



Woodsmith **PLANS**

TABLE SAW MITER SLED



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Miter joints don't have to be a trial-and-error chore. With this miter sled, you can cut perfect joints every time.



I don't think there's a woodworker anywhere that has never been frustrated when it comes to cutting miters on the table saw. It seems that no matter how hard I try, I'll sometimes end up with a gap in the joint once all the pieces are assembled.

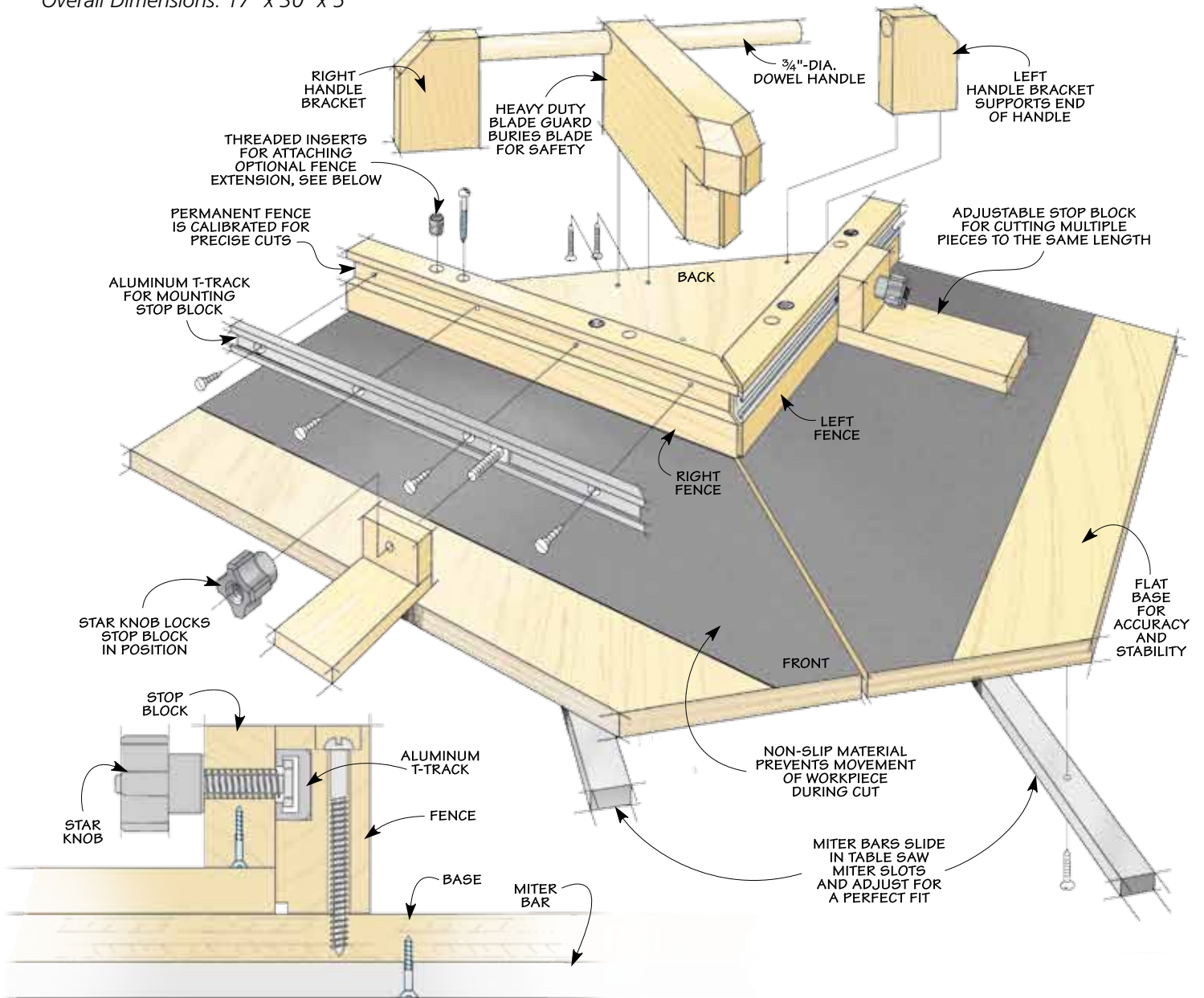
This table saw miter sled solves that problem. To make accurate cuts, it has two bars that ride in the miter slots on your table saw. This makes it solid and slide smoothly for consistent cuts. And once you get the fences calibrated, you can cut dozens of perfect miters. The fences

also have a T-track, which allows you to use a stop block. This guarantees that your workpieces will be exactly the same length.

With all the sled's features, solid construction, light weight, and precision fences and stops, you'll be cutting perfect miter joints in no time.

