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Super Tenon Jig

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Super Tenon Jig

FOR YOUR SHOP

Precision work requires precision tools and accurate setups. While most of us have (or should have) an accurate rip fence and miter gauge on our table saws, when it comes to working stock on end, such as for tenon work, all too often we see woodworkers (with nothing more than the rip fence as a guide) using their hand to advance the stock through the blade.

Relying on nothing more than your hand to advance stock on end simply isn't safe. But fortunately, you needn't spend an arm and a leg for a good, accurate tenon jig.

Special Features

If you've been thinking about buying one of those fancy commercial tenon jigs, and believe that a shop-built jig can't equal the accuracy of the store-bought versions, think again. This jig has all the desired features—perfect accuracy, robust size and a quick action toggle clamp. Like many other shop-built jigs and fixtures, our super jig uses the rip fence as a guide. But it incorporates several very special features that you wouldn't expect to find in a home-built jig.

Swivel Work Support: Like the most expensive commercial tenon jigs, our Super Tenon Jig is much more than just a work support permanently screwed to a base board. Contributing Editor Dennis Preston designed this jig to not only handle stock on end, but also at any angle up to 45 degrees. This adjustability is especially handy for things like frame making, where you can use the jig to cut a spline groove in the mitered

frame corners (see photo). We've scribed lines on the jig base to index the swivel work support at the most common angles (15, 30 and 45 degrees), but you can scribe index lines at just about any angle that you regularly use.

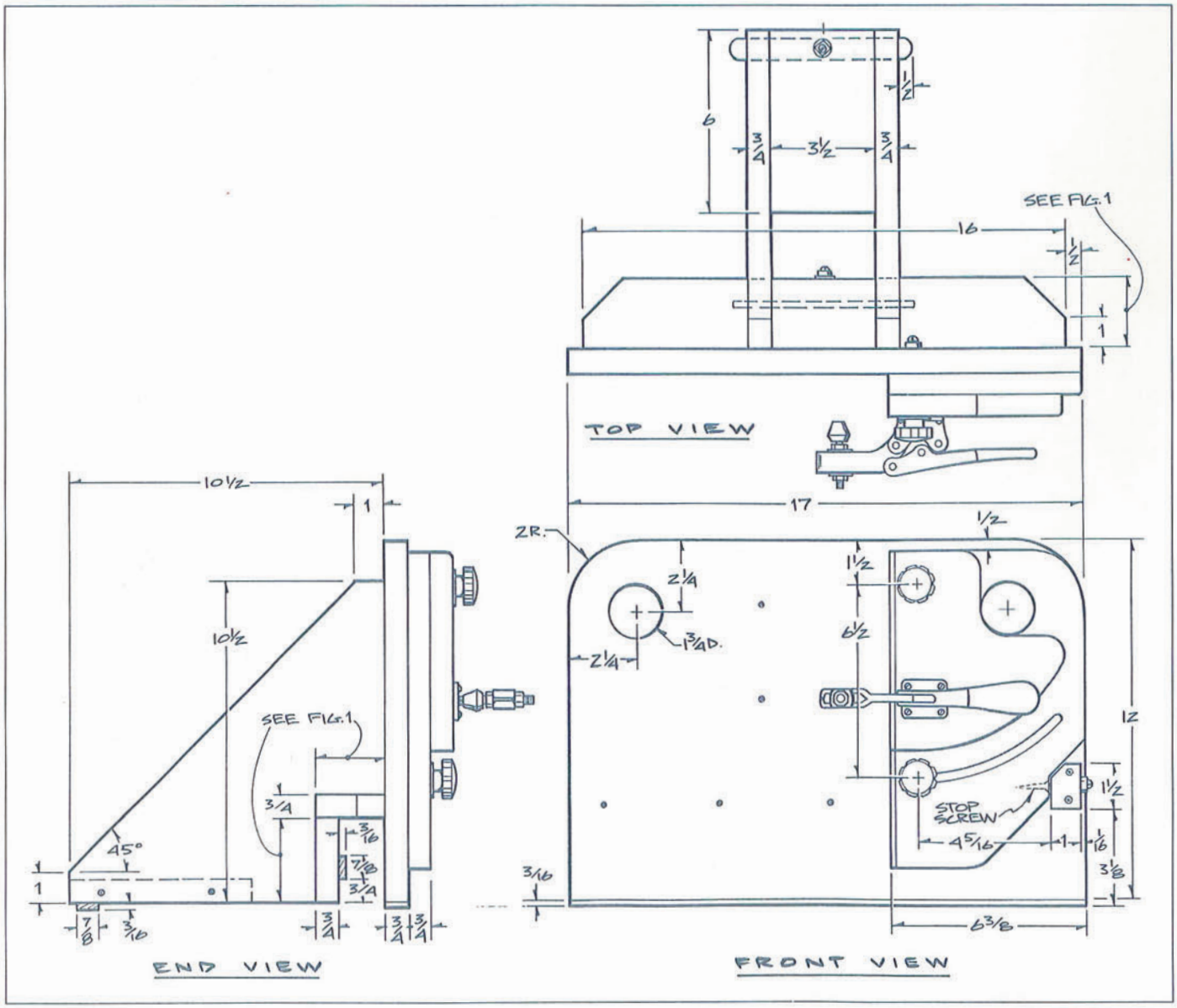
Adjustability: With most home-made jigs and fixtures, the accuracy of the jig is only as perfect as the jig maker was with his construction and assembly. If the assembly isn't quite square to the saw table, or if it doesn't fit snugly over the rip fence, then whatever work is done with the jig will be imperfect by that amount of error. In fact, in order to do perfect work with a home-made tenon jig, your jig would need to be made just about flawlessly. Unless, of course, there was a way to fine-tune the jig *on the saw table.*

