher Pegs (2)	3/8" x 3" Walnut Dowel
4	Seat Center (1)	7/8" x 4¼" x 45"
5	Seat Edges (2)	7/8" x 5⅜" x 44¾"
6	Seat Screws (10)	#8 x 2½"
7	Seat Plugs (10)	3/8" x 1/4" Walnut Dowel

Figure 3: *Most of the edges of the split mortise bench are rounded over with different bits prior to final assembly.*

much of the glue. When the glue cures, temporarily attach a copy of the *pattern* to one face of each panel (use two-sided tape or spray-mount adhesive), and carefully cut just outside the lines with your band saw. Then, using a drum sander in your drill press or an oscillating spindle sander, sand it up to the lines.

Making the Pegged Tenon Stretcher

Any pro will tell you that, when milling several operations on a single part, start with the most difficult one. That way, if you make a mistake, you'll only be out a board, instead of a board and a lot of time.

The most demanding cuts on the stretcher (piece 2) are the tenons on either end. Begin by laying out these tenons according to the *Stretcher Tenon Detail Drawing* on page 74. Note that the tenons are not quite the full height of the mortises you've already cut in the legs. This is because wood moves more across the grain than along it, and the tongues must be allowed to expand and contract widthwise.

The best way to form the tenons is to use a tenoning jig like the one on page 56, but an accurately set miter gauge will also work for cutting the tenons face down. If you opt for the miter gauge, attach an auxiliary extension fence to its face to support this long workpiece.

Define the cheeks and shoulders (see *Figure 2*) with a sharp, fine-toothed blade, then switch to a dado blade to remove the waste. Use scrap wood to establish the correct blade height first, before cutting into your workpiece.

Dry-fit each tenon in its respective mortise (see *Figure 2*, inset) marking the hole locations for the stretcher pegs (pieces 3). Now drill a 3/8" hole for each peg—using your drill press to ensure a 90° hole (see the *pattern* on the next page for the peg hole location)—then fashion the pegs by cutting them to length and easing the ends with your belt sander. Test the fit by installing the pegs in your leg and stretcher assembly.

Remove the stretcher and use your band saw and belt sander to create the gentle curves on the ends of the tenons as well as the curved profile down the center of the stretcher (see the *patterns*). With that done, it's time to turn your attention to the seat boards.

Fashioning the Seat Boards

Ideally, the three seat boards (pieces 4 and 5) should be cut from a single wide board so their grain forms a pattern extending all the way across the seat. If that's not possible, find three boards that match well.

Use the *pattern* on the next page to lay out the profile of each board, then make all the straight cuts on your table saw. While the boards are still rectangular, cut dadoes in the underside of each where the legs will join the seat. Check your cuts by dry-fitting each board to the legs as you go. Make the curved cuts on the seat edges with your band saw, finishing with a drum sander in the drill press. Now use the *pattern* to locate the screw holes in the top. Turn the seat boards upside down and center the 3/16" pilot holes for attachment screws in the dadoes. Then flip the boards back over and used a Forstner bit to create counterbores on the top for plugging the screw heads. Use a drill press for boring these holes. Dry-assemble the whole bench and use a portable drill (switch to a 1/8" bit) to extend the pilot holes down into the tops of the legs.

Final Assembly and Finishing

Before final assembly, install a 3/8"-radius roundover bit in your router and soften the legs (except their top edges) and the stretcher (except its tenons), as shown in *Figure 3*. Now switch to a 1/4"-radius roundover bit and do the same with the seat boards (being cautious around the dadoes).

Glue and clamp the stretcher to the legs, wiping off any excess glue with a wet rag, then tap the pegs into their holes. Now line up your pilot holes and attach the seat boards to the legs, using #8 flathead wood screws (pieces 6) instead of glue. Remember to check that your assembly is perfectly square as you go.

When everything dries, make some face-grain seat plugs (pieces 7) from a contrasting wood that matches the pegs (we used walnut), then glue them into their counterbores and sand the surfaces flush. Continue sanding everything down through the grits to 180, and wipe all the surfaces with a tack cloth before applying your favorite topcoat. For this rustic bench, a satin varnish or several coats of shellac will create a fitting, low-luster sheen.

Split Mortise Bench