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PICTURE-PERFECT MITERS



PICTURE-PERFECT MITERS

There's no secret or "trick" to cutting perfect miters. It just takes a careful setup and some fine tuning to get tight-fitting joints.

There's nothing very complicated about a miter joint. Just two 45° angles that fit together to form a right angle. And making a miter joint is also pretty simple. You adjust your miter gauge to 45° and make a cut on the end of two pieces of wood. Sometimes, you might have to do a little "tweaking" to the miter gauge, the saw blade, or both. But all in all, it's not too difficult to get the two pieces to fit together in a nice, tight miter.

When you're dealing with more than one miter, however (like in a picture frame), it's another story entirely. That's because if just one of the miters is off, it will throw the other three out of whack as well. In cases like this, *fitting* the miters is every bit as important as *cutting* the miters.

Making a picture frame, or any other mitered project, with perfect-fitting joints is really a matter of following a sequence of steps. And that sequence starts with setting up your equipment properly.



SAW TUNE-UP. To cut accurate miters, it's important to start with a well-tuned table saw. So if you haven't tuned up your saw in a while, now might be a good opportunity.

First, the saw blade must be parallel to the miter gauge slots. If it's not, you'll need to realign the trunnions of your saw. (Refer to your table saw manual for tune-up procedures

on your specific table saw.)

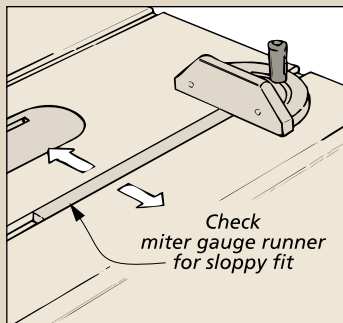
You'll also want to take a minute to inspect the fit of the miter gauge in the miter gauge slot. The miter gauge should slide freely without any side-to-side movement, see box below.

After taking care of any play in the miter gauge, check the saw blade to make sure that it's set exactly 90° to the saw table. A good way to do

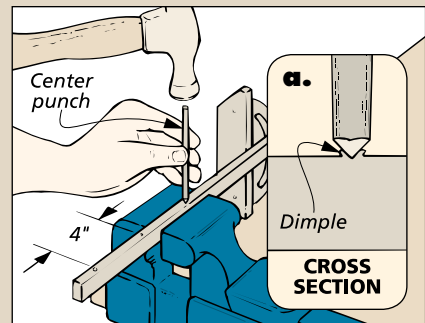
ADJUSTING A MITER GAUGE

With use, the runner (or bar) on your miter gauge can wear to the point that it fits rather loosely in the miter gauge slot, see Step 1. This can create side-to-side movement in the miter gauge, making it difficult to cut miters consistently.

To reduce the amount of "play," you need to make the runner "wider." An easy way to do this is to make a few raised dimples on one side of the miter gauge runner, see Step 2.



1 To detect a loose-fitting miter gauge runner, check the amount of side-to-side play in the miter gauge slot.



2 Take up the play in the miter gauge by striking the side of the runner with a hammer and center punch to create raised "dimples."

this is by making a test cut in a scrap piece of wood, see Figs. 1 and 1b.