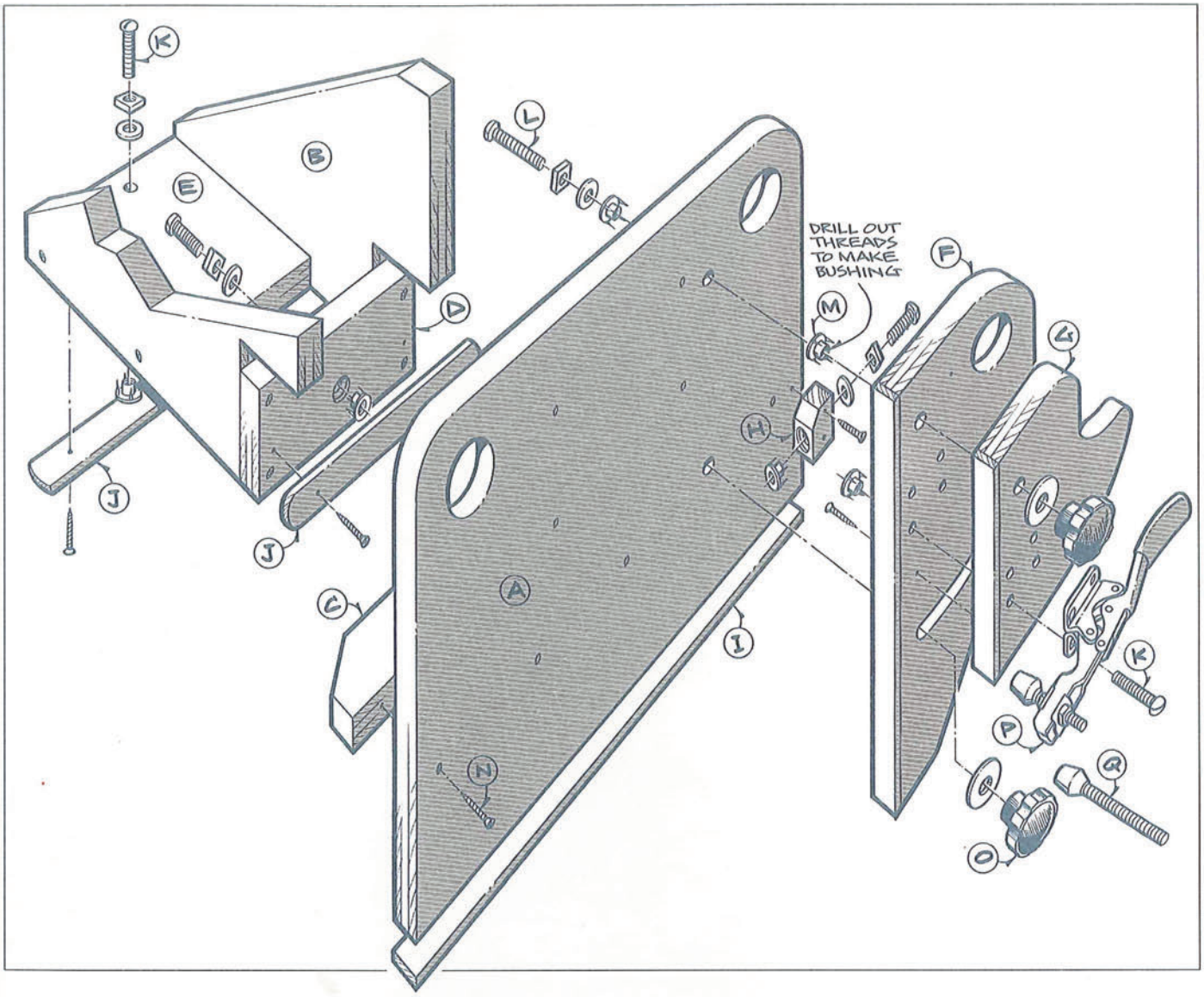
Our Super Jig incorporates exactly this adjustability. Using a simple machine screw/T-nut/rub strip alignment system, our jig can be precisely adjusted both for a snug fit over the rip fence, and to an exact right-angle setting with respect to the saw table. And, in addition to these adjustments, there's also a screw for ''zeroing'' the swivel work support at precisely 90-degrees.

