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Dave Campbell
Editorial Content Chief, *WOOD* magazine



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W A WORKHORSE OF A WORKBENCH

Our IDEA SHOP™ workbench may be the design for which you've waited for years. It's simple to build and super strong. We relied on inexpensive lumberyard stock and rugged mortise-and-tenon joinery to construct the base. For the benchtop, we laminated maple to handle a lifetime of workshop activity. And we added bench dogs and a bench vise to expand the usefulness of our workbench, making it a fitting centerpiece for any home workshop.

Design Notes

To keep costs down on this project, we hand picked straight-grained pine 2x10s for the workbench base at a local lumberyard. In addition, we checked each 2x10 for twist and bow, and chose the straightest and driest pieces available. (If you have a moisture meter, take it with you when you shop.)

After getting the stock back to the *WOOD* magazine shop, we stickered the boards, and let them acclimate to our indoor environment for several weeks before cutting the parts (A, B, C, D) from along the edges, where shown in the sketch *below*. This allowed us to use the straightest grain possible and achieve the best results.

A. R. Downing
Design Editor

Let's build the super-sturdy legs first

1 From 1½"-thick, straight-grained pine, rip and crosscut eight pieces ¾" wide by 33¼" long for the leg blanks. Plane the edges of the stock before ripping it to finished width to remove the rounded corners. (See the box at *left* for our method of obtaining straight-grained pieces from common lumberyard 2x10 stock.)

2 Cut a 3" dado ½" deep 18¾" from the bottom end of each leg blank, where shown on the Mortise detail accompanying the End-Frame Assembly drawing on *page 3*.

3 Cut a 1x3x6" spacer to temporarily fit in the mating dadoes of two leg blanks, where shown on the Laminating the Legs drawing on *page 3*. With the spacer between the pair of dadoes and the edges of the leg blanks flush, glue and clamp the pieces together. Then, remove the spacer before the glue dries. (We used pieces of scrapwood stock

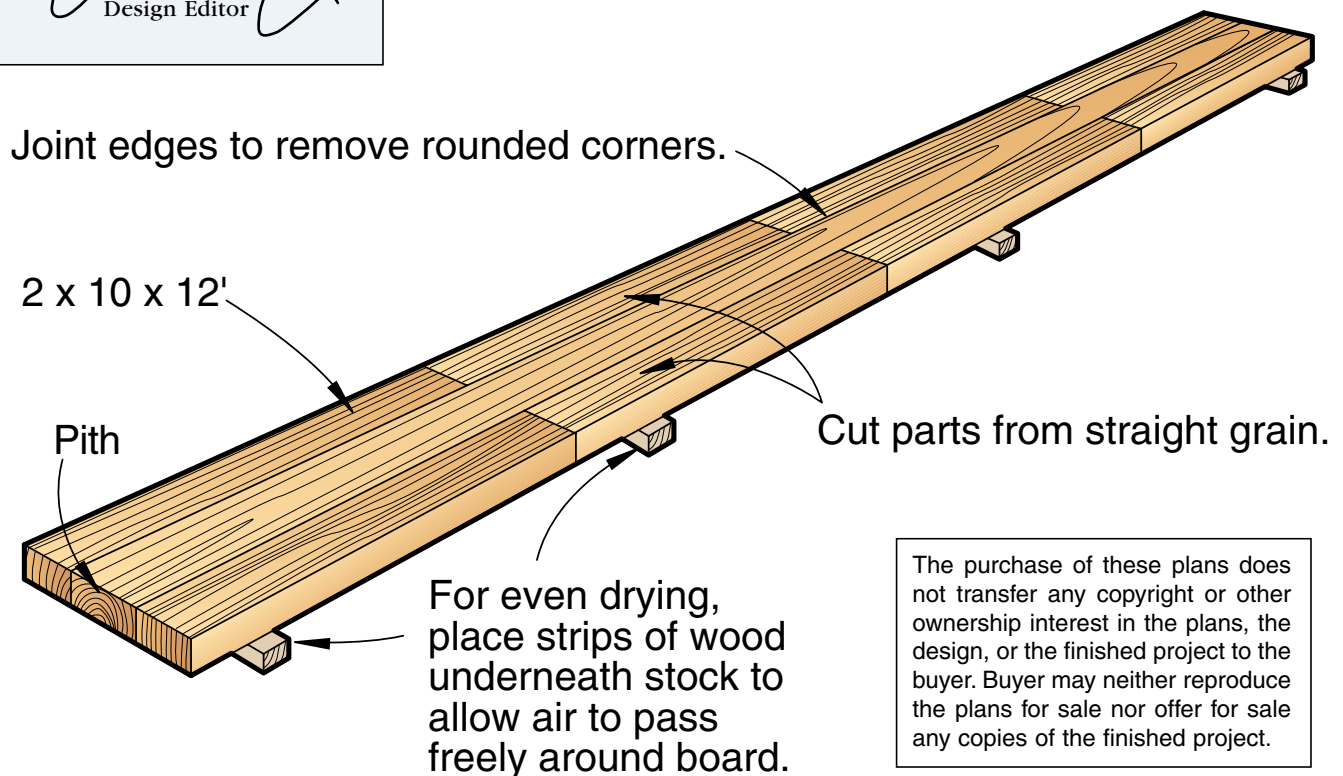
between the clamp jaws and legs to prevent the metal jaws from denting the softwood.) Repeat the clamping process for each leg.