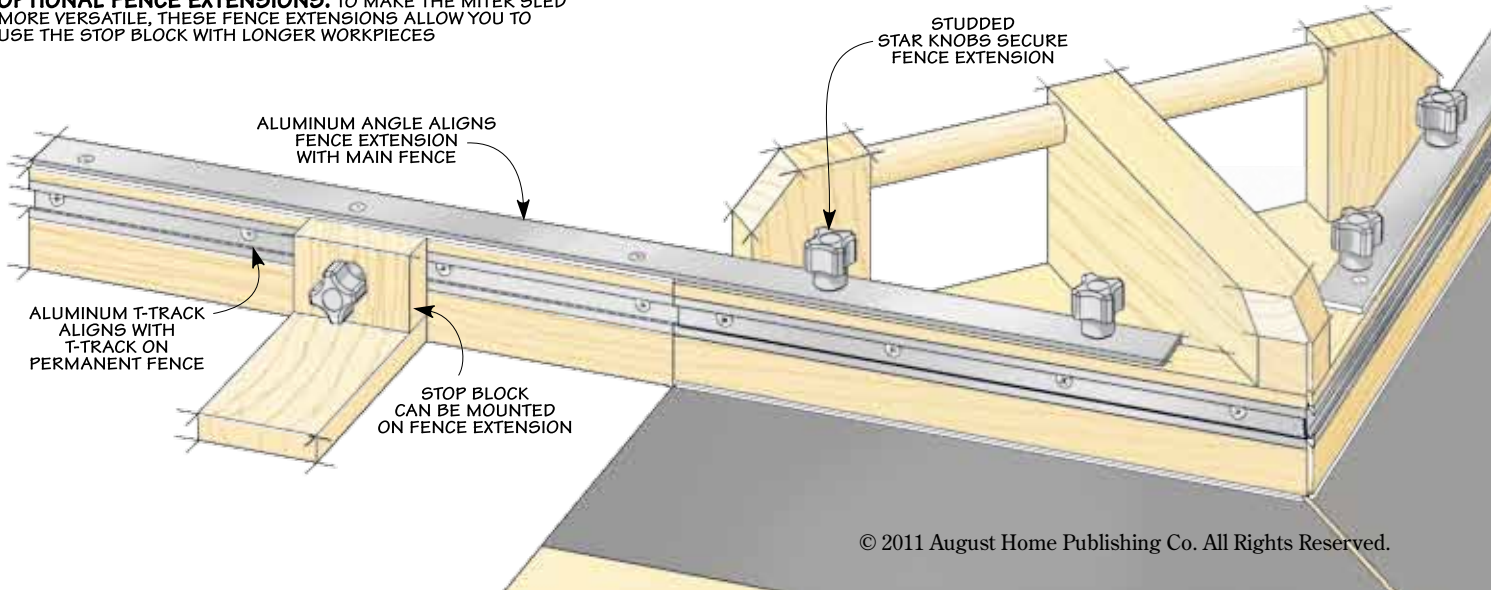
Construction Details

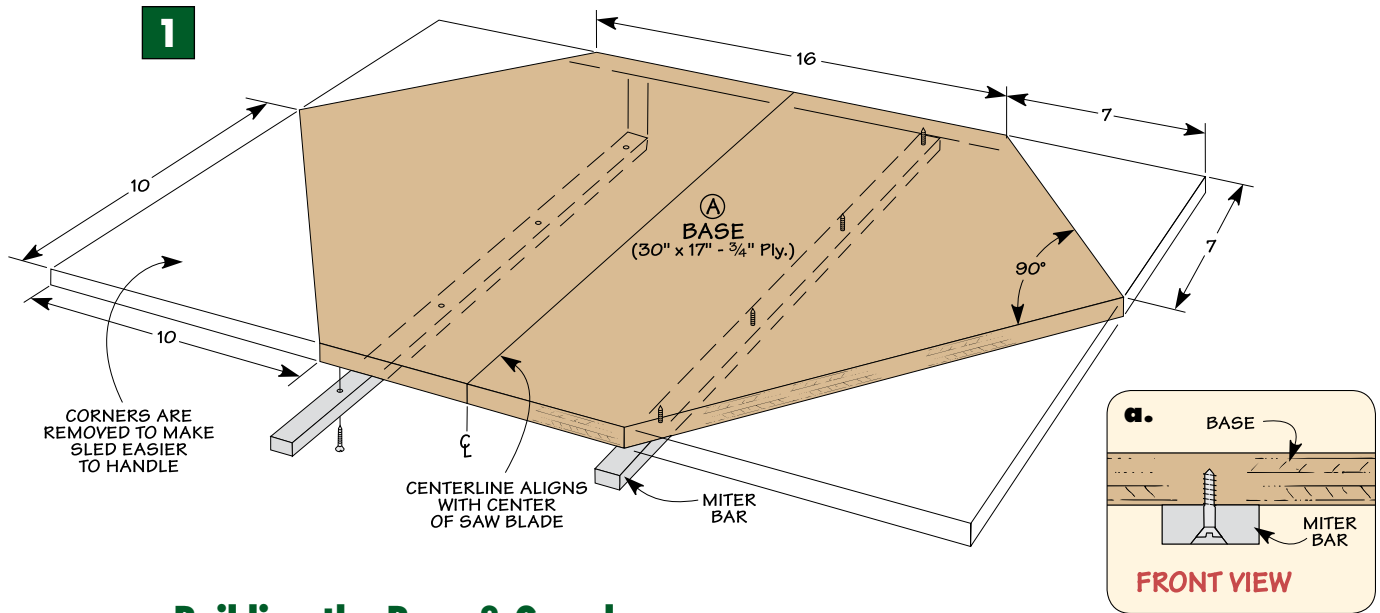
Overall Dimensions: 17" x 30" x 5"



