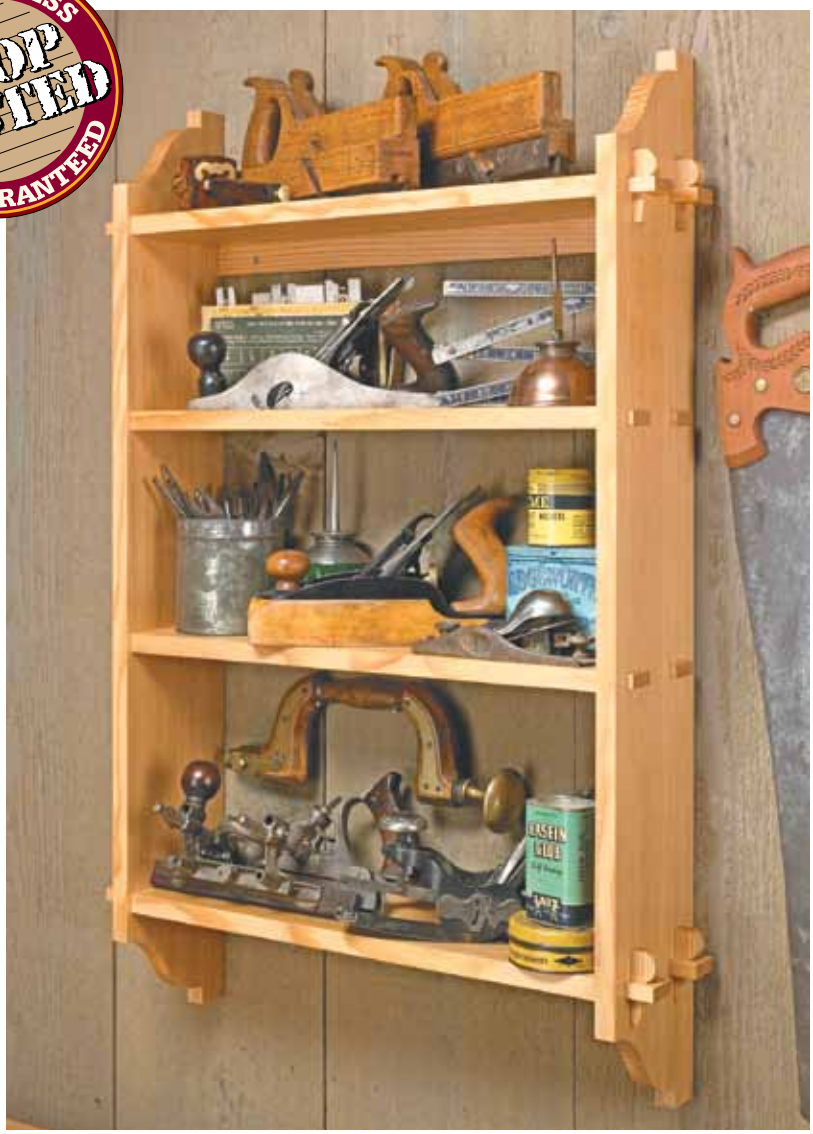
Woodsmith PLANS

KNOCK-DOWN WALL SHELF

TOTAL SUCCESS SHOP TESTED GUARANTEED



FEATURE PROJECT

KNOCK-DOWN WALL SHELF

Put your skills to the test by building this practical wall shelf. The joinery provides a traditional look and allows the shelf to be disassembled easily.

When it comes to shop storage projects, I'm all for keeping things as simple (and inexpensive) as possible. But this doesn't mean you have to settle for something that's slapped together.

Take this knock-down shelf for example. It's made up of just a few boards and can be built in a weekend. But it's constructed with solid, traditional joinery — wedged mortise and tenon joints. The result is a wall shelf that's not only challenging and satisfying to build, but also sturdy enough to hold just about anything.

JOINERY. One of the ways I kept the construction simple was the method I used for making the mortises that hold the shelves. If you look at the main drawing on page 2, you'll see that each side is glued up out of three pieces. This allows you to cut the mortises on the table saw before gluing up the sides, instead of drilling and chiseling them by hand. For more, see the box on page 2.