4 Remove the clamps, scrape the glue from one edge, and plane ⅛" from the scraped edge to get it flat. Rip the opposite edge for a 3⅛" width. Next, plane ¼" from the cut edge to remove the saw marks and to obtain the 3" finished width. Repeat for each leg.

Now, add the feet and rails for a wobble-free base

1 For the feet (B) and the rails (C), (See the End-Frame Assembly drawing on *page 3* and the Parts View drawings on *page 11*.) Follow the same method described to form the legs (A). Cut the pieces oversized in width, cut the dadoes, glue the pieces together with the dadoes and edges of the boards aligned, and trim to finished width.

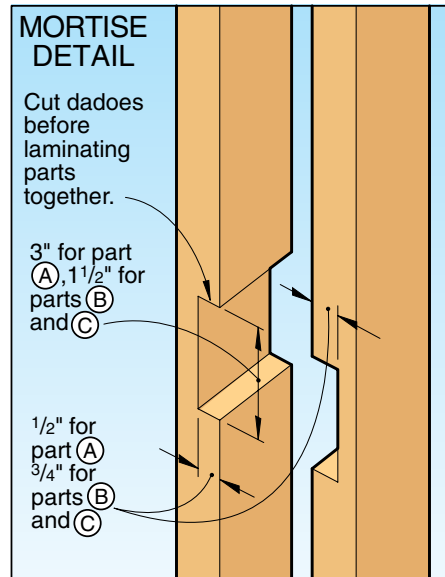
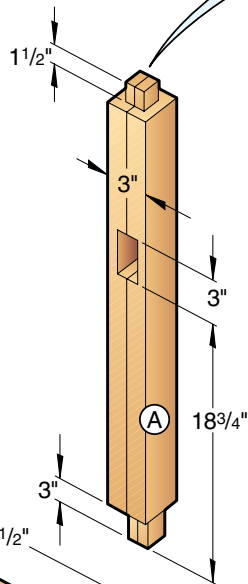
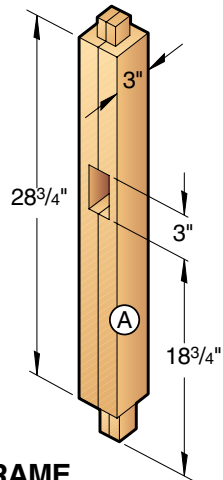
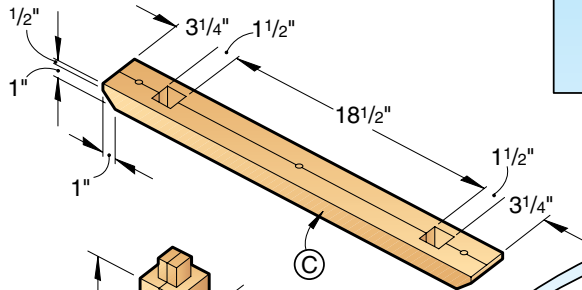
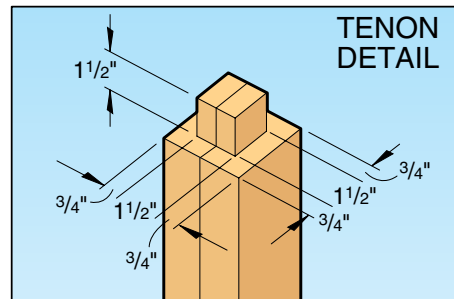
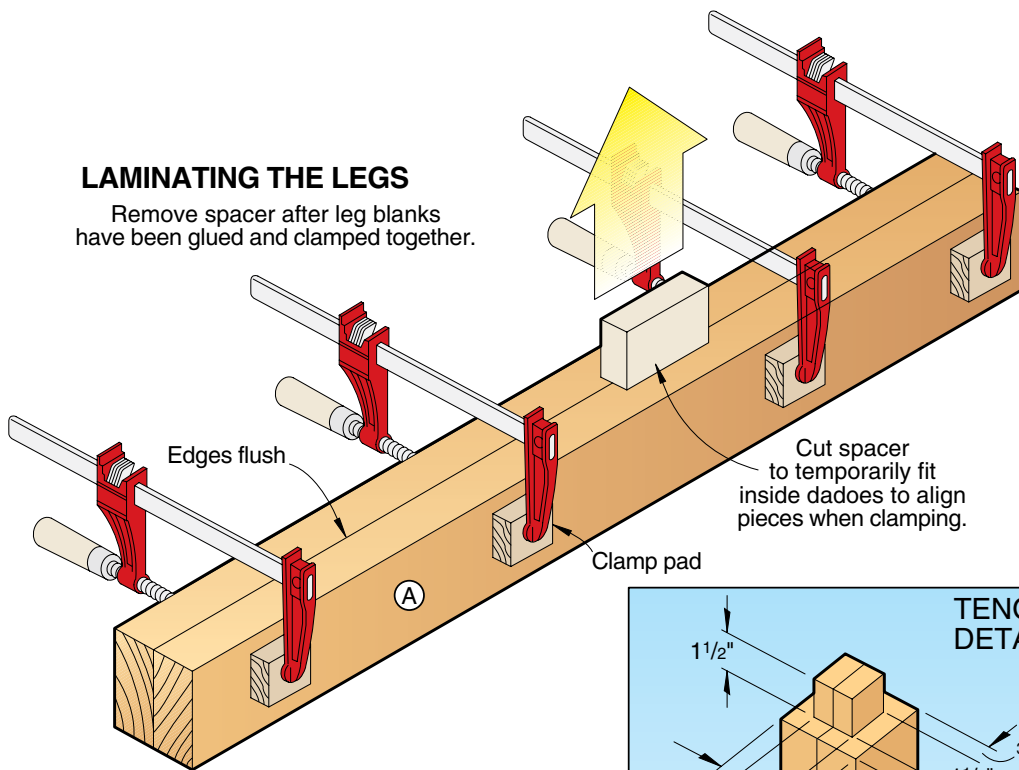
2 Clamp the two feet (B) bottom edge to bottom edge. Mark a centerpoint ¾" from each end of the