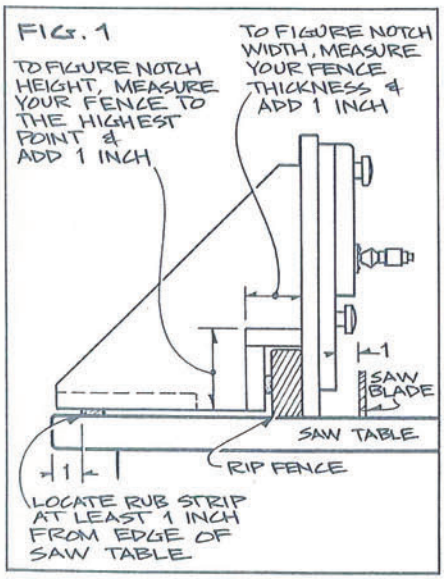
Before You Cut

As you can see from the photos and illustrations, the jig basically consists of the base (A), to which is screwed a pair of brackets (B), the base support (C) and the adjuster block (H). A fence guide (D) and connector (E) are screwed to the brackets, and the rub strips (J) are in turn mounted to these parts. The swivel work support (F) and its stiffener (G) are mounted to the base with a pair of machine screws and knobs, and the hardwood edging (I)—applied to those edges of the jig where wear is most likely—completes the wooden parts for this project.

You could go to work and build the jig exactly as illustrated, but we don't recommend it. We built the jig to fit a particular saw, and obviously, all table saws aren't the same size, nor do they have the same size fence. In building your jig you'll need to size the notch in the brackets, and the widths of the base support and fence guide, based on the actual size of your rip fence. You'll also







need to locate the rub strip on the connector with respect to the size of your saw table. As illustrated in Fig. 1, move the connector-mounted rub strip inboard (toward the base) as needed so that it is firmly on the saw table when the jig is mounted over the fence in the cutting position. If you locate this rub strip so that it is at least 1 in. away from the table edge when the jig is 1 in. away from the saw blade, your jig should be able to function in just about all situations. The 6 in. length of the connector provides sufficient area to mount the rub strip no matter what the size of your saw table.