SECTION VIEW

OPTIONAL FENCE EXTENSIONS. TO MAKE THE MITER SLED MORE VERSATILE, THESE FENCE EXTENSIONS ALLOW YOU TO USE THE STOP BLOCK WITH LONGER WORKPIECES





Building the Base & Guard

The base of the miter sled is the foundation for the whole assembly. So you'll want to use a material that's flat and stable. That makes installing and adjusting the other parts easier. I chose $\frac{3}{4}$ " plywood.

I started with a rectangular piece. You'll want to make sure the front and back edges are straight and smooth. This way, you can use them later as a reference for locating and adjusting the fences.

To make the sled lighter and easier to manage, I cut off the corners of the base, as shown above.

Once that's done, you'll need to find and mark the centerline of the base. (I used a framing square.) You'll use this line later to align the sled with the saw blade. This centerline also serves as a reference for attaching the blade guard and fences.

RUNNERS. Now for the challenging part — mounting the runners. The trick is to attach the miter bars using double-sided tape. The tape holds them in place so you can attach them with screws. Use your table saw as a guide for mounting the miter bars, and refer to the box below.

BLADE GUARD. Once the runners are mounted, turn your attention to the blade guard. The blade guard does two things. First, it shields your hands from the saw blade. As you finish the cut on the workpiece, the blade ends up "buried" under the blade guard. And second, it adds stability to the sled. It ties the two parts of the base into one unit.

To make the guard, cut a block to width and length. Then, following the steps shown at the bottom of the following page, make the cuts to form the "nose" of the guard.

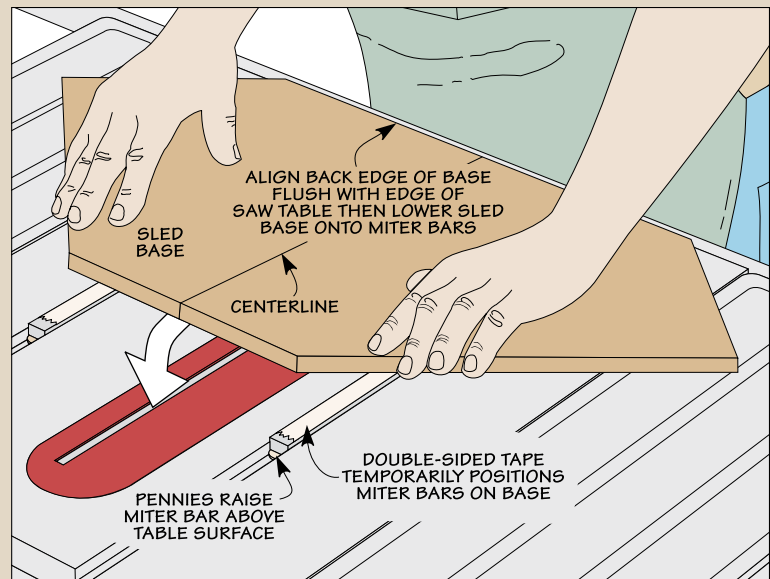
ALIGNING THE RUNNERS

Since the miter sled uses two miter bars, it can be difficult getting them aligned to your table saw. Here's a trick for attaching them that will ensure smooth operation. You'll use double-sided tape to help.

The first thing you need to do is insert two pennies in each miter slot of your saw, as shown in the drawing at right. This will hold the miter bars proud of the table surface so the tape can "grab" the base.

After attaching two or three pieces of double-sided tape to each miter bar, align the ends of the bars with the front of your saw table. Next, you'll want to align the back edge of the sled base flush with the front of the saw, as shown at right. But be careful not to let it touch the double-sided tape yet.

Now, carefully move the base so its centerline is in line with the saw blade. Then it's just a matter of lowering the sled onto the miter bars. Finally, you can remove the sled and permanently attach the runners.



