
EMPIRE BLEND TEA
IRISH BREAKFAST TEA
Ginseng

ADJUSTABLE SHELVES

I HAD BEEN TRYING TO WORK out a really simple (read "fast") way to make an elegant wooden version of the old standby, metal standards and brackets. Although I have seen many commercial versions of wall-hung shelving systems built of wood, I wanted something cleverly uncomplicated (if you know what I mean). The problem was always the shelf support brackets. What I needed was a way to hold up the shelves that didn't rely on brackets.

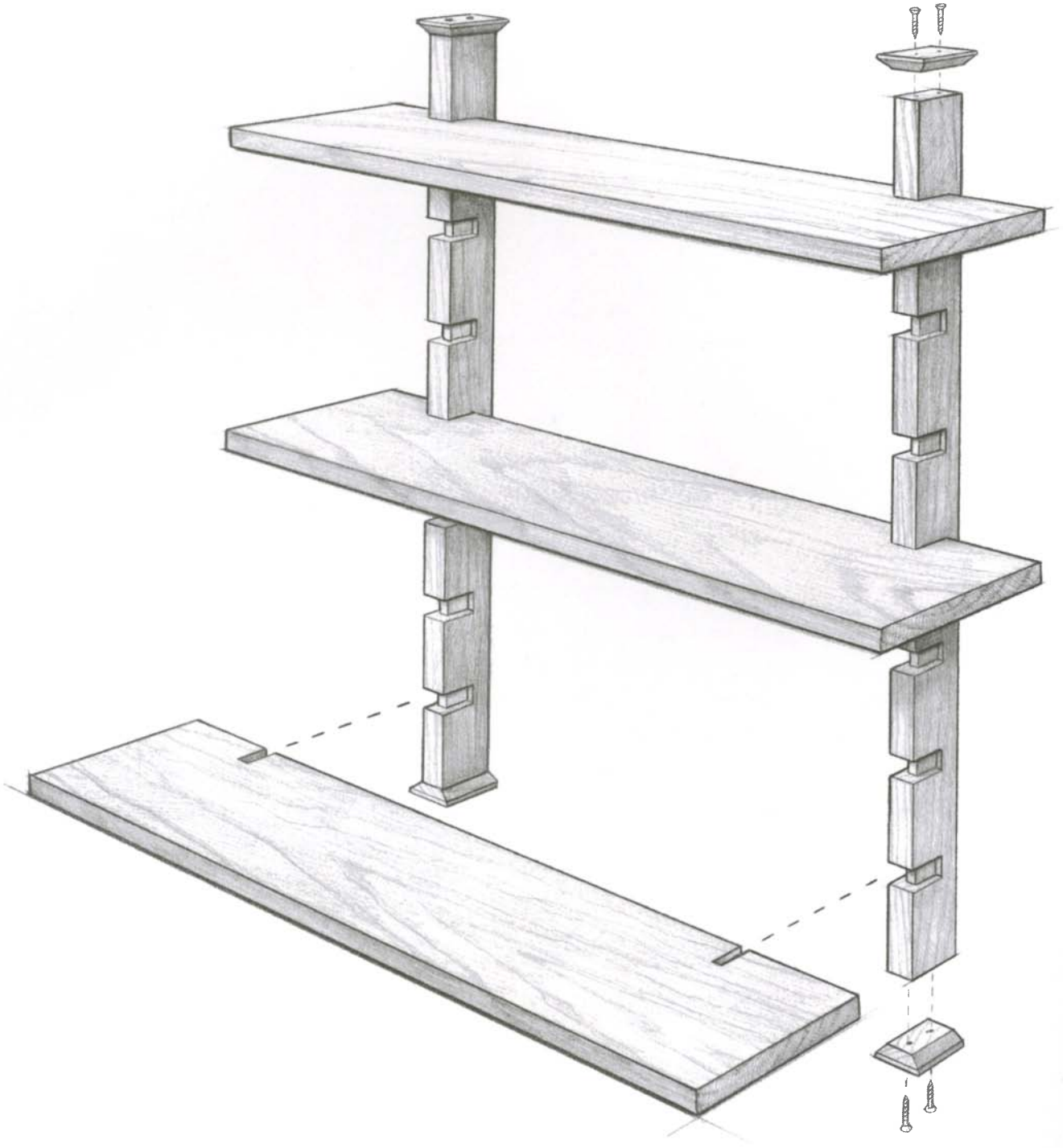
Luckily, I got this flash of insight. Why not just make couple of uprights with matching notches in them and stick the shelves into the notches? As long as the shelves fit the notches just right and weren't too deep or heavily loaded, it should be fine.

