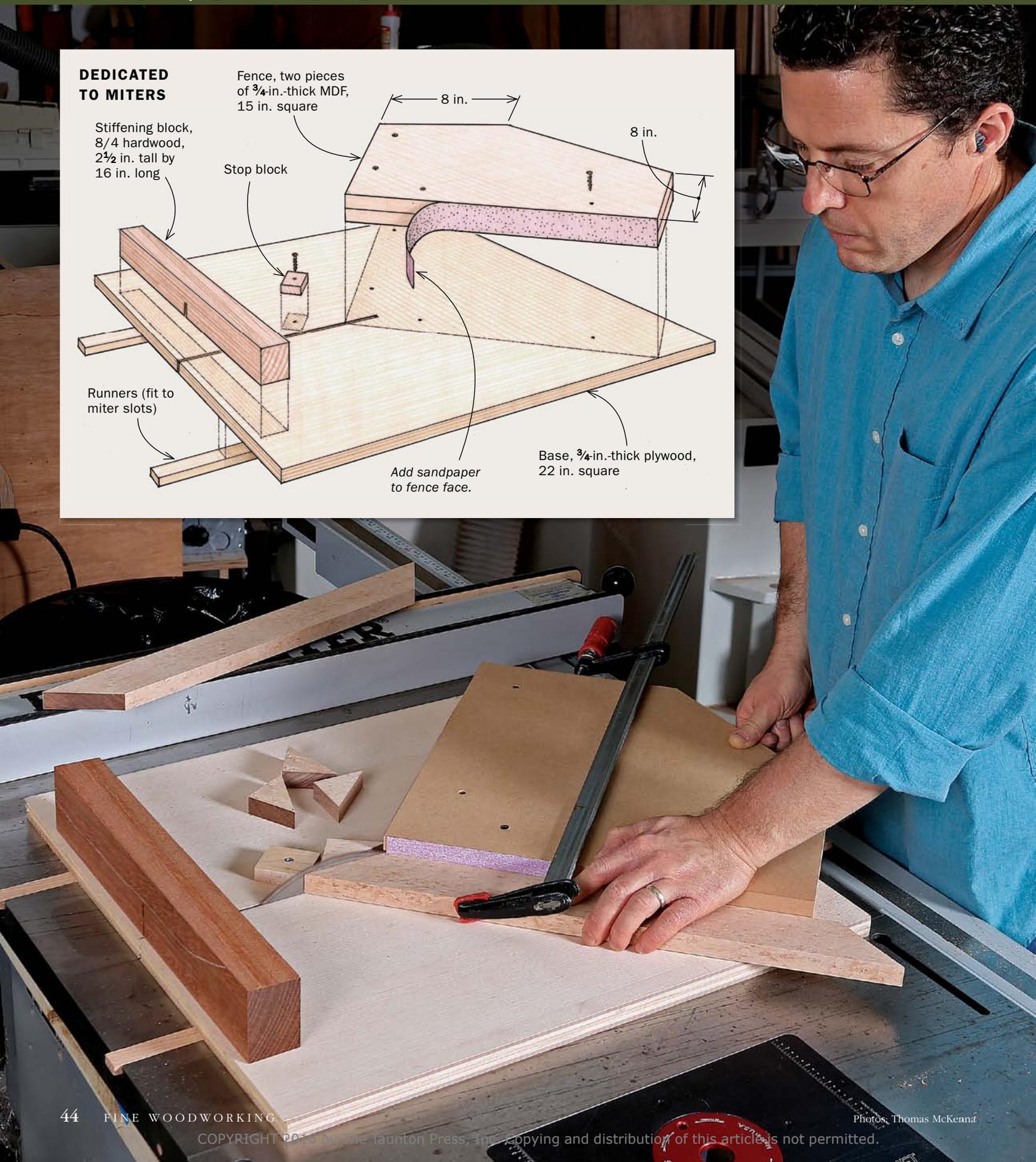
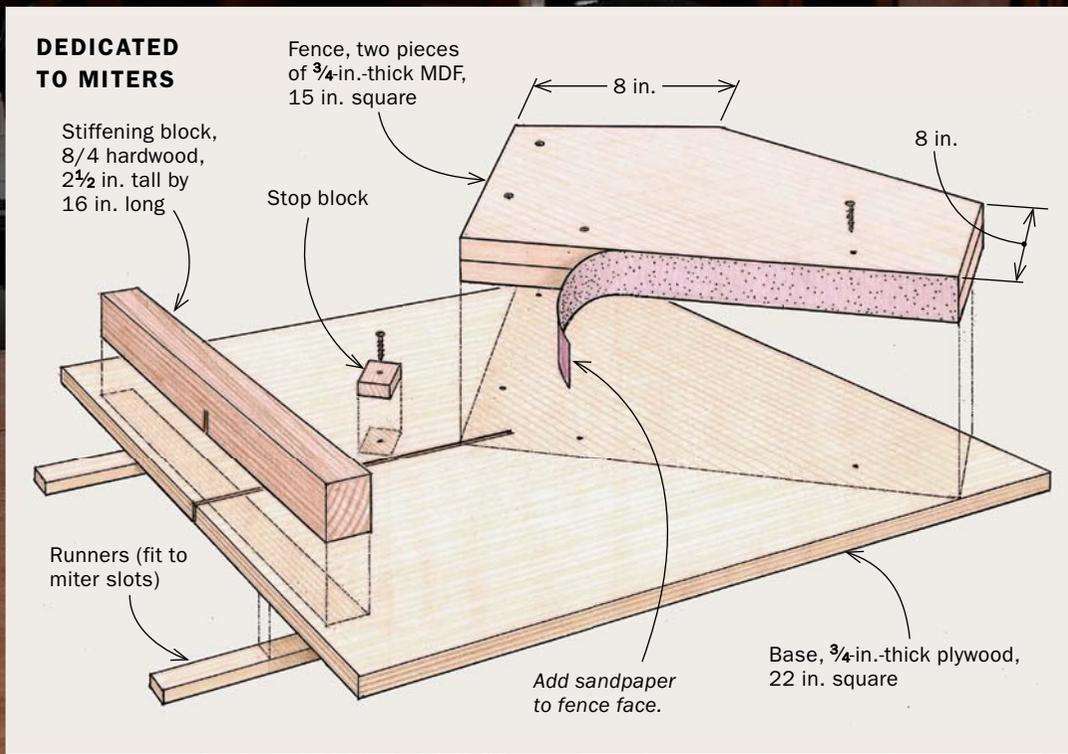