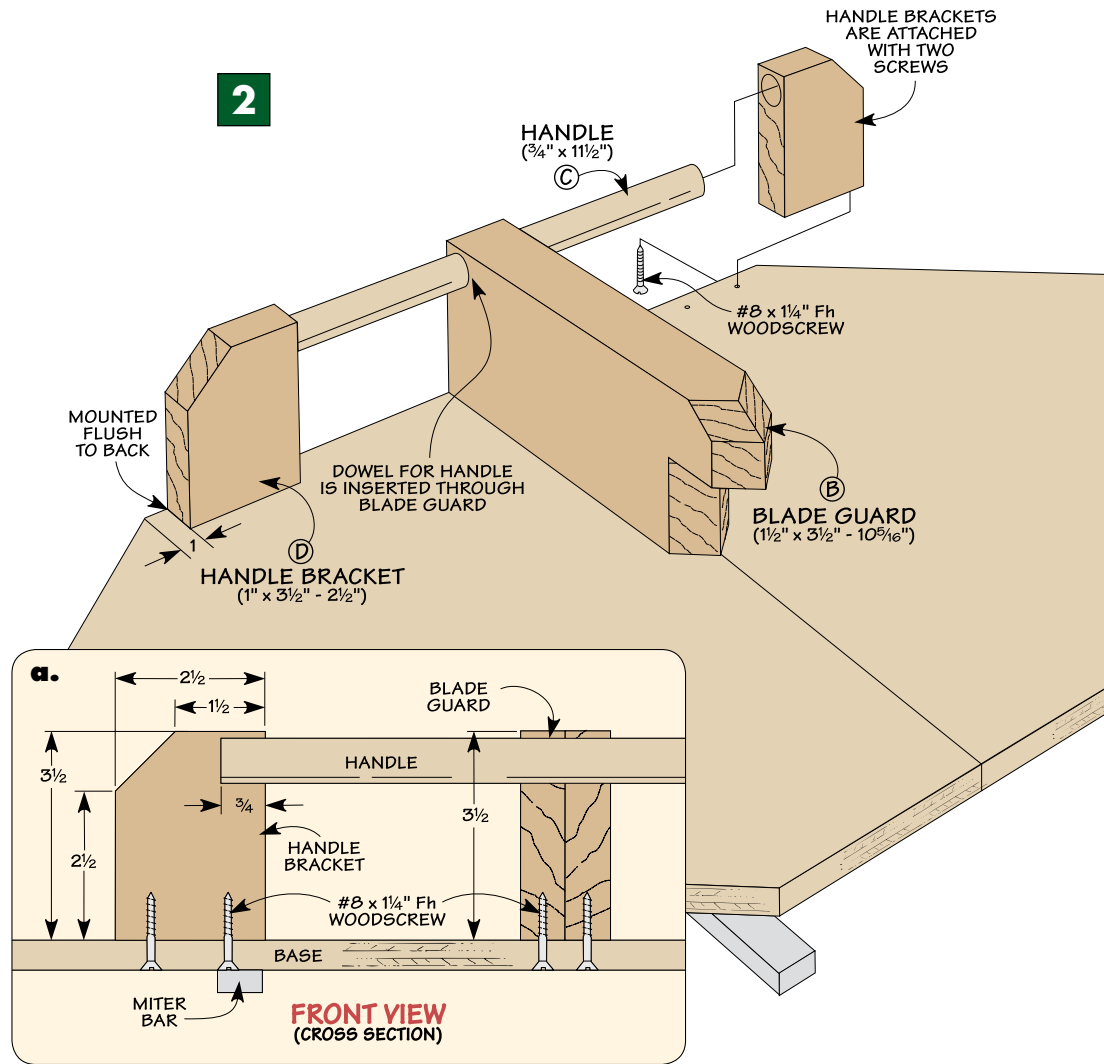
Once the blade guard is cut to shape, you'll need to drill a hole through it for the handle that's added next. Make sure the hole is square to the sides of the guard so you can easily fit and align the handle.

To attach the guard to the base, apply glue to the bottom edge and align it with the back of the base. Be sure it's centered and square to the reference line. Then screw it in place from underneath. But watch where you place the screws to keep them out of the path of the blade.

THE HANDLE ASSEMBLY. The handle is simply a $\frac{3}{4}$ " dowel that slips through the blade guard. It's held in place by two end brackets. The handle gives you excellent control of the miter sled. It also gives you a good place to rest your hands to keep them out of the blade's path during a cut.

You'll cut the handle brackets to size, and then drill a stopped hole in each bracket for attaching the dowel (Figure 2a). The corner of each bracket is cut off.

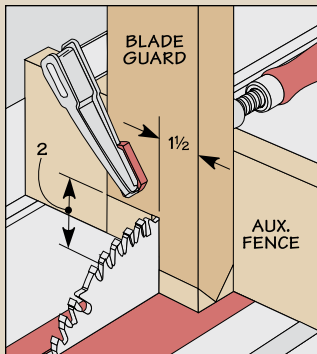
Now, you can put the handle assembly together. Slip the dowel through the blade guard, and then attach a handle bracket at each end of the dowel. A drop or two of glue will keep the dowel from spinning when using the sled. Then you can glue and screw the brackets to the plywood base from underneath to tie everything together.



