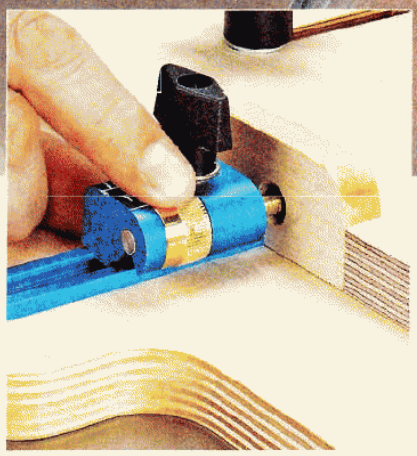
adjustable Tenoning Jig

Cutting precise tenons with perfectly smooth cheeks is a snap with this easy-to-build table saw jig.



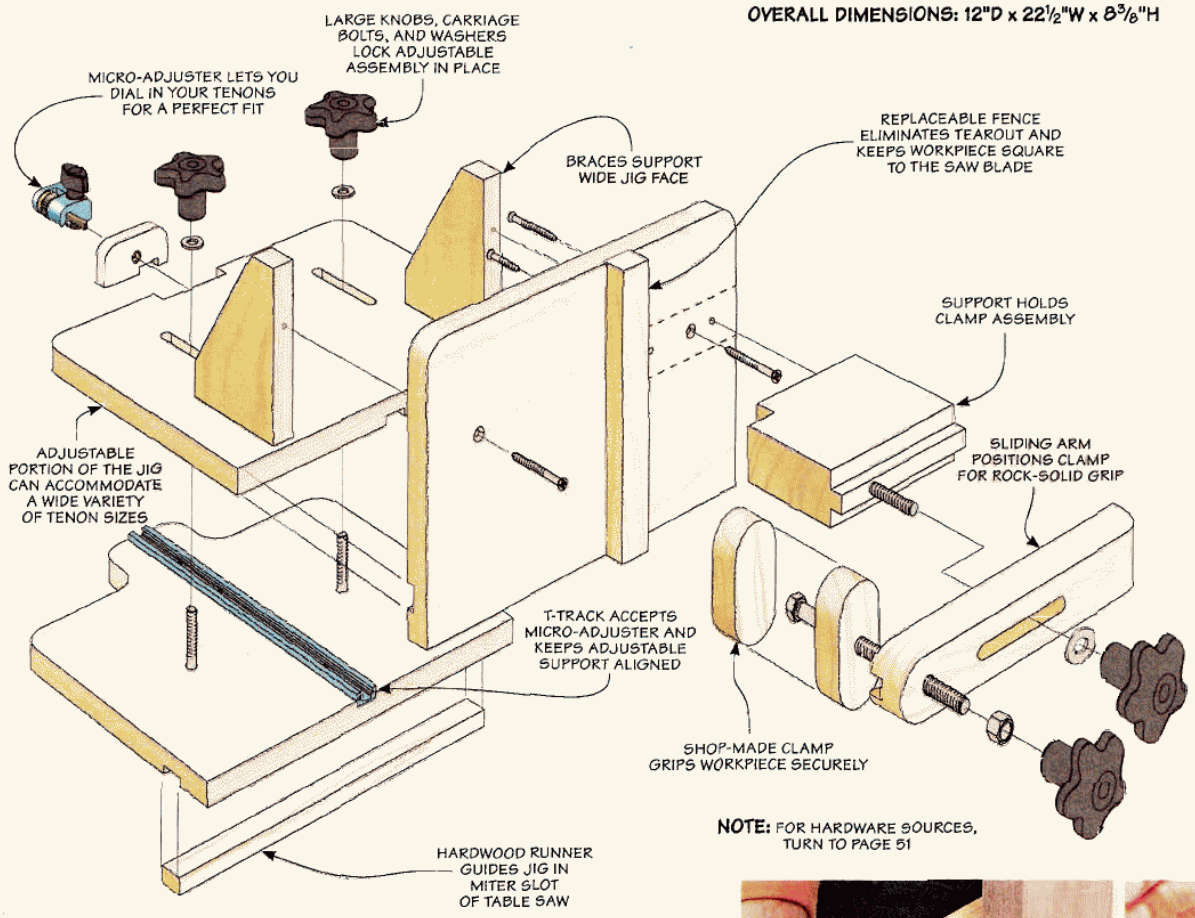
▲ ***Dial It In.*** *A micro-adjuster lets you tweak the setup in precise amounts to create a good fit.*

