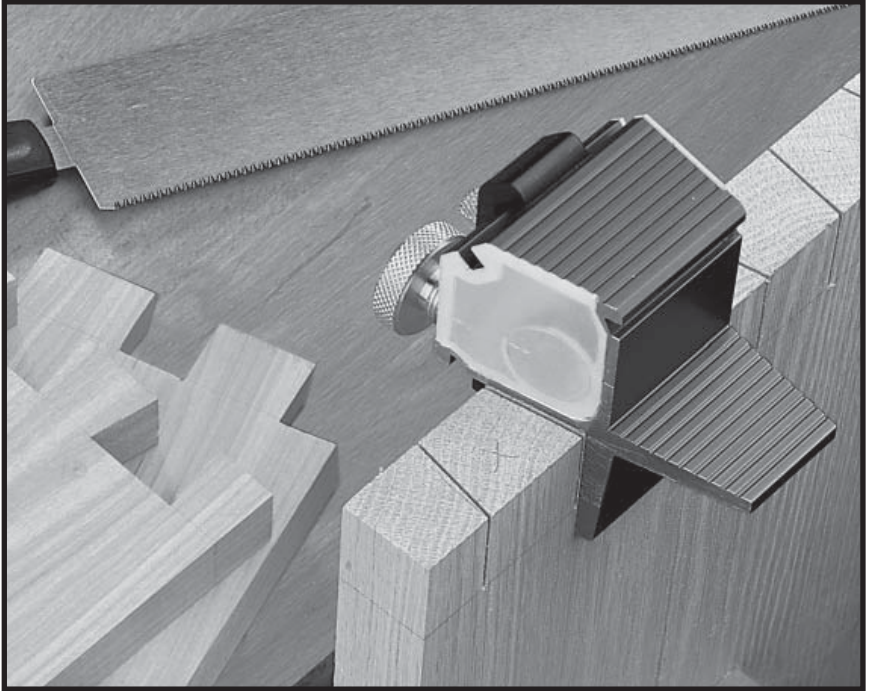


veritas[®]
Dovetail Saw Guides



U.S. Pat. No. 6,607,016

Introduction

Dovetail joints have traditionally been the hallmark of a cabinetmaker who had acquired an expert level of skill. They are also a mark of quality and attention to detail that many people look for in high-end furniture. This perception remains despite the fact that modern glues and joinery techniques can create joints of equal or greater strength, often with less effort. Also, dovetail joints can now be relatively easily made with a router and dovetail jigs.

Still, traditional hand-cut dovetails remain desirable for aesthetic reasons, as well as for the challenge they represent. Veritas® has developed these dovetail saw guides to allow amateur woodworkers to achieve professional results. This system also allows the seasoned expert to produce dovetail joints more quickly and with less effort.

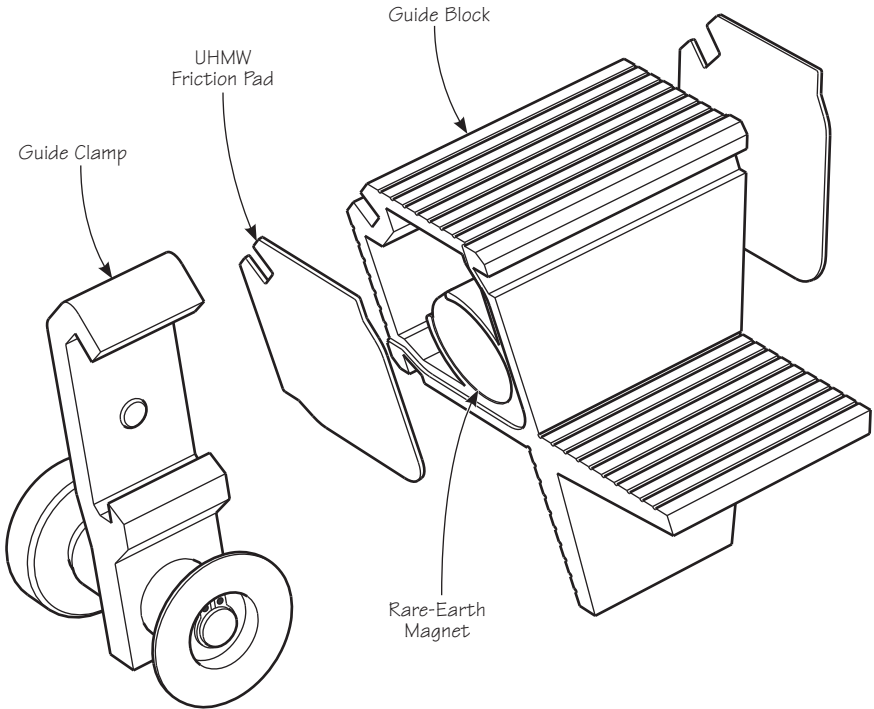


Figure 1: Dovetail saw guide, exploded view.