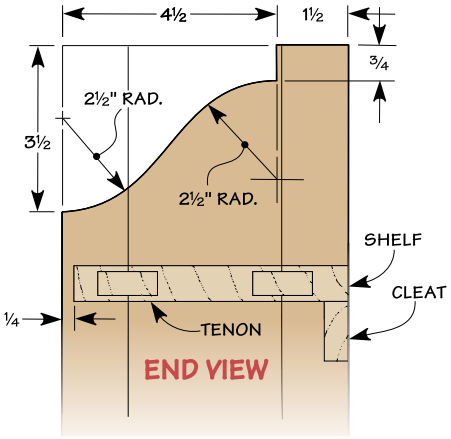
Once the sides are glued up, you can lay out the curves on the ends of the side pieces. I cut these on the band saw, but you could also use a jig saw or even a coping saw.

SHELVES. With the sides complete, the next step is to make the shelves. If you take a look at the upper right drawing on the following page, you'll see that there are four shelves. All four are joined to the sides with through tenons. But the tenons on the top and bottom shelves are longer and are locked in place by wedges. To keep things simple, however, I started off by making the tenons on all four shelves exactly the same. (See the article on page 3 for more info on making the tenons.)

▲ *Wedged mortise and tenon joints hold the shelf together without any glue (see page 3).*

Then I trimmed the tenons of the two middle shelves so they would stand proud of the sides by ¼" once all the parts were assembled.

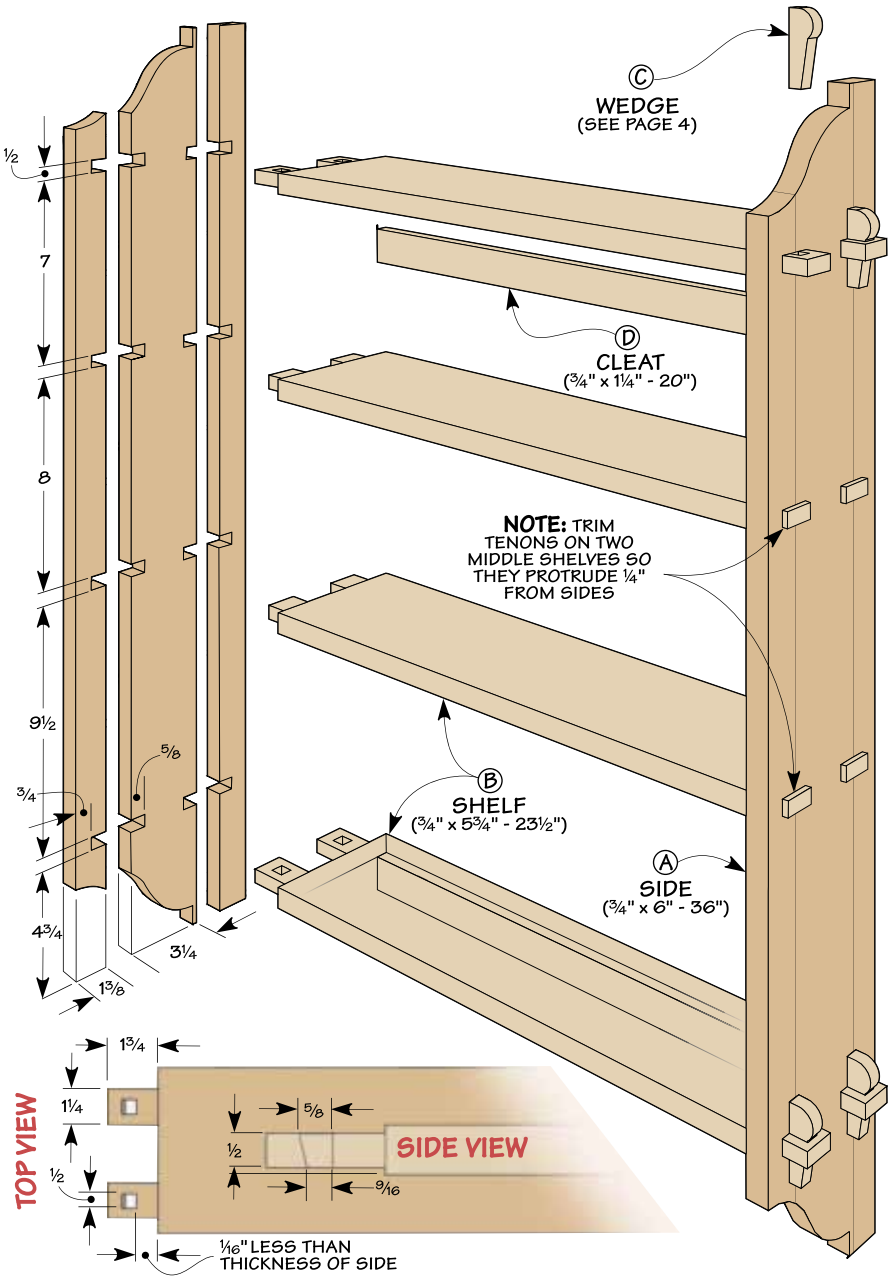
WEDGED TENONS. The tenons on the top and bottom shelves each get a tapered mortise that holds a wedge. As you do this, keep in mind that it's important to position the mortises so that the wedges will pull the shelves up tight to the sides. Again, you'll want to take a look at page 3.



