CHAPTER 9
Half-Blind Dovetails

Half-Blind Dovetails
Rabbeted Half-Blind Dovetails

⚠ **IMPORTANT SAFETY NOTE**

Before using your Leigh RTJ400 you must have completed the preparatory steps listed in the previous pages, including reading the jig safety recommendations in Chapter 3.

Note: Optional half-blind dovetail bits can be used with these instructions. See Step 9-2 below and pages 3 to 6 for complete details of optional items, router table requirements and the RTJ400 Accessory kit.

Watch the Online Instructional Video

The online video will reduce your learning time dramatically! Stream to your smart phone or tablet to use in your shop as a visual reference. Find the video in the Instructional Videos section of the Support menu at **Leightools.com**.

Half-Blind Dovetails

9-1 Getting Started
Review the drawing opposite, to get a clear understanding of how the boards fit together and to learn the joinery terms.

PIN BOARD

Depth of Cut

Min. 7/16" (11mm)
Max. 1" (25mm)

Min. 3/8" (9.5mm)
Max. 1" (25mm)

TAIL BOARD
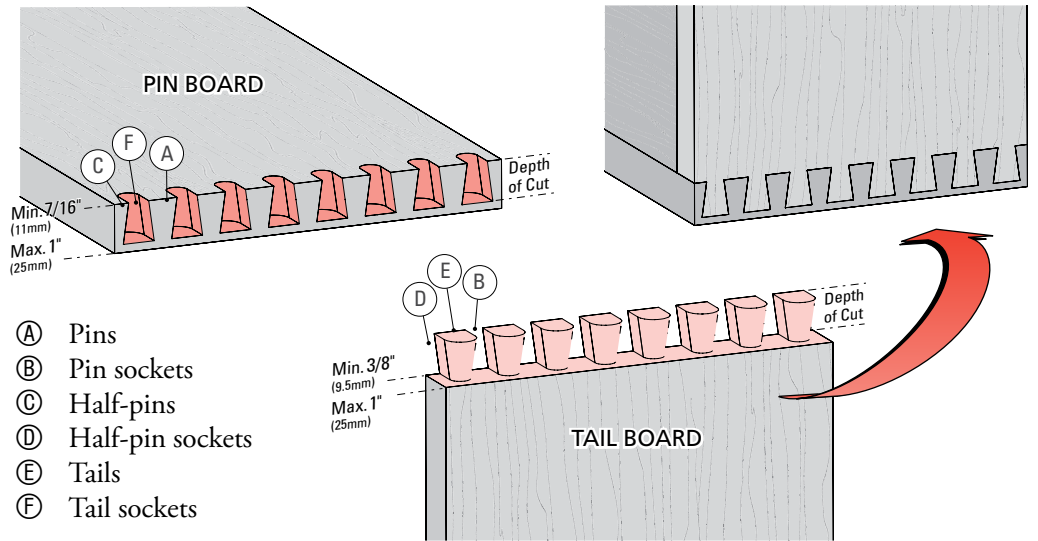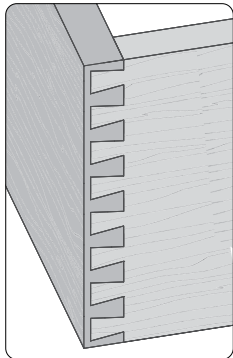
Ⓐ Pins
Ⓑ Pin sockets
Ⓒ Half-pins
Ⓓ Half-pin sockets
Ⓔ Tails
Ⓕ Tail sockets