The dovetail saw guides are available in the traditional ratios of 1:6 for softwood (05T02.01), 1:8 for hardwood (05T02.02), and 14° for matching dovetails on antique furniture as well as those made with a router (05T02.05). They are color coded for quick identification — bronze for the 1:6, gold for the 1:8, and black for the 14°.

The guides come with a sliding clamp that is designed to fit in either side of the guide to allow cutting of both pins and tails. The guides have embedded rare-earth magnets to ensure that the saw remains in contact with the guide faces, and the magnets are covered with UHMW pads to allow the saw to slide smoothly.

Some Important Points About Saws

1. Because of the need for a large reference face to accurately guide the saw, it is important to use a saw that doesn't have a back (see below for information on our dovetail saw). Any back on the blade will interfere with the guide. Unfortunately, this precludes typical dovetail cutting saws.
2. The teeth on the saw should be set no more than 0.005". The UHMW pads are 0.005" proud of the guide face, and this offset is necessary to create accurate cuts.
3. While the method described below will work no matter the thickness of the blade, we have found that thin blades tend to create better joints and somewhat quicker cuts.
4. A saw that has very fine teeth will create a much smoother cut and a higher-quality joint.

The Veritas Dovetail Saw (05T02.03) has been designed specifically for use with the Veritas Dovetail Guides. The 8½" blade length and 2" height offer good cutting action and complete registration against the guides. With 22 teeth per inch and 0.005" set on each side, it produces a fine cut on the pull stroke. The dozuki tooth form is effective in both crosscuts and rip cuts, leaving a smooth cut surface.

Some Initial Thoughts About Dovetail Joints

Dovetail joints require a level of discipline and care that can only be acquired through patience and practice. The Veritas Dovetail Saw Guides will reduce the amount of experience needed, but not eliminate it. We suggest that you spend some time with scraps to perfect your technique before starting on a project.

Terminology

Dovetail joint: a woodworking joint that connects two parts generally at 90 degrees to each other using a series of matched cuts, referred to as pins and tails (see **Figure 2**).

Tail: the part of the joint that looks like a dove's tail (see **Figure 3**).

Tail Board: the part that is cut to have a series of tails (see **Figure 3**).

Pin: the part of the joint that is cut to fit between the tails (see **Figure 4**).

Pin Board: the part that is cut with a series of pins that will interlock with the tail board (see **Figure 4**).

Waste: areas of wood to be removed.

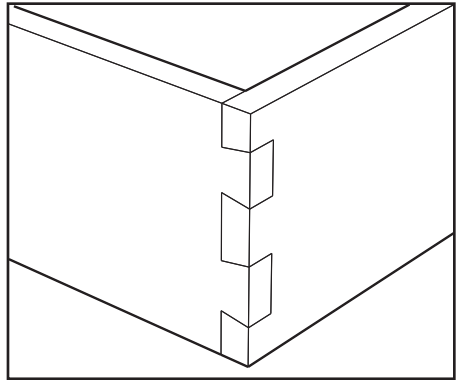


Figure 2: Typical full dovetail joint.

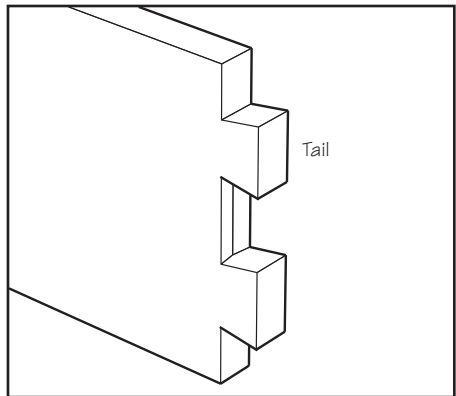


Figure 3: The tail board.

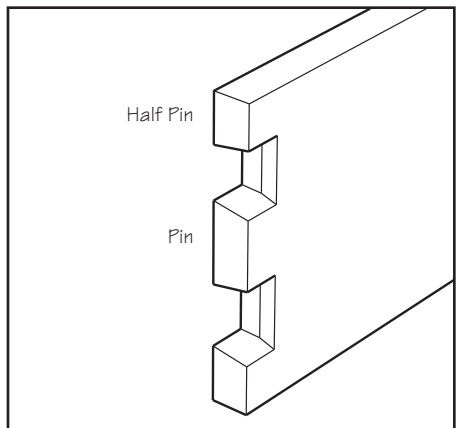


Figure 4: The pin board.