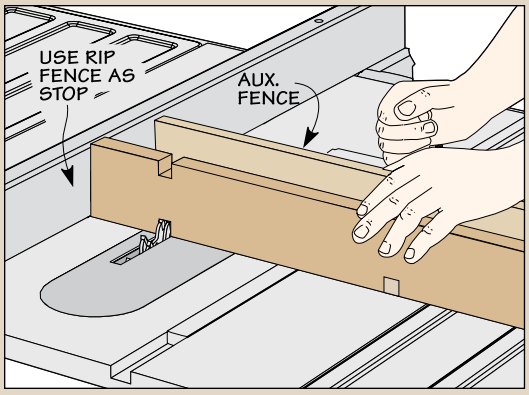
When making the wedges, start by cutting them a little oversized. That way, you can pare them down with a chisel until they slide into place. You're aiming for a tight fit without having the round part of the wedge bottom out against the tenon (left photo on page 1).

CLEATS. The last parts to make are a pair of cleats. These are simply glued to the underside of the top and bottom shelves, flush with the back edges. Although the cleats do add a little strength to the shelves, their real purpose is to provide a place to screw the shelf to the wall.

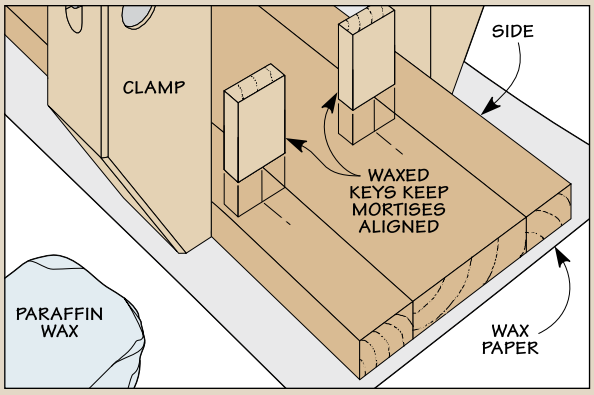
ASSEMBLY. The last step is to put everything together. The four shelves are captured in between the sides without any glue. Then the wedges are slipped in place to hold everything together. It's best to push them in by hand, rather than using a mallet. If you use too much force, you're likely to split the wood at the end of the through tenons.



