

Add Splines for Stronger Miters

Quick jig produces clean joints with hidden power

BY DOUG STOWE

When making mitered boxes, I carefully select the stock for its character and grain, which I like to wrap around all four sides. Splines help me bolster the joint by adding long-grain glue surface. Cutting them into the box's outside corners after assembly can interfere with the wood I have so methodically selected. That's why I often tuck the splines into slots routed into the miters.

These joints are easy to cut with the right jig and they are plenty strong, and

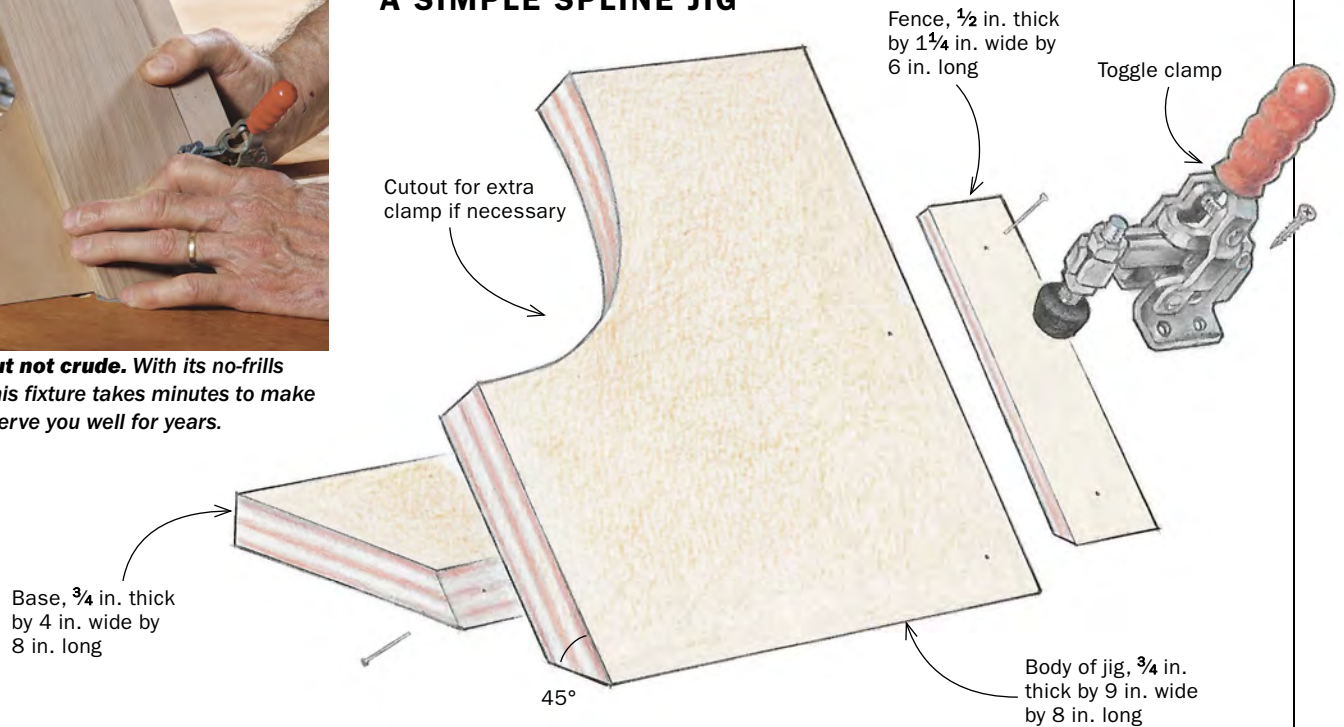
unlike most miters they can be brought together with common clamps. Plus, unlike many other types of joinery for boxes, the splines are invisible in the finished box. Well, perhaps I should qualify that: They are invisible on the outside of the box. If you cut the lid free from the body, as I like to do, the splines will be visible when the box is open. I often make the most of this design opportunity by using a contrasting wood for the spline (see photo, left).





Basic, but not crude. With its no-frills design, this fixture takes minutes to make but can serve you well for years.

A SIMPLE SPLINE JIG



Flip and secure. With the parts inverted, apply glue and nail through the base into the body of the jig.