Tools Required

- Dovetail guide
- Dovetail saw
- Pencil (must be well-sharpened and have a hard lead)
- Chisels (should have a range of sizes and be very sharp. Bevel-edge chisels work best, particularly for tail board waste removal)
- Mallet (carving or dead-blow mallet)
- Assorted clamps
- Sharp knife (striking/marking knife is best)
- Straight edge
- Square
- Marking gauge (required only for half-blind dovetails)
- Glue (Veritas® Chair Doctor Glue is recommended for its wood-swelling characteristics)

The Basic Method (through dovetails)

As with all activities of this nature, there are as many different ways of cutting dovetails as there are practitioners. After you have made a number of these joints, you will probably develop your own preferences. The following method has been found to yield good results fairly quickly.

When you are just starting out, avoid the temptation to practice on extremely soft wood. Because there is less compression of wood fibers, it is easier to get good results using harder wood. Also, since small dovetails are difficult to clean out and can be very delicate, these should be attempted only once the basic dovetail has been mastered.

To start, do only a couple of dovetails on any one joint. The more dovetails you have, the more likely one will be off, preventing the joint from fitting together properly.

Finally, if you have ever been taught to hand-cut dovetails, the common procedure is to cut and chisel the waste from one tail board. This is then used to trace the pin locations for the mating pin board, followed by cutting and chiselling the pins, an iterative procedure until all joints were complete. This is not required when using the dovetail guides. We have found it simpler to do all cutting while you are set up for this operation, then follow with waste removal with a chisel.

Layout

1. Dress your parts to the desired thickness. Ensure that they are flat and consistent across the width. Also ensure that the ends are square. To leave a sanding allowance, the parts should be slightly longer than is necessary (e.g., $1/32''$ to $1/16''$ longer if you are going to have dovetails at both ends).
2. Place the two parts to be joined outer face to outer face as shown below (**Figure 5**). Marking each piece and identifying the outer faces will help as your project progresses.
3. Mark out your dovetail spacing. The marks don't have to be perfectly square across the joint, since the significant point is where the mark crosses the outer edges of the board. The joints can be spaced very evenly if necessary, or relatively randomly, whatever the final design calls for. Since accepted practice is to have a half pin at each end, an even number of marks is required. See **Figure 6**.

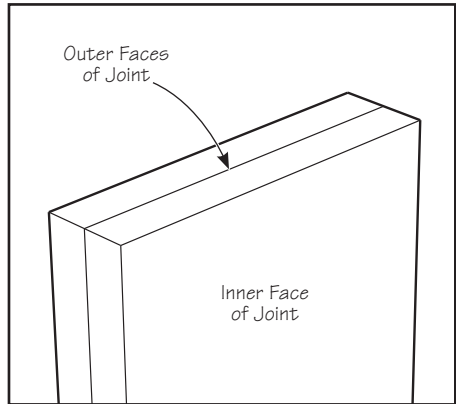


Figure 5: Place boards face to face, carefully aligned for layout. You might want to clamp them together to ensure they don't move.

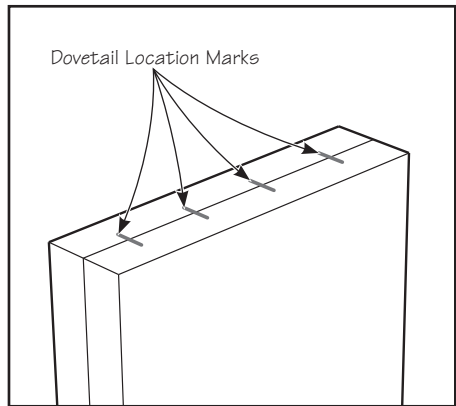


Figure 6: Mark out locations of dovetail cuts. Mark across both boards at once with a single mark at each location.

4. Identify your pin board and your tail board. Mark out the waste areas on each board (see **Figure 7**).
5. Mark out the depth of the dovetails around all the faces of each board as shown in **Figure 8**. Note that it is desirable to angle your pencil so the line is slightly higher than the horizontal board (about $1/64''$ to $1/32''$). This offset will ensure the pins and tails are a little long, leaving a sanding allowance. This extra depth adds a built-in clearance for the glue.