A strong mortise and tenon joint depends on creating a snug-fitting tenon with smooth glue surfaces. The trouble is, tenons cut with a dado blade or a band saw usually require a little further work to attain a smooth face. But with a tenoning jig like the one shown here, you can cut perfect, ready-to-glue tenons on the table saw.

A couple features built into this jig really make it reliable and easy to use. First, the fence and integrated clamp combine to give a rock-solid grip on the workpiece. And the micro-adjuster shown in the inset photo allows you to fine-tune the tenon without any hassle. The result is a long-lasting joint whether you need two tenons or twenty.

Exploded View Details

OVERALL DIMENSIONS: 12"D x 22½"W x 8⅜"H



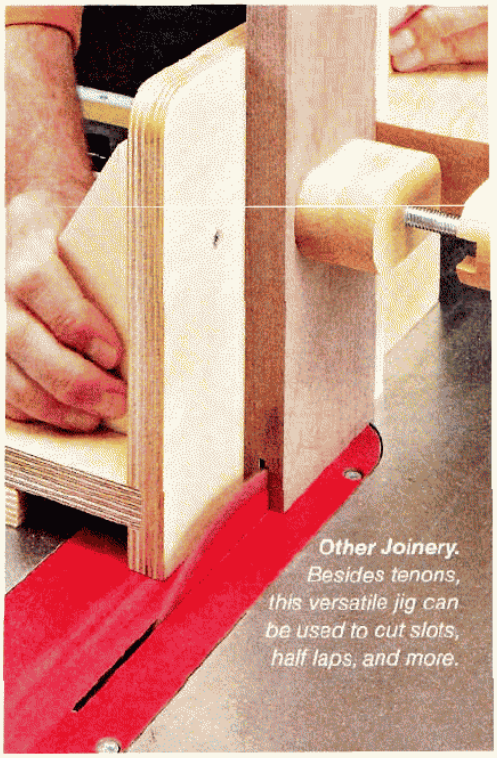
NOTE: FOR HARDWARE SOURCES, TURN TO PAGE 51