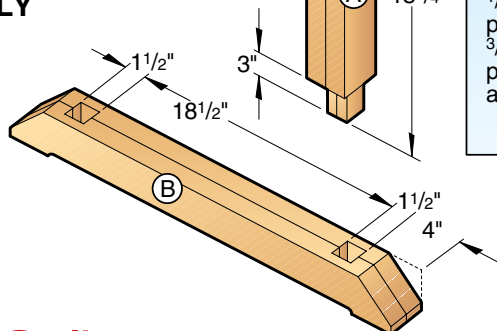
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LAMINATING THE LEGS

Remove spacer after leg blanks have been glued and clamped together.



END-FRAME ASSEMBLY



clamped-together feet. Now, use a compass to mark a 1/2" hole (1/4" radius) at each centerpoint. Draw straight lines to connect the edges of each circle, where shown in *photo A* below.

3 Mark a 45° cutline across the end of each leg, where shown on the Parts View drawing on *page 11*. Do the same thing to the end of the rails, where shown on the End-Frame Assembly drawing on *page 3*.

4 As shown in *photo A*, drill a 1/2" hole at each marked centerpoint. Remove the clamps, and bandsaw between the holes along the inside edge of the marked line. Sand to the line to remove saw marks.

5 Using the dimensions on the End-Frame Assembly and Parts

View drawings, miter-cut (we used a bandsaw) both ends of each foot (B) and both ends of each rail (C). Sand smooth.

6 Drill a trio of 3/8" holes in each rail (C), where shown on the Parts View drawing.

Next, let's assemble the base

1 Mount an auxiliary wood fence to your miter gauge and a dado blade to your tablesaw. Cut tenons to the sizes shown on the End-Frame Assembly drawing and accompanying Tenon detail on *page 3*.

2 Glue and clamp each end frame together, checking for square.

3 Route 1/4" chamfers along the edges of the end frames, where shown on the Exploded View drawing on *page 8*.

4 Cut the stretchers (D) to size. Cut a 3"-long tenon at each end of each stretcher to fit snugly through the leg mortises.

5 Route a 1/4" chamfer along the edges of the stretchers between the tenons.

6 Using the Tenon detail accompanying the Exploded View drawing, bandsaw a pair of V-shaped notches in each tenon.

7 Cut eight wedges (E) to the size shown on the Parts View drawing. (For contrast against the light pine, use a dark-colored hardwood for the wedges; we choose genuine mahogany.)

8 Glue and clamp the stretchers in place between the end frame assemblies. Inject a bit of glue in each notch, and using a mallet, tap the wedges into the notches, and check for square.



Clamp the feet together, and drill a 1/2" hole at the marked centerpoints to form the radiused bottoms.



Tap the hardwood wedges into the notches. After the glue dries, trim the wedges flush with the legs.

9 Being careful not to mar the surface of the leg, trim the wedges flush, as shown in *photo B*.

Build a top that can take a pounding

Note: You either can laminate your own maple top as described below or substitute a solid-core door from a local lumberyard or home center. Ask to find out if the company has any doors that customers have rejected because of mistakes in staining or cutting. You can purchase these for a fraction of their retail cost. Avoid doors rejected because of warpage.

1 Cut 28 pieces of 1 1/16"-thick maple (F) to 2 1/4"x61" for the laminated top. For reference when

drilling and laminating later, mark an X on the best (defect-free) edge (not face) of each strip.

2 Using the Benchtop Assembly drawing below for reference, construct and attach a long fence to your drill press to ensure consistently spaced holes. Add a support to each end. Mark the reference marks on the fence, where shown on the drawing.