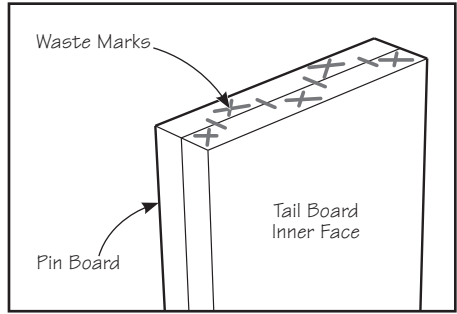


Figure 7: Mark waste areas.

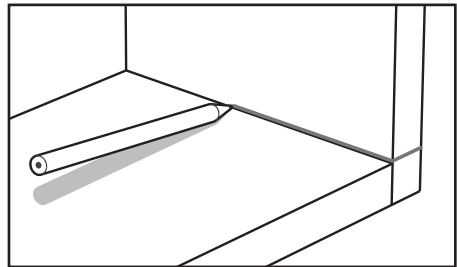


Figure 8: Marking the depth of the dovetails.

Cutting the Tails

6. Clamp the tail board (outer face towards you) in a bench vise.
7. Set the guide as shown to cut the tails (see **Figure 9**). Note that, with the use of this guide, it doesn't matter whether you cut the tails first or cut the pins first. The standard method is to cut tails first.

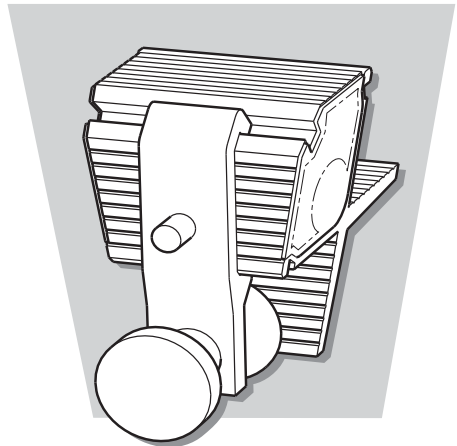


Figure 9: Dovetail saw guide set to cut tails. Note that taper is vertical.

8. Place the guide on the end of the tail board such that the **waste area is exposed**. The guide should be placed right on the mark (see **Figure 10**) to ensure that the saw is always cutting waste wood. Notice that the mark the guide needs to be placed on is the point where the mark crosses the **edge** of the board.

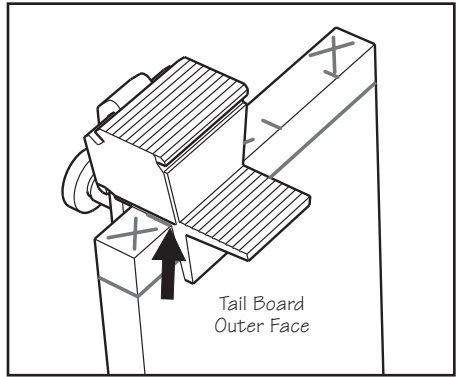


Figure 10: Guide in place; note that waste area is exposed and guide is exactly on the mark.

9. Place the saw against the guide, ensuring that it is fully registered (the magnet should take care of this). Begin your cut (see **Figure 11**).

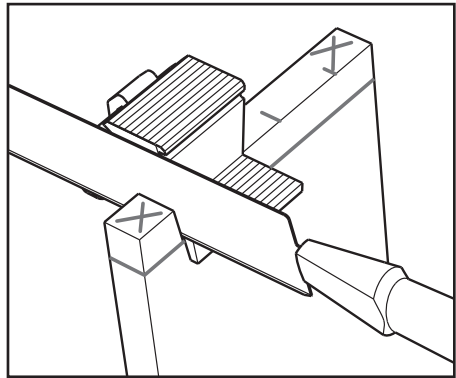


Figure 11: The first cut.

10. Cut down to the depth line, ensuring that the saw remains level as the cut nears completion.

11. Move the guide so that the face opposite to that just used is on the next mark, ensuring that the **waste area is exposed**. Repeat this procedure until all tails are cut.

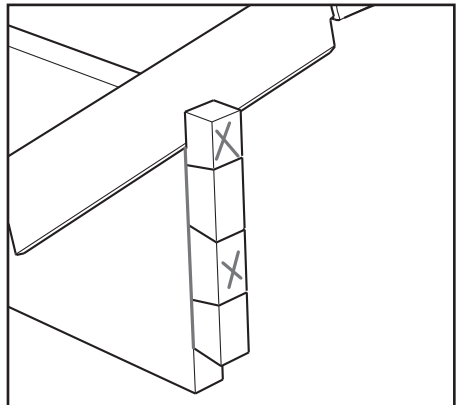


Figure 12: Removing waste material from end of tail board.

12. Saw off the waste areas at each end of the tail board. Begin by scoring the depth line with a sharp knife and then carefully saw on the waste side of the line (**Figure 12**). Be careful not to cut into the tail. Clean up the cut surface with a sharp chisel if necessary.

