Boxes in Bunches

Simple spacers lead to repeatable proportions and adaptable design

BY DOUG STOWE

Several years ago, I was faced with a daunting task—making 870 boxes with splined miters for the Crystal Bridges Museum in the Arkansas Ozarks. I was determined to streamline the job without sacrificing the final result. The answer was easy: Pair a fixed stop block with a removable spacer. The fixed stop would be clamped to my tablesaw sled and used when cutting the boxes' long sides. The spacer would be taken in and out in alternating sequence to cut the short sides. The same simple system also works well to create a wide variety of lids and bottoms, letting me batch out multiple designs in solid wood or plywood without changing my setup. Here, I'll show how I make lids with floating panels, overlaid lids, and inset lids; bottoms made from solid wood and plywood; as well as the box sides themselves—all using the same stop-and-spacer technique.

Another benefit of the removable spacer is that it lets me repeat pleasing proportions. For this reason, my block is typically a 2-in. by 2-in. square, which makes it a useful size for a wide range of appealing ratios, such as 3:5, 4:6, 5:7, 8:10, 9:11, and 10:12. I'll demonstrate the techniques on mitered boxes here, but you could easily use the stop-and-spacer method for box-jointed and dovetailed boxes.

Make a mitered box

My boxes have grain-wrapped sides, and the removable spacer really shines when making them. To wrap the grain around a box, you'd normally resaw stock for the sides, cut one long side, then the two short

Photos, these two pages: Michael Pekovich

sides, and finish with the second long side. This sequence requires removing the stop for the short sides in order to cut the second long one—no problem when you're making one box, but a nonstarter when making multiples. There's no such issue with my removable spacer.

After thicknessing stock for the box sides and ripping it to width, I use a ⅛-in. slot-cutting bit to rout a groove for the box bottom. If the box will have a captured top panel, I rout it using the same setup.

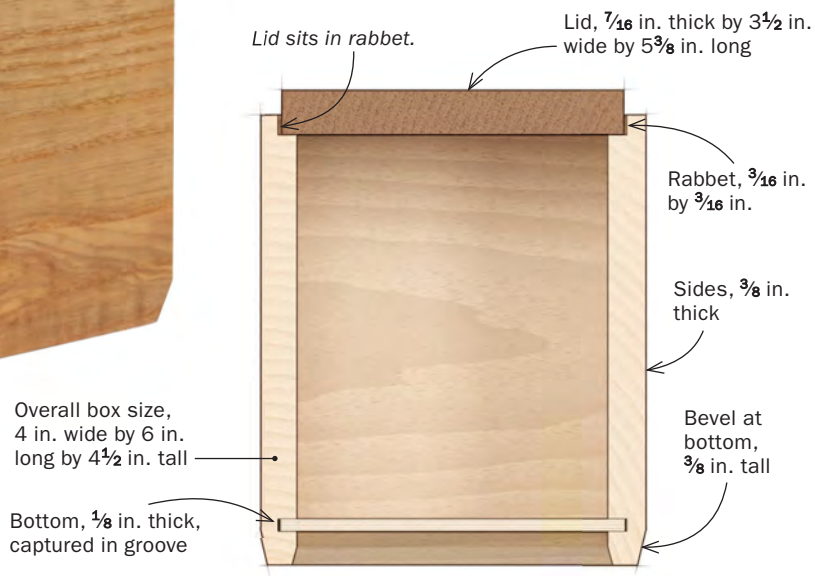
To cut the miters, I use a dedicated sled at the tablesaw. Begin by mitering one long side. The first cut will be away from the stop clamped to your sled; the second will be against it. Be sure to flip the piece face-for-face between cuts so you cut miters pointing in the same direction.

Next, cut the first short side's initial miter, flip the stock, put the spacer in place,

Inset lid

START WITH A MITERED BOX

This basic box provides an excellent canvas to explore wood combinations, like Stowe's contrasting ash and walnut.



and cut the opposite miter. Cut the other short side next, following the same procedure. I miter this piece's first end on the opposite side of the sled, letting me keep the fixed stop in place. To cut the second long side, remove the spacer and cut the remaining miters as you did for the first long side.