Tablesaw Sled for



Miters

Precision jig eliminates gaps and headaches

BY CRAIG THIBODEAU

Frame miters—used to make doors, face frames, and picture frames—look easy but are deceptively difficult to do cleanly and without gaps. Not only do the parts need to be cut at exactly 45° (and any inaccuracy is compounded in the two halves of each joint), but the parts also need to be cut to the correct length. Even if you cut the parts and miters right, you still have the challenge of getting the angled surfaces clamped and glued properly.

I use frame miters quite often in my contemporary-style work, most frequently on the tops of tables and cabinets, where the frame surrounds and protects a veneered panel. Through experience, I've developed some surefire methods for cutting and clamping these joints.

The key to my success is twofold. First, I use a dedicated miter sled for the tablesaw. Second, I cut the parts to final length at 90° first, then I use the fresh-cut ends as the reference for the actual miter cuts done on the sled. This method helps me cut miters precisely the first time, without a lot of test-fitting and recutting.

Sled guarantees a perfect joint

My miter sled cuts both left- and right-hand miters easily and accurately. It's essentially a standard crosscut sled, but I add a 45° fence to it.



THE SLED IS EASY TO MAKE

Cut a kerf. After attaching a stiffening block to the front of the base and installing runners, cut a kerf in the base, stopping the cut a little more than halfway through.



Add a guide line. Use a drafting triangle to draw a perfect 45° line to set up the fence. Align the edge of the triangle with the left edge of the sawkerf.



Install the fence. Align it with the 45° line and screw it down on one side.



Get a grip. Glue a thin strip of 100-grit sandpaper to the fence face.

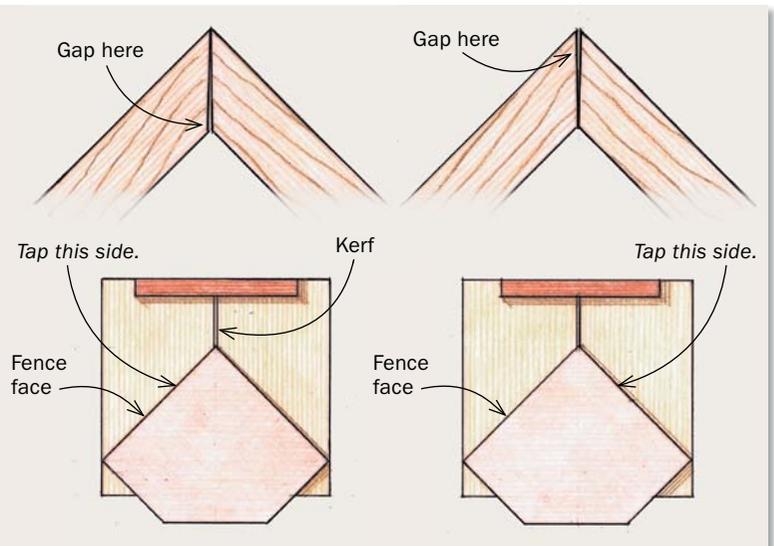


DIAL IN THE FENCE

Make a test cut. Cut miters on the ends of two frame pieces using the same fence face, then check the fit around a machinist's square (right).



