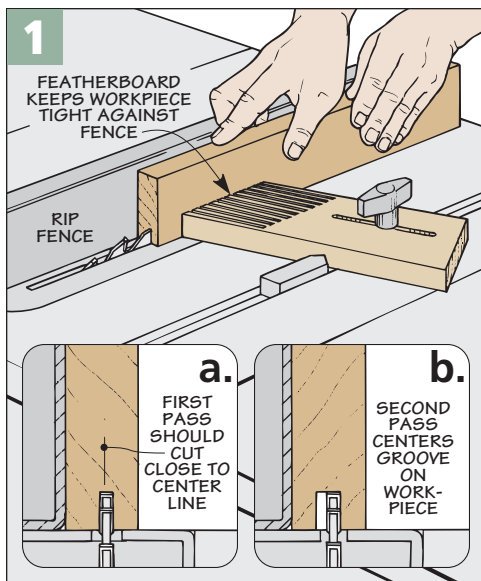


# Tongue & Groove Joinery

**W**henever I'm building frame and panel assemblies that use a plywood or hardboard panel, I almost always use a tongue and groove joint. There are a few good reasons for this. Besides being quick and easy to make, the assembly is incredibly strong. That's because a hardboard or plywood panel can be glued into the frame.

## GROOVES

The first step in creating a tongue and groove joint is to cut the grooves in the rails and stiles that make up the frame.



In most cases, the groove is centered on the edge of the frame piece. Start by adjusting the rip fence on your table saw so the blade cuts *close* to the center, as shown in Figures 1

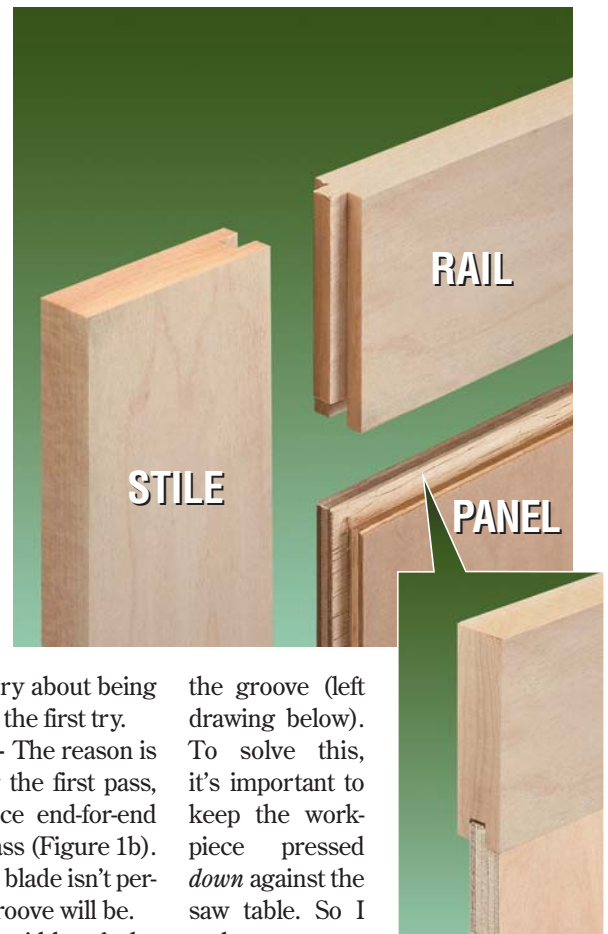
and 1a. But don't worry about being centered perfectly on the first try.

**Flip Workpiece** – The reason is simple. After making the first pass, just flip the workpiece end-for-end and make a second pass (Figure 1b). This way, even if your blade isn't perfectly centered, the groove will be.

To fine-tune the width of the groove, nudge the rip fence over a little and make another cut. Keep in mind that you're removing material from *both* sides of the workpiece. So it's best to make small adjustments and sneak up on the final width.

**Troubleshooting** – Getting a perfectly centered groove involves more than just flipping a workpiece. It's important that it stays tight against the rip fence. So I like to use a featherboard to hold it tight (Figure 1).