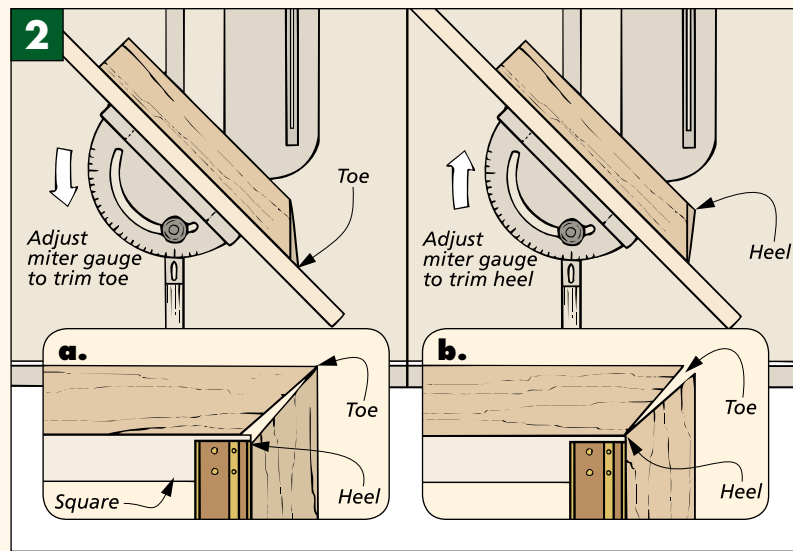
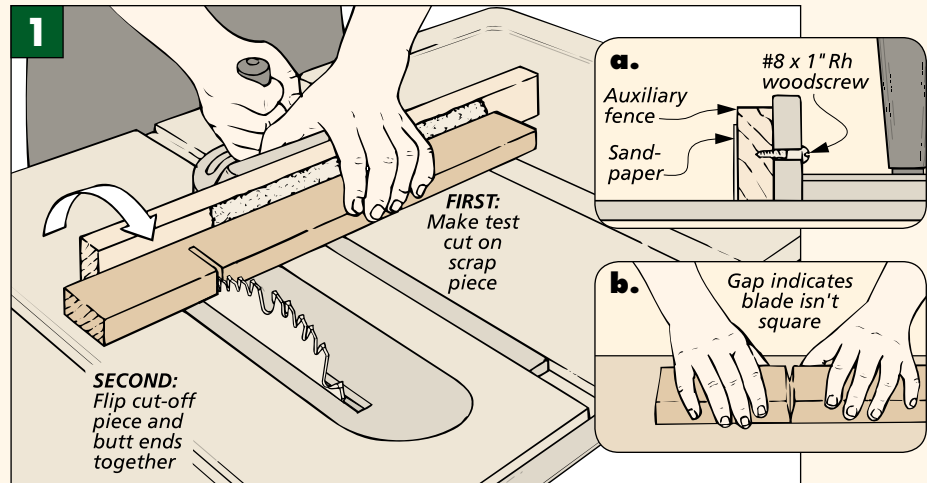
Speaking of saw blades, if you've got a good crosscut blade, you'll want to use it. A crosscut blade will leave a smooth cut with a minimum of splintering. But if you don't own a crosscut blade, a sharp combination blade should work fine.

AUXILIARY FENCE. For cutting miters, I like to attach an auxiliary fence to the face of my miter gauge. This does two things. First, it helps to back up the cut to prevent chipout. Second, it gives you plenty of support, making it easier to hold the workpiece while pushing it past the saw blade. And to prevent the workpiece from "creeping" while making the cut, I affix a strip of adhesive-backed sandpaper to the face of the miter gauge for a little extra gripping power, see Fig. 1a.

When setting my miter gauge to 45°, I don't rely on the markings on the gauge itself. Instead, I use my combination square. By simply removing the graduated rule from the head of the square, you can easily check the angle of the miter gauge in relation to the saw blade, see photo in margin.

TEST CUTS. Although the combination square is pretty accurate, there's an old saying that the proof is in the pudding. So before cutting any of my frame stock, I like to make one final check by making a couple of test cuts. If the two test pieces fit together in a perfect right angle, you're ready to move on to your frame pieces. If not, you'll need to do a little "tweaking" of your miter gauge and trim a bit off the ends, see Fig. 2.

CUTTING THE MITERS. After the set-up work and test cuts are done, you're



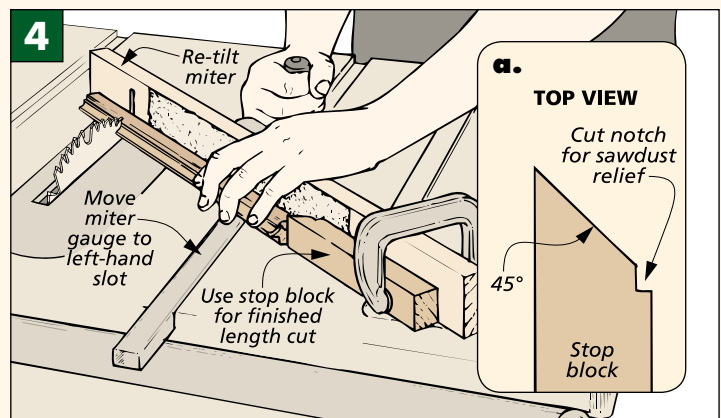
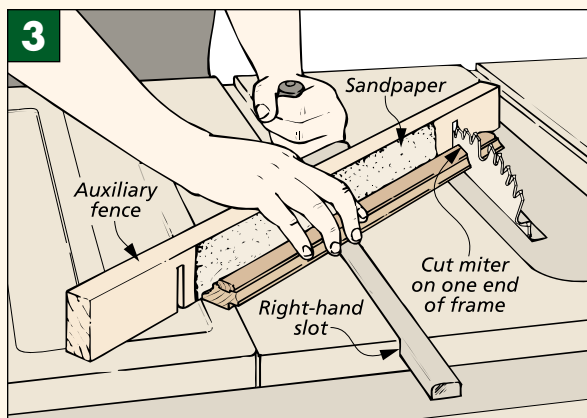
▲ Use the head of a combination square to set the miter gauge at 45°.

ready to start cutting the miters on the actual workpieces. I like to follow a sequence here as well. First, I miter *one* end of each frame piece, see Fig. 3. Hold each workpiece firmly against the miter gauge while making the cut to prevent it from slipping.