HOW-TO: MAKING THE MORTISES



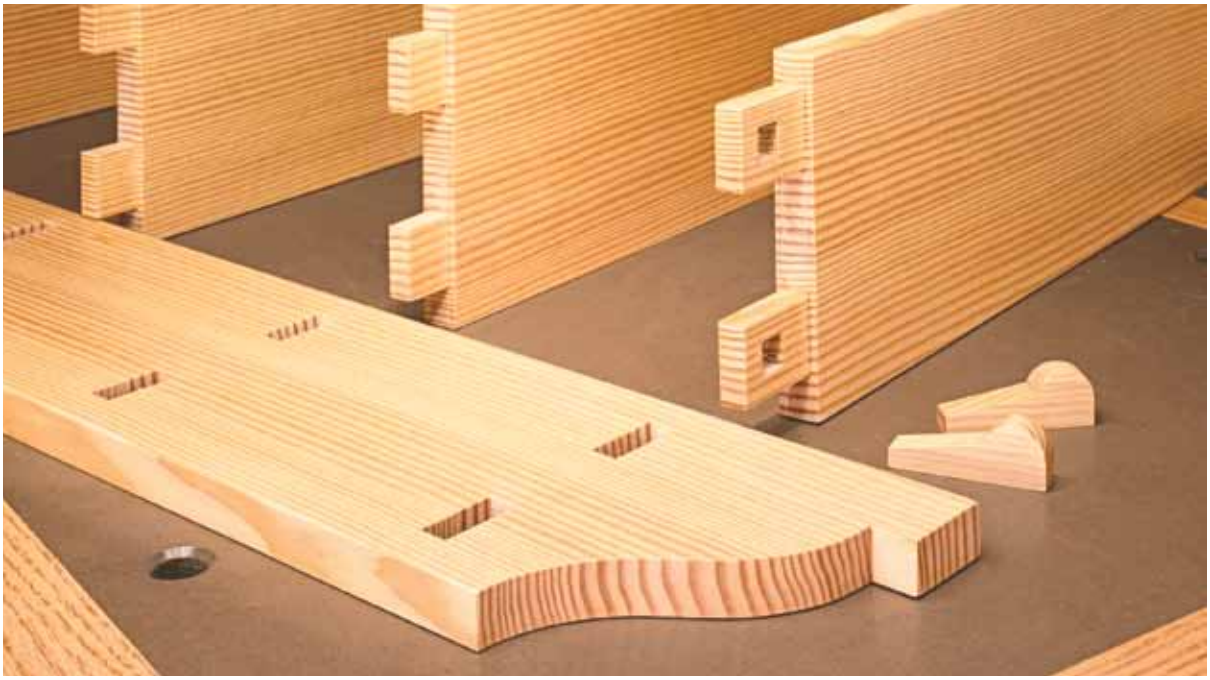
Cut Notches. *Using a dado blade and the rip fence as a stop, cut matching notches in the pieces that make up each side of the wall shelf.*