NOTE: SIMPLE CONSTRUCTION MEANS YOU CAN BUILD THIS JIG IN A WEEKEND

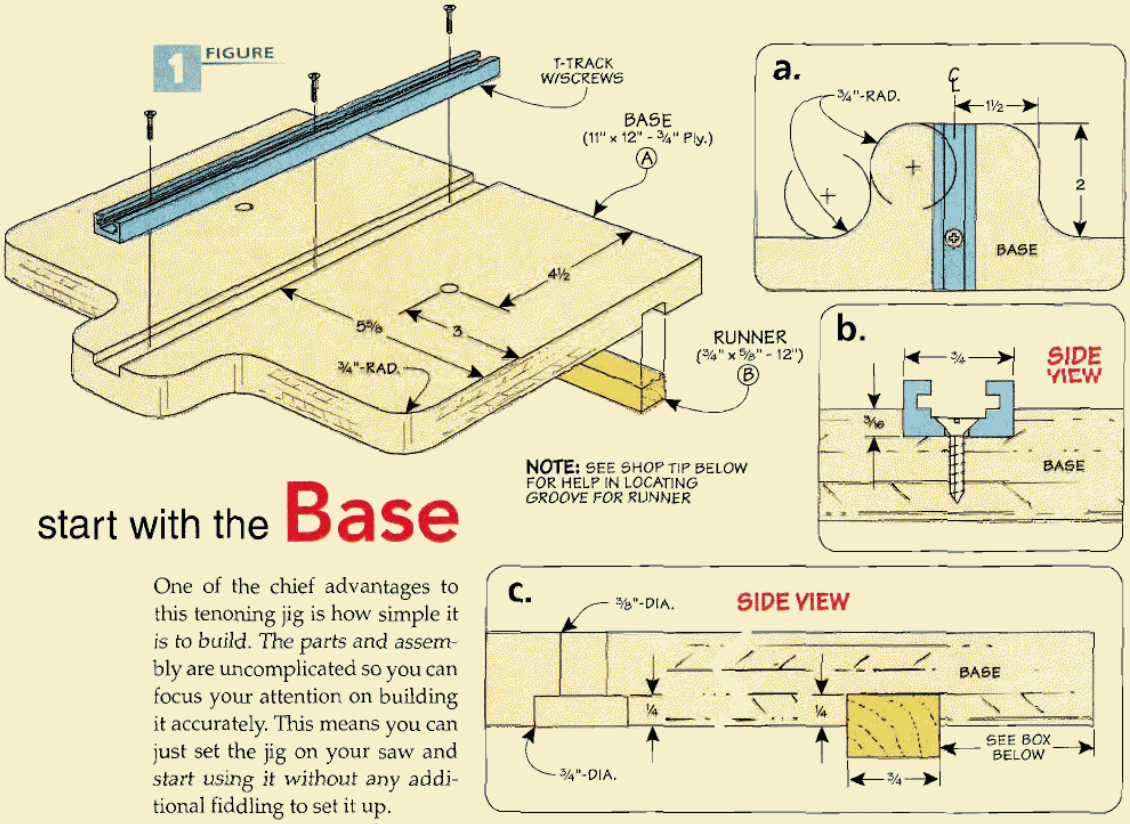
Materials & Hardware

A	Base (1)	11 x 12 - ¾ Ply.
B	Runner (1)	¾ x ⅝ - 12
C	Sliding Plate (1)	9¼ x 12 - ¾ Ply.
D	Face (1)	8 x 12 - ¾ Ply.
E	Braces (2)	3½ x 5 - ¾ Ply.
F	Block (1)	½ x 1¼ - 2½
G	Support (1)	1½ x 3⅞ - 5
H	Arm (1)	1 x 1½ - 9½
I	Clamp Pads (2)	¾ x 1½ - 3
J	Fence (1)	¾ x 1 - 8

- (1) 11"-long Aluminum T-Track w/Screws
- (2) 5/16"-18 x 2" Carriage Bolts
- (3) 5/16"-18 Through Knobs
- (3) 5/16" Flat Washers
- (4) #8 x 1½" Fh Woodscrews
- (1) Micro-adjuster
- (1) ¼"-20 Threaded Insert
- (2) #8 x 2" Fh Woodscrews
- (1) #8 x 1" Fh Woodscrew
- (1) 5/16"-18 x 3" Threaded Rod
- (1) ⅜"-16 x 5" Hex Bolt
- (1) ⅜"-16 Hex Nut
- (1) ⅜"-16 Through Knob
- (1) ⅜"-16 T-Nut



Other Joinery. *Besides tenons, this versatile jig can be used to cut slots, half laps, and more.*



start with the Base

One of the chief advantages to this tenoning jig is how simple it is to build. The parts and assembly are uncomplicated so you can focus your attention on building it accurately. This means you can just set the jig on your saw and start using it without any additional fiddling to set it up.

There are three assemblies that make up the tenoning jig. A base serves as the foundation of the jig and guides it along the miter slot of the table saw. An adjustable support positions the workpiece in relation to the blade to make the cut. And the clamp secures the workpiece to the face of the jig during the cut.

The Base. The first assembly is the base. It's just a small plywood panel with a hardwood runner on the bottom face. Begin by cutting a blank for the base.

