Table-Saw Tools

Simple jigs that turn a table saw into a safe and precise crosscutting tool

by M. Felix Marti

Carpentry is just plain fun, from the first batter board to the final cabinet pull. I must admit, though, that trim carpentry and cabinetry are my greatest satisfactions. The client meetings, site explorations, hours of drawing and days of organizing, scheduling, pouring and framing are all past by then. If all has gone well, the final trimming and fitting provide a suitable ending to the job.

Most of our work features wood that has a clear finish of some sort, and that means there's no place for sloppy joinery. Naturally, clients appreciate good joints, so I create a fairly complete temporary shop on any moderate-size to large-size job. While the shop might include a jointer, radial-arm saw, drill press, a work bench and shelves for tools and materials, the heart of the shop is the table saw.

The saw we take to most jobs is a 10-in. Rockwell contractor's saw fitted with a 50-in. capacity Biesemeyer fence (Biesemeyer Manufacturing, 216 S. Alma School Rd., Suite 3, Mesa, Ariz. 85210). A long extension table plus several sets of roller track and roller-track stands complete the setup. Roller track is available from virtually any supplier of materials handling products—check your phone book. The saw is tuned as well as possible, but that alone does not account for the accuracy I've been able to wring from the tool. I have devised several sliding tables that have greatly increased the precision of the table saw, and thus my use of it. The three I use most I call the *sliding table,* the *straight edger* and the *board stretcher*. Each one of these makes use of the existing miter-gauge slots in the saw's table and can be built relatively easily. If you have more than one table saw, however, you'll probably have to make sliding tables for each one of them. From saw to saw, there's usually just enough variation in distance between blade and slots so that sliding tables aren't interchangeable. And before making *any* jig for your saw, verify the saw's accuracy.

Tuning your saw—If the sawblade and the fence aren't aligned properly, no jig is going to improve your work. To see if the arbor is running true, I check it with a dial indicator. I have one with an adjustable arm that's mounted to a magnetic base (L S. Starrett Co., 121 Crescent St., Athol, Mass. 01331). To use it, I affix it to the table, set the gauge close to the arbor and slowly rotate the arbor shaft to get high and low readings. Adjust the arbor as needed.

It's important to adjust the sawblade so that it's absolutely parallel to the slots in the table; this is probably the most important adjustment you can make to your table saw. I bought an absolutely true sawblade blank from a manufacturer, and by checking it with a square, I can tell if any adjustments to the arbor are called for.

Here's another method for checking the sawblade. Pick one tooth on the fully-extended blade (make sure the saw is unplugged, of course) and mark it with a felt-tip marker. Then attach a piece of scrap wood to the face of the miter gauge so that one end just touches the marked tooth as it enters the table (for this to work, the miter gauge must fit snugly in its slot). Then slide the gauge to where the same tooth exits the table and see if the marked tooth is in the same relationship to the scrap—I check this with a feeler gauge. If it isn't, adjust it.

Next, adjust the saw fence so that it's parallel to the table slots. I use a Starrett machinist's combination square, but you can also use a drafting triangle. In any case make sure you check with the sawblade fully extended. With the saw's accuracy assured, the sliding tables will perform at their best.

The basic sliding table (photo above) makes crosscutting easy on the table saw. Here it is being used to trim the end of a glued-up oak panel. The bag of lead shot on the workpiece helps to hold it in place. Note the scrap stock "crutch" beneath the end of the workpiece; it compensates for the thickness of the sliding table.

Accuracy and safety—The basic sliding table is simply a flat base that slides on guides aligned with both miter-gauge slots in the saw's table (photo left). It allows superior cuts because it eliminates friction between the workpiece and the saw table. Also, the sawblade shears wood fibers against the edges of the saw kerf in the sliding table, virtually eliminating tearout. Trimming the ends of boards is a snap because a kerf line on the sliding table shows you exactly where to place