The physics of it seem to work: The notches support the shelves and hold quite a lot of weight. The first time I made it, however, installing it on the wall proved somewhat difficult. Once you cut notches in the uprights, they become more flexible. When you screw these flexible pieces of wood to a not-so-flat wall, the notches either spread open or pinch closed just enough to make the shelves either too loose or too tight in their slots. And, when open, the shelves slide easily from side to side.

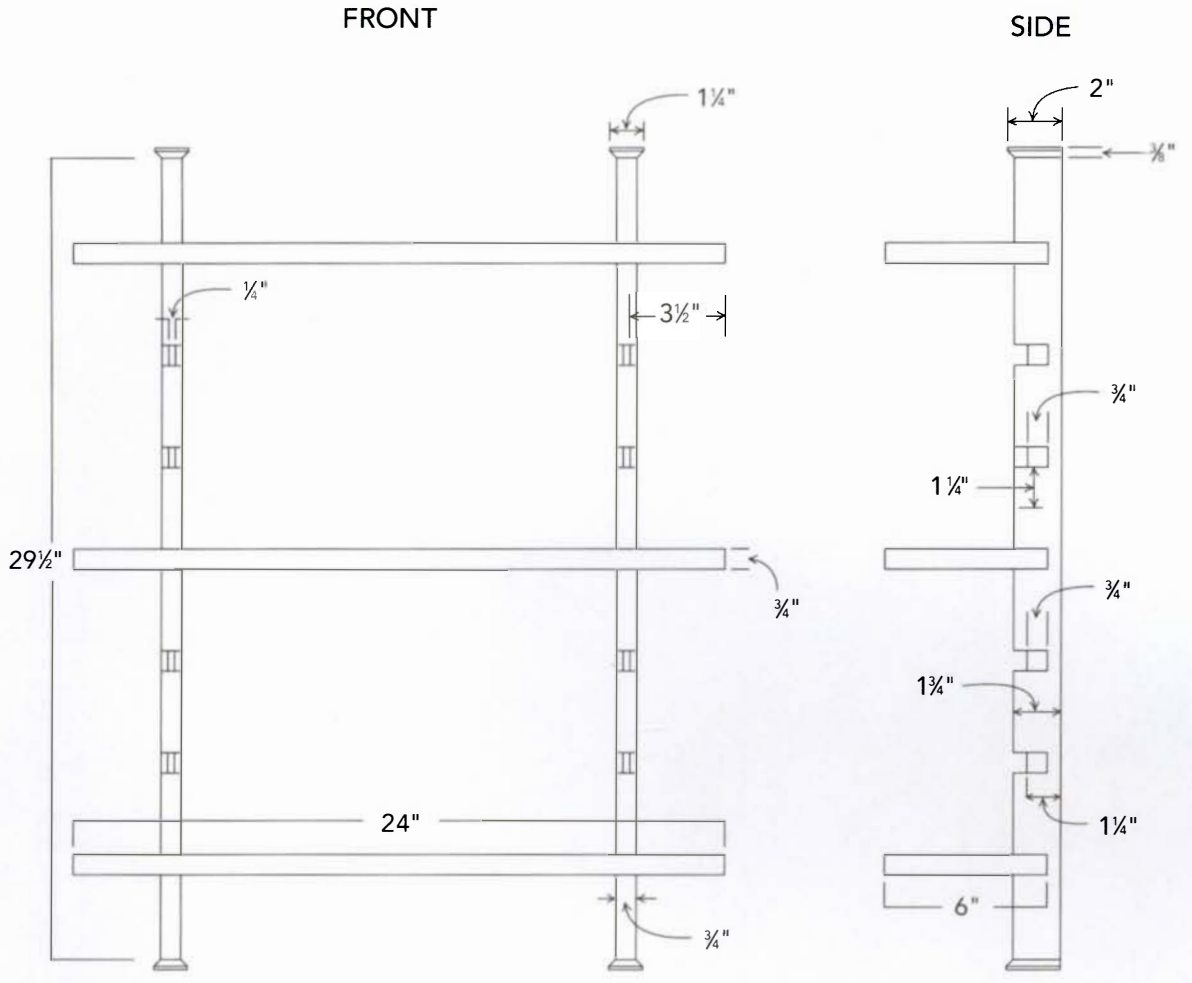
In keeping with the original spirit of this project, the solution to these issues turned out to be simple. A spline inserted into the back of each upright stiffens them so they do not bend, and matching notches in the backs of the shelves keep them from moving side to side. The arrangement also has the added benefit of being rigid enough that the whole unit can be hung from just two points at the tops of the uprights. So, with several refinements, I present you with amazingly simple adjustable shelves!