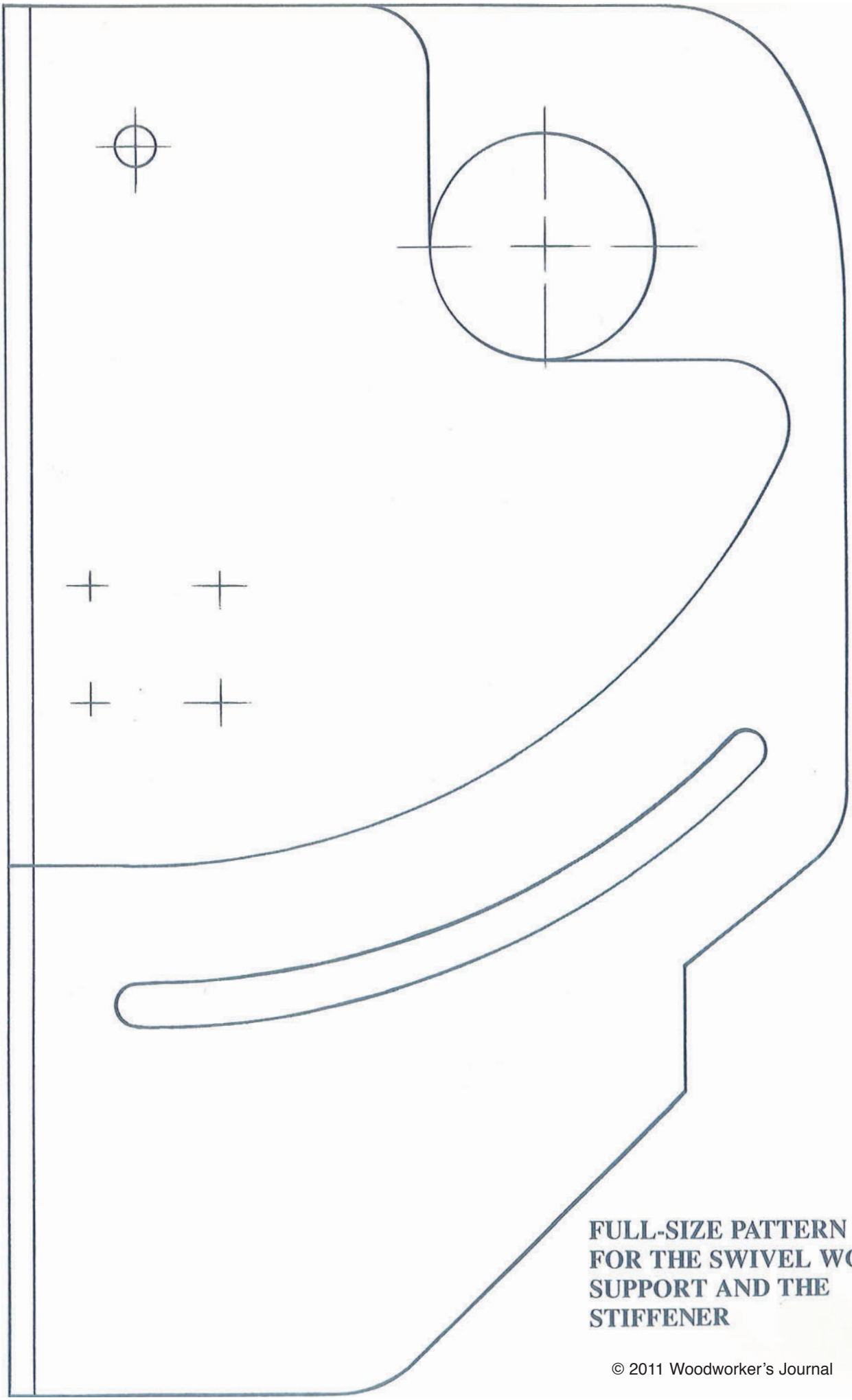
Sizing the notch in the brackets to fit your fence is also easy. As shown in Fig. 1, to determine the notch height, measure the height of the fence to the highest point (such as the top of a screw), and add 1 in. This is the notch height. The notch height allows for the fence, a 1/4 in. clearance space, and the 3/4 in. thickness of the base support. To determine the notch width, measure the thickness of the fence and add 1 in. The notch width allows for the fence thickness, the 3/4 in. thickness of the fence guide, the 3/16 in. thickness of the rub strip, plus a 1/16 in. space in which to adjust the rub strip for a snug fit against the fence.