Cutting the Pins

13. Switch the guide clamp such that the guide is configured to cut pins (see **Figure 13**).

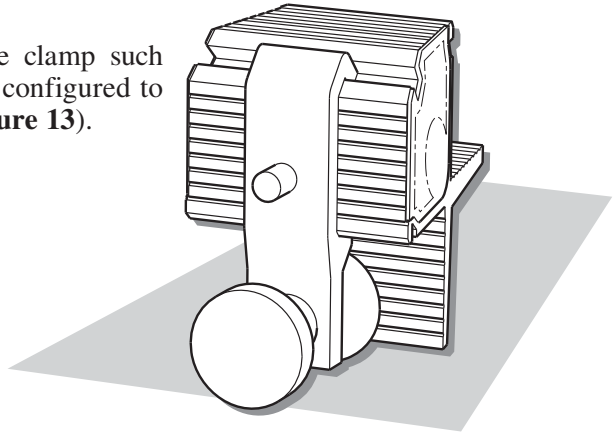


Figure 13: Dovetail saw guide set to cut pins. Note that taper is horizontal.

14. Clamp the pin board (outer face towards you) in a vise and cut the pins in much the same way as the tails. Ensure that the guide is placed **to expose the waste area**, and that it is located exactly on the outer tip of the mark. Cut all the way to the depth line, ensuring that the saw remains level as the cut nears completion. See **Figure 14**.

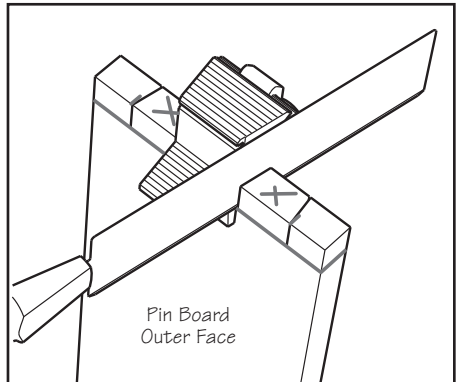


Figure 14: Cutting the pins.

15. For the two half pins at each end of the pin board, clamp the guide to an adjacent piece of wood of the same thickness (**Figure 15**) in order to keep the guide secure while sawing.

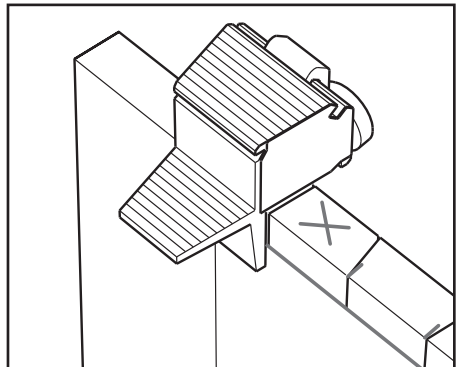


Figure 15: Using an adjacent piece to secure the guide for the last cuts.

Removing the Waste

16. Clamp the cut tail board flat to the bench and score the bottom of the waste area(s) with a sharp knife and straight edge (**Figure 16**).
17. Pare out the waste with a sharp chisel in small increments. Do not start at the complete depth to remove most of the waste. Leave about $\frac{1}{16}$ " (**Figures 17a and 17b**).

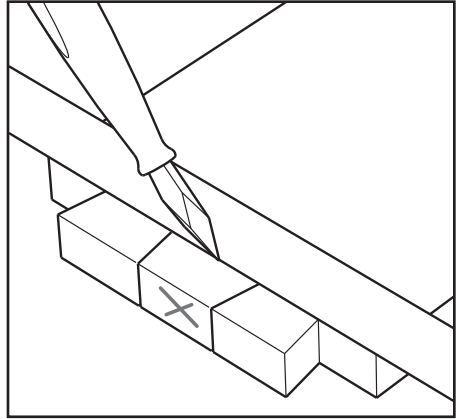


Figure 16: Scoring the depth of the dovetails.

