

Three ways to raise a panel

Frame-and-panel construction is among the woodworker's greatest inventions. Not only does it solve many of the problems we encounter with wood movement, but it also looks good, creating visual interest by adding shadow lines and reflecting light across different planes.

There are almost as many ways to cut raised panels as there are tools in the workshop. While the shaper is probably the most efficient, many woodworkers don't own a shaper. Depending on the piece I'm building and the number of panels I have to cut, I use one of three methods—hand tools, a router table, or a tablesaw outfitted with a panel-raising jig. Whatever method you choose, start with a panel that is sized to the opening in the frame plus the depth of the grooves—minus just a little in the width to account for wood movement.

The panels built for this article actually are both raised and fielded: The bevel makes it a raised panel, and the shouldered step up to the center, known as the field, makes it fielded.

A traditional look with hand tools

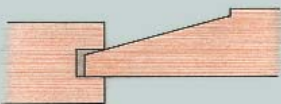
If you're not in a rush, are aiming for a traditional look, or simply want to hone your hand-tool skills, raising panels by hand is a good option. The only tools you'll need are a cutting gauge and a rabbet plane (a Stanley No. 78, a Record No. 778, or similar).

Start by laying out the field and tongue. Scribe layout lines on the face of the panel with a cutting gauge, then deepen them with a marking knife and a straightedge. Now scribe the edge of the panel to determine the thickness of the tongue. The goal is to plane away the material on a bevel with the two scribe lines as your boundaries. When laying out the bevel, aim for an angle that is between 15° and 25°. Use shallower angles with larger panels to increase the width of the bevel.

The first cut is a simple rabbet, establishing a shoulder to separate the bevel from the field. Set the depth stop on the rabbet plane to cut a rabbet about 3/16 in. deep, and adjust the

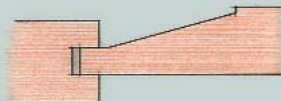
TWO TYPES OF TONGUES

BEVELED TONGUE



When cut with hand tools or on the tablesaw, the tongue is an extension of the bevel.

FLAT TONGUE



A raised panel cut with a router bit has a flat tongue, which allows the panel to shrink and expand more freely inside the frame.

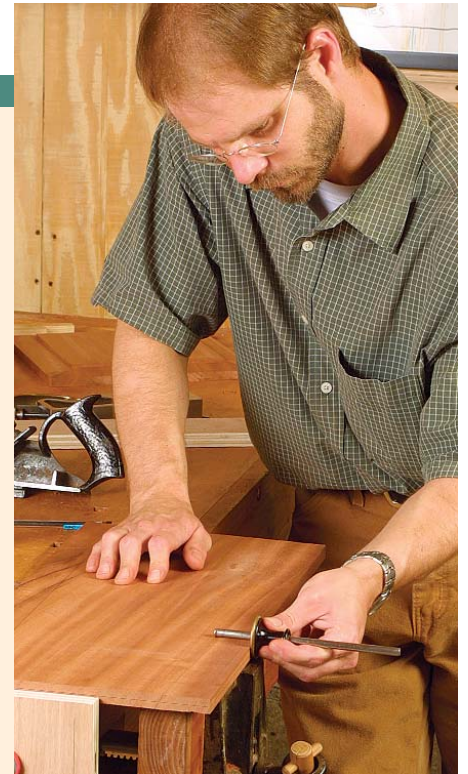
METHOD 1

RAISE A PANEL BY HAND

Lay out the field and bevels with scribe lines and handplane them to completion.



Establish the bevel. Use a marking gauge to lay out the tongue thickness (above) and the field (right) with scribe lines.



Plane a rabbet and then cut the bevel. Cut the cross-grain ends first, with scrap material on the trailing edge to prevent tearout as the plane exits the panel. After cutting the rabbet, readjust the fence to cut the bevel, working down to both the tongue thickness and the shoulder of the field, holding the plane at an angle.

Check the fit as you go. Stop before the tongue bottoms out in the groove. If all sides are raised equally, the intersecting bevels will create a straight line at the corners.

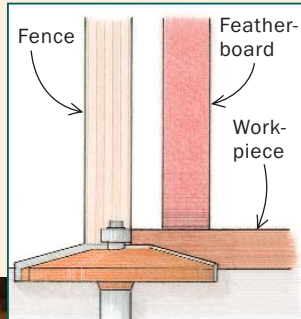


Rules of Thumb (continued)