On the fence. Miter a strip of wood for the jig's fence. Keeping it flush with the bottom and side of the jig, nail it in place. Then attach a toggle clamp to it.



Making the jig

Building the jig requires little more than cutting a miter, nailing three pieces of wood together, and adding a toggle clamp. In about 10 minutes, you'll have a reliable fixture that gets you right to box making.

Start with a piece of $\frac{3}{4}$ -in. plywood or MDF about 8 in. to 9 in. wide by 12 in. long. Set your sawblade to 45° and crosscut the blank about 4 in. from one end. The shorter piece will be the base that rides on the router table and the longer one the body, which supports the box parts. Before attaching them, make a circular cutout on one side of the longer piece to allow for additional clamps when using the jig.

Flip over the short piece and spread glue along its mitered edge. Set it in place, flush with the mitered slope of the longer piece. Drive a brad and check that everything's still aligned. If something moved, tap it gently back in place. Drive more nails to reinforce the joint. Along the right side of the jig, add a fence with a toggle clamp to lock the workpieces in position.

Cutting the box parts

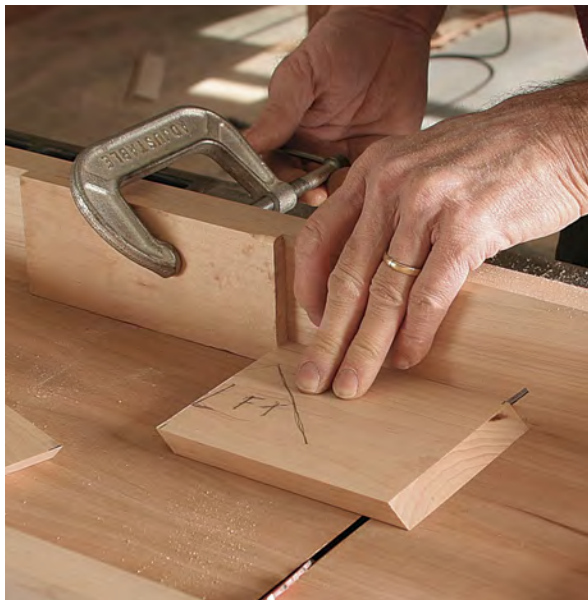
With the jig ready, I turn to making the mitered box. To make sure the miters are

Miters first

First stop. After laying out his box sides, Stowe secures a stop to a crosscut sled (right). This allows him to make repeat miters on the long sides (below).



Second stop. For boxes with ends shorter than the sides, you'll need to reset the stop. For this box, Stowe is wrapping the grain around the sides, so he aligns this miter to remove as little as possible on the outside face.



tight, I take a handful of careful steps. First, I use a tablesaw sled dedicated to 45° cuts. Second, when angling the sawblade, I use a digital gauge and double-check with a combination square. Then, to triple-check, I usually cut a test miter on stock thicker than the box sides, since the thicker stock will amplify any error in the angle. Finally, I use stop blocks on my crosscut sled to make sure the sides come out at consistent lengths. If I want the grain to wrap around the box, I mark the sides to keep track of them.

Routing the spline slots

To use the jig, you'll need a router table with a fence, two stop blocks, and a $\frac{1}{8}$ -in. or $\frac{3}{16}$ -in. straight bit. I use the $\frac{1}{8}$ -in. bit for box sides $\frac{3}{8}$ in. to $\frac{1}{2}$ in. thick but prefer the $\frac{3}{16}$ -in. router bit if the stock is $\frac{5}{8}$ in. or thicker.

I typically eyeball where to set the fence and the bit's height, aiming to place the spline so that it's roughly centered in the stock. However, make sure that the slot is located at least $\frac{1}{16}$ in. from the inside face of the stock.

Next up are the stop blocks, which get clamped to the fence to start and stop the slot. When making a box that has grooves for the top and bottom, I limit the spline slot to avoid cutting into either groove. To accurately set the fence and the stops, temporarily mount the workpiece inside face out, so you can locate the stops by referencing off the mitered face.

Slots for splines



Set the stops. To accurately set the fence and the stops, temporarily mount the workpiece with the inside face out, so you can locate the stops referencing off the mitered face. If your box has grooves for the lid and bottom, locate the stops so you don't rout into them.