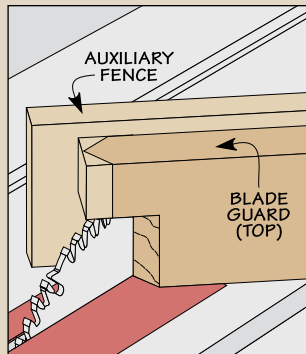
READY FOR FENCES. At this point, the base of the table saw sled is complete except for the two permanent fences and non-skid material. But before you move on to making the

fences, you'll want to take some time to check the fit of the sled on your saw and make any last-minute adjustments. You're looking for a smooth fit in the miter slots.

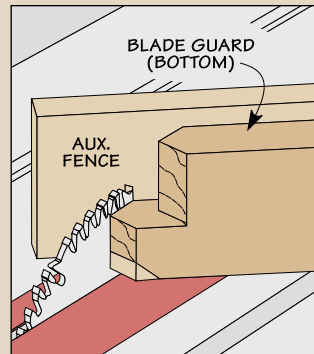
BLADE GUARD STEP-BY-STEP



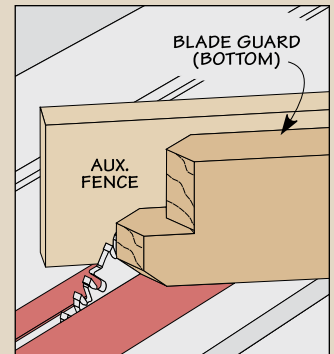
The First Cut. Using an auxiliary fence on your miter gauge, begin by forming the notches for the permanent fences in the blade guard.



Miter for the Fences. Rotate your miter gauge 45° to complete the notches where the fences will rest. Make two cuts to center the point.



Forming the Nose. Then flip the guard over and make two 45° cuts. The point should be centered to help align the guard with the blade.



Compound Cut. The last set of cuts is on the top of the blade guard. Tilt the saw blade 45° and cut the remaining bevels to form the nose.



Building the Fences

One of the biggest frustrations with cutting miter joints is getting the angle of the cut just right. But that's not the case with this miter sled. I'll show you a handy trick for adjusting the fences perfectly.

Another problem with miter joints is cutting the pieces to a consistent length. If one piece is just a hair longer than another one, there will be gaps in the miter joints. To eliminate this problem, the fences on the sled have an aluminum T-track built into them that makes it easy to attach a stop block.

FENCE ASSEMBLY. The fences are the most important part of the miter sled and I wanted them to remain

straight and true for a long time. That's why it's a good idea to cut them from straight-grained hardwood. I left the pieces a little long so I could trim them to final size later after the T-track was installed.

To make it easier to miter longer workpieces, you might want to make the fence extensions shown on the next page. While you're set up to make the permanent fences, you can also make the extensions.

I cut the groove for the aluminum T-track using a dado blade on my table saw. Make the groove deep enough so that the T-track sits

flush with or slightly below the surface of the fence. This will help the stop block seat properly when it's mounted to the fence.

After you attach the T-track, trim one end of the fence square, as shown in Figure 4. Then cut the 45° angle on the other end. You'll want to use a carbide-tipped saw blade since you'll also be cutting through the aluminum T-track. Just make sure you cut the miters in opposite directions on the two fences.

Also, to keep sawdust build-up from interfering with the cut, I rabbeted a sawdust relief on the bottom front of the fences (Figure 3).

ATTACH THE FENCES. It can be a challenge to attach the fences to the base at perfect 45° angles. So, I drilled oversized holes and counterbores for the two washerhead screws used to attach each fence (Figure 4). The oversized holes gave me some "wobble room" for fine-tuning the angle of the fences.

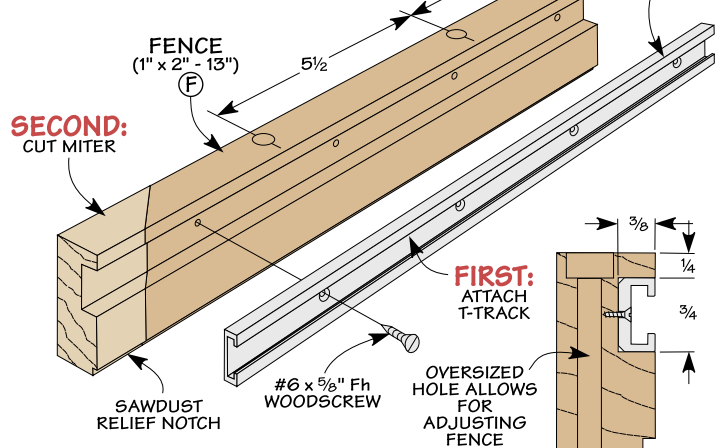
To get an idea of where to attach the left fence, I drew a line from the tip of the blade guard at a 45° angle. Using this line as a guide, I screwed the fence in place with the two washerhead screws. Don't use any glue here — you'll want to be able to make adjustments later.

TEST CUTS. Once the fence is fastened tight, make test cuts on two straight boards and adjust the fence until it's a perfect fit.

