45° Lock Miter Bits

16J75.08/18J75.08
16J75.62/18J75.62

⚠ *For better safety, use this bit only on a router table with a fence* ***– not free hand****.*

The lock miter joint is an improvement over standard miter joints in box construction. The interlocking joint guarantees an accurate fit and the increased gluing area means a stronger joint. The lock miter joint is particularly suited to veneer plywood construction (see **Figure 1**).

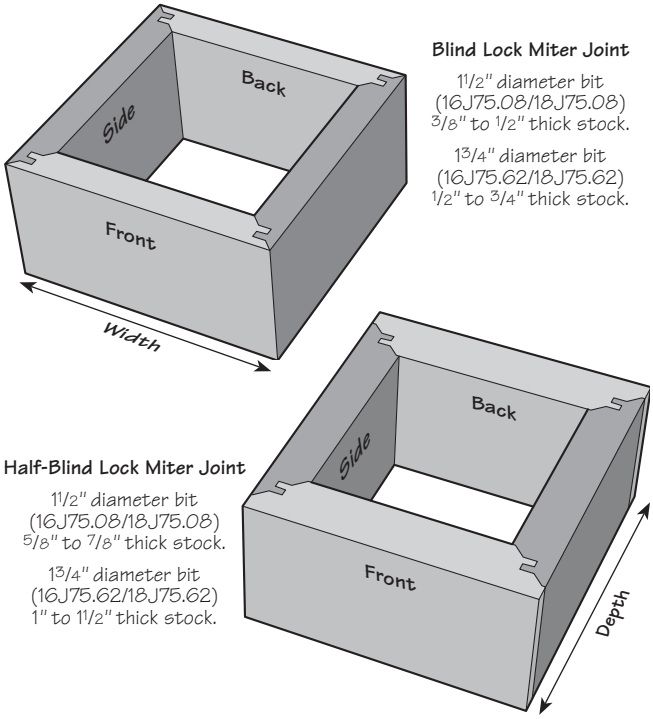


Figure 1: Lock miter joint in veneered plywood.

Cutting a Blind Lock Miter Joint

1. Prepare the drawer sides, front and back. The length of all parts is equal to the desired **outside** dimension of the box. Prepare some trial pieces of the same thickness (length and width unimportant). The thickness of the front and back must be the same as that of the sides in order to achieve a perfect corner.

2. Set the bit height so that the middle of the locking portion is aligned with the center line of the front piece, as shown in **Figure 2**. This can be set by eye or by setting the top of the bit above the router table by half the stock thickness plus 0.27″ for the 1 1/2″ bit (16J75.08/18J75.08) or plus 0.41″ for the 1 3/4″ bit (16J75.62/18J75.62).

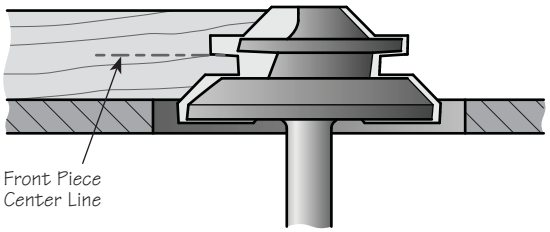


Figure 2: Setting the bit height.

3. Set the router fence so that a small flat will be left when the front piece is cut (see **Figure 3**). Final fence positioning is done after the height is perfected. The size of the flat is not critical, but should be enough for the workpiece to bear against after being shaped by the bit.

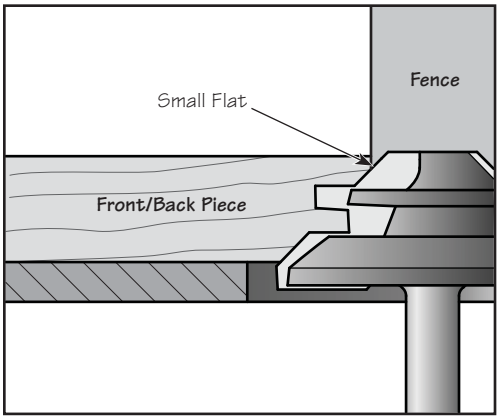


Figure 3: Setting the fence position.

4. Using trial pieces of the same thickness as the front piece, create two end-grain cuts (see **Figure 3**). Test the height of the bit by assembling the test pieces as shown in **Figure 4**. If the bit is set to the correct height, the two pieces will be aligned. To correct for misalignment, the bit need only be adjusted by half of the error.