ADJUSTABLE SHELVES

The shelves fit into notches in the uprights and are cantilevered.
There are no brackets or other hardware to hold the shelves in place.



Front and Side Views



Stock Preparation

ALL THE PARTS SHOULD BE first milled to size, and then shaped accordingly. I find it's more efficient to do the bulk of the jointing, planing, ripping, and crosscutting work at the same time.

1. Mill the uprights to their finished size.

2. Cut the shelves to width and length, but leave them a little thicker than ¾ in. for now.

3. Mill the spline material, again leaving each piece a little thick, wide, and long.

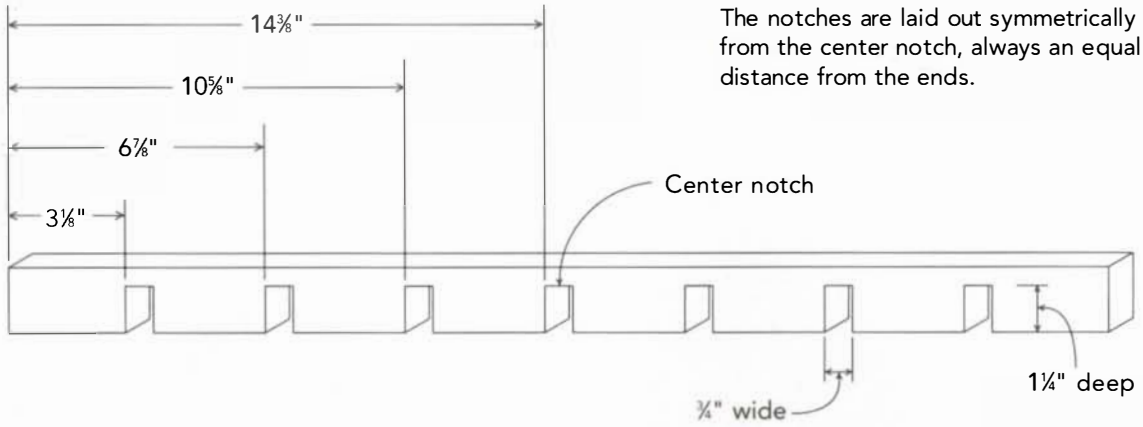
CUT LIST FOR ADJUSTABLE SHELVES

2	Uprights	1¾" x 29½" x ¾"	solid oak
3	Shelves	6" x 24" x ¾"	solid oak
4	Caps	1¼" x 2" x ⅜"	solid oak
2	Splines	1¼" x 29½" x ¼"	solid oak

Other materials

2	Keyhole hangers and screws
8	#8 x ¾" brass screws (to attach caps)

Notch Layout in Uprights



The notches are laid out symmetrically from the center notch, always an equal distance from the ends.