METHOD 2

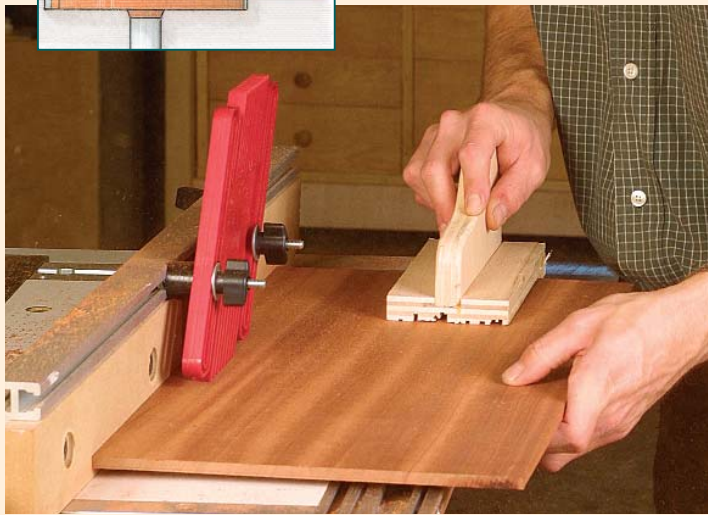
RAISE A PANEL AT THE ROUTER TABLE

Panel-raising router bits come in two styles, both of which create a flat tongue and a bevel. With each bit, take multiple passes and increase the depth of the cut with each pass.



HORIZONTAL ROUTER BIT

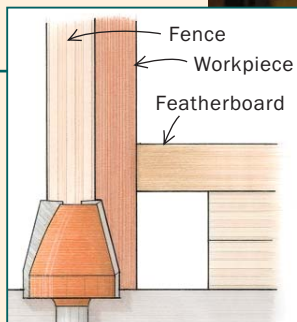
These large-diameter bits require a variable-speed router set at 10,000 rpm. Use a featherboard to keep the panel flat against the table.



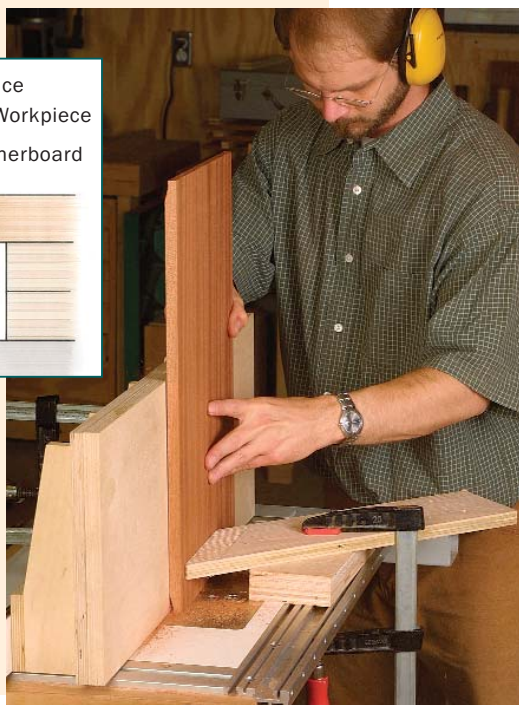
Cut the long-grain sides after the cross-grain ends to clean up any tearout. Use a push block and a steady feed rate on the final pass for a smooth finish.

VERTICAL ROUTER BIT

These bits should be run between 18,000 rpm and 22,000 rpm. Use a featherboard to keep the panel snug against the tall fence.



Take light passes with a vertical panel-raising bit. They tend to produce a rougher surface than a horizontal bit, but a card scraper or sandpaper will clean things up.



fence so that the width of the rabbet reaches the scribe lines on the panel's face. Begin by planing the cross-grain ends. Use a backer board to prevent tearout where the plane exits the workpiece. However, if there still is tearout, you can clean up the unsightly edges when you plane the long-grain sides. There's no need to use a backer board as you plane the long grain.

With a rabbet on all four sides, begin on the bevel. Again, bevel the cross-grain ends first and then finish up with the long-grain sides. Hold the plane at an angle and make passes until the bevel spans from the shoulder to the scribe lines on the edge of the panel. If you encounter a troublesome area, plane in the other direction using a rabbeting block plane registered against the shoulder. Finally, use a card scraper to smooth the bevel to a finish.

Two methods at the router table

When raising panels on a router table, you can use a horizontal router bit or a vertical router bit. Either method has advantages over using hand tools (or the tablesaw, for that matter)—the router bits cut a flat tongue on the edge of the panel, rather than a beveled tongue, allowing the panel to float more freely in the frame as it expands and contracts with changes in humidity.

Face on the table—Raising a panel with a horizontal router bit is safe and efficient, but it calls for a variable-speed router. Because panel-raising bits are so large in diameter, you'll need to dial back the router to about 10,000 rpm.

If you're raising multiple panels of the same size, you need to mark out only the thickness to be removed on the first panel. The width of the bevel is determined by the bearing on the router bit. Scribe a line on the edge of the panel to indicate the tongue's thickness. You are somewhat limited by the thickness of the panel. If it's too thick, the bit produces either an overly pronounced shoulder or a thick tongue. Alternatively, you can cut a rabbet on the back of each panel's edge to reduce the thickness of the tongue.

Start routing on the cross-grain ends and then raise the long-grain sides. Take three to five passes—depending on the density and thick-



A perfect fit. The flat tongue should fit snugly in the thickness of the groove.

