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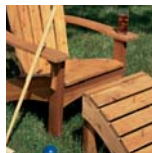
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## Router Circle-Cutting Jig

**W**hen it comes to cutting circles, there's more than one way to go about it. You can use a band saw or a hand-held jig saw. With both of these methods though, you'll most likely have to sand the edge of the circle to remove the saw marks. But a router cuts a circle with a smooth, clean edge the first time around. And with the jig you see here, using a router to make circles (or large holes) couldn't be easier.

**How it Works** – The way the jig works is actually pretty simple. The router is mounted to a plywood base that is attached to the end of an arm. The arm pivots on a steel pin that can be positioned anywhere along the length of the arm. By inserting the pin into a hole in the center of your workpiece, or into a pivot plate that is mounted to the top of the workpiece, you can rout a perfect circle every time.

**Arms** – I began by making the arm of the jig. I actually made two arms — a long one and a short one. Having two lengths of arms gives the jig a greater range. With the long arm, you can cut circles up to 8 feet in diameter. For smaller circles (from 20 inches to 4 feet in diameter), the short arm is

more convenient to use. And with the exception of the length, the two arms are identical.

To make each arm, I started with a rectangular piece of 1/2" plywood (24" long for the short arm and 48" long for the long arm). The profile of the arm is laid out on the plywood according



*Big Wheel Keep on Turning. This jig allows you to make circles up to eight feet in diameter.*

to the dimensions shown in Figures 2 and 2b. But before cutting the arm to shape, there's a couple of things you'll need to do while the blank is still square.

To start with, you'll want to drill the two mounting holes near the end of the arm (Figure 2b). These will be used to attach the arm to the base that holds the router.

Second, you'll need to create the T-slot down the center of the arm. This is a two-step process. First, I drilled a hole at each end of the slot and routed out the waste in between the holes on a router table. Then I cut a groove down the center of the blank, as you see in Figure 2a.

Once you've finished making the T-slot, you can cut the arm to shape. In order to keep the sides of the arm straight and parallel, I used the rip fence to make stopped cuts on the table saw, as you see in Figure 3. Then the curved portions of the arm can be cut on the band saw or with a

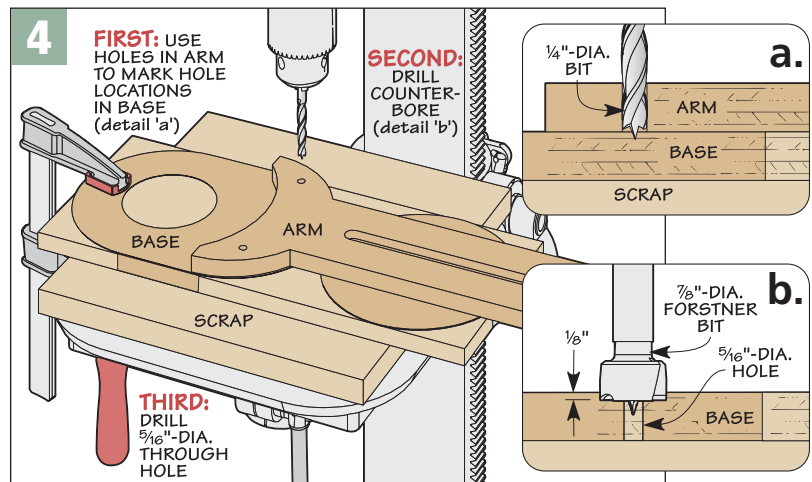
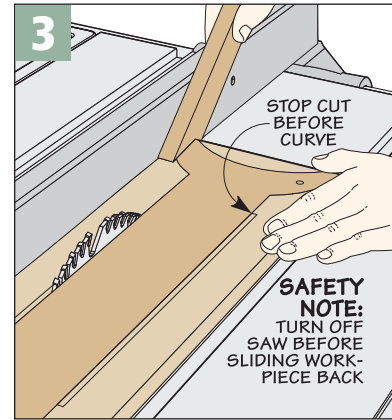
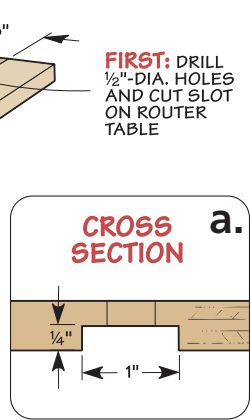
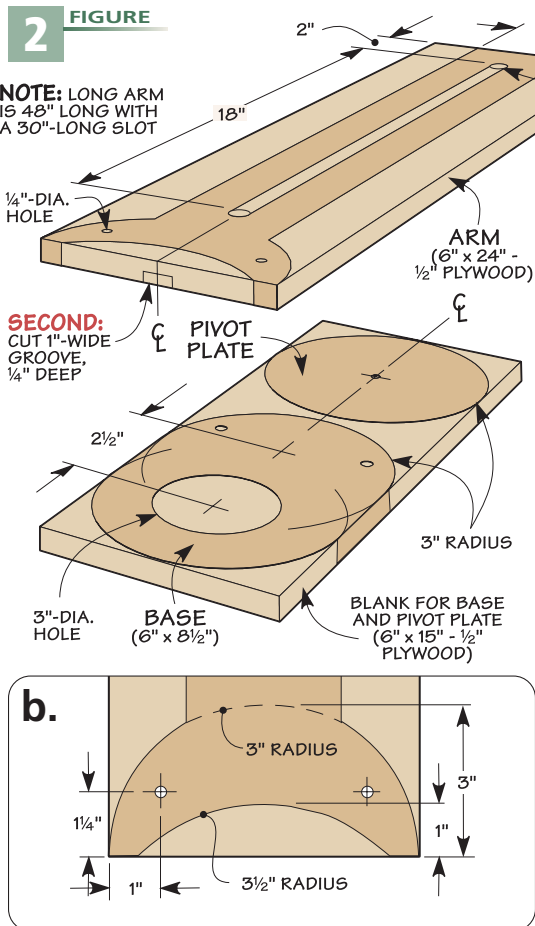
jig saw and sanded smooth.