To miter the opposite end of each piece, you'll have to move the miter gauge over to the slot on the other side of your saw blade and readjust it

to the opposite 45° setting, see Fig. 4. (Don't forget to make test cuts again on a few scrap pieces.)

To make sure each opposing pair of frame pieces ends up the same length, I use a stop block to position the pieces when making the second miter cut, see Fig. 4. Shop Note: If the end of the stop block is also mitered, it will provide better support for the workpiece, see Fig. 4a.



Frame Assembly

At this point, all your frame pieces are mitered to finished length. Your tendency now may be to hurry and glue up the pieces to finish the frame. But try to resist that tendency. You'll get much better results in the end if you take your time and make sure the pieces fit together perfectly before you begin gluing them up. Patience is the key here.

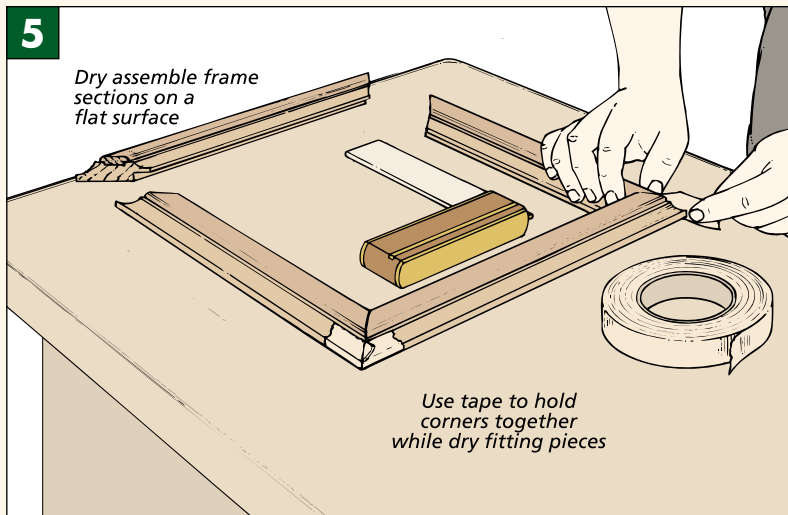
DRY-FITTING. The first step in assembling a frame is dry-fitting. This gives you a chance to correct any slight imperfections in the fit of the joints.

I like to dry fit the frame on a nice, flat surface, using tape to hold the corners together, see Fig. 5. You can use a square to check if the frame is racked, but don't be too concerned with getting a perfectly square frame. It's more important to examine the fit of each individual joint.

TRIMMING. If the joints aren't tight, you may have to pare away material from the ends of the workpieces with a chisel until the two pieces come together. It often helps to create a small hollow on the face of the miters by undercutting the surface a bit, see photo in margin.

Trim just a small amount and keep checking the fit as you go along. Don't rush the fitting stage of assembly — this is your main opportunity to work with the pieces until you're satisfied with the results. Once all the joints fit together, you're ready to start gluing the frame up.

When it comes to gluing up picture



▲ To ensure a tight-fitting miter, you may have to undercut the end of each workpiece slightly.

frames, there are a lot of commercial clamps that allow you to assemble the entire frame at once. But I've found that I get better results by working on just one corner at a time. It takes a little longer, but it allows me to focus my attention on a single joint rather than on all four at once. Another advantage is that you don't need to go out and buy any special clamps.

SMALL FRAMES

For gluing up small frames, I use the clamps that I was born with — my hands. This allows me to hold the pieces together and apply just the right amount of pressure right where it's needed while the glue sets up (usually about five minutes if you're working with yellow glue).

