One-Stop Cutting Station

Tablesaw jig handles crosscuts, tenons and miters

by Ken Picou

Making a crosscut box more versatile— *An accurate sliding-crosscut box makes a good base for cutting accessories, including this corner-slotting jig. This jig mounts or dismounts in seconds and makes for strong miter joints in picture or mirror frames and in small boxes or drawers.*

Tablesaws are excellent for ripping stock, but the standard miter gauge that comes with most tablesaws makes them mediocre at best for crosscutting material or cutting joinery. But by making a simple sliding-crosscut box and a few accessory jigs, you can greatly increase the accuracy and flexibility of your saw and turn it into a one-stop cutting station, capable of crosscutting, tenoning and slotting.

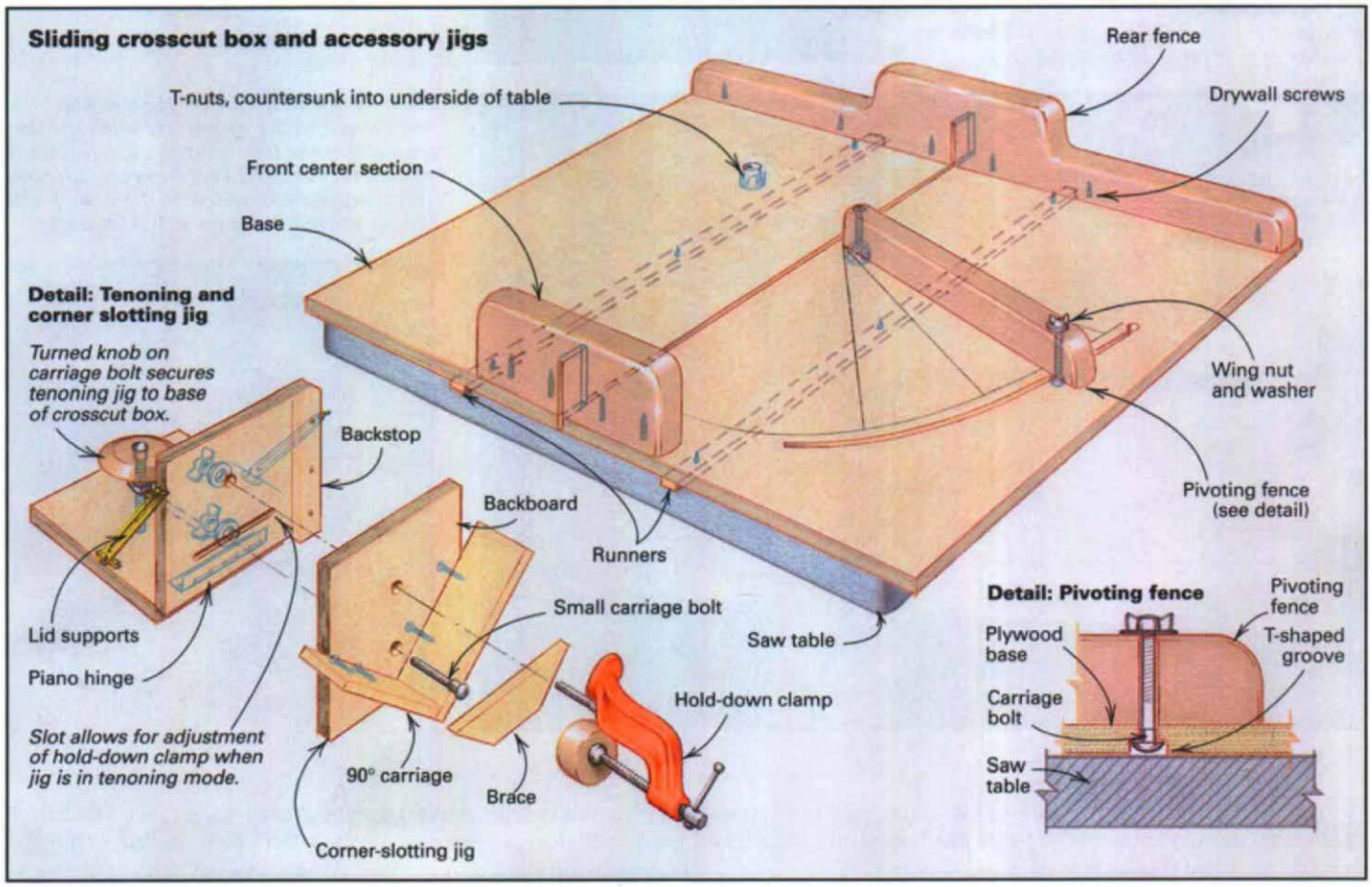
The system I've developed consists of a basic sliding-crosscut box with a 90° back rail, a removable pivoting fence, a tenoning attachment and a corner slotting jig, for cutting the slots for keyed miter joints (see the photo above). This system is inherently safer and more accurate than even the most expensive miter gauge for several reasons. First, it uses both miter slots, so there is less side play than with a miter gauge. Second, the work slides on a moving base, so there's no chance of the work slipping or catching from friction with the saw table. Third, the long back fence provides better support than a miter gauge, which is usually only 4 or 5 in. across. Fourth, the sliding-crosscut box is big, so angles can be measured and divided much more accurately than with a miter gauge (the farther from its point of origin an angle is measured, the greater the precision). Finally, the sliding crosscut box is a stable base on which to mount various attachments, such as a tenoning jig or a corner slotting jig, which can greatly expand the versatility of the tablesaw.