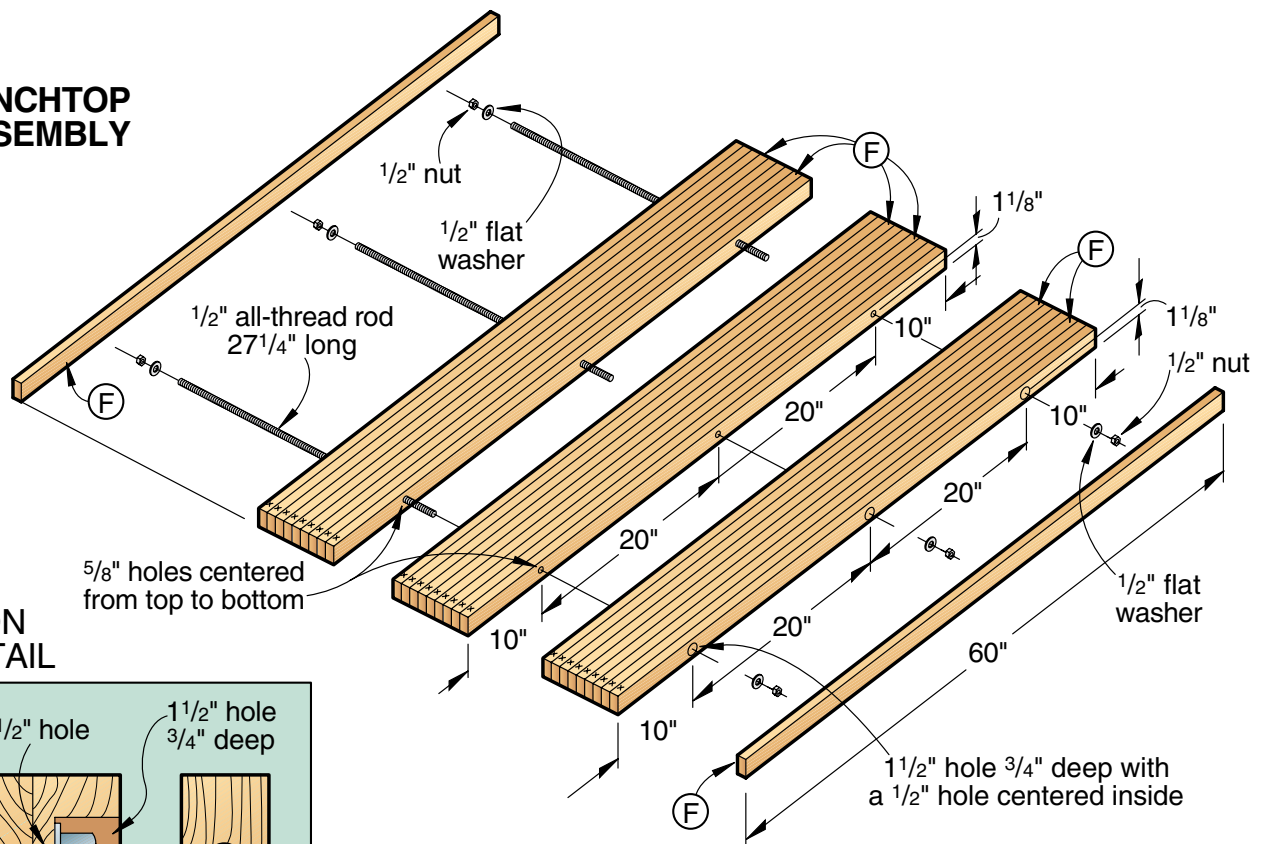
3 With the marked edge facing out, align the ends with the reference marks on the fence, and drill three 5/8" holes in 24 of the 28 benchtop pieces (F).

4 Still using the fence and your marks, drill three 1 1/2" holes 3/4" deep with a 1/2" hole centered inside each 1 1/2" hole in two of the remaining four pieces.

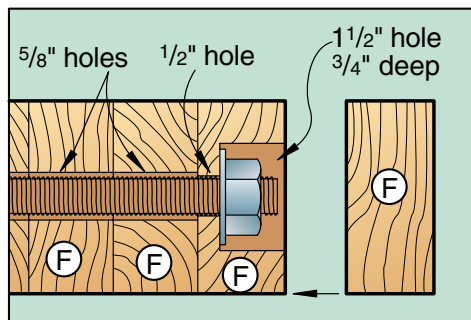
5 Glue and clamp eight of the predrilled pieces (F, G) face-to-face, with the edges and ends flush, the 5/8" holes aligned, and the Xs facing up. Next, glue and clamp two nine-piece sections together in the same manner. Each of the nine-piece sections should have a strip with the 1 1/2" holes on the outside edge. See the Benchtop Assembly drawing below for reference. (We found it easier to laminate three sections, then glue and clamp the three sections together to form the top.) You should still have two maple strips (F) with no holes in them.

6 Using a hacksaw, cut three pieces of 1/2"-diameter all-thread rod to 27 1/4" long.

BENCHTOP ASSEMBLY



SECTION VIEW DETAIL



7 Spread glue on the mating edges, and clamp the three sections edge-to-edge, using pipe clamps and the all-thread rod with nuts and flat washers attached. Check that the surfaces are flush. (We used a ratchet to tighten the ½" nuts on the all-thread rod.) Alternate back and forth between the clamps and the nuts on the threaded rods for even clamping pressure.

8 Glue the remaining two top pieces (F) to the edges of the top assembly to hide the holes and threaded rods.

9 Scrape off the excess glue, then belt-sand both surfaces of the benchtop flat.

10 Fit your portable circular saw with a carbide-tipped blade. Clamp a straightedge to the benchtop, and trim ½" off one end of the benchtop. Repeat at the other end.

base. Using the previously drilled holes in the rails (C) as guides, drill six ⅜" pilot holes 1" deep into the bottom side of the benchtop assembly. The holes in the rail are slightly oversized to allow the lag screws to move with the expansion and contraction of the benchtop. Using ¼" lag screws and flat washers, fasten the base to the top.

3 Add the finish to all surfaces. (We applied three coats of Watco Natural Danish Oil Finish.)

4 Drill the mounting holes, and add a vise using the instructions provided with the vise.

5 Mark and drill ¾" dog holes through the benchtop, where shown on the Dog Hole Layout drawing on *page 7*.

6 If you use the same type of round bench dogs we did, mark the layout for the dog holder (G) on a piece of 1⅛" maple. Mark the centerpoints

for the dogs and the mounting screws. Bore the holes for the dogs, and then cut the dog holder to shape. Next, drill the mounting holes, sand smooth, and apply the finish. Finally, screw the dog holder to the leg nearest the vise.