PHOTO A: Cut the shelf notches in the uprights with a dado blade on the table saw.

4. Make one long piece 1¼ in. wide and ⅛ in. thick for the caps. Make enough stock to cut four caps plus a couple of extras.

The Uprights

To cut ¼-in.-wide by 1¼-in.-deep notches for the shelves in the uprights, use a dado blade on your table saw and a miter gauge (see "Notch Layout in Uprights").

1. Clamp the uprights together to cut notches in them simultaneously. This will ensure that the joints line up with each other and the shelves are parallel.
2. Cut the notches an equal distance from either end of the uprights. This makes it possible to cut a notch in each end of the uprights for each setup. I used a flip stop on my miter gauge to register each series of cuts, but you can also use the table-saw fence for registration (see photo A).
3. Cut the last notch in the center of the uprights.

Splines

1. Install a ¼-in.-wide dado blade in your table saw; set it to the same 1¼-in. height as in the previous setup.
2. Position the fence to make a cut down the center of the back edge of the uprights.
3. Cut the groove for the splines in each upright.
4. Plane the spline material until it's easily pressed by hand into this groove. Don't make the spline too thick because the glue will swell it slightly and it will grab as you insert the spline.

PHOTO B: Gently tap overlong splines into the uprights. Clamp the uprights across their faces so they don't bulge while the glue sets.

5. Insert the dry splines about halfway into the grooves.

6. Spread glue on both sides of the part of each spline that remains exposed. It is important to apply the glue in this manner. The splines do not need much to keep them in place; if you put too much glue into these joints it will only end up squeezing out in the dadoes and around the visible portions of the splines, which will be extremely difficult to clean up!

7. Tap the spline in the rest of the way until it bottoms out in the cut (see photo B). You may have to put it in a vise or use some clamps to get it in all the way.

8. Once the splines are fully seated, place some clamps along the joint to make sure it remains tight until the glue dries.

9. Once the glue is dry, trim the excess off the splines. A sharp handsaw for the ends and a block plane for the back will make short work of this.

Shelves

1. Shim the ¼-in. dado blade so it will make a cut just a little wider than the slot the spline fits into. This will allow the notches you will cut in the shelves to fit easily over the splines.

2. Lower the blade to cut ¾ in. deep, and set the table-saw fence 3½ in. from the blade.

3. Using a miter gauge with a tall auxiliary face attached to support the shelves, cut a notch in each end of the back of all the shelves (see photo C on p. 36).

4. Take these still slightly thick shelves and plane them down until they fit easily into the notches of the uprights. They should slide in easily but not be too loose.

Remember that these shelves still need to be sanded and that it doesn't take much for these shelves to be too loose (see "Shelf Connection Detail" on p. 36).