Now it's time to cut the lid and bottom. However, don't move the stops even though the sides are cut. Keep the spacer handy too. After all, you'll use the same setup to cut these workpieces as well, cutting them to length against the stop before rotating the workpieces 90°, inserting the spacer, and then cutting them to width.

Plywood bottom

I like to keep box bottoms simple, capturing them in a routed groove. Luckily, the stop-and-spacer system streamlines making these, since their dimensions are proportionally the same as the sides.

Each box in this article has a plywood bottom. It's ⅛ in. thick and glued in place, adding structural integrity to the box. To cut the bottom to length, square off one end, set the stop, and cut the other end. To determine the stop's placement, measure the length at the bottom of the groove in a long box side. When cutting the bottom to width, you can simply put the spacer in place.

Three types of lids

The fixed stop and spacer combine just as well for the solid-wood lids. With this technique, you can quickly make lids that are inset or overlaid, or have floating panels. All three are sized like the bottoms, except

The sides' blanks get a groove toward the bottom edge and a rabbet at the top. *The groove captures the bottom, and the rabbet recesses the lift-off lid.*

Miter one end of the blank using a sled. *This cut establishes the box's first corner. Stowe places the outside face down on the dedicated miter sled, whose zero-clearance kerf lets him both align the cut easily and limit blowout.*

Photos, except where noted: Barry NM Dima; drawings: Dan Thornton

A STOP AND A SPACER

By pairing a removable spacer with a fixed stop in a tablesaw sled, you can cut the short and long sides for one box—or a bunch of boxes—quickly and easily with one setting.

Set the fixed stop, flip the workpiece, slide it up to the stop, and cut. *The stock's inside face is down for this cut, and the fixed stop is set to the length of the long side. The stop remains in place until you've cut all the miters for each box.*

this time I add a thin shim when cutting to width to compensate for wood movement.

An inset lid may be the simplest option. In this version, the box is topped off with just a piece of wood sitting in a rabbet at the top of the sides. You can cut this rabbet before or after mitering the sides. Either way, glue up the box sides and bottom so you can measure the space for the lid. Clamp the fixed stop to the long dimension and crosscut the lid blank. To cut it to width, I insert the spacer I used for the sides plus the shim mentioned earlier, a steel straightedge.

To build an overlaid lid, the underside of the top is rabbeted all around to fit within the box. Create the

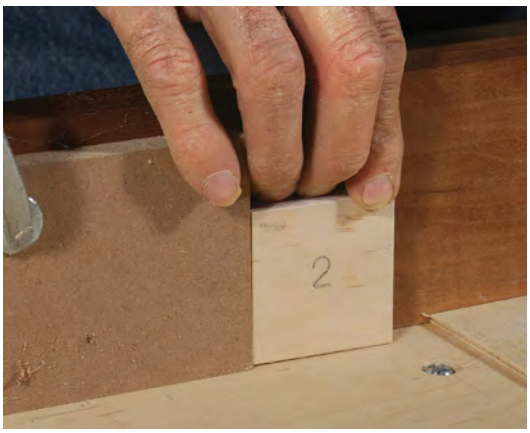
Make a short cut at that mitered end. *After completing the first box side (above), flip the rest of the blank outside face down and trim off the end in a clean miter. Cut as little as possible to maintain continuous grain.*

Add the removable spacer and cut the short side. *Stowe holds this spacer firmly in place with his fingers. He normally uses a 2-in. square, letting him repeat pleasing proportions.*

