

# A Better Way to Build Boxes



Expert jigs and tips  
speed the process

BY DOUG STOWE

I began making and selling boxes in the 1970s, and I've made them in all sorts of sizes, shapes, and styles. This one, though, has always been a favorite. I've made it in a variety of woods, and I like how the sides create a visual contrast with the top and miter splines. I also like the top: It's a floating panel but that's not obvious at first. The secret is a groove in both the top and sides. When they come together, the top and sides seem thinner than they are and the gap for expansion and contraction is hidden.

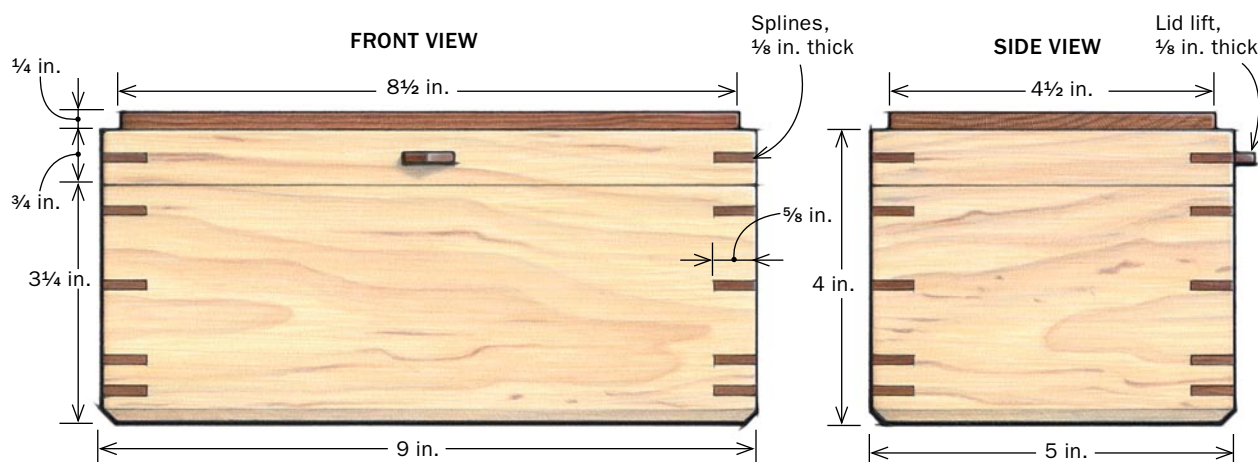
## The sides have continuous grain

The sides are made from  $\frac{3}{8}$ -in. stock, a suitable thickness for a small box. Because I like the appearance of the grain running continuously around all four sides, I add a few extra steps when preparing the stock. A continuous-grain look requires resawing, so start with stock milled flat to at least  $1\frac{1}{8}$  in. thick. It should be about  $4\frac{1}{2}$  in. wide and at least 16 in. long, a little longer than the length of the box front and one side.

Using a bandsaw, resaw the stock into two pieces, each just over  $\frac{1}{2}$  in. thick. Then move to the thickness planer to smooth and flatten the resawn side of each piece. Make light cuts until each piece is the same  $\frac{3}{8}$ -in. thickness.

## STURDY AND STRIKING

A great box gets its cachet from several sources: beautiful woods, the right proportions, and attractive joinery.



# Tablesaw magic



**MAKE THE SIDES**



**Sled adds precision.** With the tablesaw blade at 45°, Stowe uses a crosscut sled to trim one end of each resawn piece (left), ensuring that the ends are square to the edge. With a stop block clamped to the fence of the sled (right), the opposite sides of the box are sure to end up the same length.



**Groove the sides.** Using the tablesaw rip fence to guide the stock, cut a shallow groove along the top and bottom edges of the four sides to accept the top and bottom of the box. For safety's sake, use a push stick.

**Lay out for continuous grain**—Reassemble the sawn halves so the grain is arranged as it was before resawing. Then, open the halves like a book, with one end of the resawn board serving as the spine.

As you look at the two boards lying end-to-end, each with the resawn side facing up, keep in mind that each half must yield one front or back and one end. If an area of grain is especially striking, choose that section as the front and mark it in pencil. It doesn't matter where the front falls on either half; as long as there's room on each piece for one of the ends.

## Online Extra

For continuous-grain layout options, go to [FineWoodworking.com/extras](http://FineWoodworking.com/extras).

Once the location of the front is decided, mark out the location of the back and ends (see the Online Extra). I also mark each side with an arrow pointing to the top edge of the box.