**Base** – As you can see in Figure 2, both the base of the jig and the pivot plate are cut from a single blank. Start by laying out the shapes of both pieces on the blank. The next step is to drill a couple of counterbored holes in the base for a pair of T-nuts that will be used to attach the arm to the base.

To make sure the T-nuts line up with the holes you already drilled in the arm, you can just use the arm as a template, as shown in Figure 4. Simply position the arm over the blank for the base and use a drill bit to mark out the hole locations. Then drill a shallow counterbore, followed by a smaller through hole (Figure 4b).

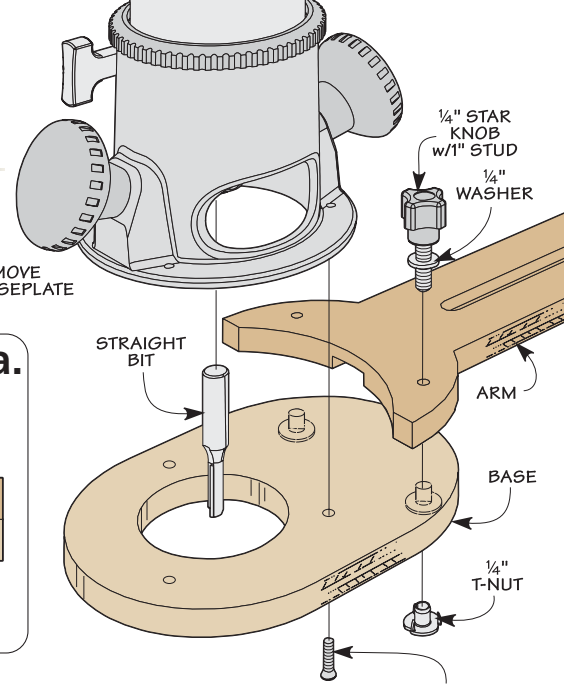
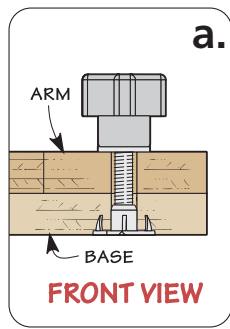
When this is done, you can cut (or drill) a 3"-dia. opening in the base right

where the router will be mounted. This opening is for the router bit. Then you can cut the base out and sand the edges smooth. Finally, drill some holes in the base to allow you to mount it to the bottom of your router. (You can use the baseplate from your router as a template for drilling the holes.)