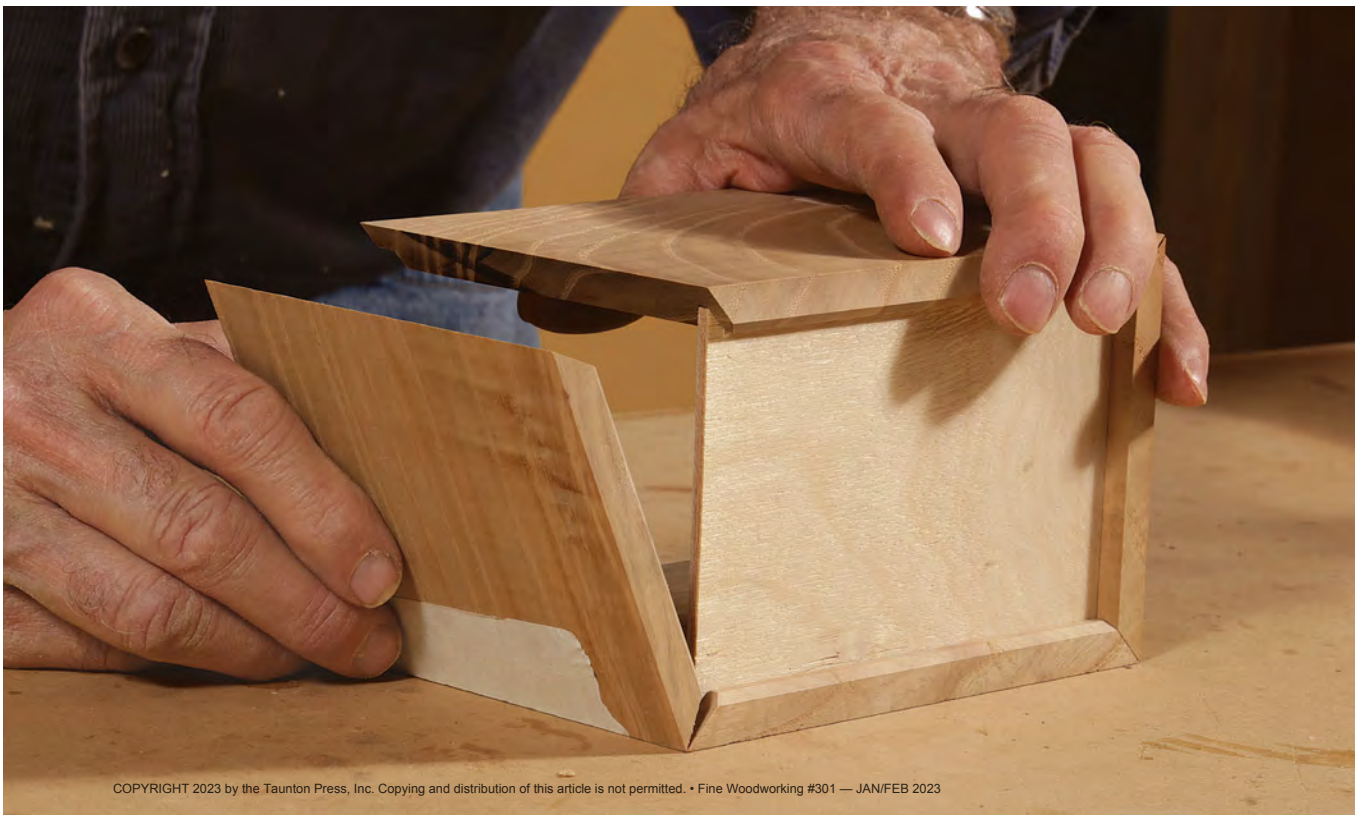
SAME SPACER FOR TOP AND BOTTOM

Having used a removable spacer to size the box sides, you can use it again to create the box's top and bottom with the same proportions.

Measure the bottom of the groove in a long side to size the bottom panel. *This measurement will be the length of the plywood bottom, so set the stop to that dimension. Make the cut (far right) after squaring up the other end.*



Use the removable spacer to cut the bottom panel to width. *The box's bottom is plywood, so you don't have to account for wood movement. Instead, you want a good all-around fit for glue.*



Glue up the box around the bottom. *For his mitered boxes, Stowe draws tape tight across the miters for light preliminary clamping. He then wraps the boxes in thick rubber bands to keep the joints closed as the glue cures.*

TOP OFF THE BOX

A thin shim modifies the existing stop setup without disrupting it, letting you cut the solid-wood top.