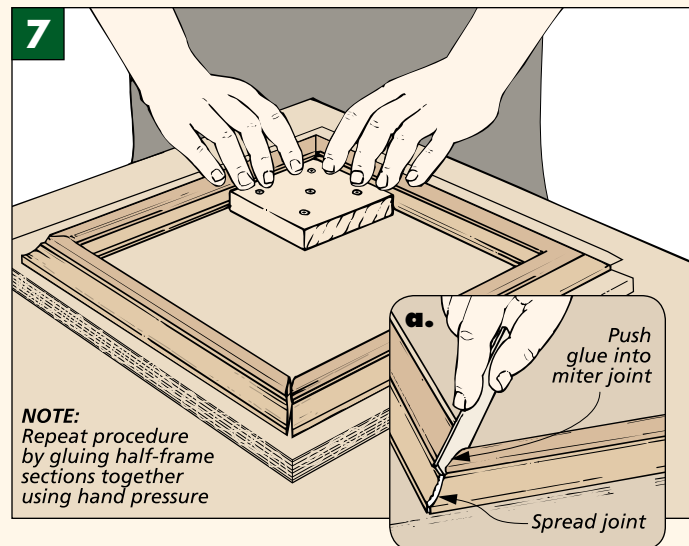
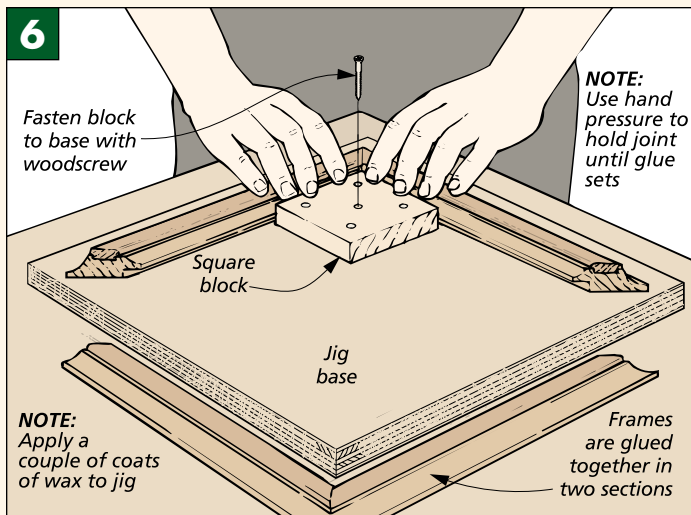
The only problem with holding the pieces is that they tend to slip. To help overcome this, I use a simple jig. It's

nothing more than a square block of wood screwed to a piece of plywood, see Fig. 6. The block provides a backstop for holding the pieces square.

I like to start by gluing up one corner. Then while the glue is drying on that corner, I glue up the opposite corner. Once these joints are dry, the two halves of the frame can be glued together. Here again, I work on just one corner at a time. When you get down to the last corner, however, you might have a hard time getting the glue in between the joint. In this case, a thin piece of cardboard (or an old playing card) can be used to spread the glue on the mitered faces of the workpieces, see Figs. 7 and 7a.

LARGE FRAMES

I use a different approach when it comes to assembling larger frames. I still work on just one corner at a time.



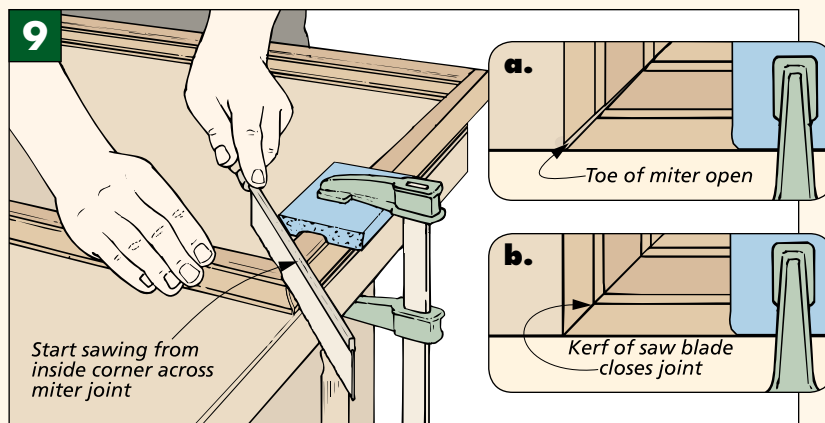
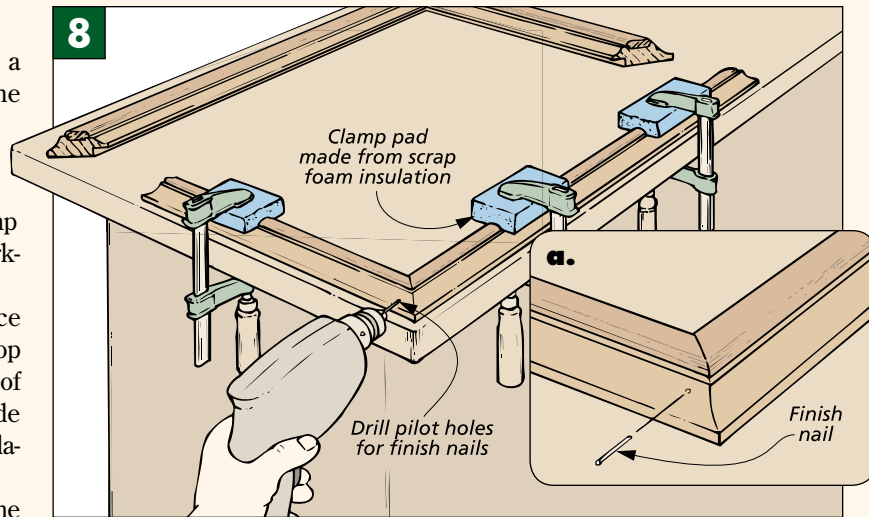
But because of the extra weight in a large frame, I usually like to nail the joints as well as glue them.