Then you can get out your dado blade to add a dado and a groove (both are ¾" wide). The key thing when making these cuts is that they should be square to each other. This ensures that tenons made with the jig will have cheeks that are parallel.

The top face of the blank has a dado to accept a length of T-track, as you can see in Figures 1 and 1b. It helps locate the face of the jig in relation to the blade. It's also used as a mounting point for a micro-adjuster.

On the bottom face of the base is a shallow groove that holds the runner, as shown in Figure 1c. I do want to point out something. The location of the groove depends on the distance of the right miter slot on your saw to the blade. The shop tip at left shows you how to mark the position.

Once the dado and groove work is complete, you can cut the base to its final shape. This is shown in Figure 1a.

The base has a couple counterbored holes for carriage bolts that lock the sliding plate in place (Figure 1c). I glued the carriage bolts in place with some epoxy.

Then, you can cut and attach the length of T-track to the upper groove. Finally, cut and glue a runner in the bottom groove.

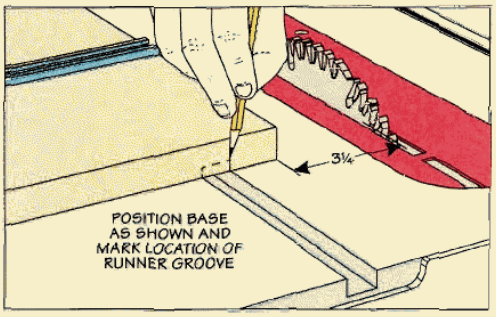
Adjustable Support. Making the adjustable support is the next task on the list. As you can see in Figure 2, it's a little more involved than the base.

It starts with a plate that has a dado that matches the one in the base. The dado fits over the exposed T-track. To keep the adjustable support aligned, aim for a smooth sliding fit without any slop (Figure 2c).

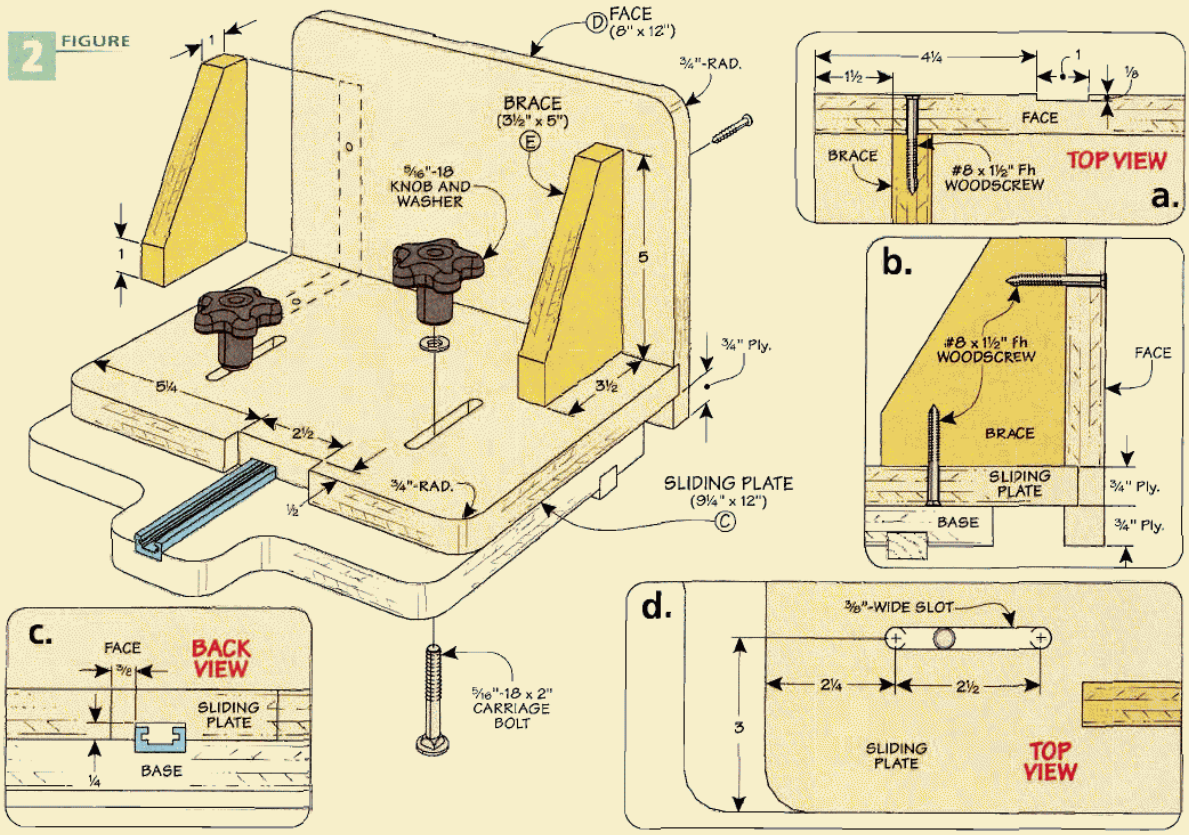
The sliding plate also has a notch on one edge to hold a small block for attaching the micro-adjuster, as in Figure 2.