Measure from rabbet to rabbet to find the length of the lid. *Like with the plywood bottom, Stowe sets his fixed stop to this dimension when cutting the solid-wood top to length (above).*

Add a shim between the stop and the spacer when cutting the solid-wood top to width. *The shim accounts for the seasonal expansion of solid wood while still allowing you to use the same spacer and stop.*

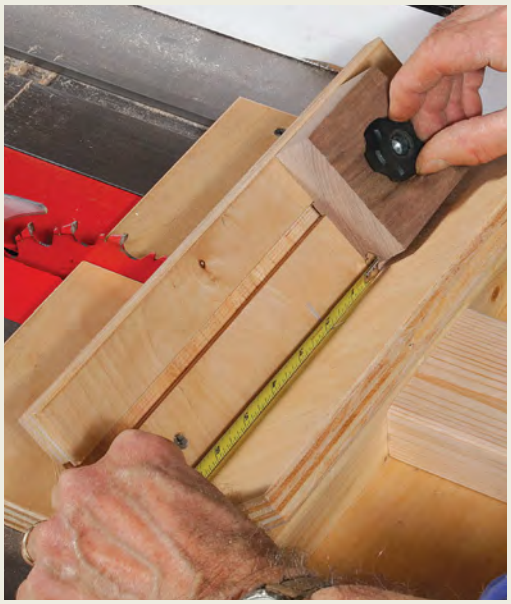
lid the same way you did the inset lid, but make it oversize.

Now for the rabbet. Because you ripped the lid to width using a shim, you've already factored for seasonal expansion and contraction. That means the rabbet can be the same width all around, greatly speeding up the process. I sneak up on the rabbets across the lid's ends before cutting them along the edges.

When I use a floating panel lid, I pair up two interlocking grooves, one around the edges of the hardwood lid and one near the top edge of the sides (see the drawing on p. 53). This arrangement opens up design opportunities while hiding gaps from wood movement. The same principles work if you want to use a floating panel as the bottom to give the box lift, or if you want to use a thin solid-wood top just trapped in a groove.

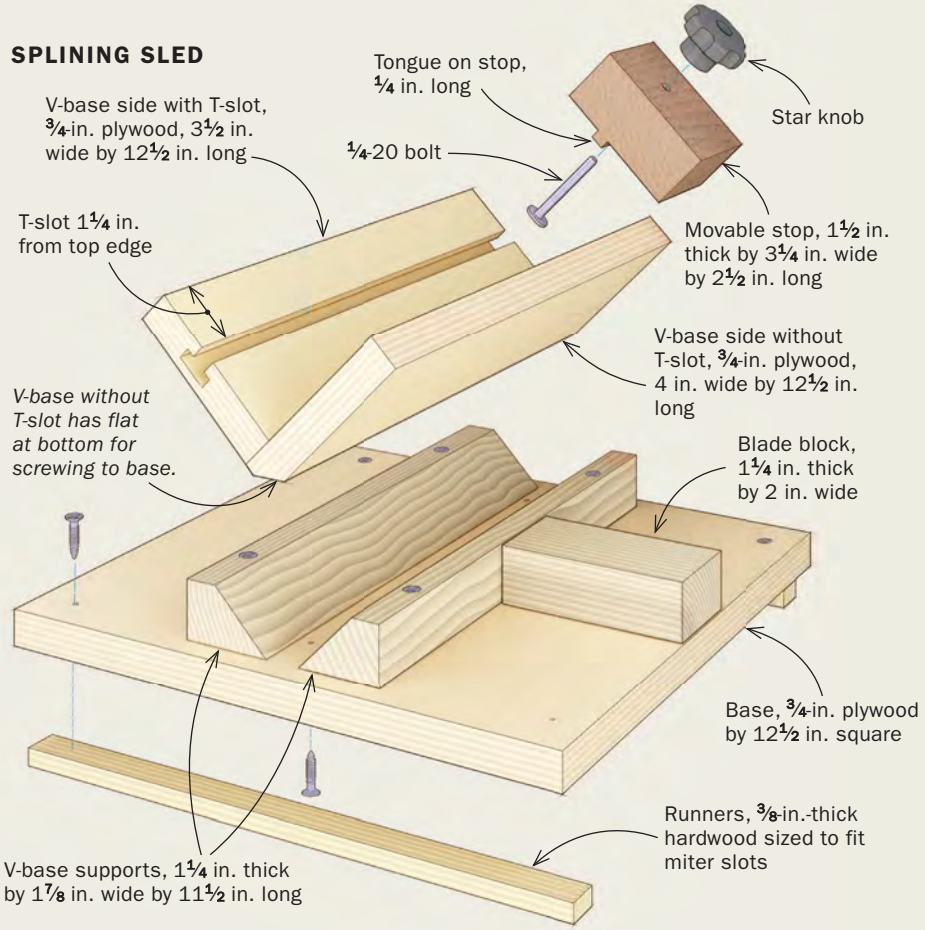
Drill a finger hole for easy lift-off. *If you can't get a good grip on the lid's edges because it sits too deeply in the rabbets, drill a hole in the middle for a low-profile lift.*