Another problem is not cutting the groove deep enough. This can happen when the workpiece "rides up" during the cut, causing a step in



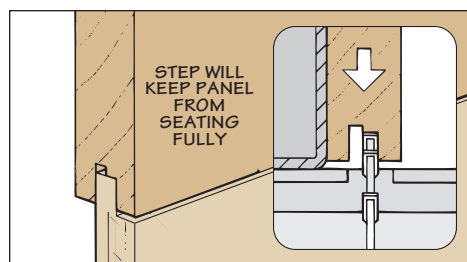
the groove (left drawing below). To solve this, it's important to keep the workpiece pressed *down* against the saw table. So I make sure to check the groove after each cut and, if necessary, make another pass.

**Groove Width** – There is one thing to mention about the width of the groove. If I'm using 1/4" plywood or hardboard, I cut the groove to match the thickness — which is often slightly less than 1/4" thick.

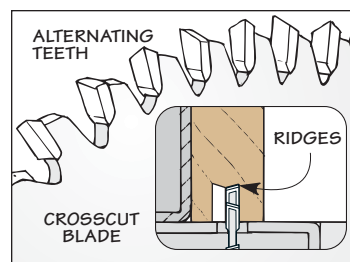
But if I'm working with 1/2" plywood, like on the workstation, I cut a 1/4"-wide groove and then cut tongues on the panels to match (see inset).

**Blades** – One last thing. If you'll see the bottom of the grooves (like on a frame and panel door), you might want to consider using a rip blade to

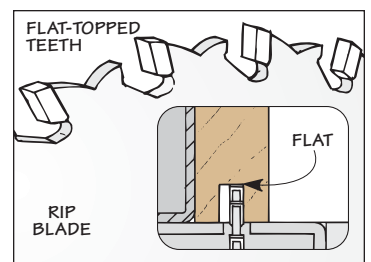
## TROUBLESHOOTING GROOVES



▲ **Downward Pressure.** To prevent stepped cuts in the bottom of the groove, hold the workpiece firmly against the saw table.



▲ **Blade Choices.** A crosscut blade produces grooves with ridges. A better choice for cutting grooves is a rip blade. The flat-topped teeth produce a groove with a perfectly flat bottom.



make the cut. It leaves a perfectly flat bottom (see bottom of [page 1](#)).

**TONGUES**

Once the grooves are complete, the next step is to cut the tongues on the ends of the rails. I prefer to use a dado blade to cut the tongue. This way, you can cut the tongue in two passes using a single setup.

To do this, start by burying the dado blade in an auxiliary fence (Figure 2). Then adjust the fence to set the length of the tongue (Figure 2a).

**Blade Height** – The next step is to set the height of the blade to establish the thickness of the tongue. As before, the idea is to make two passes, flipping the workpiece over between each pass (Figure 2b). This will center the tongue on the rail.

But you still need a starting point. A good guide is the groove itself. Simply raise the blade until it's just about even with the groove (Figure 2a). Here again, make your cuts on a test piece and check the thickness of

the tongue. It should fit the groove with a slightly snug fit.

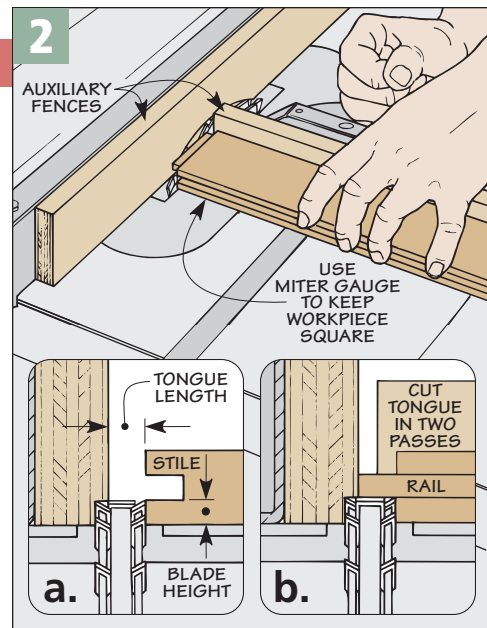
After cutting all the tongues on both ends of all the rails, you can turn your attention to the tongues on the 1/2" plywood panels. For this you can leave the rip fence set and simply adjust the height of the blade to cut a rabbet along the edge of the panel. Again, it's best to sneak up on the fit.

**ASSEMBLY**

At this point, you're just about ready to glue up the assembly. But it's always a good idea to dry assemble things to check for any problems.