Two slots are cut in the plate to accept the carriage bolts in

Shop Tip



▲ **Setup.** *Use the dimension above to locate the groove for the runner in the base. This calibrates the jig to your table saw.*



the base, as shown in Figure 2d. I then rounded the outer corners of the plate to match the base.

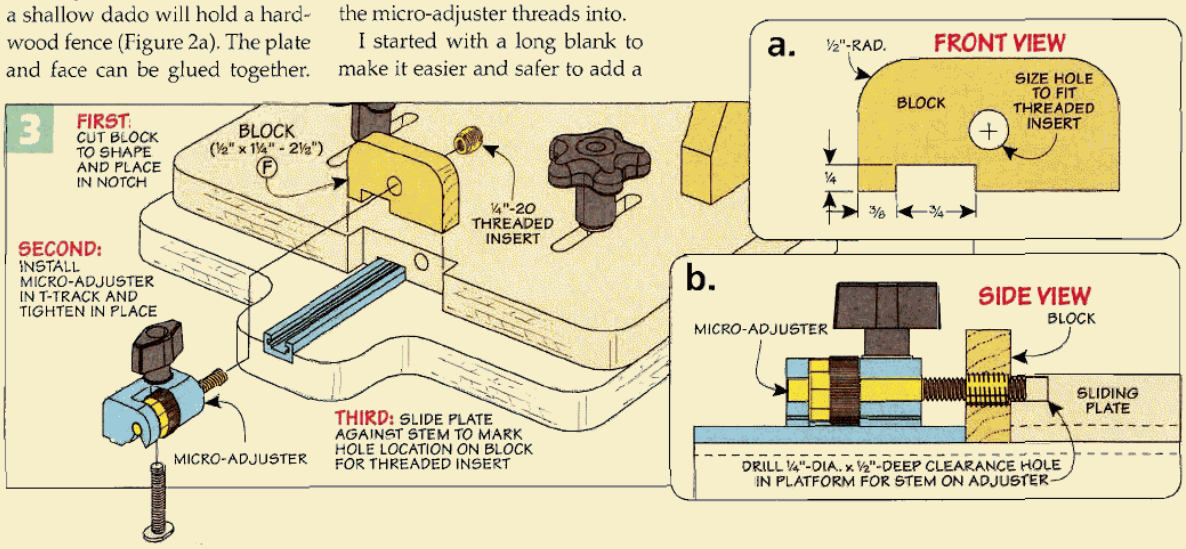
Face. You can set the plate aside for now and make the face of the jig. You'll notice it has a groove and dado cut in it.