Spacers produce speedy spline slots



Set the stop on a splining sled. *Stowe makes a lot of boxes and has a souped-up sled for cutting slots for splines. Even with a simpler setup, the principle is the same: Lock down a stop for the initial slot; add spacers for subsequent ones.*

SPLINING SLED



Cut the first series of splines. *Stowe uses a thin-kerf ripping blade. It makes for splines with a lighter look than standard ⅛-in.-thick blades, and its flat rip teeth leave a square cut, perfect for the splines to fit without gaps.*

Miters aren't terribly strong by themselves, so I add long-grain splines to mitered corners. On top of the improved strength, they add visual interest, opening doors for design. To minimize machine setups without hamstringing my aesthetic options, I employ thin spacers when positioning the spline slots. This way I keep one setup throughout the process while maintaining dozens of design choices.

To cut the slots for the splines, I use a sled that holds the box at 45°. The sled has an adjustable stop, off which I reference the box for the first spline.

To space subsequent slots, I again use thin spacers, namely ¼-in. plywood, which gives an even visual rhythm to the splines.

I don't show this here, but spacers also let you vary the depth of the cut on the fly. Simply put thin plywood between the box and the sled to produce a shallower cut. You'll end up with longer and shorter splines, again playing with the splines' visual rhythm. Depending on the scale of your boxes, I recommend trying ⅛-in. Baltic birch for this technique.

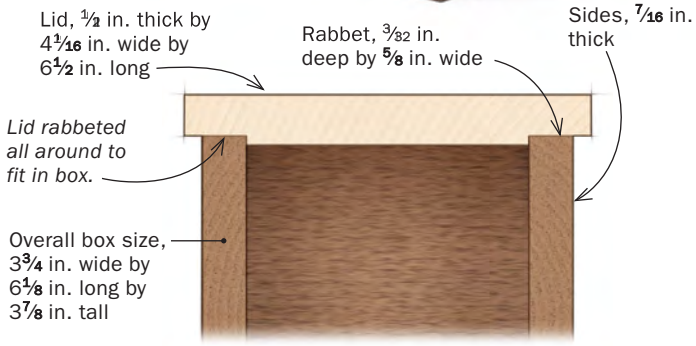
Add the removable spacer next to the fixed stop and cut the next series of splines. *Stowe uses a square of ¼-in. Baltic-birch plywood, allowing for regular, reliable spacing between the splines without disturbing your fixed stop.*

Glue in the splines, then trim them flush. *Because the bottom is plywood glued in place, the box needs reinforcing splines only at the top. Using triangles of wood for the splines minimizes waste.*

