

Folding Stool With Tray

Knockdown design for a dual-purpose project

by Tage Frid

I was asked to design a folding stool that would be light, take up little space when folded, and serve as the base for a tray. In addition, any parts broken during service would have to be easily replaceable. When the stool was finished it weighed $4\frac{1}{2}$ lb., and measured $1\frac{3}{4}$ in. folded. Nothing has broken yet, so I haven't had to take it apart, but I could if I wanted to and it would go back together good as new.

I made the stool from ash. If I had used a weaker wood, I would have added to the thicknesses and widths for strength. The seat can be either leather or canvas. The one shown is canvas, with a single row of stitches to make a hem at the edges and a double row to hold the 3-in. overlap.

The stretchers can be held to the legs with either T-nuts or barrel nuts and $\frac{3}{16}$ -in. stove bolts. The stool shown here has T-nuts, which leave the holes in the stretchers open. Barrel nuts would have filled the holes and looked like metal plugs. Where the stretchers butt against the legs there's a hidden dowel (or a steel pin) that keeps the stretchers from turning. A washer between the legs where they cross allows the stool, to fold easily, and double nuts are locked together so they don't have to be drawn too tight. If a tight single nut were used, the stool wouldn't fold. Washers under the bolt heads protect the wood.

The legs are identical except for the angle on the foot—the angle makes it a right leg or a left, to keep the dowel holes inside. Mill the leg blanks, square them and cut them to exact length. Set up the drill press with stops to locate the holes, and then drill them all. Notice that the holes for the dowels

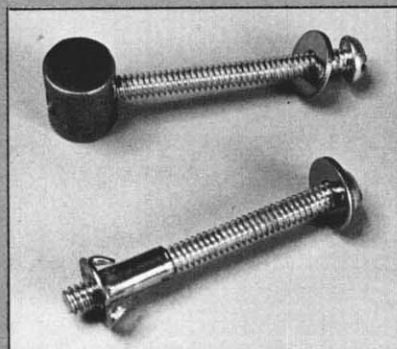
or steel pins don't go through—make these holes $\frac{3}{8}$ in. deep. After you've drilled the holes, taper the legs with a taper jig on the tablesaw or on the bandsaw. Cut a little wide so you can run the edges over the jointer to remove the saw marks, and then cut the foot angle.

The stretchers are all the same length. I made the bottom stretchers $\frac{1}{8}$ in. wider than the top because people have a tendency to put their feet on them when they sit on a stool, but the stretchers could be all the same size. Mill them out and cut them to length, then use a stop on the drill press to make the holes for the T-nuts or barrel nuts. For T-nuts, make $\frac{5}{8}$ -in. holes; for barrel nuts, use $\frac{1}{2}$ -in. holes. Of course, regular nuts could be used if the others aren't available, but barrel nuts are easy to make. My students and I use them a lot—they make an attractive and strong joint if a piece has to be disassembled. They can be of $\frac{1}{2}$ -in. cold-rolled steel, aluminum, brass, or other rod stock. Cut the nuts to length, so they will be flush with the surface if you want them to show, or shorter if you want to use them in a blind hole. File and sand the ends, then drill and thread holes for the bolts. Use a V-block jig in the drill press to bore the hole. Remember to countersink these holes so the bolt will start easily—when it comes time for assembly, you can wiggle the nut until you feel the bolt start to engage. If you use barrel nuts or regular nuts for the stool, use a $\frac{3}{16}$ -in. stove bolt, $2\frac{1}{2}$ in. long. For T-nuts, use a 2-in. long bolt. Tilt the drill-press table to 90° and clamp a jig to hold the stretchers while you drill the holes