Get To Work

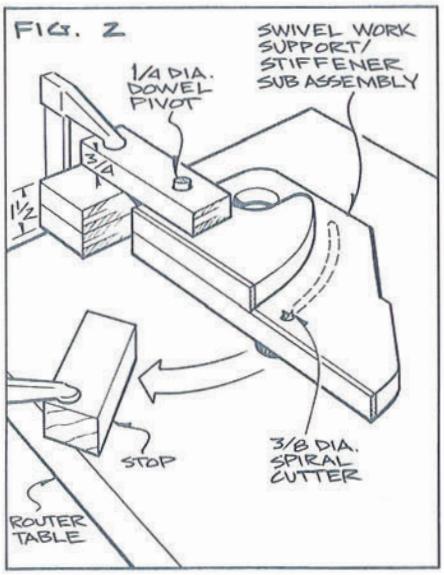
We used cabinet-grade birch plywood for our jig. If you have access to Baltic birch or Appleply, these would be even better choices. We don't recommend that you use fir construction plywood for jig making, since this plywood isn't made to exact enough specifications.

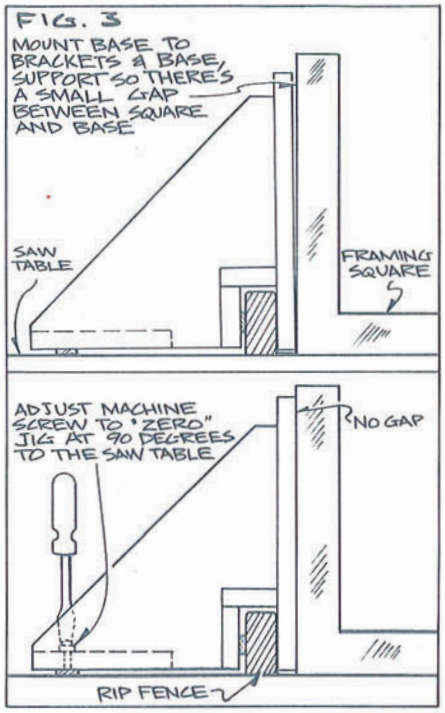
Once you've determined the notch dimensions in the brackets, you can cut the various parts to the sizes listed in the Bill of Materials. Note that the widths of the base support and fence guide will depend on the notch size. Once the parts have all been cut to size (refer to the full-size pattern on the opposite page for the profiles of the swivel work support and stiffener), you can begin the assembly work.

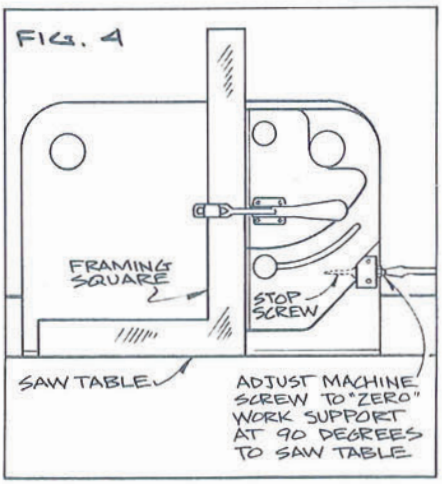
First, apply the solid wood edging to



FULL-SIZE PATTERN FOR THE SWIVEL WORK SUPPORT AND THE STIFFENER







the bottom edge of the base and to the straight edges of the swivel work support and stiffener. Start by ripping enough 3/16 in. thick by 7/8 in. wide edging material to yield both the rub strips and the edging. Glue and clamp the 7/8 in. edging to the 3/4 in. thick plywood edges specified, then use a router (or laminate trimmer) equipped with a flush trimming bit to flush the edging with the plywood. Then glue and clamp the stiffener to the swivel work support, making certain that the edgings are perfectly aligned to provide a smooth work support surface.