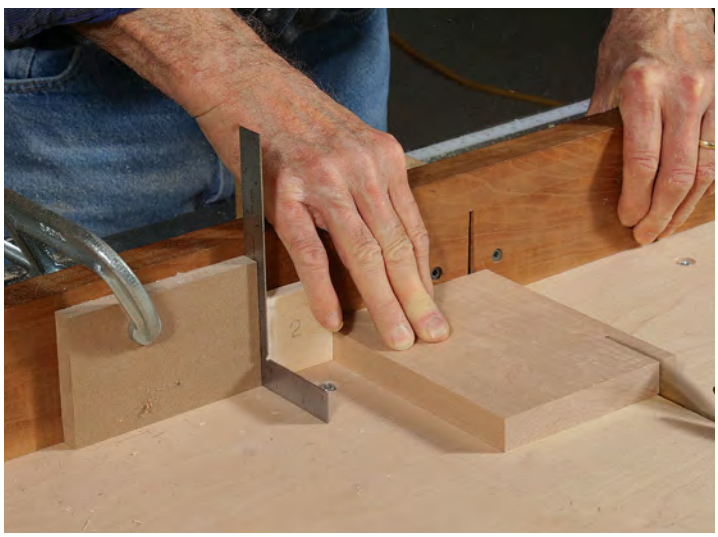
Overlaid lid

The rabbet under this lid is cut similarly to the inset lid, allowing you to use solid wood without constraining its seasonal movement.

Measure the box's outside length to determine the lid's length. *You want to make the lid longer than this dimension so it overhangs the box. Set the fixed stop to this longer dimension and crosscut the top to size.*



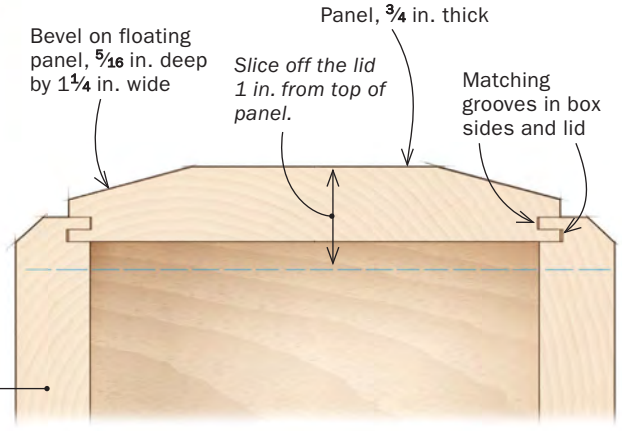
A solid-wood top requires a shim next to the removable spacer. *Because the top is solid wood, it will expand and contract with the seasons. A thin shim, here a steel straightedge, accounts for that when cutting the top to width.*



A rabbet runs all around. *Because the top was cut to width with a spacer and shim, you can use the same rabbet setup on all four sides of the top's bottom face. If you didn't use the shim, the rabbet would have to be wider along the sides, reducing machine efficiency.*

Floating panel lid

Interlocking grooves pair the solid-wood panel with the box, both allowing for and concealing seasonal movement. A removable spacer allows you to size these complex panels quickly.



Crosscut the panel to length against a fixed stop. *Set the fixed stop to a snug fit between the short ends' grooves, since wood does not move much along its length.*

Add the removable spacer and thin shim when cutting the panel to width. *Because wood expands and contracts across its width, Stowe adds the shim to size the panel slightly narrower to keep the wood from pressing against the box sides during humid months.*

Groove the box sides and the lid using the same setup. *Stowe uses an ⅛-in. slot-cutting bit at the router table. For the lid's panel, he routs the end grain before the long grain to clean up any blowout on the ends. You'll know the fit is just right when there's a slight gap between the edges of the panel and the bottom of the side's groove.*

Floating panel lid continued

Glue up the box around the bottom and floating panel. *The bottom panel is plywood, so it gets glued for structural integrity. The solid-wood top, however, is left unglued so it can expand and contract.*

Like with the other lids, make this one by using a fixed stop when cutting it to length and the removable spacer and shim when cutting it to width. To cut the grooves, I head to the router table and employ a slot-cutting bit. Use the same setup for both the box sides and the lid. To keep the lid's grooves from weakening the workpiece too much, I like the stock to be at least ⅜ in. thick.