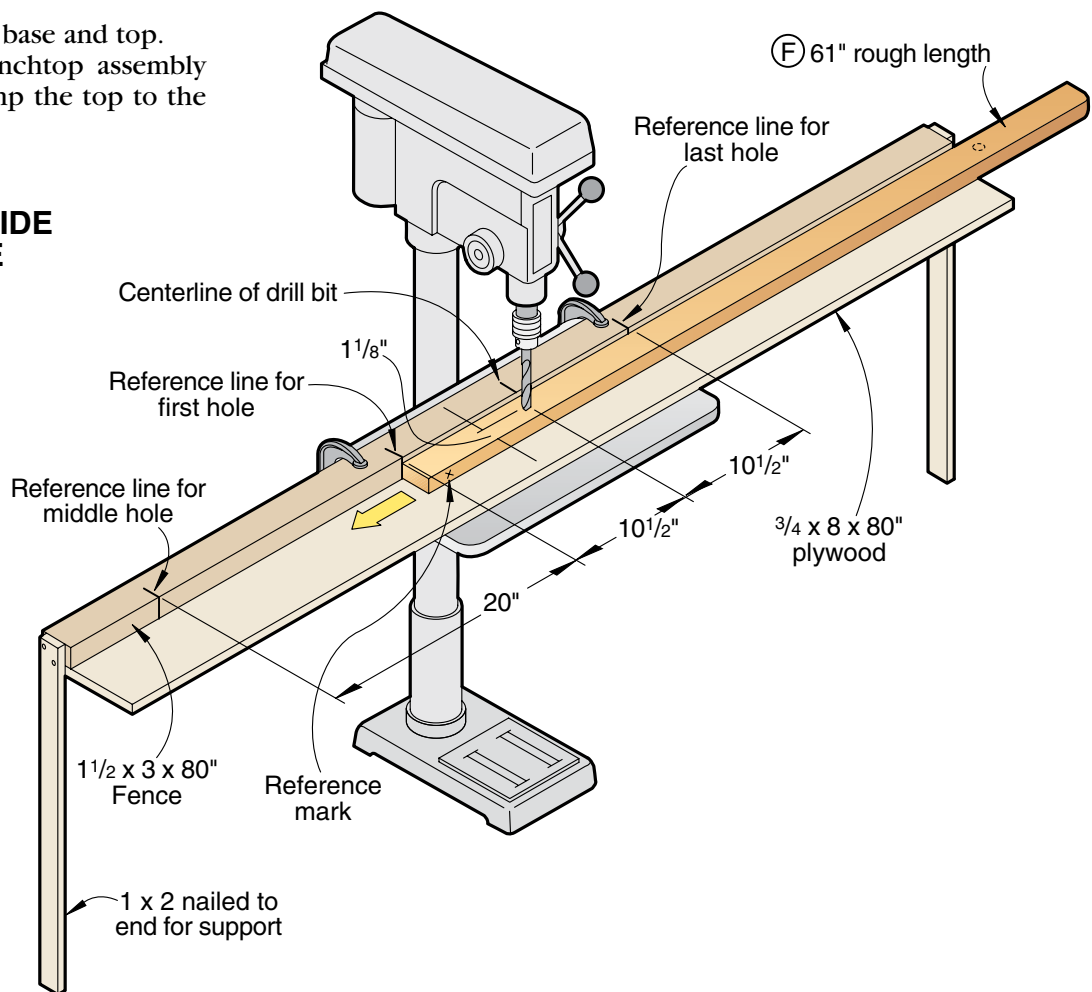
Buying Guide

Round bench dogs. Solid brass, with wire springs allowing for height adjustment. Catalog no. 911-194. Woodworker's Supply, Inc., 5604 Alameda Place NE, Albuquerque, NM 87113. Or call 800/645-9292 to order. ♣