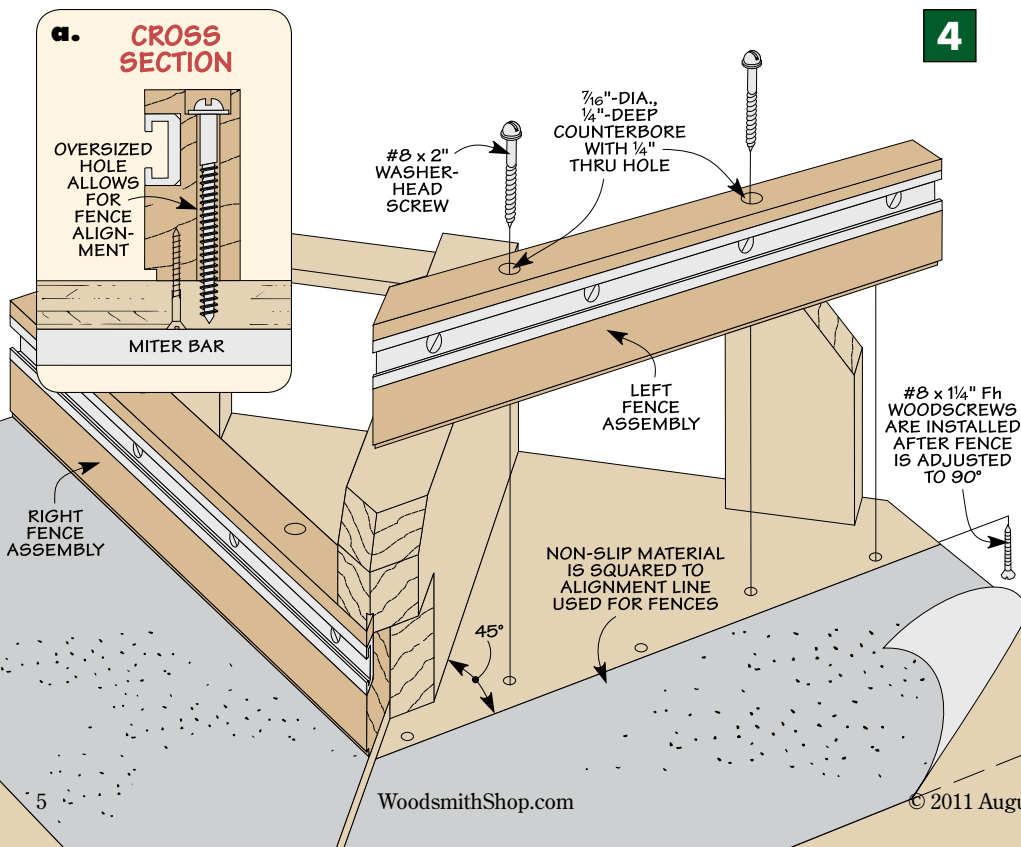
Then do the same for the other fence.

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NOTE: MAKE FOUR 14"-LONG FENCES IF MAKING EXTENSIONS, THEN TRIM FENCES FOR SLED TO LENGTH SHOWN



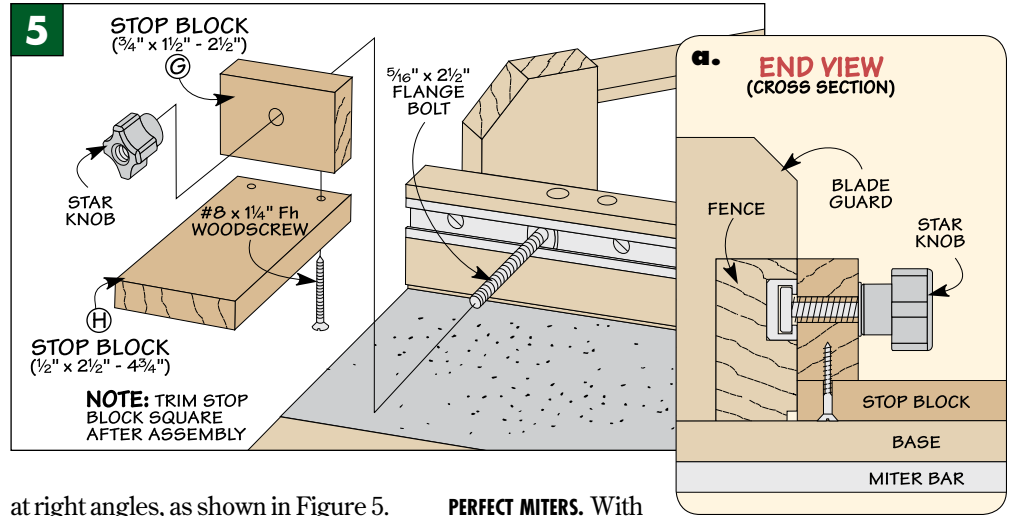
4



NON-SLIP SURFACE. Sometimes when I'm cutting miters, the workpiece has a tendency to "creep" as the saw blade starts to cut. To solve this problem, I found some non-skid material that is often used on stairs. As you can see in Figure 4, I aligned the material with the front face of the fence. You'll have some material hanging over the edge of the base to trim with a utility knife.