9-2 Bits, Guide Bushing and Cutter Depth Gauge
All half-blind dovetail *tails* and *pins* are routed in a single pass with the included e10 guide bushing and 120-500 half-blind dovetail bit, or two optional bits available individually or in the RTJ400 Accessory Kit (ACRTJ) at leightools.com. See bit specs on page 4. Each bit is designed to cut to a specific cutting depth and is set using the Leigh cutter depth gauge. The stop rod is used for routing board thicknesses of 7/16"[11mm] to 5/8"[16mm]. Note: Half-blind dovetail bits must be ½"[12.7mm] in diameter.
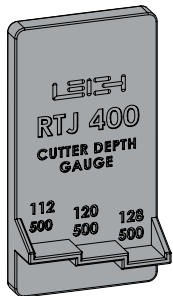
Cutter Depth Gauge
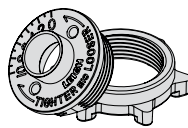
e10 Guide Bushing (eBush)

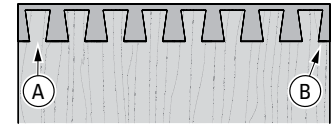128-500 (Optional)
120-500 **(Included)**
112-500 (Optional)
Carbide Tipped Bits

| CUTTING DEPTH for Half-Blind Dovetails		
Bit no. 128-500	120-500	112-500
18°	14°	12°

Depth: 3/8", ½", 19/32"

Stop rod

9-3 Board Width Selection

Use this chart to determine the board width for your project. Half-blind joints may be routed in boards up to 1" thick. Board widths are based on the number of full tails Ⓐ in the joint design. Board edges always end with a half pin Ⓑ. Board widths in the chart below may be increased by ¼" [6mm] or decreased by ⅛" [3mm] if required.