Next, you'll need to lay out the holes for the two long machine screws (L) in the base and in the swivel work support/ stiffener subassembly. Bore the topmost 1/4 in. diameter hole in the subassembly for the machine screw that holds the topmost of the two knobs (O), and bore a second hole (3/8 in. diameter), on center exactly 6 1/2 from the 1/4 in. hole. You'll now need to rout the curved slot in the swivel work support. There are several ways to do this. If you have a shop trammel outfitted for your router (this can be as simple as a piece of 1/4 in. plywood, with your router mounted to one end and a nail as a pivot point on the other end) you can rout the slot before gluing the stiffener to the swivel work support. But this job is also easily accomplished on the router table.

First, mount a 3/8 in. diameter spiral bit (or a 3/8 in. diameter straight bit if you don't have a spiral cutter) in the router table. Then make a simple pivot block, as shown in Fig. 2, to allow the subassembly to be fixed to a pivot point. This pivot block is just a few scraps of plywood, with a 1/4 in. diameter dowel extending down out of the top block. Slide the subassembly over the 3/8 in. diameter bit, and clamp the pivot-point block to the router table. Turn the router on and gradually pivot the subassembly until the 6 1/2 in. radius slot is completed to the specified length (mark the slot length from the full-size pattern). Since you are making a full 3/4 in. deep cut (spiral bits, thanks to their aggressive cut and chip-clearing capacity should handle this cut easily), advance the work very gradually. If you don't feel that your router is capable of making a cut of this diameter and depth in a single pass, you'll need to make the cut in several passes, raising the cutter about 1/8 in. each time. Clamp a stopblock to the table to limit the travel of the piece so all the passes will index to the same stopping point (you won't be able to see the bit until the final cut).

To complete work on the swivel work support/stiffener subassembly, mark and drill for the four machine screws (K) that mount the De-Sta-Co clamp (P), and drill out the back of these four holes and the top knob hole for the T-nuts (M). The 1/4-20 T-nuts require a 5/16 in. diameter sleeve hole and a shallow 3/4 in. counterbore for the head. Insert the T-nuts and mount the De-Sta-Co clamp. Then take a 1/4 in. diameter drill bit and drill through the T-nut that you mounted in the machine screw hole for the top knob. By drilling out the threads in this T-nut, you've turned it into a bushing that will protect the hole from being worn out by the machine screw threads.

Next, drill though the base for the machine screws that mount the two knobs. An easy way to locate these screw holes is to first use a framing square to mark an index line, measure 1 1/2 in. down from the top edge of the base to mark the first hole, and 6 1/2 in. down from that point for the second hole. Drill these two holes, and for the two T-nuts that mount the machine screws, then insert the T-nuts. Insert the machine screws (the nuts lock the machine screws in position), mount the swivel work support/stiffener, large washers and knobs, and check that the swivel action is smooth. Also, bore out the adjuster block for the adjusting screw and T-nut, then mount it to the base (allow a little space between the adjuster block and work support, for adjustability). Insert a drywall screw (N) into the edge of the swivel work support at the point where the adjuster screw makes contact. The head of the drywall screw serves as a positive stop.

Assemble the remaining parts, using the connector and fence guide to join the brackets (the adjuster screw holes and T-nut counterbores should be made first, and the T-nuts mounted). Screw the rub strips in place, then mount the base to the brackets and base support. Use

screws only (no glue) when mounting the base to the brackets and base support. This way, should the need ever arise to replace the rip fence rub strip, you'll be able to effect the replacement without destroying the jig.