Where to rout. With the stock in the jig, Stowe eyeballs where to locate the fence. He aims for the bit to be roughly centered in the stock and always leaves at least $\frac{1}{16}$ in. of clearance between the slot and the inside face of the workpiece.

To rout the slot, mount the inside face of the workpiece against the jig. Push the piece against the fence and clamp it down while holding it and the jig against a flat surface, guaranteeing the end of the stock and the base of the jig will be flat against the router table. Double-check that things are aligned, since any discrepancies will keep the joint from closing easily. For example, failing to get the miter flush with the bottom of the jig can result in a slot that's too shallow for the spline to fit at the intended depth.

Hold the jig firmly against the fence when you rout the groove, and pivot against the stops to enter and exit the cut.

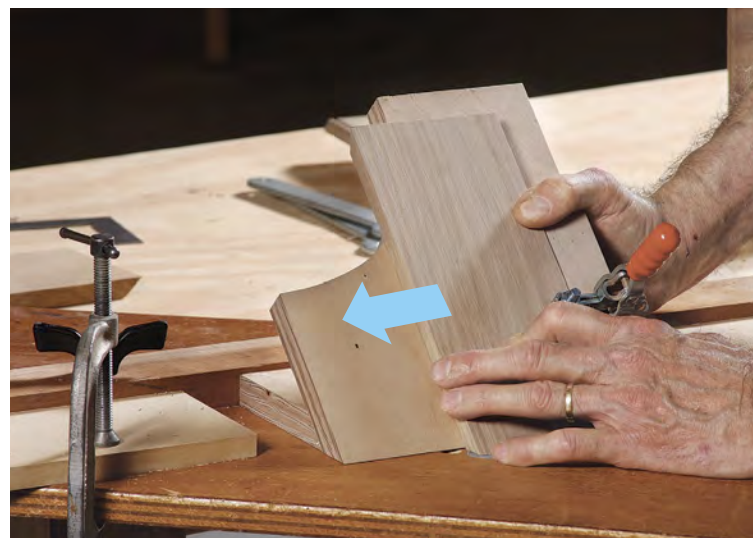
Making the splines

Make sure the grain of the splines runs in the same direction as that of the box when installed. This makes for the strongest joint, and the splines expand and contract with the box, maintaining the strength of the joint as the weather and humidity change.

To make the splines, thickness an over-long piece of stock to fit the slots. The blank should slide in and out with slight finger pressure; a fit that is too tight will cause problems during glue-up.

Online Extra

For another take on miters, watch Duncan Gowdy create rock-solid miters with L-tenons at FineWoodworking.com/268.



Plunge and push. Pivot on the right stop to plunge into the cut and then move the jig across to the other stop. When you get to the far stop, lift the trailing end to exit the cut.

Get it together

Crosscut and test the splines. Be sure the grain in the splines and the box sides runs in the same direction. After thickening the spline stock and ripping it to fit the slot's length, use a stop to crosscut the splines to width.



Dry run. Before glue-up, slip the splines into place and bring the corners together to check for gaps. Make sure the splines don't bottom out and prevent the miters from closing.

Rip the blank to width to establish the splines' length, which should be a bit shorter than the length of the slots. You can use a sanding block to round the edges to match the slots' rounded ends, but sometimes I skip this step since the corners will be buried, never to be seen again. Crosscut the spline stock to create individual spline pieces.

Before gluing up the box, dry-fit the splines and make sure the box parts come together without any gaps. If necessary, sand or trim the splines to fit.

Assembly tips

Gluing up a mitered box with hidden splines is a bit different than gluing up a mitered box without them. With typical mitered boxes, F-style clamps squeeze things out of alignment unless you use special cauls or glue blocks. But here the hidden spline directs clamping pressure in a way that allows you to use these common clamps right on the box. If you use F-clamps, be sure to tighten them from both directions to bring a particular corner together. Frame clamps work as well when you're ready to assemble (for a homemade option, see "Shopmade corner clamps for boxes," *Workshop Tips*, *FWW* #259). Put a bit of glue on each mitered surface and slot. Assemble the sides around the top and bottom panels, easing the box together from all four sides at once. □

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Clamping options. Frame clamps work well for assembling small boxes with hidden-spline miters; Stowe uses shopmade ones. F-clamps work, too. Although standard miter joints slip if you use F-clamps, the hidden splines keep things in place.