| Board Width Selection for Half-Blind Dovetails																				
No. of Tails	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Min (Inches)	²¹⁄₃₂"	1 ⁷⁄₁₆"	2 ⁷⁄₃₂"	3 "	3 ²⁵⁄₃₂"	4 ⁹⁄₁₆"	5 ¹¹⁄₃₂"	6 ⅛"	6 ²⁹⁄₃₂"	7 ¹¹⁄₁₆"	8 ¹⁵⁄₃₂"	9 ¼"	10 ¹⁄₃₂"	10 ¹³⁄₁₆"	11 ¹⁹⁄₃₂"	12 ⅜"	13 ⁵⁄₃₂"	13 ¹⁵⁄₁₆"	14 ²³⁄₃₂"	15 ½"
Exact (Inches)	²⁵⁄₃₂"	1 ⁹⁄₁₆"	2 ¹¹⁄₃₂"	3 ⅛"	3 ²⁹⁄₃₂"	4 ¹¹⁄₁₆"	5 ¹⁵⁄₃₂"	6 ¼"	7 ¹⁄₃₂"	7 ¹³⁄₁₆"	8 ¹⁹⁄₃₂"	9 ⅜"	10 ⁵⁄₃₂"	10 ¹⁵⁄₁₆"	11 ²³⁄₃₂"	12 ½"	13 ⁹⁄₃₂"	14 ¹⁄₁₆"	14 ²⁷⁄₃₂"	15 ⅝"
Max (Inches)	1 ½"	1 ¹³⁄₁₆"	2 ¹⁹⁄₃₂"	3 ⅜"	4 ⁵⁄₃₂"	4 ¹⁵⁄₁₆"	5 ²³⁄₃₂"	6 ½"	7 ⁹⁄₃₂"	8 ¹⁄₁₆"	8 ²⁷⁄₃₂"	9 ⅝"	10 ¹³⁄₃₂"	11 ³⁄₁₆"	11 ³¹⁄₃₂"	12 ¾"	13 ¹⁷⁄₃₂"	14 ⁵⁄₁₆"	15 ³⁄₃₂"	15 ⅞"
No. of Tails	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Min (Millimeters)	17	37	56	76	96	116	136	155	175	195	215	234	254	274	294	313	333	353	373	392
Exact (Millimeters)	20	40	60	79	99	119	139	158	178	198	217	237	257	277	297	316	336	356	376	395
Max (Millimeters)	26	45	65	85	105	124	144	164	184	203	223	243	263	282	302	322	342	361	381	401
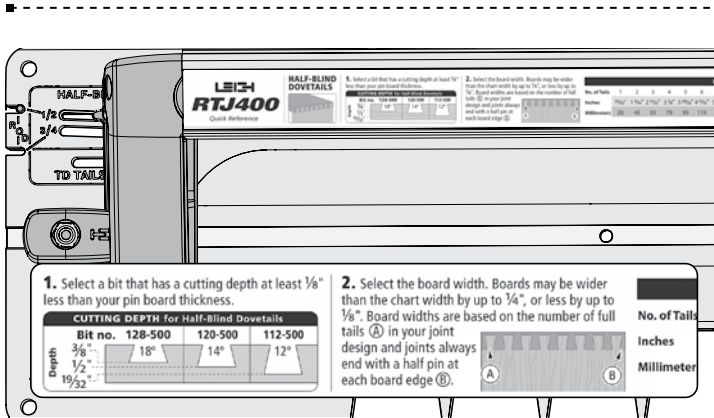
9-4 Use the Quick Reference strip to determine the correct dovetail bit and guide bushing combination for the board thickness, in this case, the Leigh e10 Guide Bushing and the optional ½" 18º dovetail bit.