Note that in locating the base with respect to the brackets, the bottom edge of the brackets should be just a little over 3/16 in. higher than the bottom edge of the base. This 3/16 in. allows for the thickness of the rub strip plus a little extra for adjustment so the base can be squared perfectly to the table.

One easy way to obtain this adjustability is to hold a framing square to the base, then mount the base to the brackets so there's just a little space between the top of the base and the square (Fig. 3). You can now adjust the machine screw in the connector to zero out the base at exactly 90 degrees. Also, adjust the machine screw in the fence guide so the jig fits snugly on the fence, slides easily, but exhibits no slop. Finally, once again using the framing square, adjust the machine screw in the adjuster block until the work support is square to the saw table (Fig. 4). All three of these adjusting screws should be mounted with a washer and nut; the screw position is locked in position with the nut.

Using a protractor and a sliding bevel, you can scribe index lines directly onto the base at commonly used angles. We show lines at 15, 30 and 45 degrees, which should handle just about all your needs. Although no finish is needed on the jig, we rubbed in a penetrating oil finish. Somehow, it always seems a bit more satisfying to use a jig that not only does great work, but that looks good doing it.

Using Your Jig

The majority of the times that you use the super jig, the work support will be in the vertical position. The De-Sta-Co clamp that's included with the kit will provide adequate holding power for just about all cuts with the work support in this position. When you are using the jig with the work support in the 45-degree position, an extra clamp is strongly recommended, as shown in the photo.

Depending on the thickness of the stock you are working on, you'll need to either adjust the spindle on the De-Sta-Co clamp so the clamp provides the proper tension, or if you are working with thinner stock, replace the short spindle with the extra-long replacement spindle (Q)

As shown, the jig has the capacity to handle any stock thickness up to 2 in. If you intend to use it for stock thicker than 2 in., you'll need to block up the De-Sta-Co clamp to accommodate the increased thickness (you'll also need longer machine screws to mount the clamp). In adjusting the De-Sta-Co clamp for the proper tension, keep in mind that the intent is for the clamp to exert enough force to hold the workpiece securely; if you have the clamp adjusted for excessive force, you risk racking the work support, especially when it's in an angled position.

To work very thin stock, employ a spacer scrap between the workpiece and the jig base. In the process of using the jig, you'll no doubt eventually cut away the bottom portion of the work support (this area of the work support is cut into when the blade is raised higher than about 1 3/16 in.) but this in no way effects the function of the jig.

Bells & Whistles

We designed this super jig to provide the most bang for the buck. Hence, we eschewed fancy things like Teflon rub strips (instead of the oak we used) and ultra high molecular weight (UHMW) polyethylene adhesive-backed tape on all the wear points.

The Teflon sheet runs about $30 a square foot, and the tape about $13 a roll, so be prepared to spend the big bucks if you want to customize your jig with these bells and whistles.

Bill of Materials
(all dimensions actual)

Part	Description	Size	No. Req'd.
A	Base	3/4 x 12 x 17	1
B	Bracket	3/4 x 10 1/2 x 10 1/2	2
C	Base Support	3/4 x 16 long*	1
D	Fence Guide	3/4 x 5 long*	1
E	Connector	3/4 x 3 1/2 x 6	1
F	Swivel Work Support	see full-size pattern	1
G	Stiffener	see full-size pattern	1
H	Adjuster Block	3/4 x 1 x 1 1/2	1
I	Edging	3/16 x 7/8**	as req'd
J	Rub Strip	3/16 x 7/8 x 6	2
	Hardware		
K	Machine Screw	1/4-20 x 1 1/2	7
L	Machine Screw	1/4-20 x 2 3/4	2
M	T-Nut	1/4-20	10
N	Drywall Screw	1 1/4 bugle-head	29
O	Knob	1 3/8 dia.	2
P	De-Sta-Co Clamp	as shown	1
Q	Extra-Long Spindle	as shown	1

* Widths of base support and fence guide will be dependent on the size of the notch you cut in the brackets to accommodate your rip fence.

** Edging should be 7/8 wide when applied to plywood. Then use flush-trimming bit to trim flush.

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