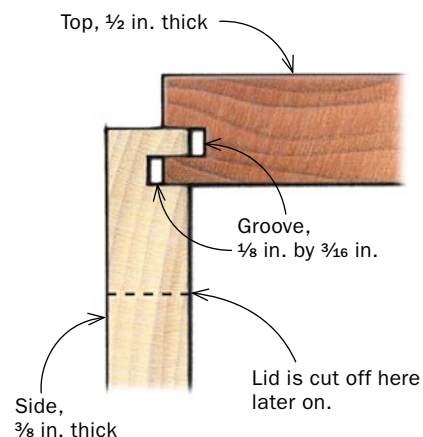
**Sled and stop blocks ensure tight miters**—Now you can cut the front, back, and ends to final length. I use a miter sled on the tablesaw with the blade tilted to 45° for all the mitering cuts. The procedure shown is for a left-tilt saw; for a right-tilt saw, make all the cuts from the opposite side of the blade.

With the outside face of one of the resawn halves against the sled table and the top edge against the sled fence, position the stock to trim about 1/8 in. or so off one end. This cut also squares the end. Repeat on the other resawn half.

Now add a stop block to establish the length of the part. Turn the stock over, slide the freshly trimmed end of the resawn half against the stop block, and make a cut to create the first side



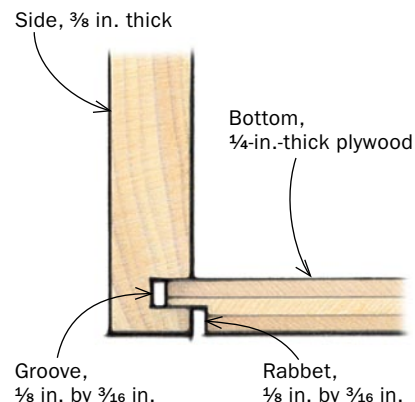
**GROOVE THE TOP**



**Same setup, different part.** Without changing the tablesaw setup used for the side grooves, cut a groove on all four edges of the top.



**RABBET THE BOTTOM**



**Still the same.** Without touching the tablesaw setup, you can cut the rabbet on all four edges of the bottom.



# No-clamp assembly

**Tape the sides.** Butt the ends of the side pieces together so the grain flows continuously from one piece to another, then use packaging tape to hold the four parts together. A single piece of tape will do at each joint.



**Add glue and wrap it up.** Apply yellow glue to each miter (above), making sure all the surfaces are covered. Slip the top and bottom pieces into the grooves in one of the face pieces (below), then wrap the other sides around them.

piece. Repeat on the second resawn half. Finally, reposition the stop block and cut the two remaining side pieces.

## A groovy trick for top and bottom

For this box, I made the top from 1/2-in.-thick mesquite and the bottom from 1/4-in.-thick Baltic-birch plywood. To get the size of these parts, temporarily tape together the box, measure the interior length and width, and add 1/4 in. Fitting the top and bottom is an easy tablesaw operation. First, for safety's sake, make sure you have a zero-clearance insert in the saw. Then adjust the blade height to 3/16 in. Now here's the key: Set the distance between the blade and rip fence to the thickness of your sawblade.

Pass the box sides across the tablesaw, inside face down, and with each bottom edge against the fence in turn. Repeat with the top edge against the fence. Next, cut the top and bottom pieces to fit the grooves in the sides. These are cut standing up on edge along the fence. Cut along the end grain first. This way, when the lengthwise cuts are made, any resulting tearout of the end grain will be removed in the final cuts. The top panel partly overlaps the sides, hiding the expansion gap.

## Assemble the box

Once the box is assembled, it's a big chore to sand the inside. So it's best to sand the inside surfaces of the sides, top, and bottom before assembly. Now, arrange the sides—end-to-end and in the order they will wrap around the box—on a flat surface, outside face up. Apply a strip of tape to join the four parts together. I prefer clear packaging tape, as it gets a good grip and allows me to see how the corners fit. With the tape in place, acting like a hinge, you can temporarily assemble the sides, top, and bottom to form the box and make sure everything looks OK.

Reopen the box, and start assembly by spreading glue (I use yellow glue) on the mitered surfaces. Miters absorb a lot of glue, so apply an even coat to both sides of the joint. Don't use too much glue, however, or you'll make a mess on the inside of the box.

Once you've added glue to all the joints, it's just a matter of rolling the taped sides around the top and bottom. In the process,



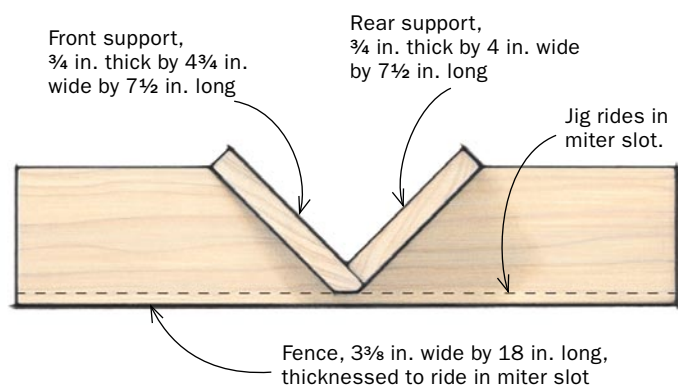
**Close the deal.** Stowe stretches additional pieces of tape across the joints to close any gaps.