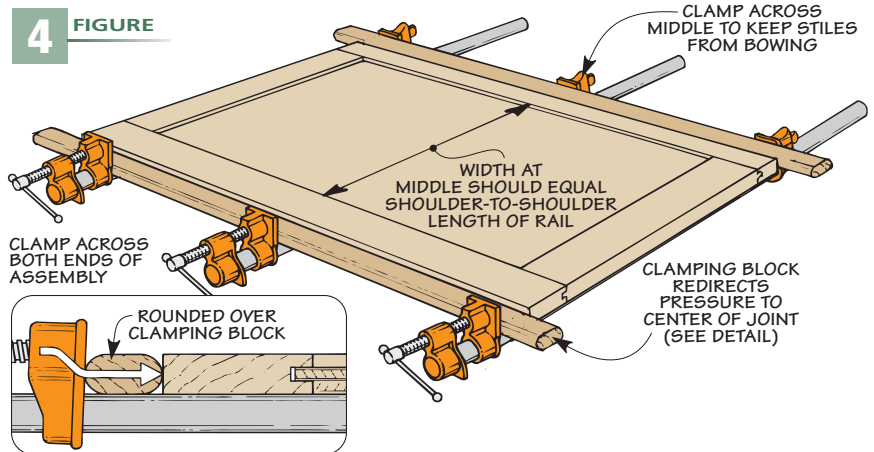
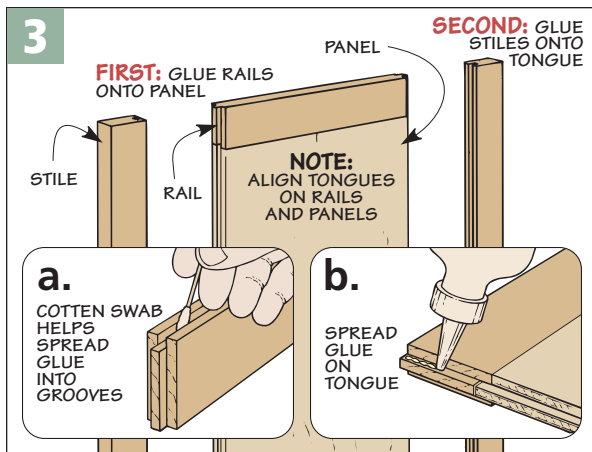
**Sand** – Then you can sand the face of the panel as well as the inside edges of the stile and rails. These areas are difficult to sand later.

**Glue** – Like most glue-ups, the trick is using enough glue to make a strong joint, but not so much that it runs all over the place. I start by gluing the rails to the panel, applying glue to the groove and *inside* face of the tongue on the panel (Figure 3).

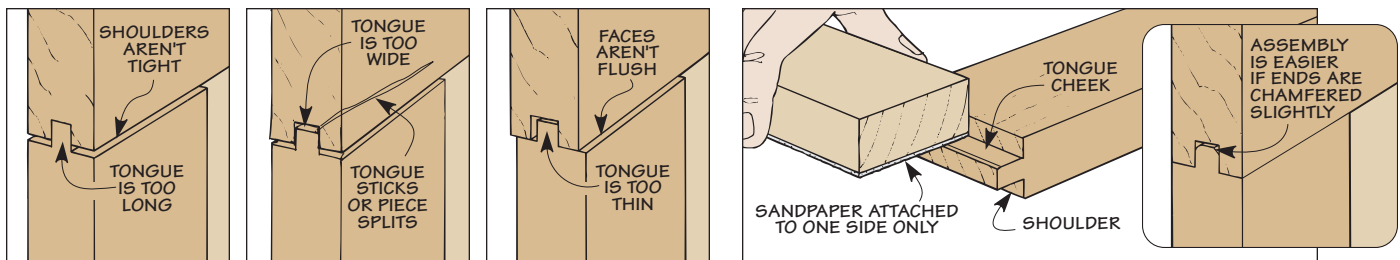


Attaching the stiles is just a matter of repeating the same process. But here I apply glue to *both* sides of the tongues on the rails (Figure 3b).

After clamping the pieces together (Figure 4), check to see that the frame is flat and square. If it isn't flat, try loosening the clamps a bit. And if it isn't square, try repositioning the clamps slightly.



**TROUBLESHOOTING TONGUES**



▲ **Tongue Troubles.** When the tongue is too long (left) or too wide (center), assembly is difficult. A tongue that's too thin (right) results in a poor glue joint and makes it hard to align the faces.

▲ **Fitting the Tongue.** Lightly sand the tongue cheeks and chamfer the ends to get a good fit in the groove. But stay clear of the shoulder to keep it sharp.