Building the basic crosscut box

I cut the base of my sliding-crosscut box from a nice, flat sheet of ½-in.-thick Baltic-birch plywood, and then I make it a little bit wider and deeper than my saw's tabletop. A cheaper grade of plywood also would be fine for this jig, but I decided to use a premium material because I wanted the jig to be a permanent addition to my shop.

The runners that slide in the tablesaw's miter-gauge slots can be made from any stable material that wears well. I prefer wood to

Photos: Vincent Laurence



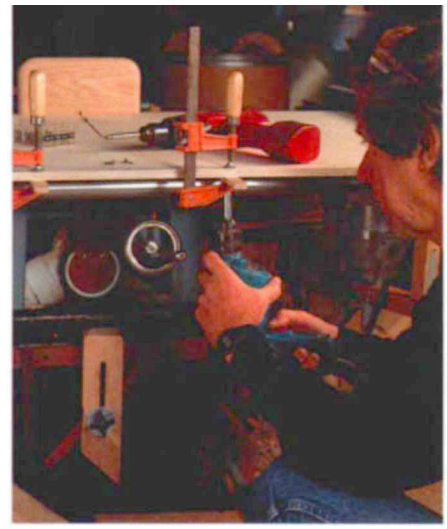
metal because wood works easily, and I can screw right into it. I usually use hard maple, and I've never had a problem. Using a long-wearing, slippery plastic such as an acetal (Delrin, for example) or ultra-high molecular-weight (UHMW) plastic is also a possibility. (For more on using plastics for jigs and fixtures, see *Fine Woodworking* #105, pp. 58-61.)

I start with a maple board of sufficient length that is at least as wide as three or four runners are thick. I plane this board, taking off minute increments with each pass, until it slides easily on edge in one of the slots but isn't sloppy. Once the fit's right, I rip the runners from this board, setting the fence on my tablesaw to just under the depth of the miter-gauge slot. Then I drill and countersink them at the middle and near both ends (I check the dimensions of the Baltic-birch base to make sure I drill the screw holes so they'll fall near the edges of the base). I usually drill a couple of holes near each end as insurance in case a screw drifts off when I'm screwing the runners to the base.

Next I crank the sawblade all the way down below the table and lay the runners in the miter-gauge slots. I position the base so that its back edge is parallel to the rear of the saw table and the front edge overhangs by a couple of inches. I clamp the runners to the base in the front. I drill pilot holes in the plywood from below using a Vix bit (a self-centering drill bit available through most large tool catalogs) placed in one of the countersunk holes in the runners. Then I screw up through the runners into the base. When I've done both runners at the front of the saw, I slide the base back carefully and repeat at the rear (see the top photo on p. 42). I check for binding or wobble by sliding the base back and forth a few times. If the fit is less than ideal, I still have four more chances (the extra screw holes I drilled at both ends of each runner) to get it right. If the fit is good, I drill pilot holes with the Vix bit and screw the runner to the base in the middle, taking care not to let the runner move side to side. I also trim the runners flush with the front and back of the crosscut box.

If the fit's a bit too snug at first, use will tend to burnish the runners so that they will glide more easily. If, after some use they're still a little snug, you can sand the runners just a bit and give them a coat of paste wax. That will usually get them gliding nicely.

Drawing: Michael Gellatly



Accurate holes are key to an accurate jig. *Clamps hold the crosscut-box runners in place (left) while the author drills and screws the runners to the base. Using a Vix (self-centering) bit in the previously drilled and countersunk holes in the runner keeps the bit centered going into the plywood, which helps keep the screws from pulling the runners out of line.*

Checking and rechecking for a perfect 90° *(below), both with a square and with test-cuts, is time well-spent. The accuracy of the whole crosscut box and all jigs that mount to it depends on getting the relationship of rear fence to blade just right.*

Rear fence helps align jig's hinge—*Using the rear fence as his reference, the author aligns the tenoning jig's hinge with a square (below). The Vix bit ensures that the screw holes are centered, so the screws will go in true and the hinge will be straight.*

Building accuracy into the jig—An inaccurate jig is useless, so it's essential that assembly of this jig be dead-on. Fortunately, this isn't difficult; it just takes a little time and patience.