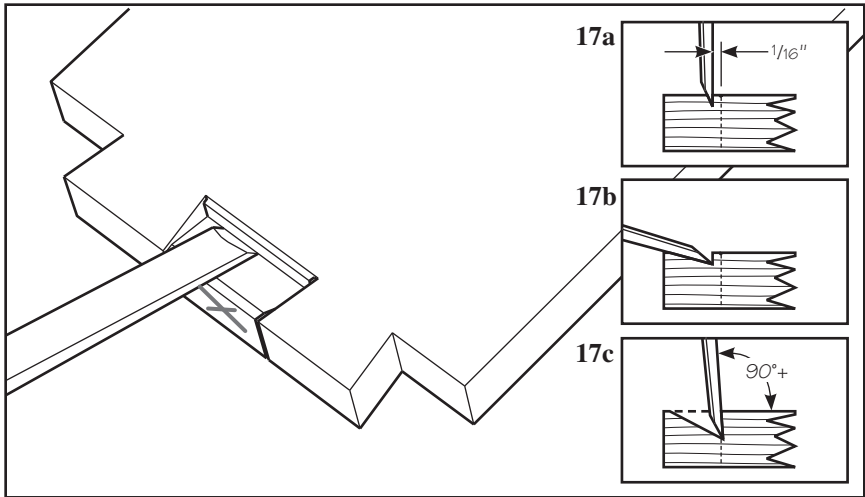


Figure 17: Chiselling out the waste. Note the angle of the chisel ensures clearance in the middle of the joint.

18. Remove waste to half the thickness of the board. Avoid nicking the edges of the joint at the surface of the wood as these will show up in the assembled joint.
19. Pare out the remainder of the half thickness of the board to the full depth of the joint with a single stroke. Angle the chisel so that the middle of the joint will be lower than the edges (**Figure 17c**).

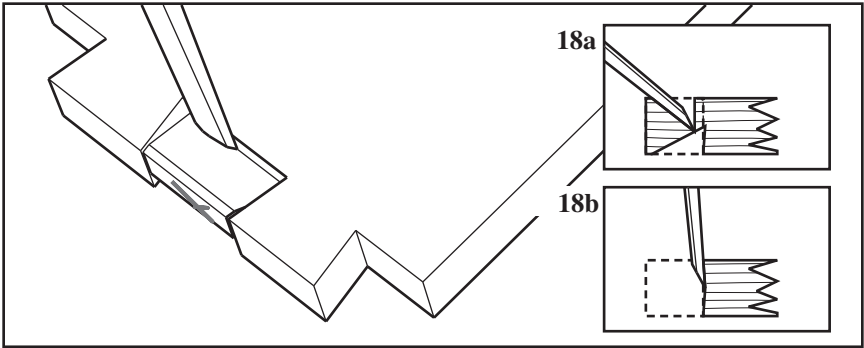


Figure 18: Cutting the final depth of the dovetail.

20. Flip the board over and repeat for the other side as shown in **Figures 18a** and **18b**. Do the same for all pin and tail boards. The finished cuts should look as shown in **Figure 19**.

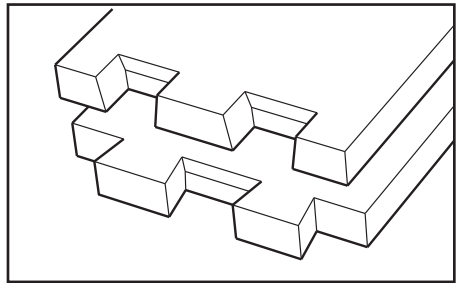


Figure 19: Finished pin and tail boards.

Final Fitting and Gluing

21. Clean out the cuts completely so that the corners are as crisp as possible.
22. The joint should now fit together with very little effort. Notice that the pins and tails extend slightly beyond the widths of the boards; this is intentional.
23. Glue the joint. Wicking glue such as Veritas Chair Doctor Glue is ideal for this as it swells the joint, ensuring positive locking (and filling any small gaps). If your joint has minimal clearance, you can actually dry assemble the joint, then inject Chair Doctor glue into the joints.
24. Once the glue is dry, sand the ends of the pins and tails flush with the faces of the parts. Purists will use a very sharp low-angle plane rather than sandpaper.

***Note:** Your first attempt probably won't yield perfect dovetails, but it will take little practice to create fine dovetail joinery.*

Half-Blind Dovetails

The dovetail guides can also be used to cut half-blind dovetails (**Figure 20**). The general method is pretty much the same, but with some minor changes to the process.