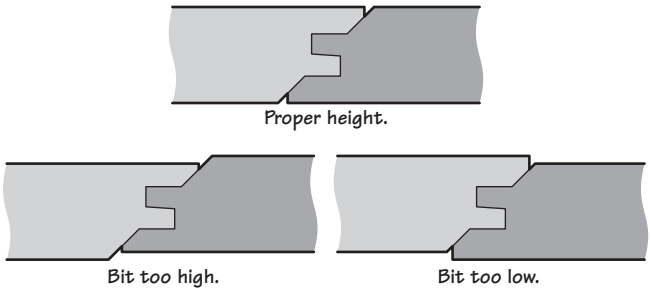


Figure 4: Checking the bit height.

5. Once the bit height has been perfected, use a front piece to set the fence position. As shown in **Figure 5**, the face of the fence, top surface of the front piece and router bit cutting profile should all contact point "A".

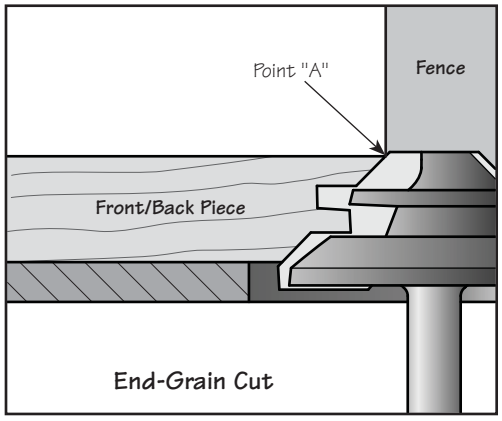


Figure 5: Perfecting the fence position.

6. Using the trial pieces, create an end-grain and face-grain cut representing the front/back and sides of the drawer, respectively. Note that each piece is routed with the fence in the same location, as shown in **Figure 6**.

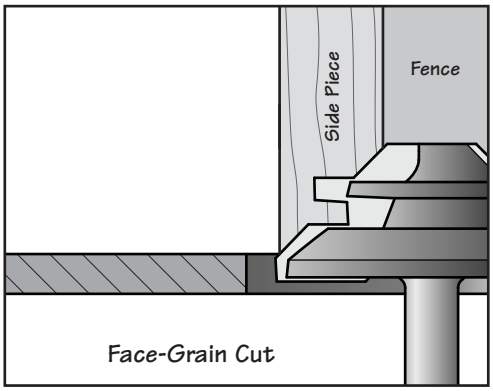


Figure 6: Face-grain cut.

7. Test the fit and make adjustments as necessary. The following diagrams illustrate the typical fit problems and how to solve them.

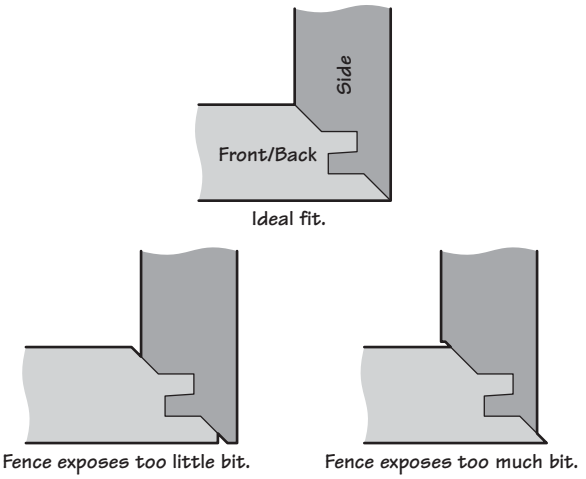


Figure 7: Checking the bit projection.

8. Once the bit and fence are set to produce the proper fit, rout all the drawer pieces.

A single clamp across the side pieces is sufficient for gluing the box together.

Note: *When properly set up, the drawer lock bit removes the entire reference surface of the workpiece. This means that the outfeed end is not supported after passing over the bit and dig-in at the end is possible (see **Figure 8**).*

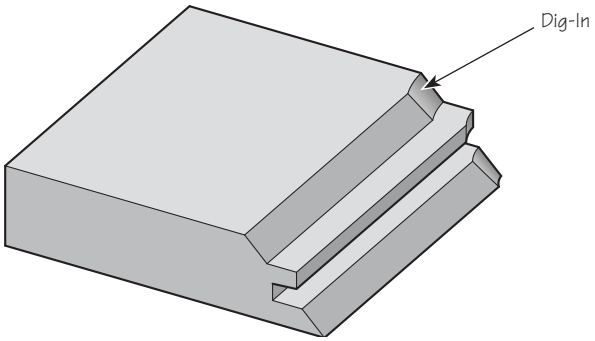


Figure 8: Dig-in from unsupported workpieces.