I made both the back fence and the front center section from straight-grained red oak, but any straight-grained hardwood will do (see the drawing on p. 41). I make sure the center portions of both pieces are built up high enough to provide 1½-in. clearance with the blade cranked up all the way.

The front section helps keep the table flat and prevents it from being sawn in half. Because this front section is not a reference surface, its position isn't critical, so I screw it on first.

Then I mount the rear fence about ¼ in. in from and parallel to the back of the Baltic-birch base. I clamp the fence to the base and drive one screw through the base, which I've already drilled and countersunk, into the fence a couple of inches to the right of where the blade will run. This provides a pivot point, making it easier to align the rear fence to the blade.

I remove the clamp, raise the blade up through the base and cut through the front section and the base, staying just shy of the rear fence. So far, there's only one screw holding the rear fence in place. To set the rear fence permanently and accurately at 90° to the blade, I place the long leg of a framing square against the freshly made kerf (saw is *off)* and the short leg against the fence. With the fence flush against the square, I clamp the fence on an overhanging edge and do a test-cut on a wide piece of scrap. I check this for square with a combination square and adjust the position of the fence as necessary. When I've got it right, I put another clamp on the fence near the blade on the side opposite my one screw. Then I drill, countersink and screw through the base into the fence right next to the clamp, and I check the fence's position again to make sure screwing it to the base didn't pull it off the mark (see the bottom left photo). I also make another test-cut, and as long as it's still good, I screw the fence down near the ends and the middles on both sides of the blade (see the drawing on p. 41). If the second cut is not a perfect 90°, then I'll fiddle with the fence until the cut is perfect before screwing it into position permanently. Time spent getting the fence right is time well-spent. If, for aesthetic reasons, you want the rear of the base to be flush with the fence, you can trim the base flush with a bearing-guided, flush-trimming router bit. Either way, the performance of the crosscut box will be unaffected.

Anything from a small wooden handscrew to a fancy commercially made stop will work as a stop block for this fence. A self-stick ruler can be added to the fence or table.

A pivoting fence

I wanted a pivoting fence for making angled cuts, but I also wanted to be able to remove the fence quickly when I need to cut wide

Quick, accurate tenons, even in large boards *are easy with the author's hinged tenoning jig (right). A hold-down clamp grabs the workpiece securely and accommodates almost any size workpiece. The big footprint of the tenoning jig's base anchors it securely to the base of the crosscut jig below. The jig is also useful for cutting long miters and angled tenons.*

Setting angles accurately *can be done quickly with a miter square or a bevel square (below). By setting the angle both fore and aft in the tenoning jig, you can be sure the angle will be true across the face of the jig.*

boards. I accomplished this first by setting a T-nut for the pivot point into the underside of the jig's base about 6 in. forward of the fixed fence. Then I routed an arc-shaped track for a carriage bolt at the end of the fence (see the drawing on p. 41). The arc runs from 0° to a bit more than 45°, and there's a plunge-routed hole just below the 0° point through which the carriage-bolt assembly can be lifted out to remove the fence. I marked two common angles (22½° and 45°) onto the jig for quick reference using a large protractor and transferring that angle to a bevel square and then to the plywood. These angles can also be checked and fine-tuned by cutting them, setting the resulting blocks together and checking for 90° with an accurate square.

A slotted screw and washer secure the fence at its pivot point but allow the fence to move, and a wing nut (with washer) fixes the angle of the fence at its outboard end. As with the fixed fence, a stop block may be as simple or sophisticated as you like.

An adjustable tenoning jig

A simple hinged jig that uses the rear fence as a reference surface will allow you to cut both regular and angled tenons, rabbets and angled edges accurately and without too much fuss. I built this jig also from Baltic-birch plywood. I crosscut it in the basic jig and routed the slots in it on my router table.

To attach the hinges accurately, I indexed both halves against the fixed rear fence, set a length of piano hinge in place and used a small carpenter's square to align the hinges (see the bottom right photo on the facing page). Then I drilled screw holes using the Vix bit and screwed the hinge on.

A small shopmade (turned) knob at the end of a carriage bolt secures the tenoning jig to a T-nut in the underside of the crosscut box's base. The fixed rear fence ensures that the face of the tenoning jig stays parallel to the blade. Two brass lid supports hold a set angle securely (see the photo at left). And a hold-down clamp travels in a slot in the upper portion of the jig, allowing me to hold almost any size workpiece securely (see the photo at right).

Corner-slotting jig

Attaching directly to the tenoning jig, the corner-slotting jig is easy to build and simple to use. I screwed two scrap boards to a backboard to form a 90° carriage positioned at 45° to the base of the crosscut box (see the drawing). I cut a brace to fit up a few inches from the corner of the 90° carriage and across whatever it is I'm slotting. A hole through the backboard permits a hold-down clamp to bear upon the brace, distributing the pressure of the clamp.

In use, I slide the workpiece into place, then the brace and then I tighten the clamp. The jig feels solid and works well. □

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