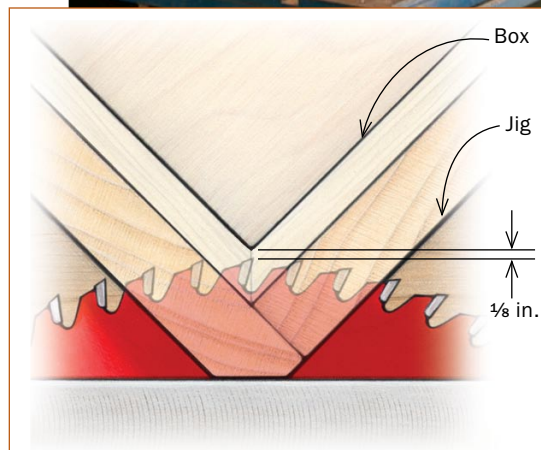
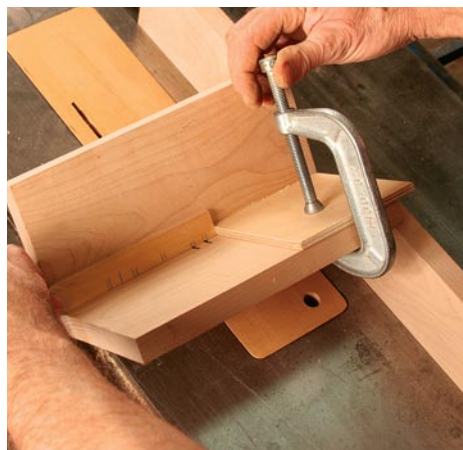
# Splines add strength and style

## MORE TABLESAW MAGIC

A slot-cutting jig makes it easy to run the assembled box over the blade at a perfect 45° angle.



**Story stick dials in setup.** Use a pencil to mark the slot locations on one corner of the box, then transfer the locations from the box to a thin, narrow stick. After that, use the stick to position a stop block on the jig.



**Cut the slots.** With the jig riding in the miter slot, make the first cut. Slot all four corners before moving the stop block for the next spline location.

four flat sides transform into a box. To me, it's the magic moment in box making. Now add more tape, as needed, to pull each of the corners tight. Check to make sure the box is square and that each edge is perfectly aligned. Also make sure the top panel and the bottom are centered in the sides. Let the glue dry overnight.

## Another simple sled for the splines

Splines add strength and they look good, too. To cut the slots for the splines, I use the table saw with a rip blade that cuts a 1/8-in.-wide kerf. This blade produces a kerf with a flat bottom that fits the square shape of the splines better than the shallow V-shape you get from typical crosscut or combination blades.

I use a jig to support the box at 45° to the table. To create the most glue area for the splines, set the blade to a height that cuts the slot just short of the inside corner of the box.

With the slots cut, you can move along to making the miter splines. To make the spline stock, I simply thickness-plane material down to the width required and then use the table saw to rip 1/8-in.-thick slices from the stock.

I precut the spline stock to approximate size. This eliminates having to use a saw to trim the splines after the glue dries. Add a coat of glue to each spline and slot, then slip in the splines. Make sure that each one is fully seated at the bottom of the slot. A few



**Slip in the splines.** After planing the spline stock to fit and cutting out little triangles, add glue to the slots and splines and slide them into place.



**Sand the splines flush.** Stowe uses a stationary belt sander to quickly sand the splines flush to the sides of the box. A block plane would also work.



## Safe separation



**Cut the lid from the box in four steps.** Raise the blade to a height that's  $\frac{1}{32}$  in. less than the thickness of the stock (1). With the bottom against the rip fence, cut a groove all around the box (2). Use a sharp knife to cut through the thin web of stock that remains, separating the two parts (3). Once the lid is free, sand away the remainder of the web (4).



light taps with a mallet can help. When the glue dries, I use a stationary belt sander to sand the splines flush to the box.

### Instant lid on the tablesaw

I use the tablesaw to cut the lid from the box. The trick is to keep the lid connected to the box after making the cut on all four sides. A lid that breaks free could tip into the blade. If that happens, you will get a scored surface that requires extra sanding.

I solve this problem by leaving a thin web of material to keep the lid in place. To measure the blade height, position the box adjacent to the sawblade, then raise the blade to a height that's about  $\frac{1}{32}$  in. less than the thickness of the sides.

Before cutting, position the rip fence so the blade establishes the correct thickness of the lid. Make a cut while holding the bottom of the box against the rip fence as you pass the box over the blade. Then make the three remaining cuts all around the box.