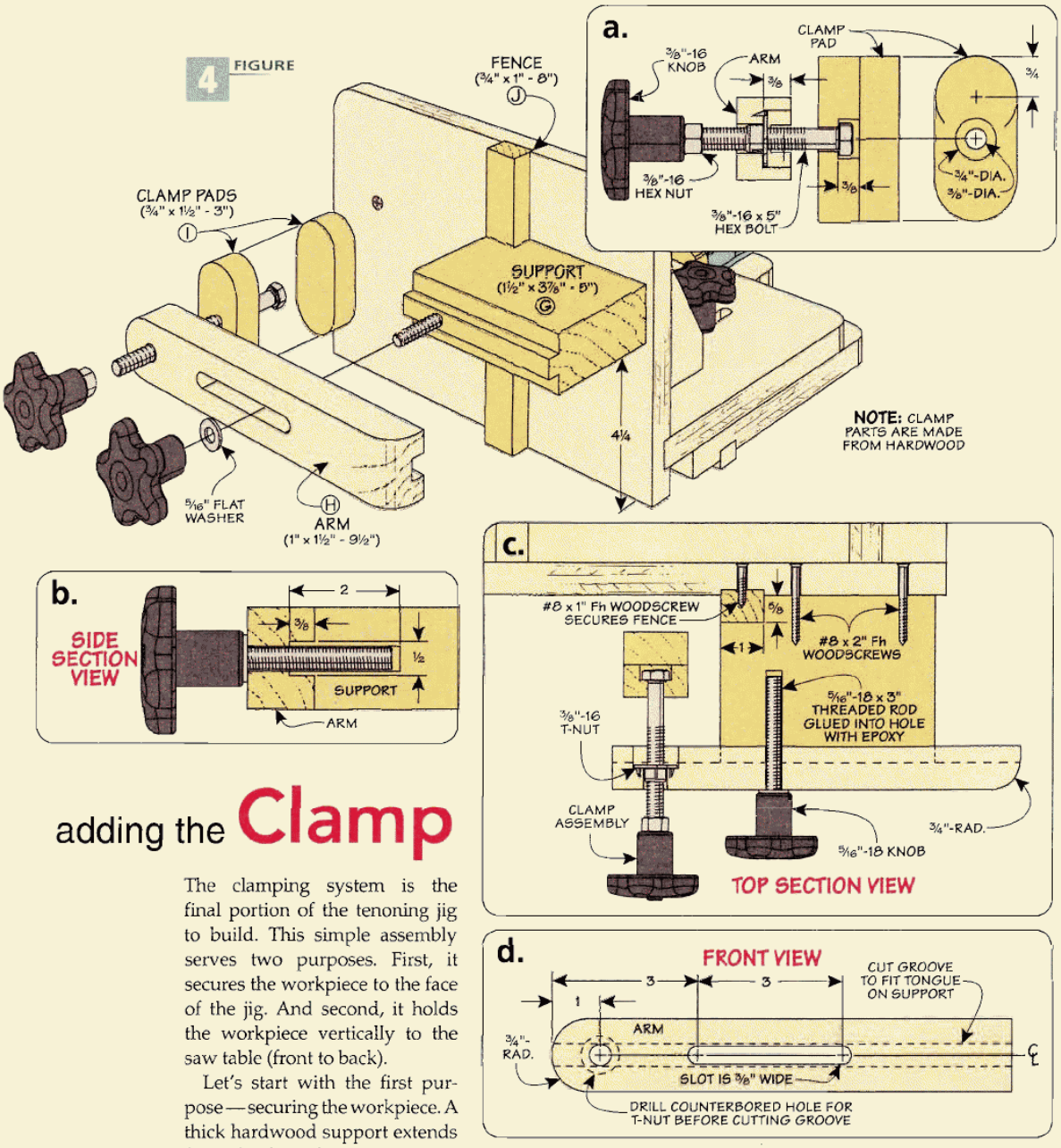
On the inner side of the face, a groove accepts the sliding plate, as in Figure 2b. On the outer side, a shallow dado will hold a hardwood fence (Figure 2a). The plate and face can be glued together. Angled braces keep the assembly rigid and square in use. They're glued and screwed in place, as shown in Figure 2b.