**1 OVERVIEW**

**NOTE:** REMOVE ROUTER BASEPLATE



**NOTE:** REPLACE THE BASEPLATE SCREWS WITH LONGER ONES

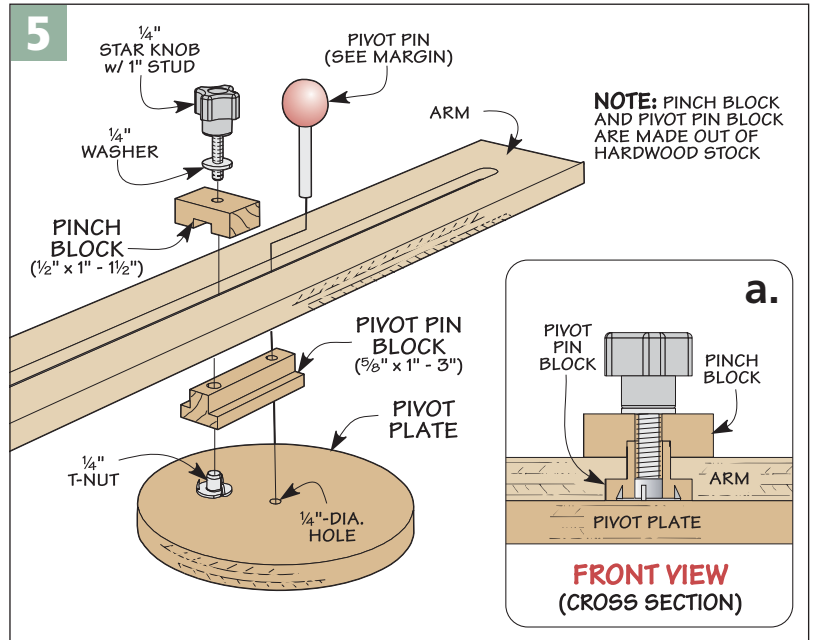
# Pivot Plate & Pivot Pin Assembly

With the arm and the base completed, you can turn your attention to making the remaining parts of the jig. All that's left is the pivot plate and the pivot pin assembly.

**Pivot Plate** – There's really not much to the pivot plate. It's just a 6"-dia. circle cut from the leftover blank that you used to make the base of the jig. In the center of the plate is a 1/4"-dia. hole that will receive a pivot pin that is added later. But for now, you can just set the pivot plate aside once you've finished making it.

**Pivot Pin Assembly** – Although it's the smallest part of the jig, the pivot pin assembly is really the heart of the jig. The assembly holds a steel pivot pin that will be the centerpoint of the circle (or arc) that you want to cut. To adjust the size of the circle, all you do is simply slide the pivot pin assembly along the slot in the arm.

The assembly consists of three parts — a pivot pin block, a pinch block, and a pivot pin. The pivot pin block fits into the T-slot of the arm and holds the pivot pin. The purpose of the pinch block is simply to lock the pivot pin block in place. Both of these pieces are fairly small. So to



make it safer to work with them, I started by cutting the blanks to exact width, but leaving them extra long.

**Pivot Pin Block** – The pivot pin block starts off as a narrow blank about 12" long. The first step is to drill a centered hole that will hold the pin. Then you'll need to drill a larger, counter-bored hole for a T-nut, as shown in Figure 6.

Once the holes are drilled, the next step is to cut a rabbet along each side of the blank to create a tongue that fits in the slot of the arm. Figure 7 shows how I did this. Then just cut the block to length and install a T-nut. That's all there is to it.

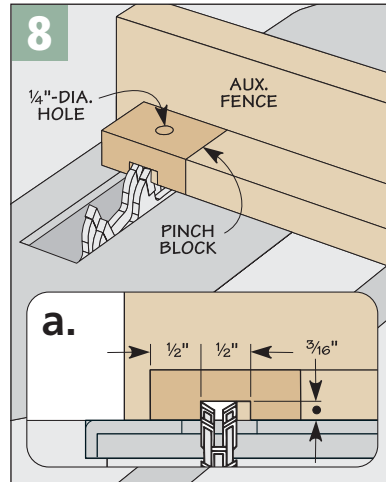
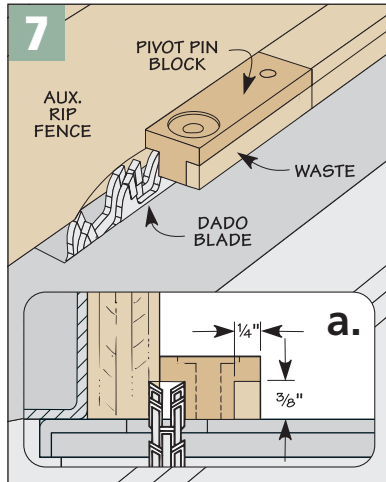
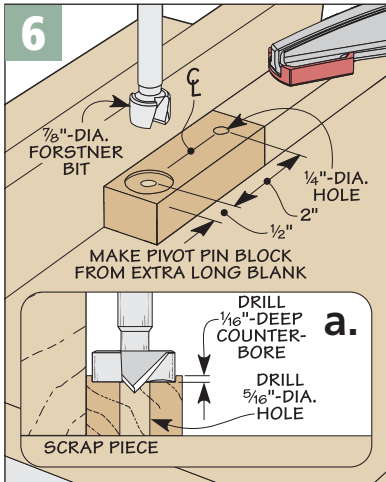
**Pinch Block** – The pinch block is even simpler to make. It's just a short block with a dado cut down



▲ **Pivot Pin.** All you need to make the pivot pin is a standard hex bolt and a threaded knob.

**FIRST:** CARPET TAPE WORKPIECE TO SCRAP PIECE, THEN CLAMP TO WORKBENCH





the center to allow it to fit over the pivot block (Figure 5a). After cutting the dado as shown in Figure 8, you'll need to drill a hole near the end of the blank and then cut the block to length. A studded knob and washer are used to assemble the pivot block and pinch block to the rest of the jig.

