



Woodsmith **PLANS**

# ROUTING A PERFECT RULE JOINT



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*Two mating profiles come together to create a seamless, hinged joint. The secret is some careful work at the router table.*

**F**or me, making a rule joint (or drop-leaf joint) is one of the most interesting tasks in woodworking. A rule joint is the traditional way of mating folding table leaves with a tabletop. As the story goes, the name comes from the close resemblance to the joint used on old-style, folding carpenter's rules.

Most woodworking joints are cut and fit to make a rigid, stable assembly. This is not the case with a rule joint — it's designed to move. And it moves in a way that makes the joint both pleasing to the eye and very functional.

**HOW IT WORKS.** A rule joint consists of two opposite profiles connected by a special table-leaf hinge, as shown in the drawing below. On the edge of the tabletop you rout a roundover (quarter-round), leaving a narrow shoulder along the top edge.

The leaves have a cove cut into the lower edge with a radius that matches the roundover. A shoulder is left along the top edge of the cove so that



▲ A roundover and a matching cove bit are the start of a rule joint.

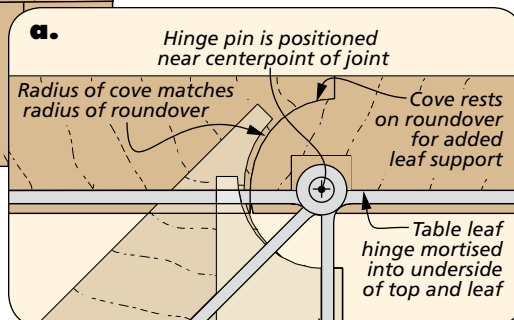
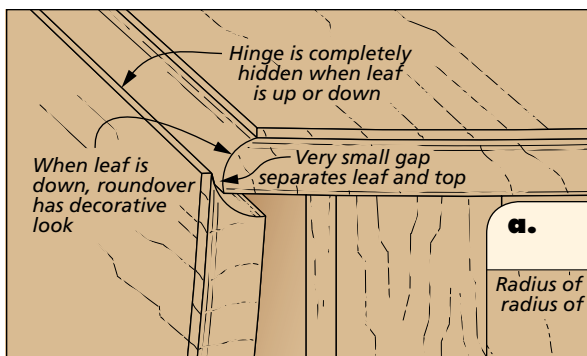
when the leaf is positioned next to the top, the two profiles form a seamless match. The hinges are installed to allow the cove on the leaf to smoothly rotate around the roundover on the top. It's a clever concept.

**WHY BOTHER?** What's the value in making a table leaf joint this way? The answer is that it offers both structural and functional advantages, as well as aesthetic appeal.

When the table leaf is raised, The cove rests on the roundover, taking

the weight of the leaf (and anything sitting on it) off of the hinges and distributing it across the joint.

But a rule joint really shows its stuff when the leaf is lowered. The leaf rotates smoothly around the top with only a small gap opening between them. Even when the leaf is hanging vertically, the joint maintains this close tolerance. The hinges are completely hidden and all you see is a decorative roundover along the edge of the top.



**Two Complementary Profiles.** A rule joint consists of a cove profile on the leaf that rotates around a roundover profile on the top. A special drop-leaf hinge spans the joint to make it work smoothly.

## ROUTING A RULE JOINT

One final advantage to a rule joint seals the deal — cutting the profiles at the router table is easy. A matching roundover, a cove bit, and a dash of patience are all it takes.

### CONSISTENT THICKNESS & STRAIGHT EDGES.

To end up with a flat, seamless joint, you need to get started on the right foot. The top and leaves should be