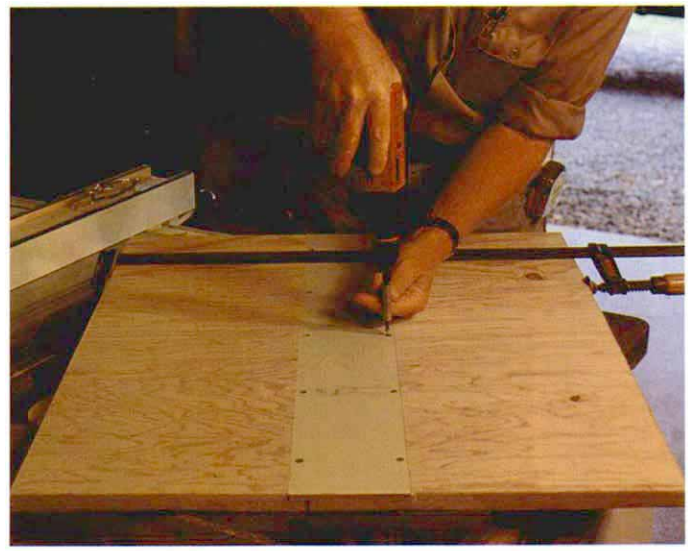
the workpiece. And the sliding table can provide a bigger, more solid base on which to hold the workpiece.

The table improves safety, too. Small pieces of stock can be cut with less risk because they're firmly supported by the table and the fence, and because there's no gap around the sawblade throat. The table and fence offer plenty of support for the stock during crosscutting or mitering operations, which reduces the risk of kickback—stock won't shift during the cut. Another safety advantage is that the sliding table can easily be fitted with various hold-downs and clamps so that you needn't find your fingers close to the blade, Many blade guards will inhibit the use of a sliding table, particularly those mounted at the rear of the table. Overarm guards (like those mounted at the side of the table) should work. But I'd welcome any suggestions on how better to guard the blade when using these tables. *[Note to readers: We'll publish the best guards in a future issue.—eds.]*

Making the sliding table—I start building the sliding table by cutting the table guides. These are hardwood strips about 36 in. long that fit into the slots in the saw table. I cut them slightly undersize for clearance, but they should fit as tightly as possible without binding in the slots. You'll need only two for the sliding table, but if you make a dozen guides now, including six or eight which are 10 ft. to 12 ft. long, you'll have plenty for making the other kinds of sliding tables in the future. Straight-grain cherry, maple and oak are the woods I like to use for guides.

The base for the sliding table can be cut next. Virtually any ¾-in. thick plywood or particleboard may be used. I favor a good grade of particleboard for its more consistent composition, but plywood scrap is often what's hanging around (that's what is shown in the photos accompanying this article). The only drawback to using stock that's ¾ in. thick is that it reduces the maximum depth of cut possible with the saw. Thinner material would be less of a problem, but the resulting table would be too flimsy to support heavy stock. And because I often tack on an auxiliary fence or guide of some sort, ¾-in. material reduces any worry about punching through with fasteners. A base that's 24 in. to 30 in. wide and 30 in. to 36 in. long is a pretty good size for most work.

The simplest table base to construct utilizes a single piece of plywood for the base, but will have to be replaced as it wears. A better table base is one that permits replacement of the saw kerf area, and that's the one I prefer. To make this base, I begin by adhering plastic laminate to both sides of a piece of ⅝-in. plywood. The laminate strengthens the plywood and adds an abrasion-resistant surface. From this laminated stock I rip a 4-in. piece as long as the table will be. Then, after cutting two pieces of ¾-in. plywood (14 in. wide by the length of the table), I rabbett each one lengthwise. The laminated particleboard then receives mating rabbetts, and the three pieces are gently clamped edge to edge without glue. After fastening the pieces together with countersunk #6 flat-head Phillips tapping screws, ⅝ in. long, the base of the sliding table is complete (photo top left).



Though the base of the sliding table can be made from a single piece of plywood or particleboard, the three-piece base shown here (photo above) ensures a precise kerf line. The joint between the pieces can be seen in the foreground. Screws should be countersunk.

To provide an accurate guide against which the permanent fence can be registered, a temporary fence (photo above) is first screwed to the sliding table. It can be adjusted into precise position with a framing square held against the saw's rip fence. Wood guides beneath the sliding table are just visible in this photo.