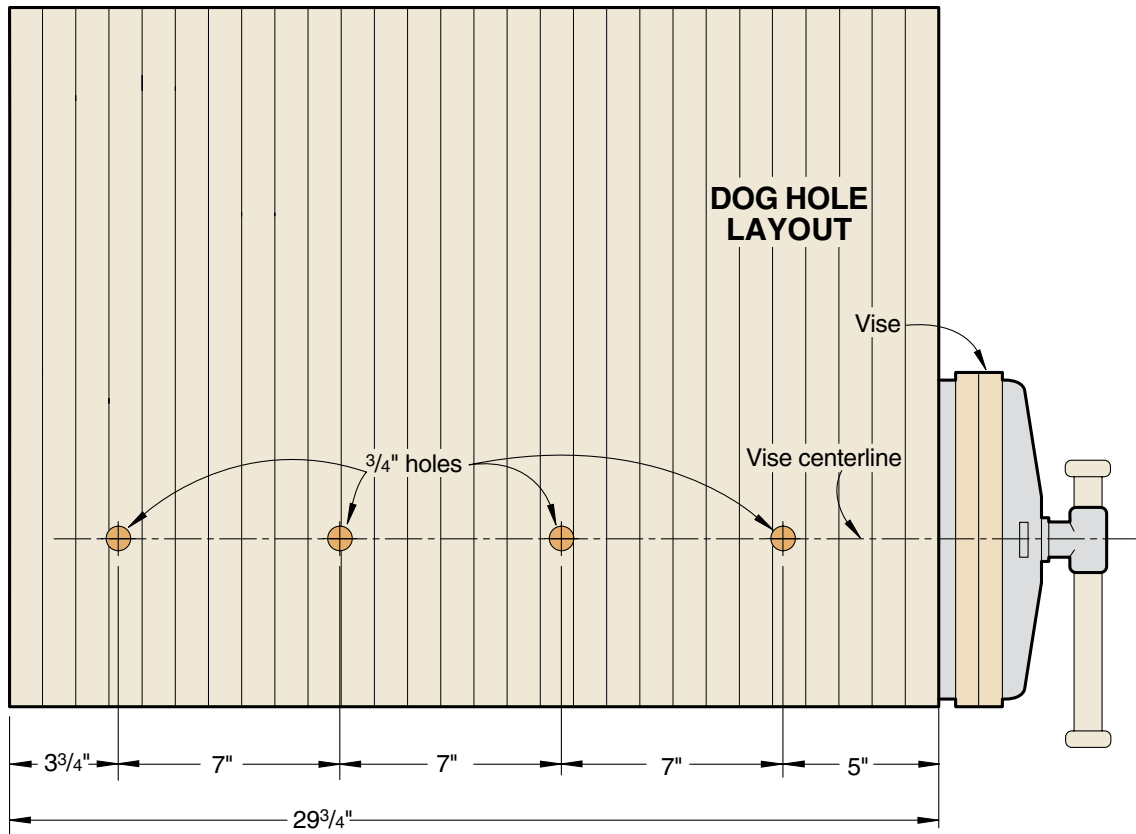
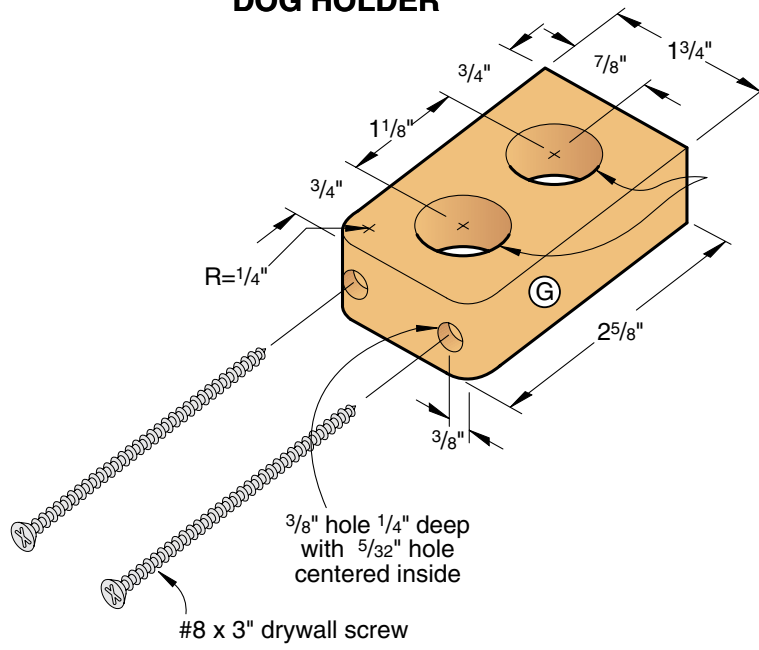
Finishing up

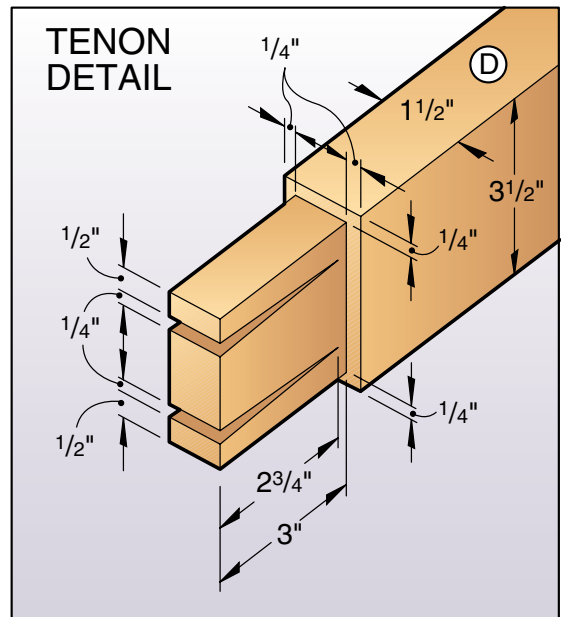
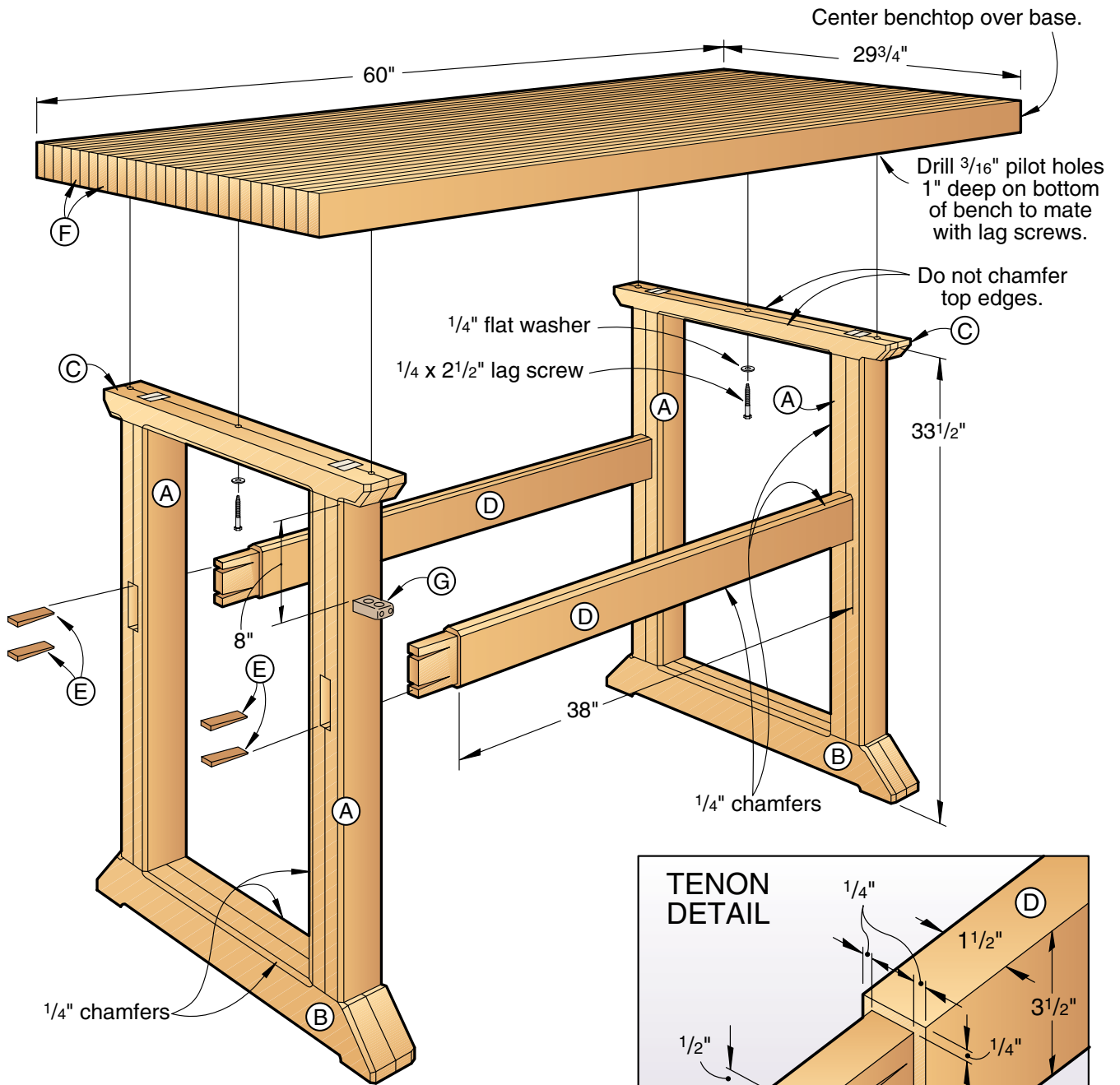
- 1** Finish-sand the base and top.
- 2** Center the benchtop assembly on the base. Clamp the top to the