### Finishing touches make a big difference

Use a knife to separate the lid from the base, then sand away the material that remains. With a sanding block, apply a light chamfer around the perimeter of the lid and along all sharp corners of the sides. For uniform results, use the same number of strokes on each chamfer. To chamfer the bottom edges for an elevated look, I use a  $45^\circ$  chamfering bit in the router table, set for a  $\frac{1}{8}$ -in.-deep cut.

For the lid lift, I use the router table and a  $\frac{1}{8}$ -in. straight bit to rout a  $\frac{1}{8}$ -in.-deep by  $\frac{1}{2}$ -in.-long groove in the front face of the lid. Then, I use a dovetail saw to cut the lift to size and shape. Round the edges with sandpaper to match the radius of the router bit, then glue the lid lift into the groove.

After adding the hinges (see the facing page), I gave the piece a final light sanding with 320-grit sandpaper and finished it with three coats of Deft Danish Oil Finish. □

Doug Stowe builds furniture and boxes in Eureka Springs, Ark.



## Flip stick is secret to perfect-fitting hinges



I discovered a simple way to use a router table to create perfect-fitting hinges. The secret is a notched stick—I call it a flip stick—that positions the router-table fence and stop blocks.

Make the stick about  $\frac{1}{4}$  in. thick, roughly double the width of the hinge leaf, and the same length as the box. Decide where the hinges will go and mark that distance on the stick. Only one hinge location needs to be marked.

Raise the tablesaw blade so it's just slightly below the barrel of a hinge. Standard butt hinges typically require the mid-point of the barrel to be on the edge of the stick, but the hinges I use have built-in stops, so the entire barrel must be outside the stick. Now, make a series of cuts to create a notch.

Install a  $\frac{3}{16}$ -in.-dia. straight bit in the router. Adjust the bit height until it's just under half the thickness of the closed hinge. Now, butt the edge of the flip stick against the fence and position the stop blocks as shown below.

Rout the hinge mortises, first on the lid, then the box. Now, flip the stick end over end and reclamp the stop blocks. Cut the second mortise in the lid and box.

### 1. MAKE THE FLIP STICK

**Cut the stick to length.** The stick is cut to the same length as the box; use the box as a template to mark the length.



**Notch the stick.** Stowe uses his table-saw to cut a precise notch to accept the leaves of the hinge.



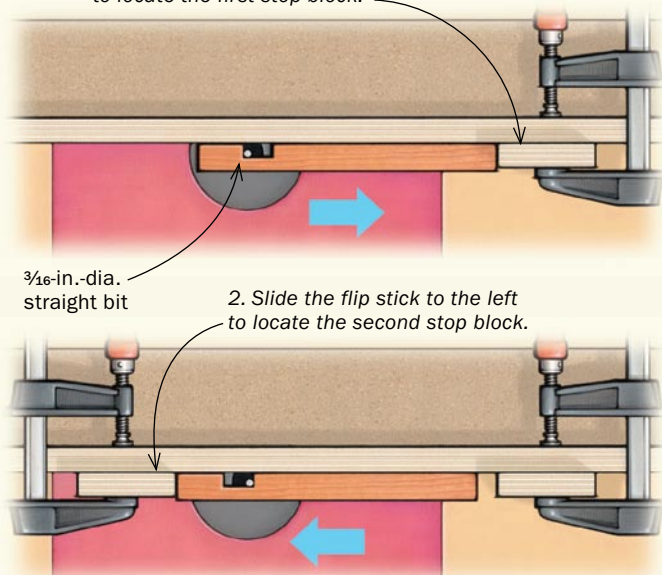
**A perfect fit.** Nibble away slowly until the hinge leaf fits snugly in the notch.



### 2. USE THE STICK TO SET UP THE ROUTER TABLE

**Position the stop blocks.** With the flip stick serving as a template, clamp a pair of stop blocks to the router fence.

1. Slide the flip stick to the right to locate the first stop block.

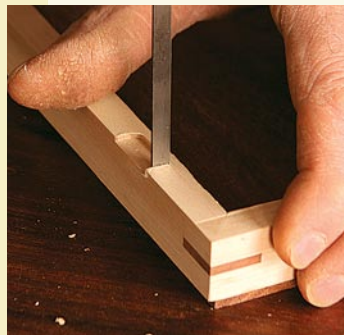


2. Slide the flip stick to the left to locate the second stop block.

### 3. ROUT THE HINGE MORTISES



**Mortise in two steps.** With the stop blocks in place, cut one mortise in the lid and a second on the box. Flip the stick and reposition the stop blocks; then cut the remaining mortises on the lid and box.



**Square the corners and install the hinges.** The router bit leaves rounded corners, so you'll need to square them with a chisel. The fit will be perfect.