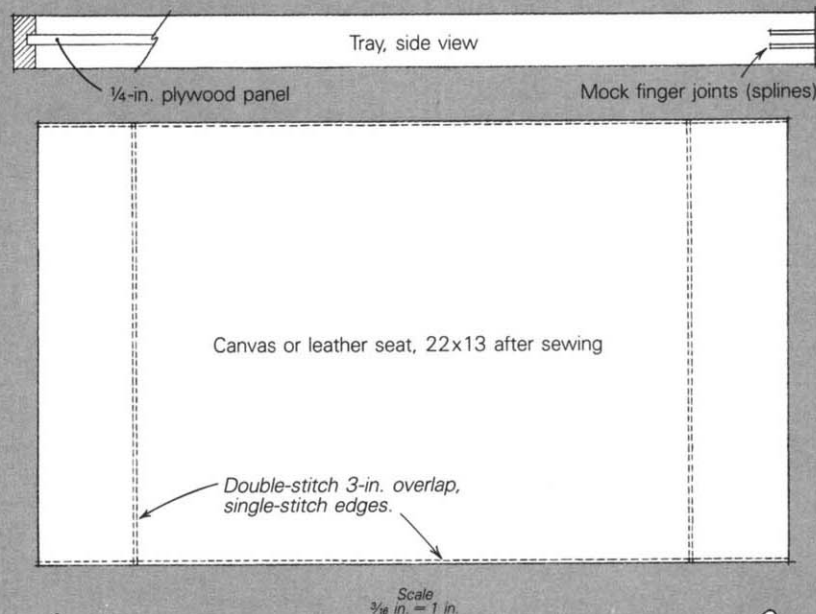


The taper in the legs of this stool cuts down weight, leaves the wood where it's needed, and allows the stool to close up to a snug $1\frac{3}{4}$ in. T-nuts in the stretchers allow disassembly. You don't have to store this stool in the closet when you're not sitting on it—make a tray that converts it into an occasional table or server, as shown above.

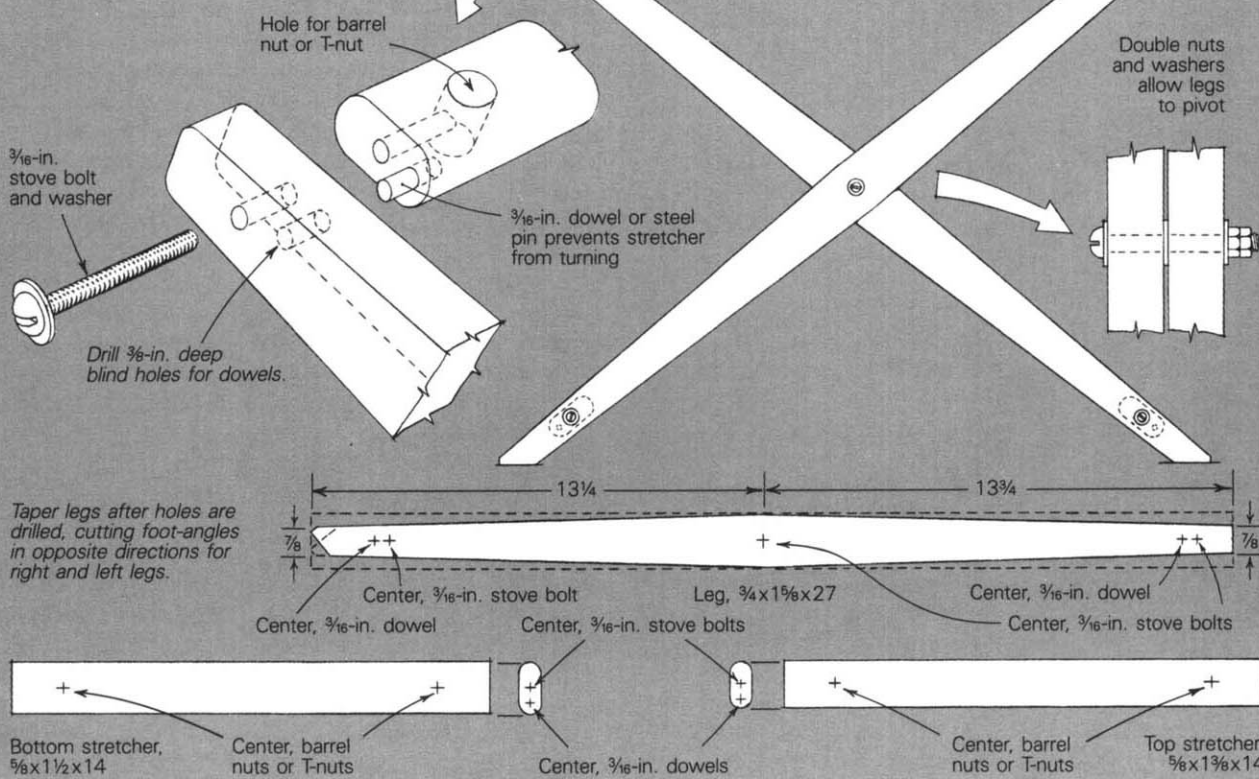
Folding stool with tray



Barrel nut, top, provides a sturdy attachment for knockdown furniture and can be shopmade to fit standard bolts. Prongs of T-nut, bottom, keep the nut from turning or loosening.



Typical stretcher-to-frame connection



for the bolts and dowels. The stool is now ready to be assembled, but first chamfer all the edges with a router or a plane, then sand and finish the pieces.

Don't make the tray before you have assembled the stool and measured it to be sure that the tray will fit. This one is an ash frame with a panel of 1/4-in. walnut plywood in a groove. I didn't use solid wood for the panel because, to remain stable, it would have had to be 3/8 in. thick, and that would have made the tray too heavy to carry around. There's

no trick to making the tray—I cut the corners to 45°, rubbed them together with hot glue, then strengthened them with a mock finger joint, which I learned from that wonderful book by Tage Frid. □

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