Glue up the box around the bottom and lid, leaving any solid-wood panels unglued so they can expand and contract. The lid itself is cut free from the box after glue-up. I like hinging these lids. □

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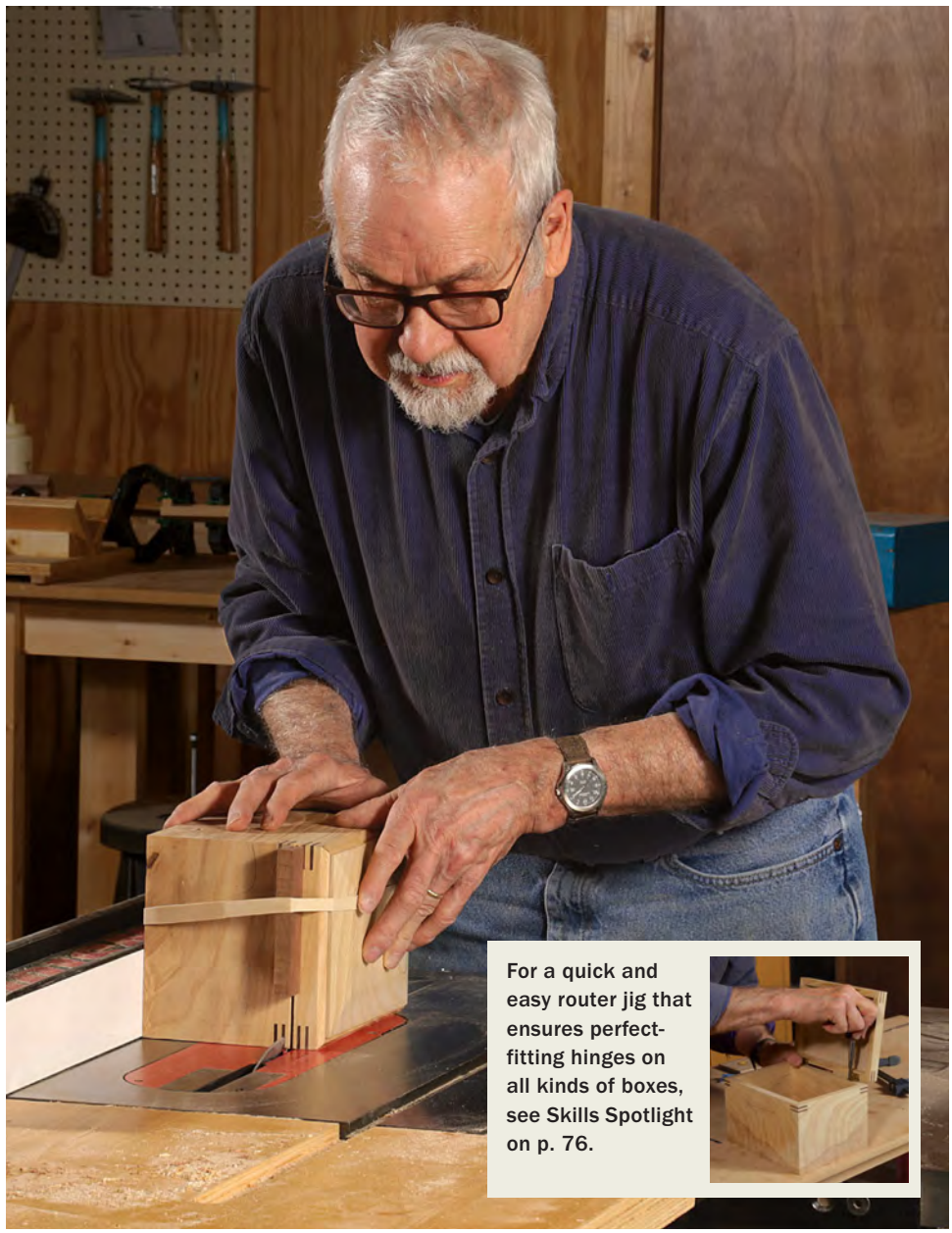
Start cutting the lid free by ripping along the box's short sides. *Hold the box tight to the table and the fence. At layout, space the spline slots to allow room for this kerf.*

Install spacers in those kerfs before freeing the lid by ripping the long sides. *The spacers, held in place with rubber bands, keep the kerfs from closing and pinching the blade. They also prevent the lid from falling away prematurely and possibly getting damaged. Stowe reattaches the lid with hinges.*



For a quick and easy router jig that ensures perfect-fitting hinges on all kinds of boxes, see Skills Spotlight on p. 76.