Adjust the fence as needed. If the test miters show a gap, it should be small. The solution is to give the fence a light tap on the edge to move it left or right. Then make another round of test cuts. Keep adjusting until you no longer have a gap.



Lock it down. Once the jig is making perfect miter cuts, screw down the fence on both sides of the kerf. Clamp the fence down tightly while you do this.

Once you have the runners and stiffening block on your sled, make a stopped cut down the center of the sled base. Then mark a 45° line on one side of the kerf, using a 45° drafting square placed against the sawkerf. You'll use this line to adjust the fence at roughly 45°. Screw down one side of the fence, then make some test cuts using frame offcuts. Cut the mitered pieces all on one side of the sled only. That way when you put them together, the error is doubled. If you were to cut one piece on each side of the sled, the corner would end up 90° but one side might be 47° and the other 43°. The test pieces and all the frame pieces you make must be flat, straight, and square.

Your first test cuts should be very close to 45°. Once they are exactly 45°, clamp and screw down the opposite side of the fence. Be sure to locate the screws so they will not be in the path of the blade. Then cut another set of miters and check to make sure they are perfect. If they are not, loosen the screws

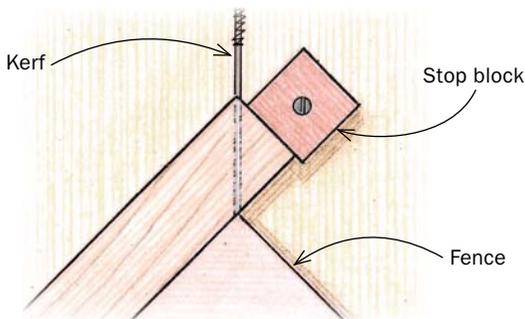
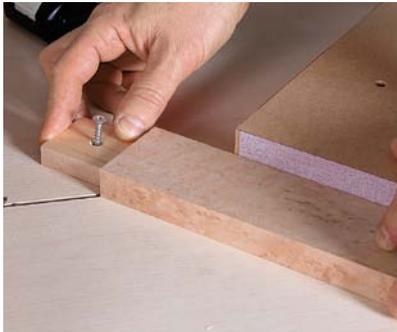


START CUTTING PERFECT MITERS

The secret to success. Cut all the frame parts to final length. Use a stop block for accuracy and a backer to prevent blowout.

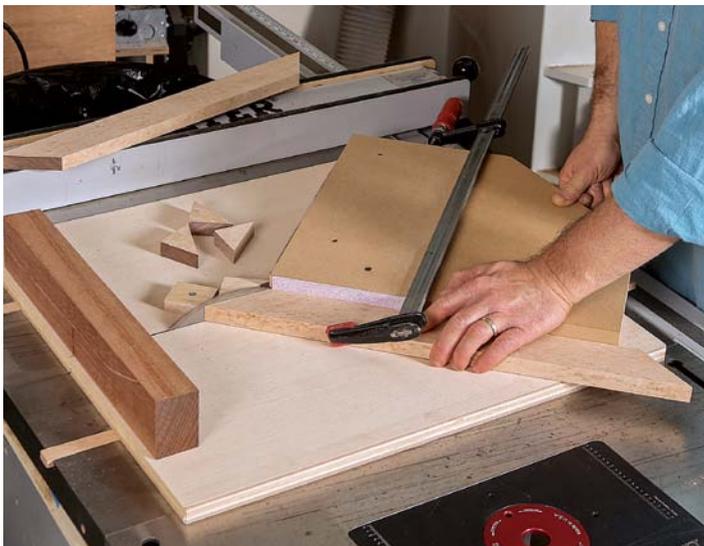
Add a stop block.

With a frame piece against the fence, align its forward corner with the left edge of the sawkerf and position a stop block against its end. Clamp the frame piece in place and screw down the block.



Happy mitering.

With the parts cut to final length, all you have to do is align them with the stop block, add a clamp, and cut. The offcuts simply fall away, leaving perfect miters behind.



slightly and give the fence a light tap with a mallet to adjust it in the correct direction.