The problem is that it's difficult to hold the pieces together while you're driving in the nail. To solve this, I clamp the pieces to a flat surface (like a workbench), see Fig. 8.

I start by clamping the first piece down along the edge of my bench. Shop Note: To avoid damaging the profile of the molding, try using clamp pads made out of some scrap pieces of foam insulation (blueboard).

Next, I apply the glue and clamp the second piece in place. With both pieces clamped securely to the bench, you can now drill a pilot hole and drive in a finish nail. Nailing not only strengthens the joint, but allows you to move on to the next corner while the glue is setting up.

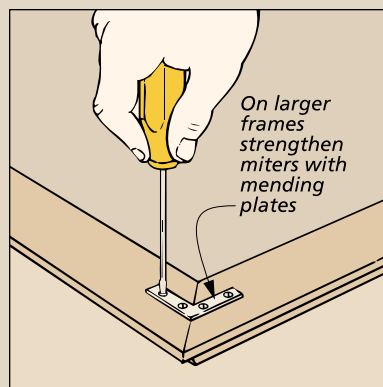
The two halves of the frame are glued together one corner at a time, just like the small frames. If the last joint doesn't quite fit together, I use an old carpenter's trick (instead of trimming it with chisel). I simply saw through the joint with a backsaw, see Fig. 9. Then I glue the pieces together and nail the joint. **W**



REINFORCING LARGE FRAMES

Large frames can be subjected to a lot of stress, especially if they contain a piece of heavy glass or artwork. Here are a couple of easy ways to reinforce large picture frames.

MENDING PLATES. A very simple way to strengthen the joints on a large



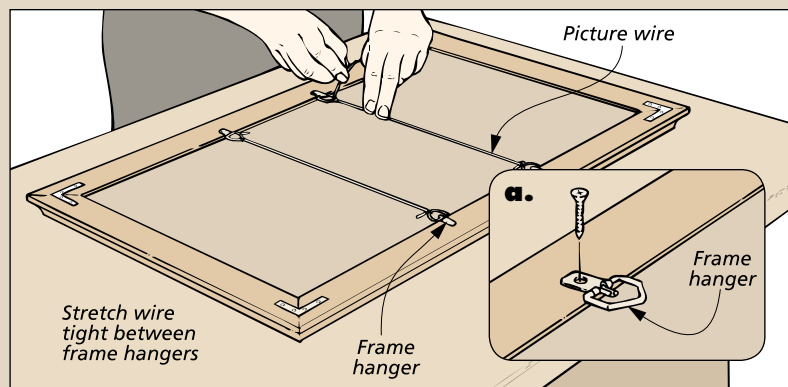
Mending Plates. Screw a mending plate to the back of each corner to reinforce the miter joints.

frame is to screw an L-shaped mending plate to the back of each corner, see left drawing.

WIRE SUPPORTS. To prevent a large, wide frame from “sagging” in the middle, I also reinforce the frame using some picture hanging wire, as

you see in the right drawing below.

To do this, first install a couple of frame hangers in the top and bottom of the frame, as shown in detail ‘a.’ Then tie a piece of wire between the two hangers, pulling it taut like a bowstring.



Wire Supports. To prevent a wide frame from sagging in the middle, attach frame hangers to the top and bottom rails of the frame. Then stretch some picture hanging wire between the two hangers.