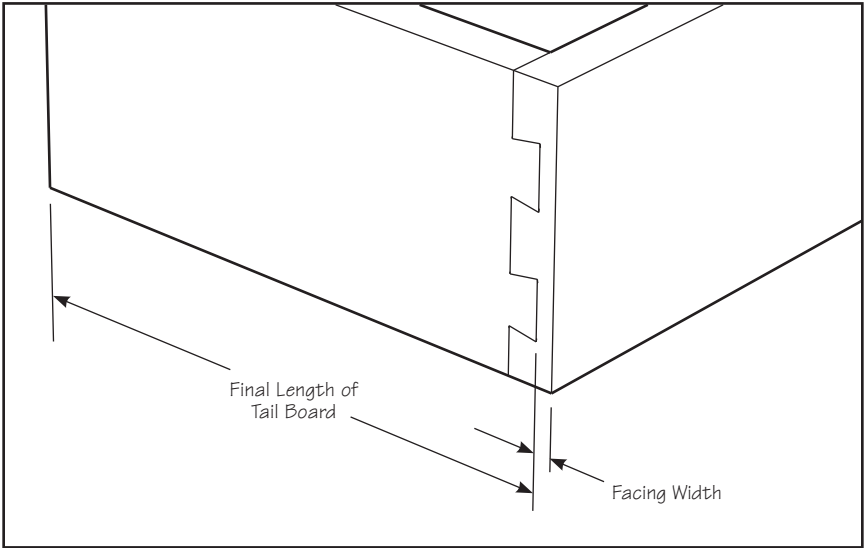


Figure 20: Half-blind dovetail joint.

Layout

1. The tail board should be the final length (no sanding allowance). The pin board should be longer by the usual $1/32''$.
2. Use a square to mark the dovetail positions (see **Figure 21**). This is necessary because the location of the tails has to be transferred to the facing line on the pin board. Unlike through dovetails, the point where the guide must be placed is not the intersection of the mark and the edge of the board, but placed where the position line crosses the facing line (see **Figure 24**).

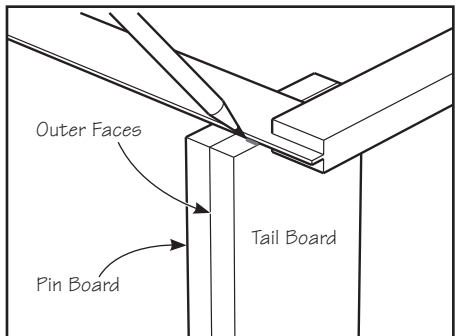


Figure 21: Marking the dovetail locations with a square. Extend the lines completely across the ends.

- The pin depth can be marked as with through dovetails; however, it is best to mark the facing line on the pin board and the depth of the tails on the tail board with a marking gauge (**Figures 22 and 23**). The tail depth will be the thickness of the pin board, less the facing width (see **Figure 20**).

Cutting the Tails

- Mark waste areas, then cut the tails as described in *The Basic Method (through dovetails)*. The tails have to be cut accurately, both in width and in height, in order to fit properly.

Cutting the Pins

- To cut the pins, align the guide where the position line crosses the facing line (**Figure 24**).
- Position the saw as shown to cut the pins (**Figure 25**). Note that this will cause damage to the UHMW friction pads due to the tooth set in the blade. Although the pads should still be OK for regular through dovetails, they can be replaced to maintain accuracy.

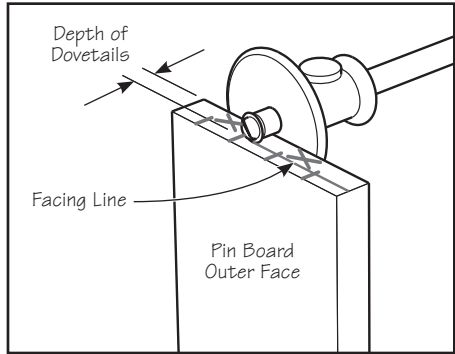


Figure 22: Marking the facing line on the pin board. Note that the marking gauge is set to the depth of the dovetails.

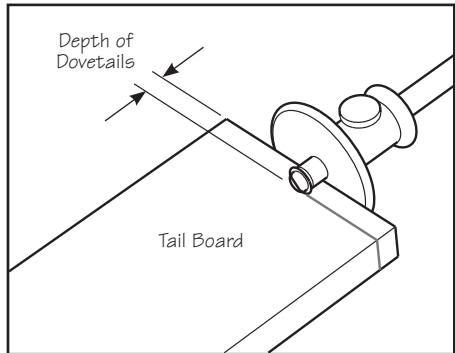


Figure 23: Marking the tail depth line. The marking gauge is set to the same depth as shown in Figure 22.

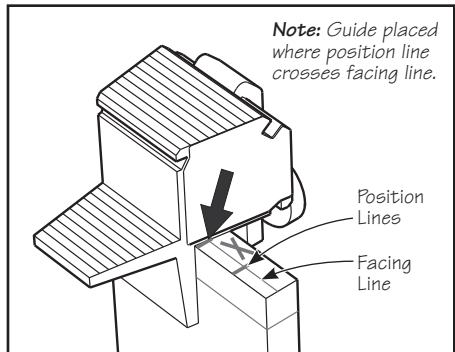


Figure 24: Guide located for cutting pins.