The next step is to place the saw's rip fence so that the laminated plywood is centered over the sawblade (which is retracted for this stage). I draw two lines on the plywood so that they're centered over the saw-table slots, then remove the base and slip the pre-cut guide strips into the slots, flush with the rear of the saw table. Then I run a tiny line of glue down the strips and set the plywood back in place, flush at the rear of the table. Brads hold the plywood to the guides while the glue sets up, but the brads shouldn't be so long as to go clear through. I use a pneumatic stapler or brad gun and start at the back of the table, nailing every 4 in. or so.

Once the nailing is done, I flip the plywood over and remove glue squeeze-out (I'll clean the saw if it needs it, too). The ends and edges of the guide strips should now be chamfered and, if necessary, I'll gently sand or plane them so that the base moves freely. You could chamfer the strips before attaching them to the base, but I find it easier to work them when they're attached to something. Paste wax applied to the bottom of the base and the guide strips helps the assembly slide smoothly.

Adding the fences—Now it's time to cut and fasten the front and back fences. They should be hardwood, about 4 in. in height, and in length they should reach from one side of the plywood base to the other. Later on, the base will be cut from front to back, so the 4-in. height will leave about enough wood to hold the two sides of the base together.

The back fence can be made of ¾-in. or 1-in. thick hardwood stock. Its primary purpose is to hold the two sides of the base together, so I don't spend much time aligning it. Instead, I just

run a bead of glue along one edge, align the fence with the edge of the base and fasten it to the base with screws run in from below. I prefer to use #9 particleboard screws or #10 sheet-metal screws because they're hardened, unlike wood screws, and I've rarely broken one.

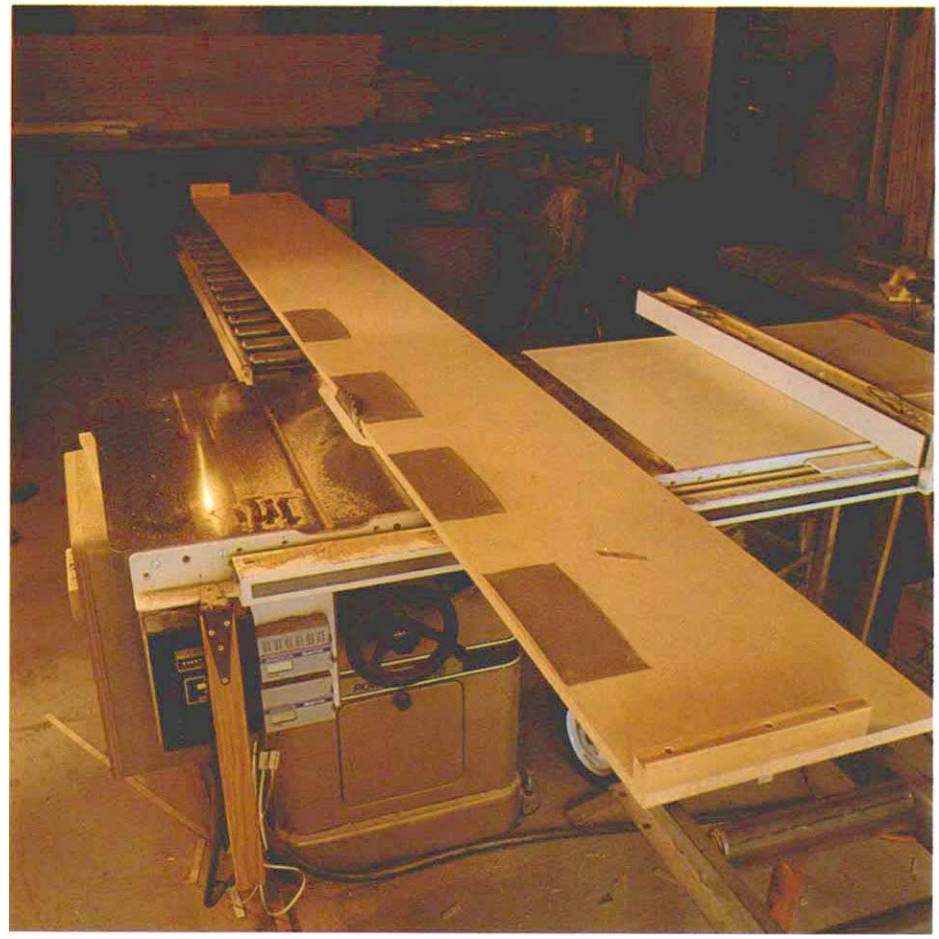
The front fence is best if made of full 1-in. stock—this makes it strong enough to hold the two sides of the table together, and the thickness makes it easier to attach. Locating the front fence correctly is critical but simple. I start by installing a temporary fence, and once it's perpendicular to the kerf line, I use it to align the permanent fence.