There are several techniques that can be employed to minimize or prevent this problem. The simplest approach is to use larger workpieces, rout the lock miters first, then rip the boards to the finished sizes you need.

Another option is to use a right-angle fixture to support the workpieces (see **Figure 9**). This technique can be used only if the workpiece is wider than it is high. The right-angle fixture can also be used for face-grain cuts by holding it against the fence.

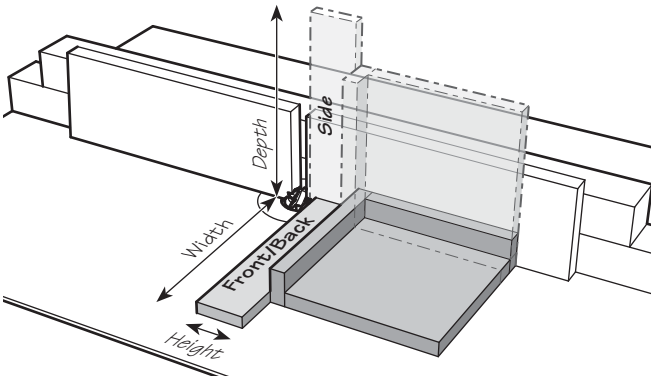


Figure 9: Using a right-angle fixture.

If creating lock miters is a frequent activity, it may make sense to build a lock miter jig (see **Figure 10**). This jig consists of a straight backing block, onto which the workpiece is clamped. The jig runs along the fence and keeps the lock miter cut straight and uniform.

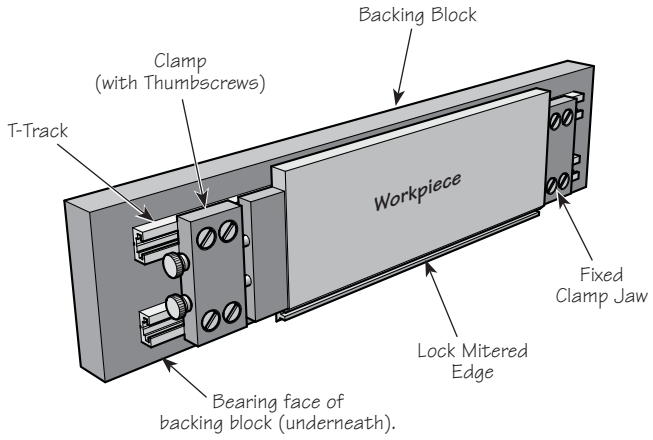


Figure 10: Lock miter jig.

Cutting a Half-Blind Lock Miter Joint

1. Prepare the drawer sides, front and back. The length of the front and back pieces should be equal to the desired outside width of the drawer. The length of the side pieces should be 1.08″ (~1 3/32″) **longer** than the inside depth of the drawer for the 1 1/2″ diameter bit (16J75.08/18J75.08), or 1.66″ (~1 21/32″) **longer** for the 1 3/4″ diameter bit (16J75.62/18J75.12). Prepare some trial pieces of the same thickness (length and width unimportant). The thickness of the front and back may be different than the thickness of the sides.

2. Set the bit height so that the lowest corner of the sloped surface is aligned with the surface of the router table, as shown in **Figure 11**.

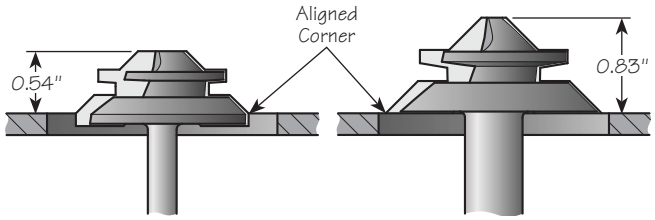


Figure 11: Setting the bit height.

3. Position the fence so that the center of the tapered cutting profile is aligned with the side workpiece center line. This need only be set by eye (it will be perfected later).