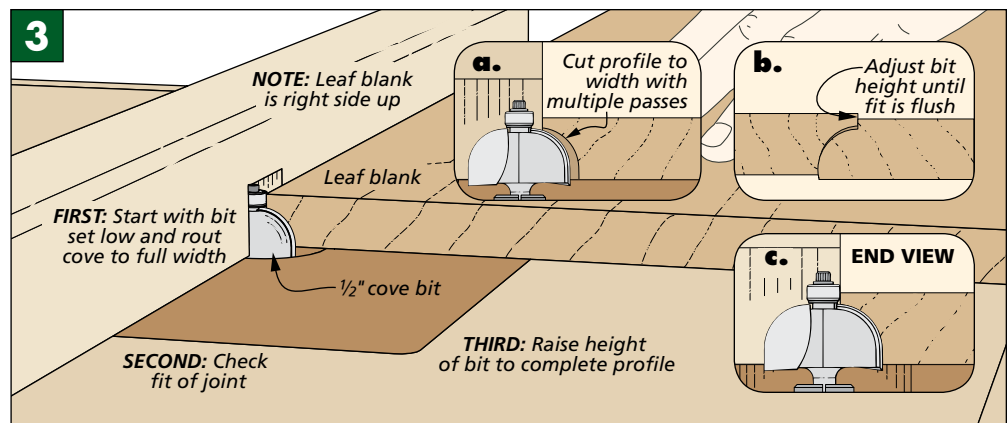
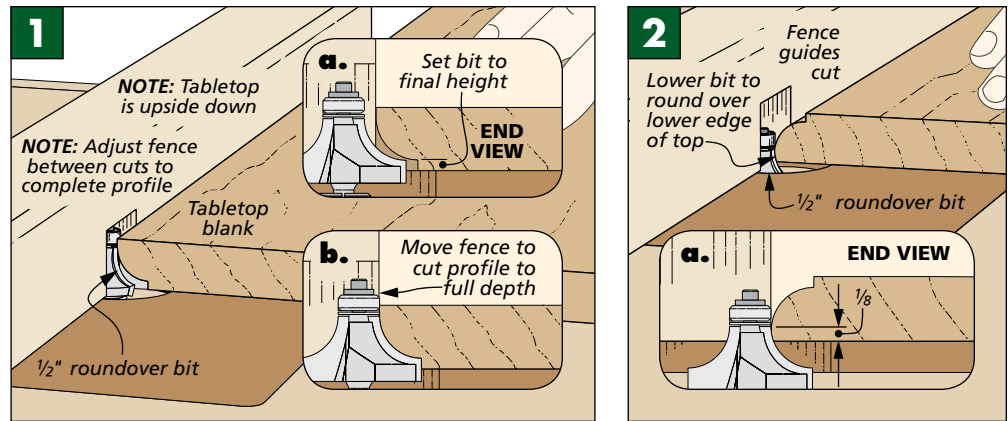
the same thickness, and the edges that will form the joint need to be straight. To ensure a consistent thickness, I glue up and surface the top and leaves all at once. Then, I joint all the mating the edges.

**ROUNDROVER.** The first step in cutting the joint is routing the roundover on the edges of the tabletop. This is pretty standard stuff, but there are a couple of points worth mentioning.

The initial setup is shown in Figure 1. Your primary goal is to cut the shoulder of the roundover to the correct depth (usually between  $\frac{1}{8}$ " and  $\frac{1}{4}$ "). To do this, I start by setting the bit to its final cutting height, using the shoulder depth as my reference. Then I cut the profile in multiple passes using the fence to control the depth of the cut.

The initial shallow cuts allow you to check the shoulder depth and make any necessary adjustments to the bit height (Figure 1a). Remember that the shoulder is on the upper edge of the top. So you'll rout the profile with the top face down. Just hold the top snug to the fence and use firm downward pressure as you make the cuts. Adjust the fence to expose more of the bit and repeat the process until the roundover is cut to full width (this matches the radius of the bit).

**EASE THE UNDERSIDE.** Next, to allow the joint to swing smoothly without binding, you need to relieve the flat section along the bottom of the profile (Figure 2). To do this, lower the bit until only the amount needed to complete the profile is exposed ( $\frac{1}{8}$ " in the example above). Then make a



pass across each edge with the top face up. That's it for the roundovers.

**THE COVES.** When routing the coves, you'll want to have the top within easy reach. Some test fitting is necessary to get a good match.

Again, the routing technique is pretty straightforward. However, I find that it works best to come at it from a different direction. Figure 3 shows what I mean. The profile is still cut in multiple passes. But instead of adjusting the fence to complete the profile, I adjust the height of the bit.

This allows you to sneak up on the height until the top and the leaf nest perfectly flush.

First, with the bit set a tad low, I cut the cove to full width in several passes (Figure 3a). When the width is right, the shoulders should close up tightly, and there should be no gap between the roundover and the cove. But since you haven't cut the cove to full height, the leaf and the top won't rest flush (Figure 3b).

You need to tweak the height of the bit to complete the cove. At this point, it works best to make fine adjustments. Sometimes all you need to do is put a little more pressure on the workpiece to get a perfect fit. When the cove on the leaf is the correct height, the profiles should fit together like two pieces of a jigsaw puzzle.

Once that's done, the hinge mortises can be cut and the table-leaf hinges installed (box at left). You'll find more information about this on page 7 of the swing-leg table article.

And when the drop-leaf top is assembled and in working order, you'll marvel at this clever joint and your own handiwork.

## THE RIGHT MORTISE



The short leaf of a table hinge is mortised into the top. The long leaf is mortised into the table leaf. You'll need to cut a narrow slot in the mortise to accommodate the barrel of the hinge.