The Block. The remaining piece to add to this assembly is the small hardwood block I mentioned earlier (Figure 3). *Its job* is to provide a solid anchoring point for a threaded insert that the micro-adjuster threads into.

I started with a long blank to make it easier and safer to add a notch that fits over the T-track in the base, as in Figure 3a. Then I cut the block to shape and fit it in the notch without glue.

You can use the micro-adjuster to locate the hole for the threaded insert, as illustrated in Figure 3. *After drilling a clearance hole in* the plate for the micro-adjuster, glue the block into the notch.





adding the Clamp

The clamping system is the final portion of the tenoning jig to build. This simple assembly serves two purposes. First, it secures the workpiece to the face of the jig. And second, it holds the workpiece vertically to the saw table (front to back).

Let's start with the first purpose—securing the workpiece. A thick hardwood support extends from the front face and holds a sliding arm. The arm allows you to apply clamping pressure in just the right place based on the width of the workpiece.

On the end of the arm, a shop-made clamp presses the workpiece against the front face of the jig. The clamp's capacity will easily handle the pieces you commonly use in most furniture construction. To use the tenoning jig on larger workpieces, all you need to do is remove the arm and clamp from the support. Then secure the workpiece to the jig with a bar clamp.

Hardwood Support. The support has a tongue cut on the outer edge, as you can see in Figure 4b. This positions the arm.

To lock the sliding arm in place, I used a knob, washer, and a length of threaded rod. I glued the rod into a hole drilled in the tongue with some epoxy, as shown in Figure 4c.

The remaining detail to take note of on the support is a notch on the inner edge. It corresponds with the groove on the front face and will house the fence later on. This is shown in Figure 4c.

The support is attached to the jig with glue and long screws. Be sure to keep the support parallel to the bottom edge of the face.

Sliding Arm. The details for making the sliding arm are shown in Figure 4d. A counterbored hole

at one end accepts a T-nut for the shop-made clamp.

Then a groove can be cut along the inner face that mates with the tongue on the support. A slot is cut to attach the arm to the support with a washer and a knob. Finally, shape both ends of the arm to soften the edges.

The Clamp. The next component to make is the clamp. It's built around a long hex bolt. A pair of clamping pads capture the head of the bolt in a counterbored hole drilled in one of the pads, as illustrated in Figure 4a. This is then threaded through the T-nut in the arm. A hex nut locks a star knob on the end to make applying clamping pressure straightforward.

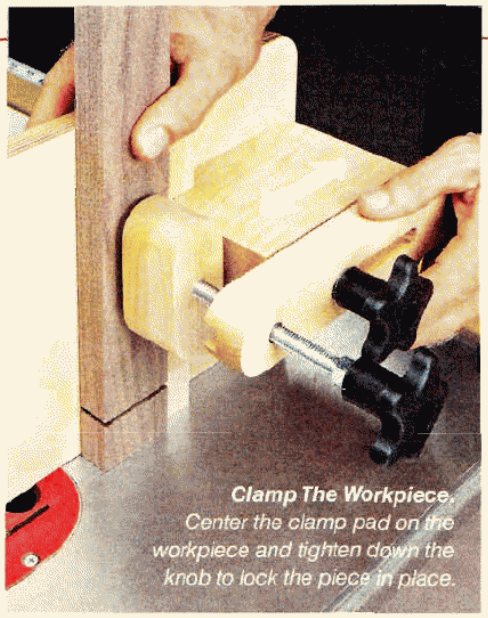
Fence. The other purpose of this assembly is to hold the workpiece square. This task falls to the fence. This simple strip is cut for a snug fit in the groove in the front face of the jig. In addition to holding the workpiece vertically, it also provides some tearout protection by backing up the back edge of the workpiece. This means the fence will get chewed up. When that happens, you can just slip out the old one and pop in a new one. A screw through the back side locks it in place.