**Pivot Pin** – The last part to make is the pivot pin. This is nothing more than a hex bolt with a round knob on one end (see photo in margin at left).


To make the pivot pin, you can start by cutting off both ends of the bolt so that it's about 2<sup>1</sup>/<sub>8</sub>" long with only 1/2" of the threads remaining. Then run a

little epoxy on the threads of the bolt and add the knob. Finally, grind a slight chamfer on the end of the pin to make it easier to insert into the pivot hole.

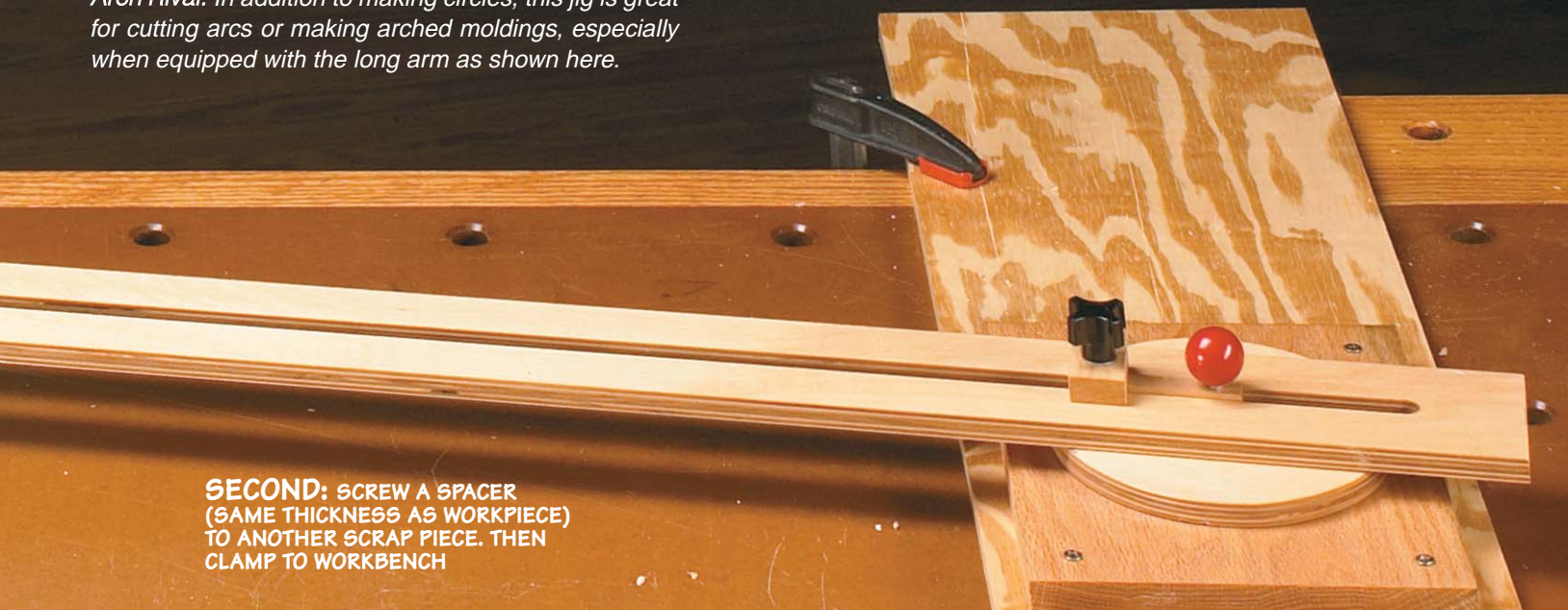
**Using the Jig** – There's not really much to using the jig. To start with, remove the base plate from your router and mount it to the base of the jig. The next step is to position the pivot pin along the arm of the jig according to the size of the circle you wish to make.

How you attach the jig to your workpiece will depend on your project. If you don't want any holes in the finished circle, you can carpet

tape the pivot plate to the top of your workpiece over the center of the circle. Otherwise, just drill a 1/4"-dia. hole at the center of your workpiece for the pivot pin.

When it comes to actually cutting out the circle, just remember to take it slow. You'll need to make multiple passes, lowering the bit no more than a 1/4" between each pass. And make sure to put some scraps of wood underneath your workpiece before you start routing so that you don't accidentally cut through the circle and into your workbench (see photo on bottom of page 1). 

*Arch Rival. In addition to making circles, this jig is great for cutting arcs or making arched moldings, especially when equipped with the long arm as shown here.*



**SECOND: SCREW A SPACER (SAME THICKNESS AS WORKPIECE) TO ANOTHER SCRAP PIECE. THEN CLAMP TO WORKBENCH**