STOP BLOCKS. The last pieces you need to complete the miter sled are stop blocks. They're easy to make but they serve an important role. They allow you to cut your workpieces to a consistent length.

The stop blocks are just two pieces glued and screwed together



at right angles, as shown in Figure 5. You'll drill a hole in the back that's used to attach them to the fences. I made two of them so I could have one on each fence.

PERFECT MITERS. With the fences and stop blocks in place, your miter sled is complete. After final test cuts, you're ready to cut perfect miter joints.

OPTIONAL FENCE EXTENSIONS

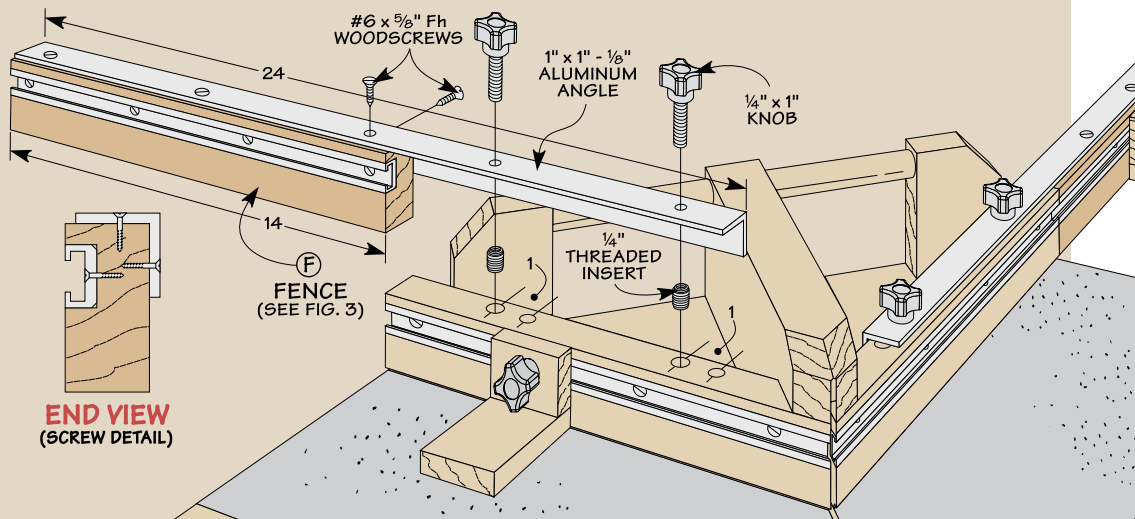
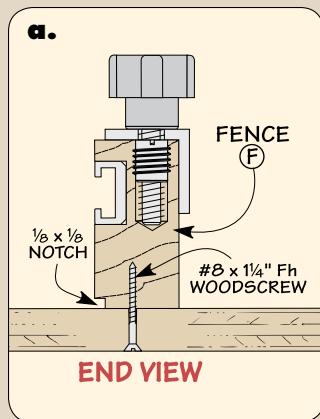
The miter sled is great for cutting perfect miter joints. But I found that I sometimes needed to make repetitive cuts on pieces that were longer than the fences. So I added these fence extensions.

The stock for the fence extension is identical to the stock used for the stationary fences, including the aluminum T-track. The only difference is that I added a length of aluminum angle for attaching the extension to the stationary fence, as shown.