The jig is now ready for use. For tips on getting the best results take a look at the box below.

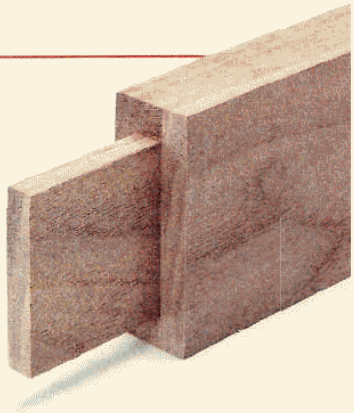
Using the Jig

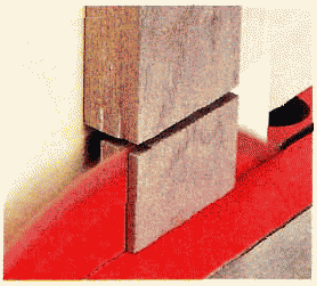
Using the tenoning jig is pretty straightforward. Before putting it on the saw, I like to lay out the tenon on my workpiece. Then I'll cut the four shoulders using the miter gauge to guide the piece.

From there, I clamp the workpiece to the jig, centering the clamp pad on the part (right photo). Loosen the knobs on the adjustable support and roughly position the workpiece with the blade, as in the lower photo. I make a test cut and sneak up on the fit. To fine-tune the position of the jig, you can use the micro-adjuster. Once everything is set, you can cut the cheeks. Finally, follow the same steps to cut the ends of the tenon.

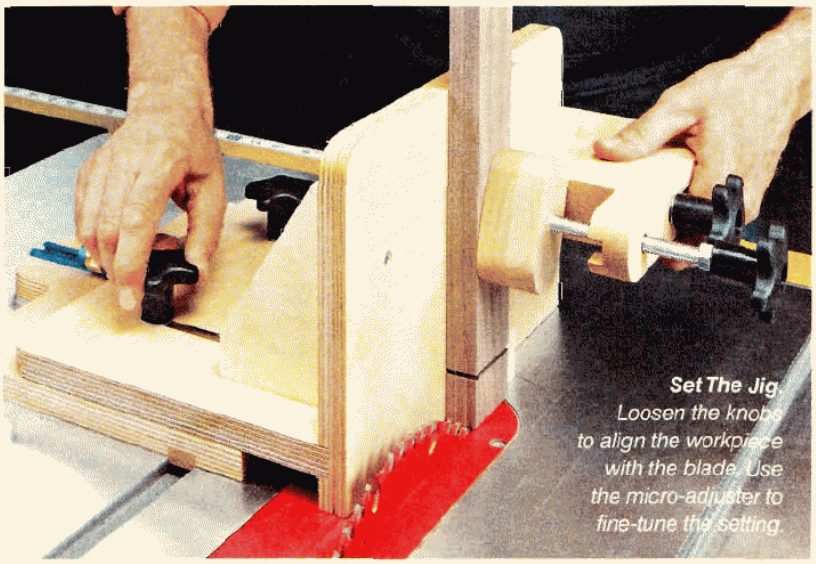


Clamp The Workpiece. *Center the clamp pad on the workpiece and tighten down the knob to lock the piece in place.*

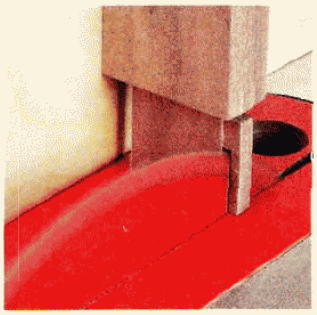




▲ ***Cheeks First.*** *Make test cuts to dial-in the jig setting so the tenon matches the mortise.*



Set The Jig. *Loosen the knobs to align the workpiece with the blade. Use the micro-adjuster to fine-tune the setting.*



▲ ***Edge Cuts.*** *Use the same steps to cut the end cheeks of the tenon for a snug fit.*