7. Cut until you reach the depth line on the end face and the depth line on the inside face of the pin board (**Figure 26**). Be careful not to cut beyond the depth lines for aesthetic reasons.
8. Carefully remove the waste areas with a sharp chisel by making a series of alternating cuts — start by cutting across the grain, then cut with the grain. The sides of the cavities shown in gray in **Figure 27** are not cut with the saw, and must therefore be removed with the chisel. Fit in this area can be looser than ideal in order to assemble the joint, but this can reduce the strength of the joint due to reduced contact area. Using a gap-filling adhesive may alleviate this.
9. Once the parts have been completed, assemble them and glue in place.
10. Sand (or plane) off the extra length on the pin board.

Half-blind dovetails are somewhat trickier to create than through dovetails, so a bit more practice will probably be required.

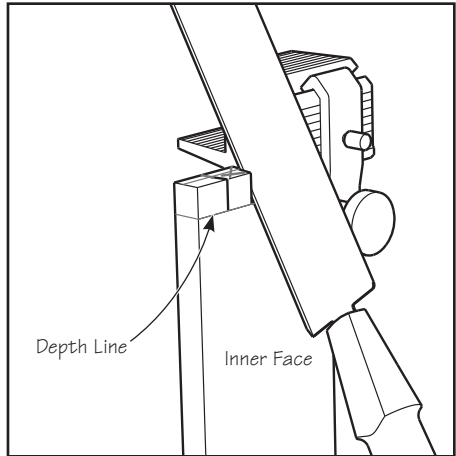


Figure 25: Cutting the pins. Note the angle of the saw.

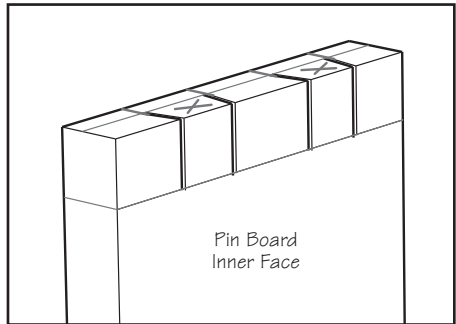


Figure 26: Pin board after the cuts have been made.

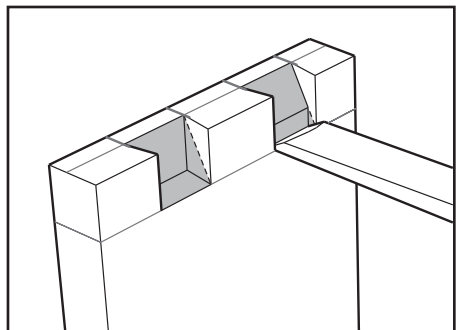


Figure 27: Pin board after the waste has been removed.

Troubleshooting

| | |
|--------------------|---|
| Problem: | Everything is cut and the waste has been removed, but the joint still won't go together. |
| Solution 1: | Joints too tight. The pins and/or tails are too wide. It is possible that not enough of the waste material was removed if the guide covered your mark slightly. The guide should be placed exactly on the mark where it crosses the edge of the wood. Fortunately, the joint can be saved... but it will require some careful work with a very sharp chisel. Check the two parts against each other and carefully trim one to fit the other. It will probably be easier to trim the pin board to fit the tails. |
| Solution 2: | Joints too loose. The pins and/or tails are too narrow. If the guide was too far away from your mark, it did not cover enough of the mark, and hence too much material was removed. Depending on how loose the joint is, it can be fixed either by gluing in very thin slices or wedges to dovetail pins or tails, or with wood filler, or not, in which case the parts are junk. Alternatively, you could attempt to cut either a new pin or tail board, using the part you want to save as a template. |
| Solution 3: | Pins and tails not proud. The pins and/or tails are not cut deeply enough. Go back and cut them a little deeper. Check to make sure the waste has been completely removed, particularly in corners. |
| Problem: | Guide moves once it's clamped in place. |
| Solution: | Add two pieces of adhesive-backed coarse sandpaper to the guide clamping surfaces to increase the friction between the guide and the workpiece. Be sure the sandpaper does not overhang the edge of the clamping surface; otherwise, the saw blade might be damaged. |

Accessories

- 05T02.03** Veritas Dovetail Saw
- 05T02.04** Replacement UHMW Pads, 1 pair
- 05T02.01** 1:6 Dovetail Saw Guide
- 05T02.02** 1:8 Dovetail Saw Guide
- 05T02.05** 14° Dovetail Saw Guide
- 05T04.01** Right-Angle Saw Guide

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