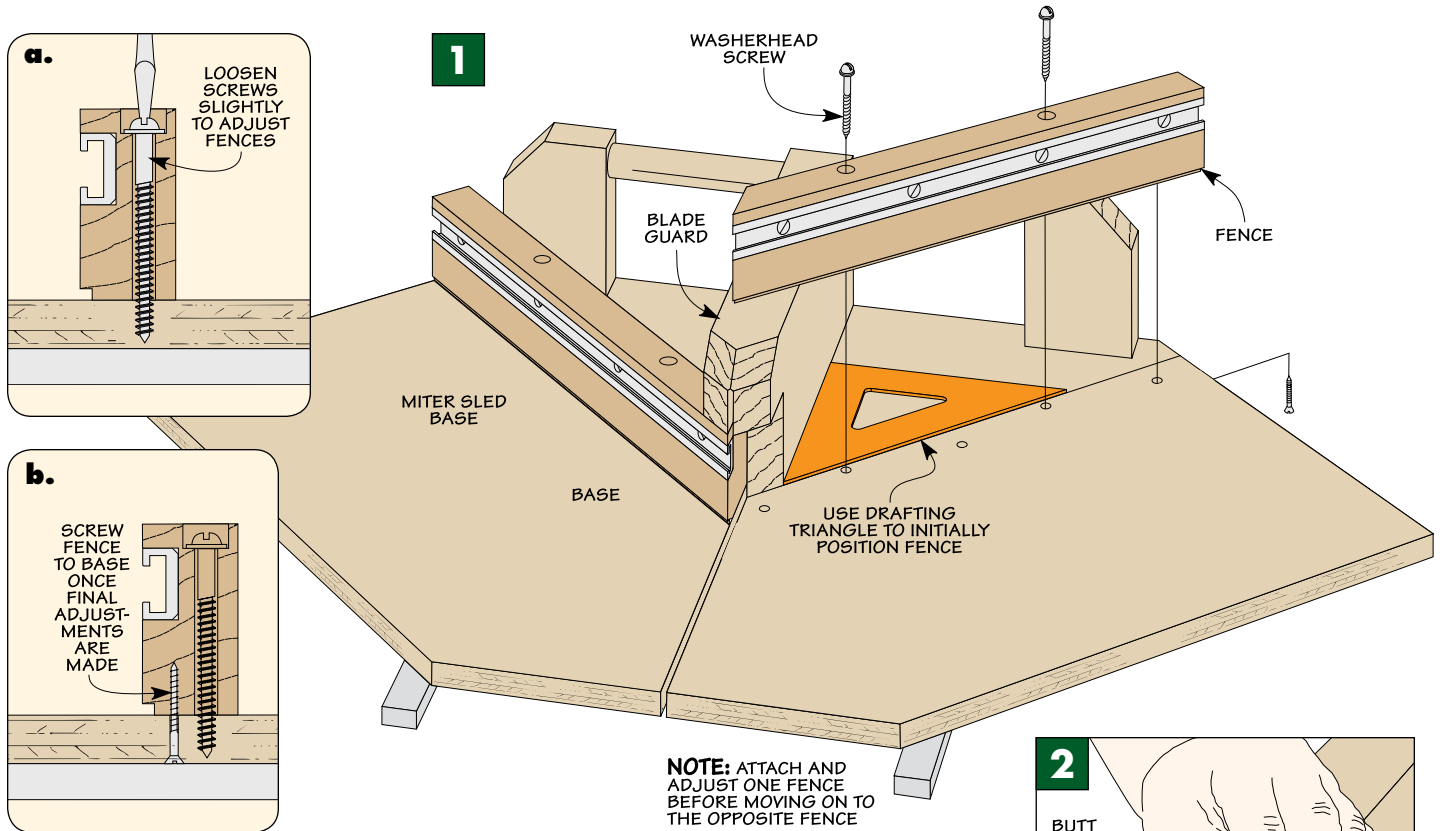
Once the fence extensions were complete, the first thing I

did was cut a 24" length of aluminum angle. After aligning one end flush with the outside end of the fence extension, I fastened the aluminum angle in place. You can see how this all goes together in the drawing below.

Finally, I wanted to have an easy way to attach and remove the fence extension, so I used the threaded inserts and studded knobs that you see in detail 'a.' I drilled the mounting holes in the aluminum angle and used them to mark the location of the threaded inserts on the fence.



SHOP SHORT CUTS



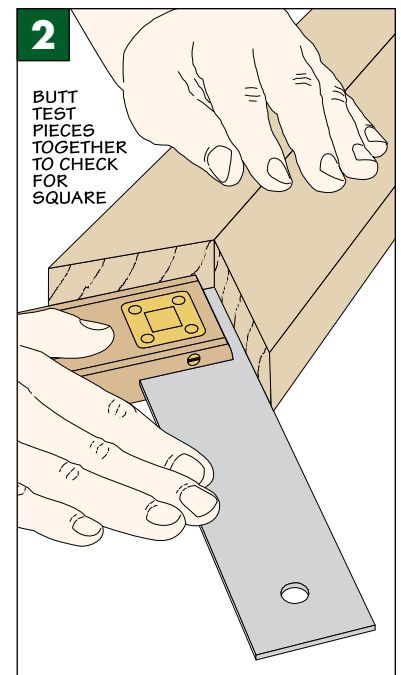
Attaching Fences to the Miter Sled

There's not much to attaching the fences on the miter sled. They're simply screwed in place. But getting each fence positioned at a perfect 45° angle on the first attempt is easier said than done. To make this task a bit easier, I used a pair of oversized holes for the screws that attach the fences. This allows you to "tweak" the position of each fence for a perfect 45° miter.

To initially position the fence, I used a plastic drafting triangle. (These are inexpensive and accurate.) I set the triangle against the blade guard and drew a line to indicate the position of the back edge of the fence, as in Figure 1. Then I attached the fence to the miter sled base with washerhead screws.

With the fence attached to the miter sled base, you can now check the position of the fence for accuracy. To do this, I made a couple of test cuts and then placed the test pieces together side by side, as illustrated in Figure 2. Now simply use a square to check the included angle. If the angle is 90°, you know that fence is positioned at 45°. If it's not, you'll need to nudge the fence a bit and check the setting on a new set of test cuts.

Once you have the fence in position, you can tighten down the two washerhead screws, as shown in Figure 1a. Then to hold the fence securely, I added three more screws from the underside of the base of the sled (Figures 1 and 1b).



With the first fence in position, you can now repeat the process to attach the second fence. Once you're done, both fences should be set up to cut perfect miters.