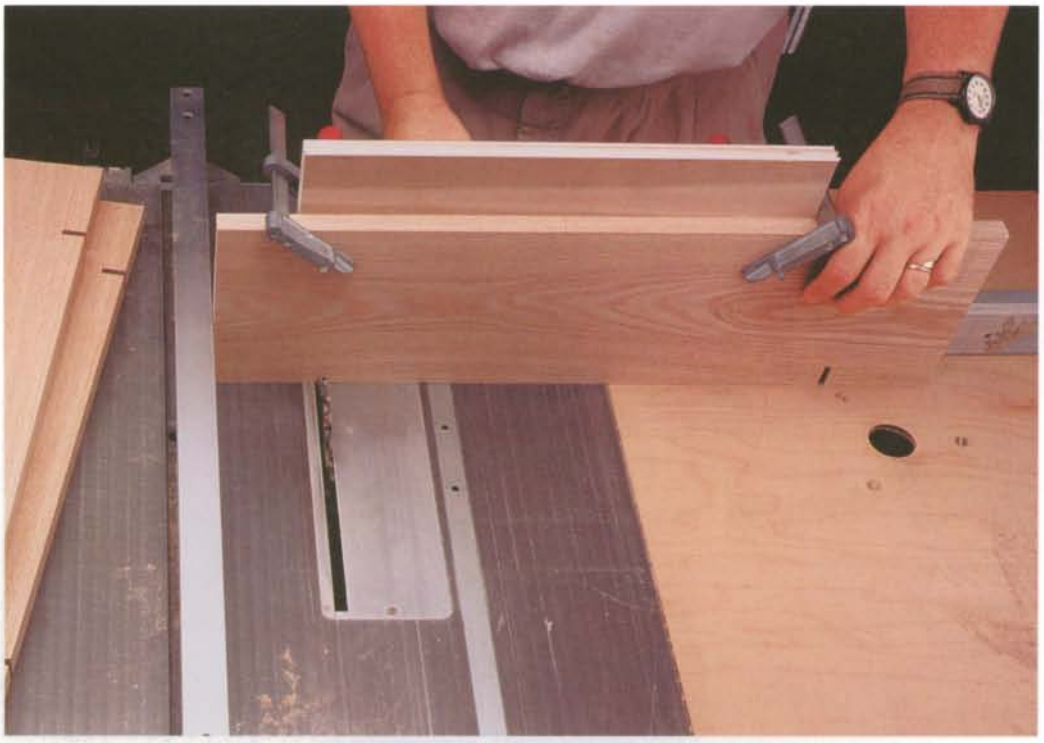


PHOTO C: With a ¼-in. dado blade, notch the backs of shelves to fit over the splines. Use the rip fence to ensure the notches are an equal distance from the ends of all the shelves.

Shelf Connection Detail

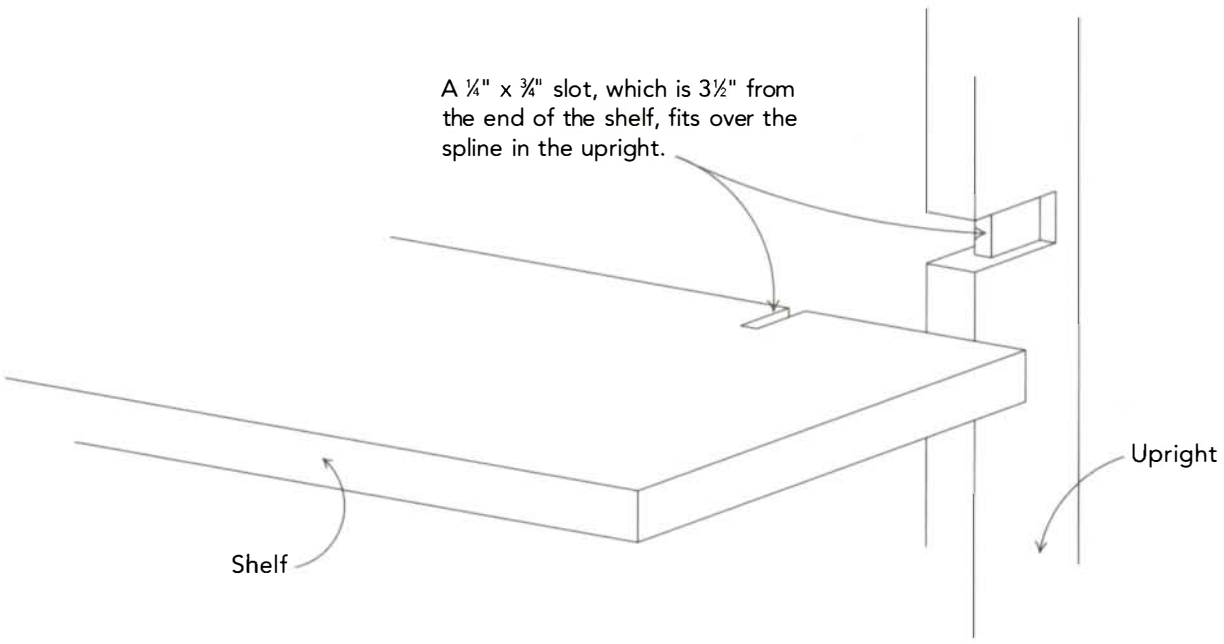


PHOTO D: Install hanger hardware flush with the back side of the uprights.