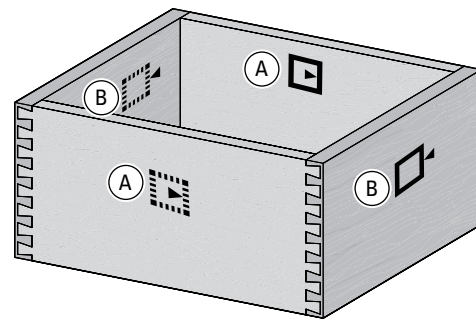
9-5 Making a Box Note the symbols indicating the inside or outside of the pin and tail boards. When assembled with the finished pieces properly oriented, any one of the pin ends will fit any one of the tail ends. ***Mark the inside faces of the tail boards Ⓐ and outside face of the pin boards Ⓑ.***
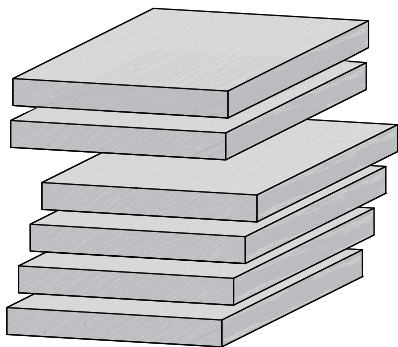
9-6 Prepare six similar boards (two for testing) about ⅝"× 6¼" by about 12" long [13mm × 159mm × 305mm]. Boards of different thicknesses may also be joined. ⚠ **IMPORTANT:** *Read this whole chapter before routing any boards.*
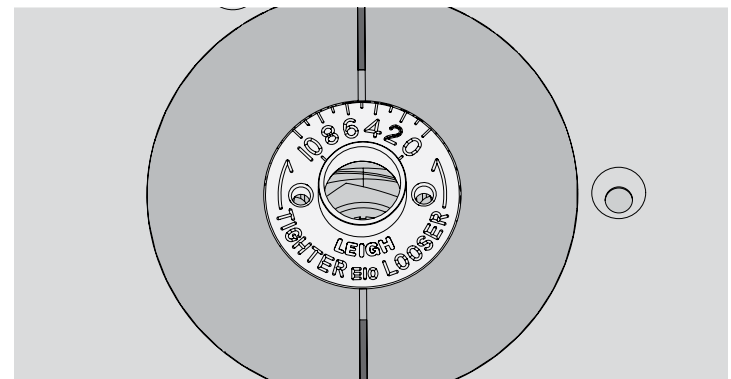
**9-7** Fit the e10 eBush to the router table insert ring, set to 5.
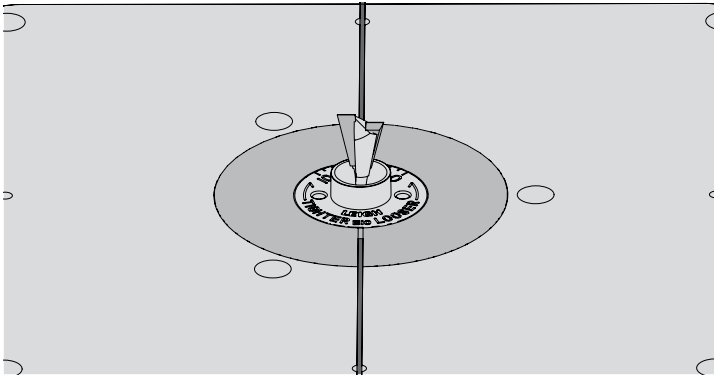
9-8   Unplug the router and install the Leigh 120-500 dovetail bit. ⚠Make sure the bit spins freely before reconnecting the power.
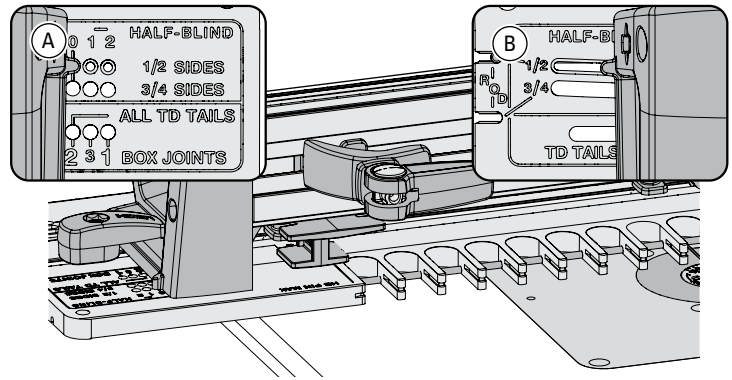
9-9   Insert the right frame pin in the **No.0 hole** of **HALF-BLIND ½" SIDES** mode Ⓐ and the left frame pin in the matching **½" slot** Ⓑ. Latch the frame. **Note: The HALF-BLIND pin hole settings refer only to the thickness of the tail board (drawer side).**