Stop block ensures success

When the sled is finished and cutting perfectly, you're ready to cut some miters. As I mentioned, I cut the parts to length before mitering them. This enables me to use an unusual stop-block setup that ensures accuracy and keeps me from ever having to use the point of a miter for measurement or reference. The key to the setup is that the stop block is placed on the cutoff side of the blade. I locate the block by placing one frame piece on the sled with the forward corner aligned with the edge of the sawkerf. Then I place the stop block flush with the end and screw it in place. The stop block can then be used to index all of the frame

parts by cutting them all on one side of the sled and it will cut them all the same. You'll have to change out the block for different-size frame pieces.

I use a standard combination blade for these cuts and they come out very clean with no tearout, because the bottom of the crosscut sled is essentially a zero-clearance surface. Try to push the sled from the center so that you're not favoring one side or the other while cutting. If you've taken the time necessary to get the sled aligned perfectly, there is no need for additional adjustment of any of the miter joints on a disk sander or other tool.

Craig Thibodeau is a professional furniture maker in San Diego (ctfinefurniture.com).

Clever clamping tricks ease assembly

When it comes to gluing miters, there are two big issues. First, this is a weak end-grain joint, so you have to take extra steps to ensure a good bond. Because the end grain will soak up glue quickly, I recommend double-coating the joint. Apply glue to all the end-grain parts, wait a few minutes until the first application of glue has soaked into the end grain, and then coat them all again before assembly.

To ensure a long, gap-free life, I reinforce miters with Domino slip tenons (biscuits and splines work, too). The Dominos also keep parts aligned while clamping, reducing the need for sanding or planing later.

The next challenge with miters is applying pressure at 90° to the mitered surfaces, and in the center of the joint. To help, I use the small triangular offcuts from the mitering process as clamping cauls. Sometimes I glue them to thin ¼-in. MDF strips. I clamp a pair of these at each corner of the frame during glue-up. These work very well for picture frames, but I take a different approach for situations where it's not convenient to clamp them to a frame from the inside, such as a frame-and-panel assembly. In these cases I just glue the offcuts to the frame pieces and then bandsaw and plane them off after assembly.

When I have a frame with molded edges, I make cauls that are roughly the reverse of the molding profile. They don't need to be exact, but they should make enough contact to be glued securely in place. Once the caul is shaped, glue it in place with a bit of yellow glue, making sure the clamping surface lines up with the miter. After the frame is assembled, these blocks will be cut off using a bandsaw or handsaw. Then the frame gets planed and sanded smooth.

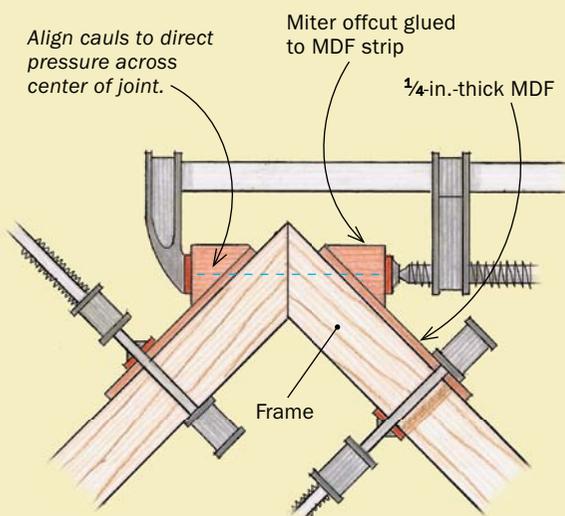
—C.T.



No-slip zone. To prevent the parts from sliding out of alignment, Thibodeau uses slip tenons inside and clamped-on cauls on the outside. The tenons add strength, too. The cauls are made by gluing the miter offcuts to strips of MDF.



Pressure where you need it. When clamping on the cauls, align the corner blocks so that clamping pressure is centered across the joints (see drawing, below).



The final step. Even with a tenon in the middle, parts can slip slightly. To lock them flush, use waxed cauls above and below the joints.



GLUED-ON CAULS FOR FRAME-AND-PANELS

Use the offcuts. In situations where the clamped-on caulks won't work, such as door panels, Thibodeau glues the miter offcuts to the frame parts. He glues the caulks in place with yellow glue and a rub joint.



Good pressure in the right spot. Position the caulks so that you get clamping pressure across the center of the joint.



Cut them off when you're done. After the glue dries on the assembly, cut off the caulks just proud of the frame edge, then plane the area flat.



SOLUTION FOR SHAPELY FRAMES

To handle frames with complex shapes, Thibodeau fashions mirror-image caulks to fit the profile. He glues them to the frame to get solid pressure across the center of the joint. The caulks have to be cut off after the glue-up, and then the frame is planed, scraped, and sanded.