Hangers

The next step is to install some metal hangers in the top back of each upright. There are several types of hangers available from woodworking suppliers, and the exact installation method will depend on the type you choose. You will need to choose a flush hanger, however, to allow the shelves to hang flat against the wall. A typical installation requires you to mortise the hanger into the workpiece.

1. With a sharp marking knife, trace the outline of the hanger onto the top back of each upright.

2. Using a sharp chisel, remove enough material to allow the hangers to be installed flush.

3. Drill a hole inside each mortise deep and large enough to allow each hanger to fit over a screw head.

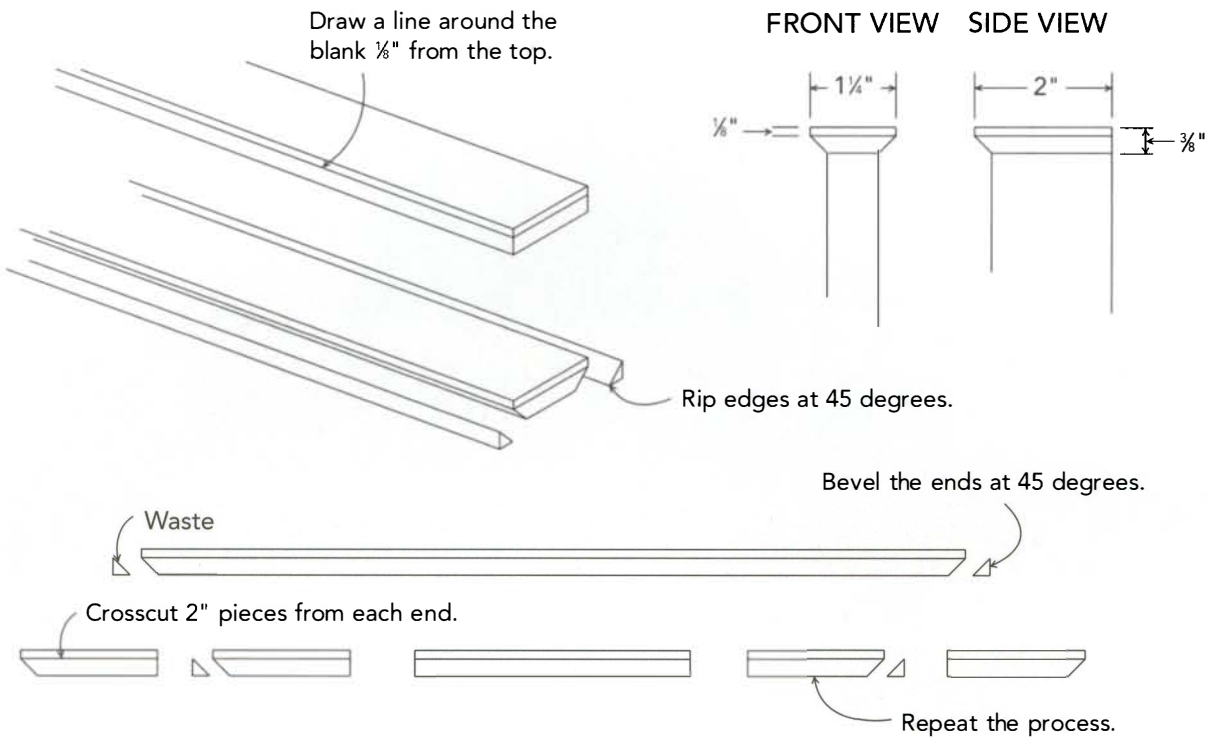
4. Screw the hangers in place (see **photo** D).