Rules of Thumb (continued)

METHOD 3

RAISE A PANEL ON THE TABLESAW

Set the tablesaw blade to 90° and build a tablesaw jig that holds the panel at an angle. In this case, a 75° jig creates a 15° bevel. Before cutting the panels, make test cuts with scrapwood.



Establish the field. Score a $\frac{3}{16}$ -in.-deep shoulder around the field using the tablesaw.

ness of the wood—raising the bit with each pass until you reach the final depth. If you're raising more than one panel, rout each panel in order before raising the bit. To guarantee a clean cut, make sure your last pass is a shallow one, removing no more than $\frac{1}{16}$ in.

Face against the fence—You can raise a panel at the router table using a vertical panel-raising bit buried in a tall auxiliary fence. This method requires you to take light passes, and your router should be running at 18,000 rpm to 22,000 rpm, which is in the range of many single-speed routers.

Again, cut the cross-grain ends before the long-grain sides and take several passes, exposing more of the bit after each cut by moving the tall fence. For safety's sake, use a featherboard mounted high on the panel to ensure that the workpiece stays snug against the tall fence as you cut.

Panel-raising on the tablesaw

Finally, you can raise panels on the tablesaw. Similar to the hand-tool method, this method produces a beveled tongue.

Rather than tilting the blade to cut a bevel, I use a shopmade jig (left) that holds the panel at a 15° angle and straddles the tablesaw fence. It alleviates almost any chance of kickback and allows you to secure the panel to the jig with clamps so that your hands are out of danger when making the cut. Also, it is easy to adjust for different size panels. Just raise and lower the blade or move the fence.

Raise the panel—Once you've built a jig to the specifications included in the drawing above, you can begin cutting the panel. First, cut a test bevel using scrap material that is the same thickness as the panel. Aim to create a tongue that fits in the groove of your frame and will leave some room inside the groove for the panel to expand. Then measure the width of the bevel to determine the location of the shoulder.

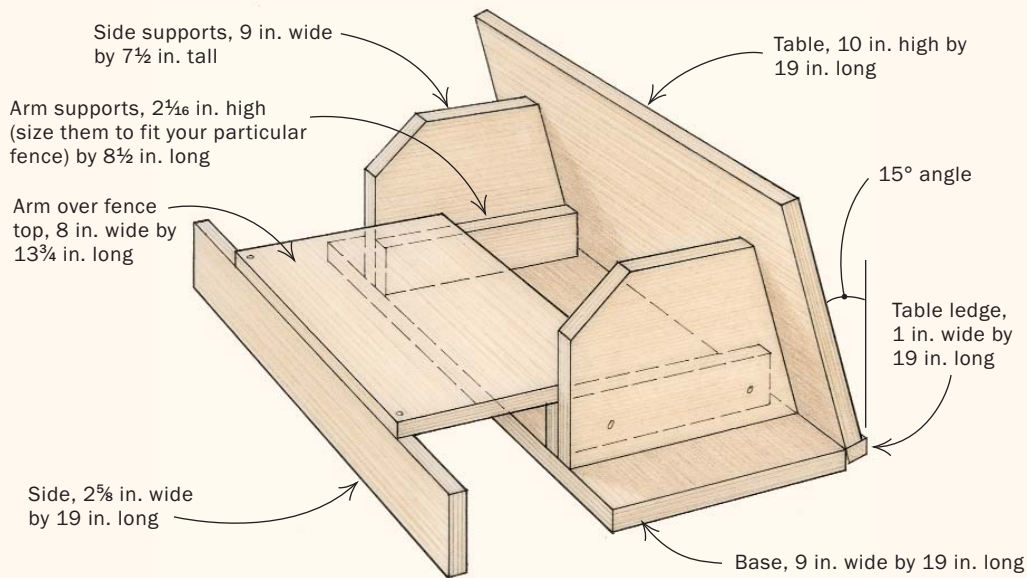
Start by establishing the shoulder on the tablesaw. Set the tablesaw fence to the width of the bevel on your test cut, and raise the blade to about $\frac{3}{16}$ in. Then run all four sides of the panel through the tablesaw.

After establishing the shoulder, clamp the panel to the jig and align the fence for the correct tongue thickness. Raise the blade so that it just reaches the shoulder and begin cutting.

The tablesaw is far and away the fastest way to raise panels. If you have more than two or three panels, you'll make up the time spent building a panel-raising jig. And once you've built the jig, you can use it again and again. I use mine not only for raising panels but also for cutting wide chamfers on the top or bottom of small tabletops. □

BUILD A PANEL-RAISING JIG

This jig is relatively straightforward but makes raising a panel at the tablesaw speedy and safe. It's made of $\frac{3}{4}$ -in.-thick plywood and assembled with $1\frac{5}{8}$ -in. drywall screws. Build the jig first, then attach the arm so that it's snug over the tablesaw fence.



Clamp the panel to the jig and cut.

Raise the blade so that it reaches the shoulder. Make the cross-grain passes before cutting the long-grain sides. A steady feed rate and a sharp blade reduce burn marks. Leftover marks can be cleaned up with a scraper.