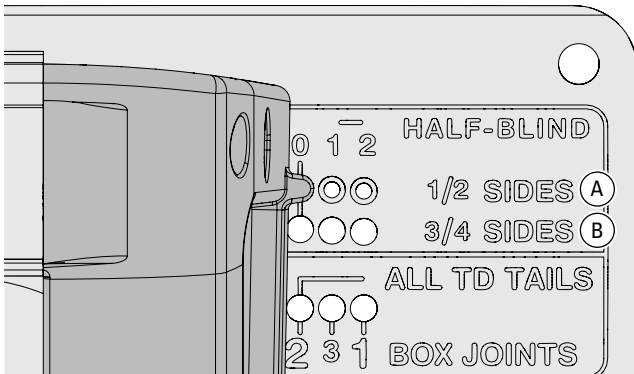
**9-10 NOTE:** Tail Boards (drawer side) must be between ⅜" [9mm] and ⅞" [22mm]. For tail boards between ⅜" [9mm] and ⅝" [16mm] thick, use the ½" row of holes Ⓐ. For tail boards between ¹¹⁄₁₆" [17.5mm] and ⅞" [22mm] thick, use the ¾" row of holes Ⓑ.
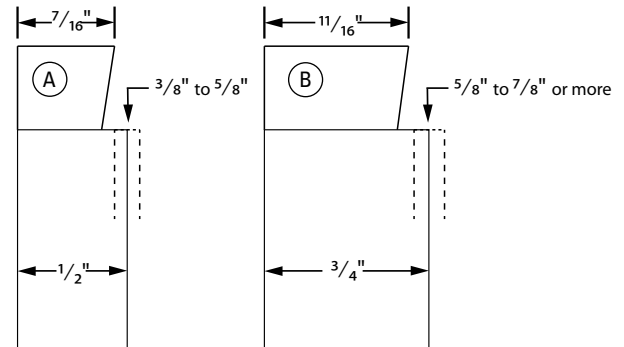
9-11 When the frame pin and stop rod are in the ½" positions, all tails will be this dimension Ⓐ, regardless of actual board thickness (dashed line). Similarly, when the frame pin and stop rod are in the ¾" hole, all tails will be this dimension Ⓑ, regardless of actual board thickness.
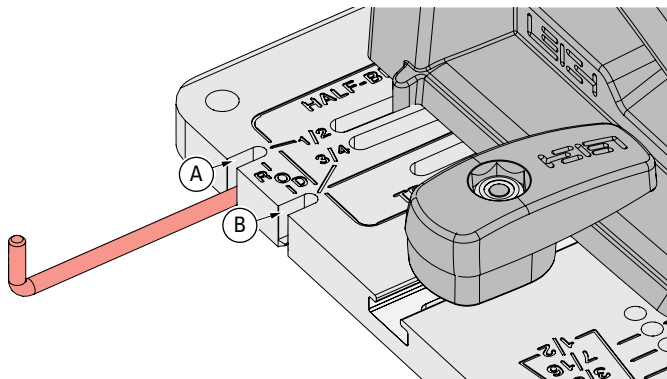
9-12 The Stop Rod. For tail boards (sides) from ⅜" [9mm] to ⅝" [16mm] thick, insert the stop rod in the ½" slot Ⓐ. **Note: For tail boards 11/16" [17.5mm] thick or greater, the stop rod is stored in the ¾" slot Ⓑ.**
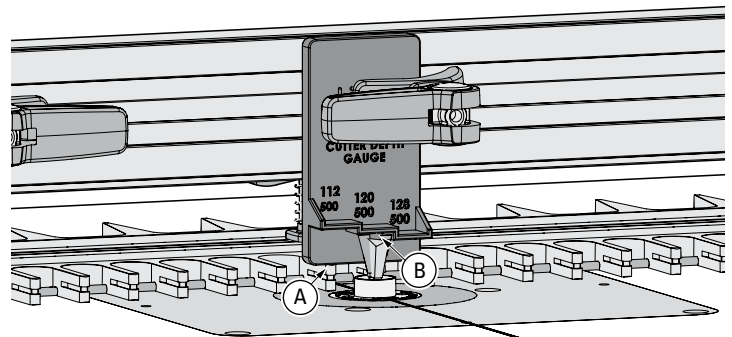
9-13 Bit Height: Clamp the cutter depth gauge as shown, flush on the template Ⓐ. Raise the bit until it touches the bottom of the gauge for the selected bit Ⓑ. ⚠Double check that the bit still rotates freely. **Hint:** As you raise the bit, slide a piece of paper back and forth until it is trapped and snags on the bit.