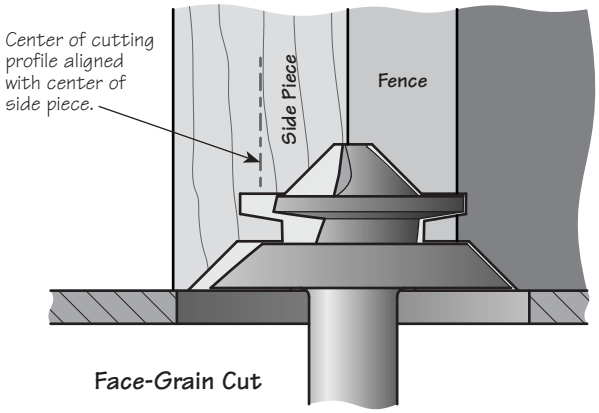


Figure 12: Setting the fence position.

4. Using the trial pieces, create an end-grain and face-grain cut representing the front/back and sides of the drawer, respectively. Note that each piece is routed with the fence in the same location, as shown in **Figures 12** and **13**.

   Note: *Using a lock miter bit to create a half-blind joint requires a very heavy cut. If you are using a dense hardwood or have a light-duty router, the cuts should be made in several incremental passes. Use the position of the fence to control the depth of the cut.*

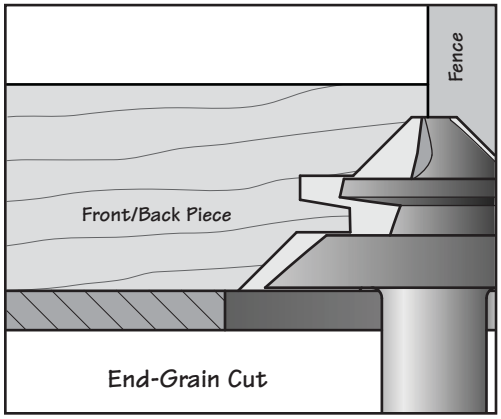


Figure 13: End-grain cut.

5. Test the fit and make adjustments as necessary. When assembled, the outside faces of both pieces should be aligned and there should be no gap, as shown in **Figure 14**. **Table 1** below illustrates the typical fit problems and how to solve them.

6. Once the bit and fence are set to produce the proper fit, rout all the drawer pieces.

A single clamp across the side pieces is sufficient for gluing the box together.

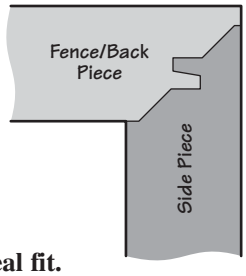
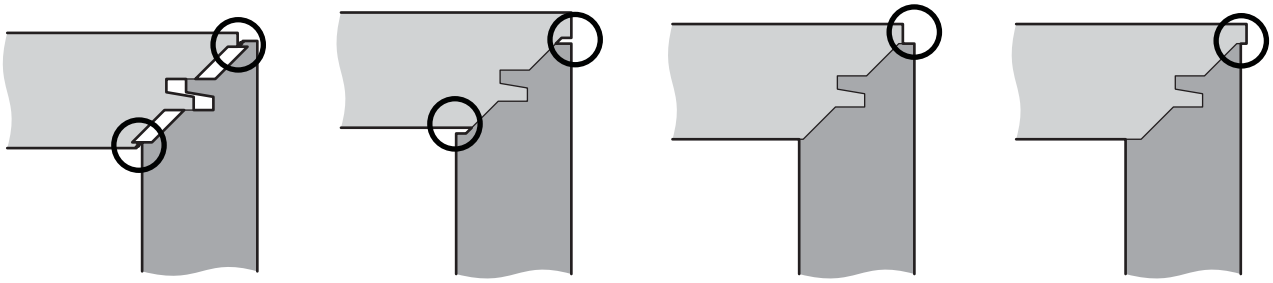


Figure 14: Ideal fit.

Table 1: Troubleshooting Half-Blind Joints



Problem: Thin shavings break off and prevent joint closure.	**Problem:** Small gaps.	**Problem:** Outer corner incomplete.	**Problem:** Front piece overhangs side piece.
Cause: Bit too high.	**Cause:** Bit too low.	**Cause:** Fence exposes too little bit.	**Cause:** Fence exposes too much bit.
Solution: Lower bit.	**Solution:** Raise bit.	**Solution:** Adjust fence for deeper cut.	**Solution:** Adjust fence for shallower cut.

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