The temporary fence (bottom photo, previous page) is a straight length of scrap stock, about 3 in. wide, that's fastened to the front edge of the sliding base. One edge of the scrap should be 1 in. inboard of the front edge of the base. To fasten the temporary fence, I screw one end of it to the base, then drill an oversize hole in the other end and fasten it lightly with a round-head screw and a washer; the oversize hole allows the scrap to be adjusted into precise position against a framing square held against the saw's rip fence. Once the temporary fence is perpendicular to the saw fence (and thus to the blade path), both screws are firmly tightened.

Now it's time to test the position of the temporary fence. I raise the blade about 2 in., then start the saw and slide the base into the blade until it just cuts into the temporary fence. Then I pull the base back, place a scrap of stock against the temporary fence and cut the scrap in half (the edges of the stock must be parallel to each other). Then I flip one-half of the scrap over and, keeping both halves against the temporary fence, press the freshly cut edges together. If there's a gap between the two halves, the temporary fence isn't perfectly aligned; I loosen it, adjust it as needed and test again. When there's no visible gap between the cut pieces, it's time to install the permanent front fence.

After running a bead of glue along one edge of the permanent fence, I hold the piece against the temporary fence and clamp it to the base. Then it's easy to run #9 particleboard screws or #10 flathead sheet-metal screws through the bottom of the base and into the permanent fence (they should be kept well away from the kerf line). I like to ease the corners and edges of the new fence once it's secure—my hands appreciate it.

Other uses for the sliding table—When I make box joints, I use a small version of the sliding table (about 2 ft. square) along with a sawblade ground so that the bottom of each cut is square. The sliding table works quite well for cutting miters, too. My chop saw quit on a job once, so I fastened some 2x2 scraps to my sliding table at 45° and used them as auxiliary fences. The result: faster, better miters. It's easy, too, to mark odd miters on the table so that you can quickly return to a particular setup should you ever need to.



Another of the author's sliding tables, called a straight-edger (photo above), is used to remove the curved edges of rough stock. A board placed on the jig can easily be run through the sawblade to remove the curvature. Patches of sandpaper along the straight-edger prevent stock from sliding.

Hand screws, because of their wood jaws, are best for fastening work to fences attached to the sliding table, but I sometimes use quick-action cabinet clamps instead. Bags of lead shot are helpful in keeping a large workpiece flat against the table.

If you have long pieces to cross cut in the sliding table, the outboard end should be supported with a "crutch" (photo p. 58). This is simply a table-length scrap of ¾-in. material that compensates for the thickness of the sliding table. I glue stops to both ends of the scrap to keep it from sliding off the saw table.

Over time, you'll find that lots of use will begin to soften the edges of the saw kerf in the base and front fence. You can easily renew the fence by attaching a secondary fence—just screw through the back of the original fence and into the secondary fence. The base may be rescued by replacing the old center piece of the base with a new one. Some sawblades "whip" sideways when starting, and this will enlarge a portion of the kerf, making it less accurate as a cutting guide. By keeping the sliding table forward of the blade at startup, you'll lengthen the life of the sliding table.

Making the straight-edger—The straight-edger is merely another version of the sliding table, but it's 8 ft. to 12 ft. long (photo above) and has a single guide strip running lengthwise. It's often the first stop for rough stock coming into my shop. I buy hardwoods S2S (surfaced two sides). All boards require some truing, so I set up my straight-edger and quickly put a straightedge on boards up to 12 ft. long.