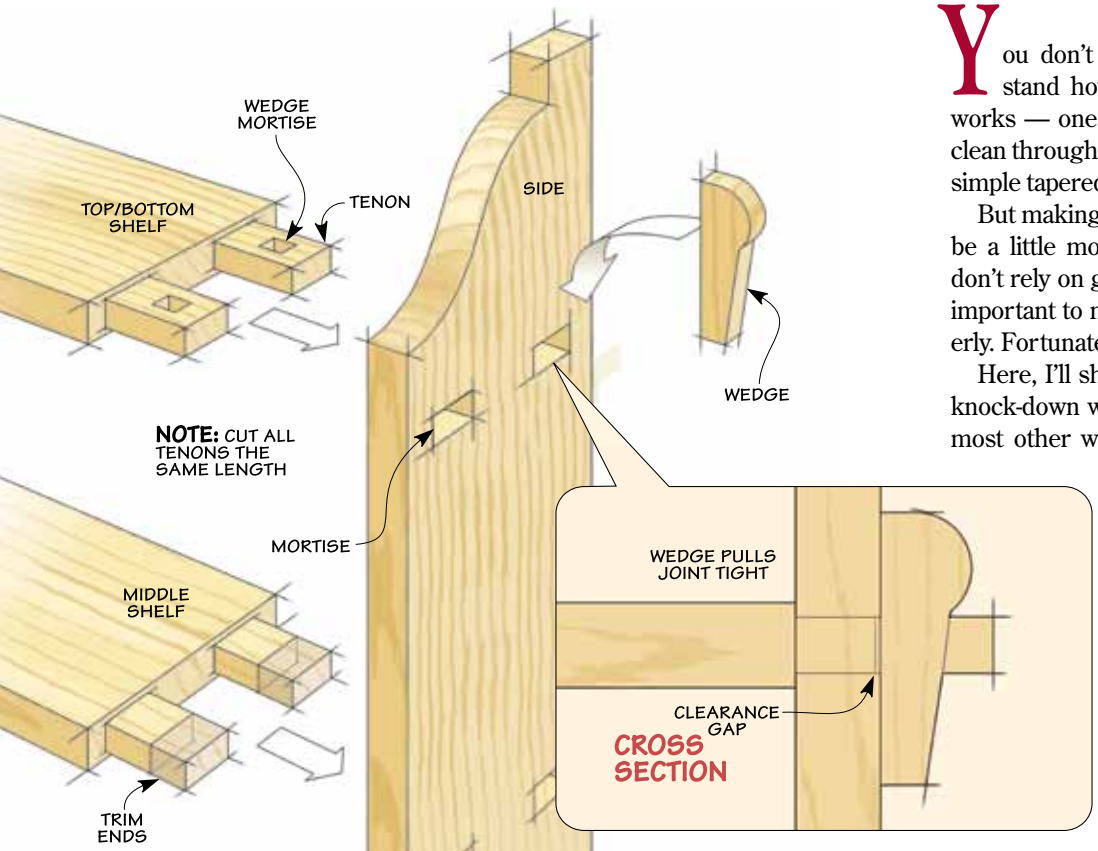


Glue Up the Sides. *Waxed hardwood keys help to keep the mortise notches aligned while gluing up the sides of the wall shelf.*

WEDGED MORTISE & TENON

Learn the secrets to making this traditional woodworking joint.





You don't have to be a woodworker to understand how a wedged mortise and tenon joint works — one look is all it takes. The tenon passes clean through the mortise and is locked in place by a simple tapered wedge (drawing at left).

But making a wedged mortise and tenon joint can be a little more complicated. Because these joints don't rely on glue for their strength, it's all the more important to make sure the pieces fit together properly. Fortunately, this isn't all that difficult.

Here, I'll show you how I made the joints for the knock-down wall shelf. The procedure is similar for most other wedged mortise and tenon joinery. So you can apply the technique time and time again.

MORTISES. The first step to making this joint is to create the mortise. I made the mortises for the wall shelf on the table saw, as shown in the box on page 3. No matter what method you use to do this, the important thing is to keep them as square and accurate as possible. Otherwise, you'll end up with noticeable gaps around the tenons.

TENONS. Once the mortises are complete, you can start on the tenons. To make the tenons, I began with the cheek cuts, as shown in Figure 1. The goal here is to establish the thickness of the tenon by removing a small amount of material from each face of the workpiece. To do this, I used a simple tenon jig to hold the workpiece while making the cuts.

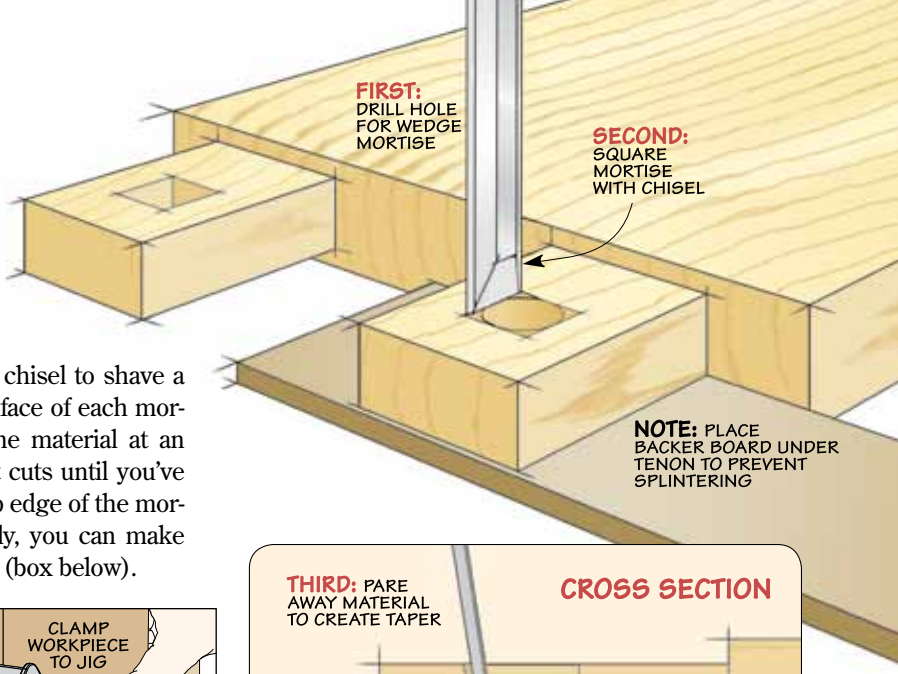
Then to create the shoulders of the tenons, I made multiple passes to remove the waste from the sides of the tenon (Figure 2). An auxiliary fence attached to the miter gauge helps support the workpiece.