DRILL-GUIDE FENCE

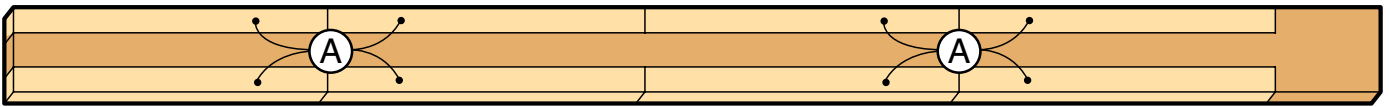


DOG HOLDER

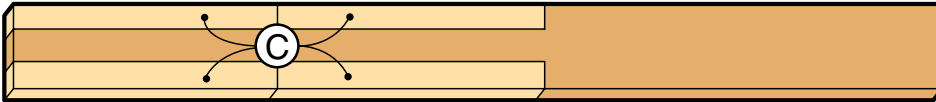




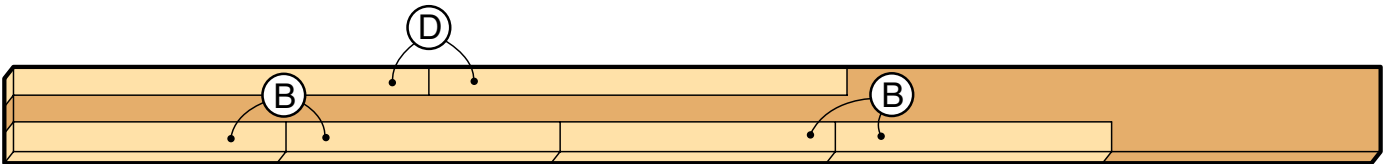
CUTTING DIAGRAM



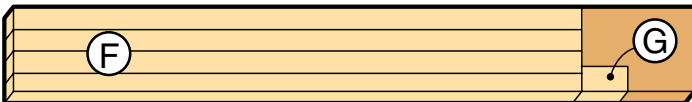
2 x 10 x 12' Pine or Fir



2 x 10 x 8' Pine or Fir



2 x 10 x 12' Pine or Fir



1 1/16 x 9 1/4 x 72" Maple (7 pieces)