Decorative Caps

1. Bevel both long edges of the cap stock on your table saw with the blade tilted 45 degrees. This bevel should leave the narrow side of the stock $^{13}/_{16}$ in. wide (just slightly wider than the uprights). It should also leave a right angle flat along each long edge $^{1}/_{8}$ in. wide.

2. With the blade still tilted, transfer the workpiece to your miter gauge set at 90 degrees, and cut a matching bevel on each end (see "Making the Caps" on p. 38).

Making the Caps



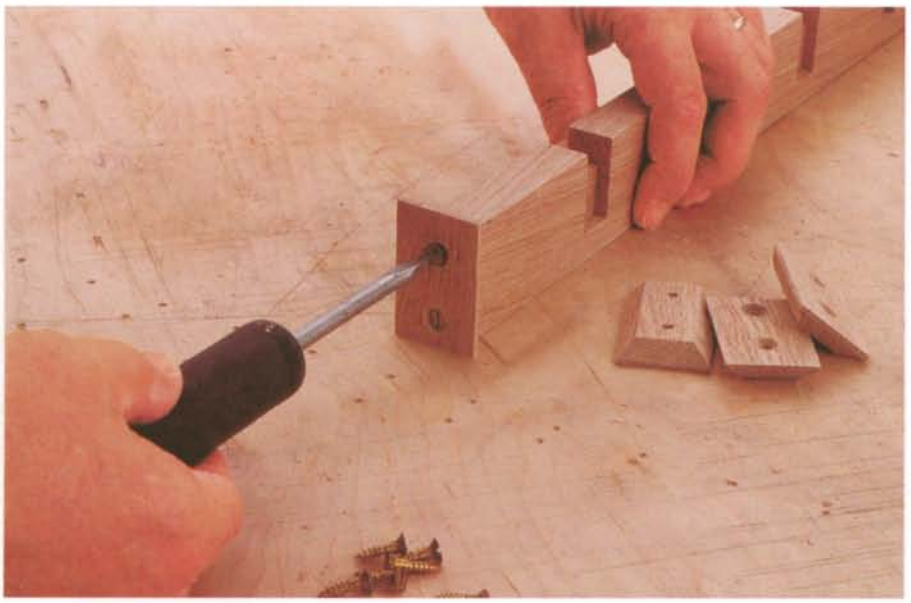


PHOTO E: Install the top and bottom end caps with two brass screws.

DESIGN OPTION: LARGE OR SMALL?

The shelves in this chapter are relatively small, but I have built several different sizes of this kind of shelving, including some quite large (see the photo).

You can certainly make a unit as tall as your ceiling height will allow, but shelves deeper than 9 in. should be avoided. You could possibly make them a little deeper, by making the uprights larger and deeper (the ones in the photo are 2½ in. deep and 1½ in. wide), but I think the scale would look wrong.

A shelf length of 48 in. is the maximum for a unit with two uprights—as long as you keep 30 in. between upright centers and 9 in. on each side. If you want a wider unit, you will have to use more uprights. All of this is assuming ¾-in.-thick shelves. You can use thicker shelves, but you really gain very little since the thicker shelves are heavier. I also think the lighter look of ¾-in. shelves is more in keeping with the simple, open spirit of the piece.

A much larger version of the adjustable-shelf project, used to hold this antique-radio collection. It isn't a good idea to make this type of shelf much larger than this.

3. Crosscut a 2-in. piece off of each end, and repeat the process until you have enough caps for the project and a couple of extras. I recommend cutting extra because it only takes a few moments to do, and these little pieces can sometimes split when you drill holes for the attachment screws.

4. Drill two countersunk holes for some small brass screws and some mating pilot holes into the ends of the uprights, and attach the caps (see photo E).

Sanding and Finishing

Sand all the parts to at least 150 grit. You might find it easier to temporarily remove the caps for sanding and even finishing, and you should definitely remove the hangers for finishing. I finished my shelves with a satin spray lacquer, but as with many of the projects in this book, a good-quality oil finish or even a carefully applied brush-on water-based polyurethane would also work well.