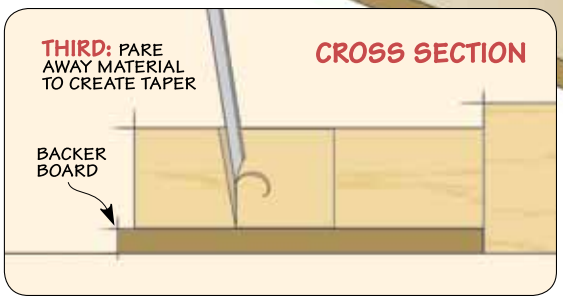
WEDGE MORTISES. After you've cut all the tenons, you're ready to start making the mortises for the wedges.

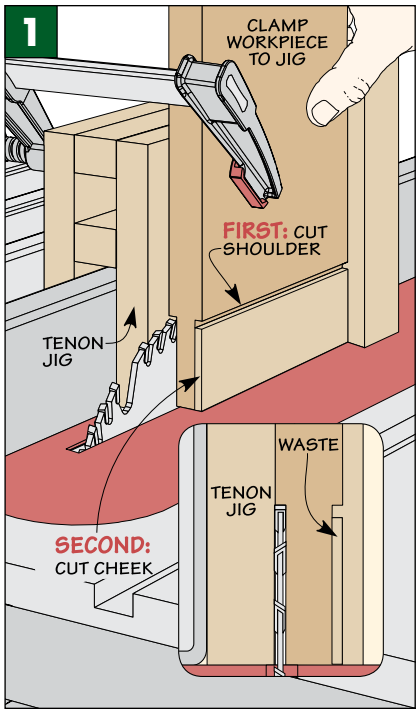
There's just one thing to keep in mind when laying out these mortises. You want to locate them so they end up slightly behind the outer face of the side pieces of the wall shelf, as shown in the detail drawing on the previous page. This allows the shelves to be drawn up tight against the sides when the wedges are seated.

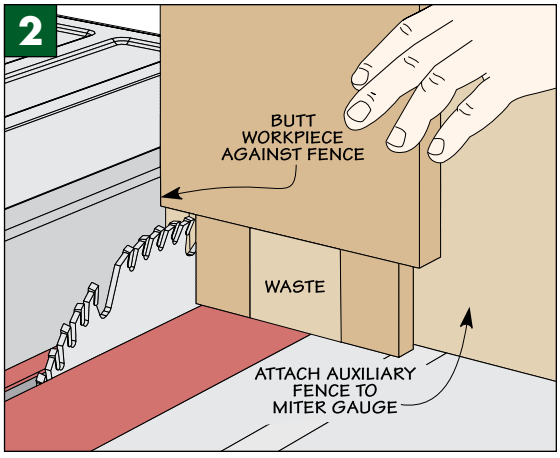
If you take a look at the detail drawing at right, you'll see that each mortise is tapered on one face. This allows the wedge to lock securely in place without any glue. But it's easier to start by making square, straight-walled mortises. I did this by drilling out the waste and then squaring up the sides with a chisel, as illustrated at right.

To taper the mortises, I used a chisel to shave a little off the outer face of each mortise. Slice away the material at an angle, taking light cuts until you've pared back the top edge of the mortise by $\frac{1}{16}$". Finally, you can make and fit the wedges (box below).









HOLD IT TOGETHER: WEDGES

When it comes to making the wedge for a mortise and tenon joint, the important thing is for the taper of the wedge to match the mortise so it seats properly. I've found that the best way to do this is to start by cutting the wedge slightly wider than necessary. Then with a sharp chisel, you can shave off material as needed to fine tune the fit.

To make the wedges for the knock-down shelf, I started with an extra-long blank and cut the tapered faces on the table saw. Then you can cut the wedges free from the blank with a band saw or scroll saw.