To make the straight-edger, I start with a length of particleboard shelving that's 16 in. wide and 12 ft. long. Pre-cut shelving usually comes in widths of 8 in. to 24 in. and features a bullnose front edge that has been filled and sanded, making the product good for closet shelves. Working with this material saves me from having to cut a 16-in. strip from a 4-ft. by 12-ft. sheet of particleboard, and that's no small advantage.

To double-check the straightness of the shelf, I stretch a fine string very tightly between points on each end of the board and use a combination square to check the string along it's length. If the board is straight, the same setting on the square serves as a stop gauge against which I can align the guide strip—with a guide strip this long, it's important to make sure it doesn't bind in the table slot. Once the strip has been fastened in place (glue and brads again), I rub a soft-lead pencil against the sides of each saw-table slot, then run the straight-edger back and forth until black smudges show me the

The author's "board stretcher" is a simple sliding saw table used to cut scarf joints (photo above).

An assembly jig (photo above) assures alignment of the scarfed pieces so that the resulting joint will be nearly invisible.

tight spots on the guide strip. With these planed off, the straight-edger slides with satisfactory snugness.

For fences, I glue and screw a cross piece of 1¼-in. by 1¼-in. stock to the leading end. Unlike the front fence on the sliding table, the front fence of the straight-edger doesn't have to be precise because it simply serves as a handle for pulling the straight-edger back. After fastening the back fence, I run a sharpened tapping screw through the end nearest the blade, pointed towards the front fence. The screw projects 1 in. beyond the surface of the wood—you'll see why in a minute. After chamfering the bottom of the guide strip, I wax both the strip and the bottom of the edger, and run it through the saw to create a straightedge and an exact reference line. From about 7 ft. to 11 ft. along the length of the straight-edger, I staple pieces of 60-grit sandpaper along the kerf line. They prevent side-creep of the stock when ripping, yet don't mar the surface of the stock.

To use the straight-edger, I slide the stock against the sharpened screw protruding from the back fence, convex edge over the kerf line. The kerf line provides a reference point at the beginning and end of the cut (the start and stop of the curve in the stock).

Many saw-table and extension-table arrangements have good outfeed support, but you'll also need some sort of infeed support when using the straight-edger. I use adjustable stands and roller track.

The straight-edger is also good for making long tapered cuts in a board because it's easy to see exactly where the blade will enter and exit the work piece. Temporary stops screwed or tacked to the straight-edger along its length permit quick and accurate repeat-cutting.

Making the board stretcher—My board stretcher is a version of the double-guide sliding table, but I use this one solely to cut accurate scarf joints. The board stretcher (photo above left) is marvelous for making long molding pieces with almost invisible joints. It works as well with preformed moldings as with rough stock you later put through your own molder. With a high-quality smooth-cutting blade and my board stretcher, I can cut scarf joints that require only gluing and clamping to assemble.

The board stretcher has no front or rear fence; instead, it has a fence angled across the kerf line at 18.5°. The base of the board stretcher is 25 in. wide and 60 in. long, and stock to be cut is secured with permanently attached cam-action clamps reaching over the fence. Several companies make these clamps, but one I know of is De-Sta-Co, (A Dover Resources Company, P. O. Box 2800, Troy, Mich. 48007-2800).

When I'm stretching lumber that I expect to run through a molder, I first rip the stock to rough size. Then I lay these pieces end to end so that the figure is similar on either side of every joint. I also try to orient the grain properly to avoid tearout. After all the boards are arranged, I mark the ends of each with a quick pencil line to remind me which way to set it on the board stretcher. Once they're all scarfed, I clamp one-half of the joint in my "alignment bracket" of laminate-faced particleboard (photo above right), swab the mating piece with glue, then clamp the joint firmly until the glue sets. Stretching premolded stock requires more care in assembly to maintain alignment of the shaped faces. Clamping requires more care, too, so that you don't mar the finished surfaces.

If you're concerned about the strength of the scarf joints and don't mind a more visible glue line, this is a good place for epoxy. But using yellow carpenter's glue (aliphatic resin), I've stretched five pieces of wood into a molding over 24 ft. long and picked up the finished piece from one end with no joint failure. □

M. Felix Marti is a designer, builder and cabinetmaker in Monroe, Oregon.