Bill of Materials

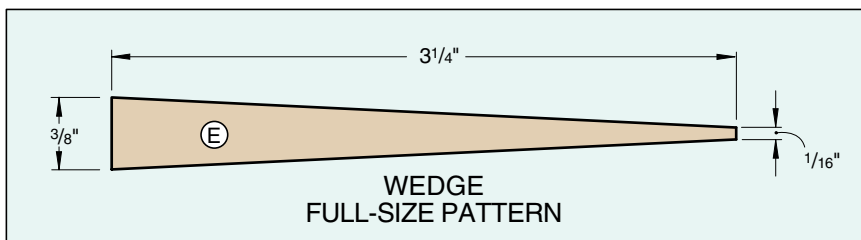
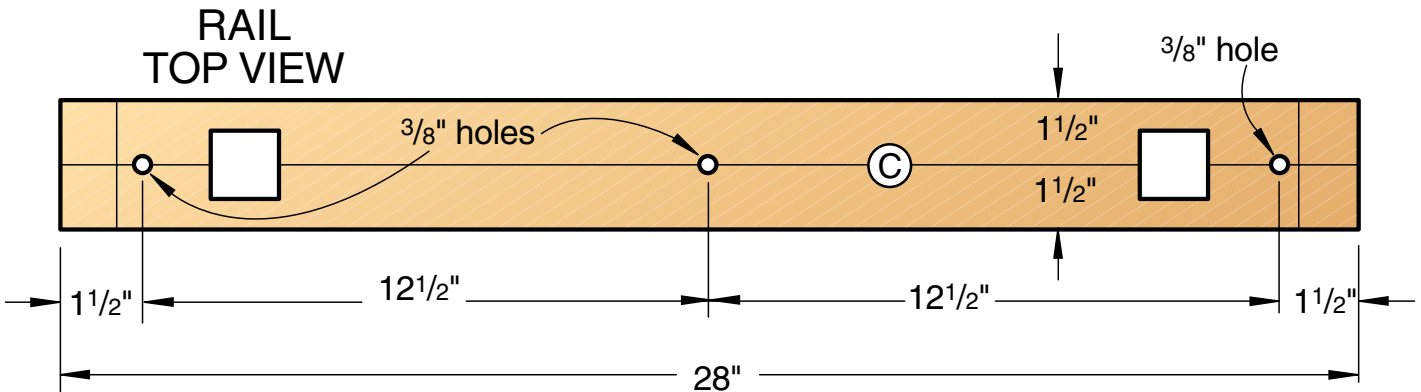
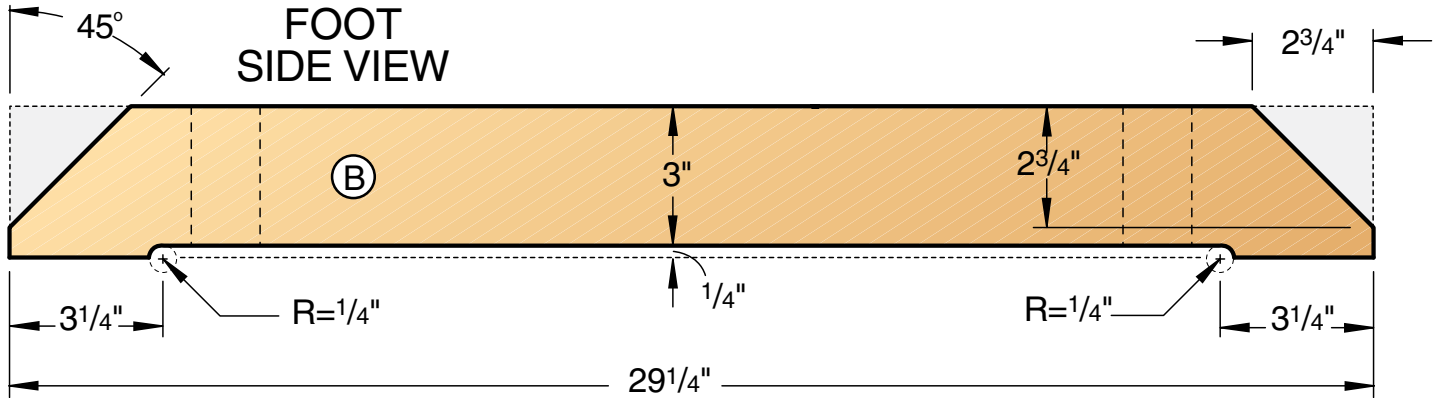
Part	Finished Size			Mati.	Qty.
	T	W	L		
A* legs	3"	3"	33 ¹ / ₄ "	LP	4
B* feet	3"	3 ¹ / ₄ "	29 ¹ / ₂ "	LP	2
C* rails	3"	1 ¹ / ₂ "	28"	LP	2
D stretchers	1 ¹ / ₂ "	3 ¹ / ₂ "	44"	P	2
E* wedges	³ / ₈ "	1"	3 ¹ / ₄ "	DH	8
F* top pieces	1 ¹ / ₁₆ "	2 ¹ / ₄ "	60"	M	28
G dog holder	1 ¹ / ₁₆ "	1 ³ / ₄ "	2 ⁵ / ₈ "	M	1

*Initially cut parts marked with * oversized in width. Trim to finished size according to the how-to instructions.

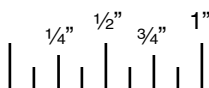
Materials Key: LP–laminated pine, P–pine, DH–dark hardwood, M–maple.

Supplies: 3–¹/₂" all-thread rods 27¹/₄" long, 6–¹/₂" nuts, 6–¹/₂" flat washers, 6–¹/₄x2¹/₂" lag screws, ¹/₄" flat washers, clear finish.

PARTS VIEW



To ensure full-size patterns are correct size, your printer should be set to print at 100% (not fit to page). Measure full-size patterns to verify size.



Produced by Marlen Kemmet
 Project Design: James R. Downing
 Illustrations: Kim Downing
 Graphic Design: Lorna Johnson
 Photographs: Wm. Hopkins
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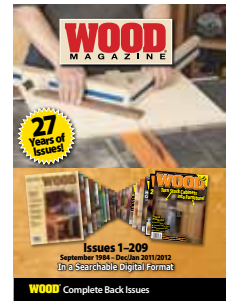
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