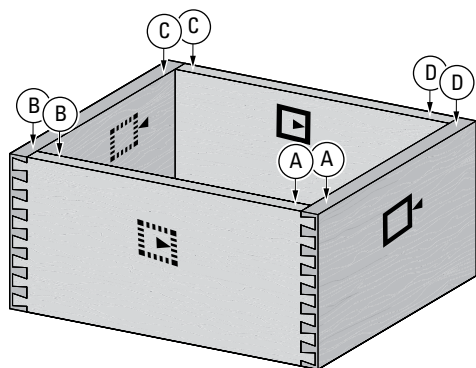
9-14 When making a box, it is important to label the corners of each board Ⓐ,Ⓑ,Ⓒ and Ⓓ. When routing the corners of the box, both halves of each corner must be in the jig and routed at the same time.
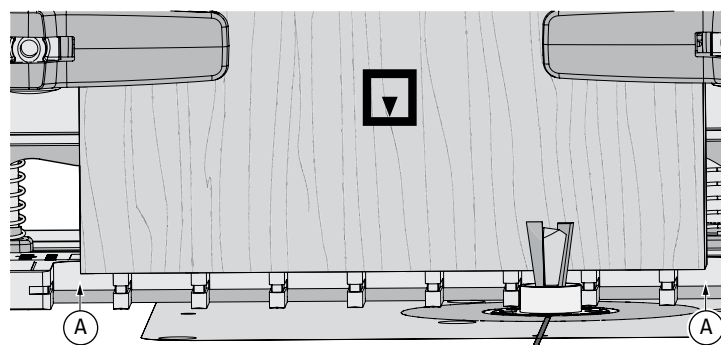
9-15 Center a *test* tail board over the template so that the side edges Ⓐ are equally spaced over the template fingers and the end edge sits flush on the template. The edge of the board must be positioned halfway into the first opening, otherwise you'll rout into the side stop. Clamp the tail board.
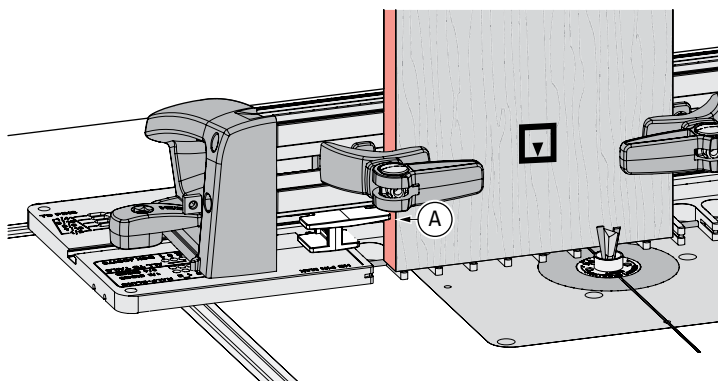
9-16 Slide the side stop so it lightly touches the tail board and tighten it Ⓐ.
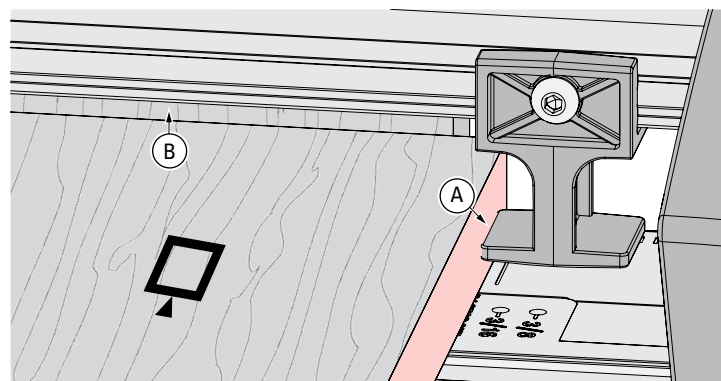
9-17 Position a *test* pin board against the side stop Ⓐ with the end edge touching *flush against the rear of the tail board* Ⓑ, and clamp. *Note: Clamp removed for clarity.*
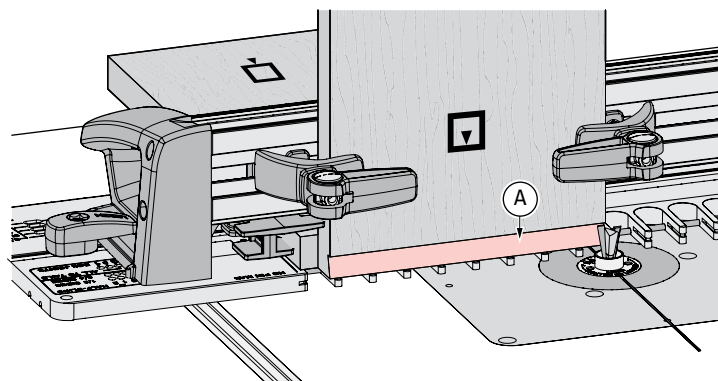
9-18 Start by routing a very light, shallow climb cut, moving the jig right to left Ⓐ. This will leave a nice clean shoulder. ⚠ *The bit will tend to drive the jig to the right, so make the cut light and with a firm grip.*
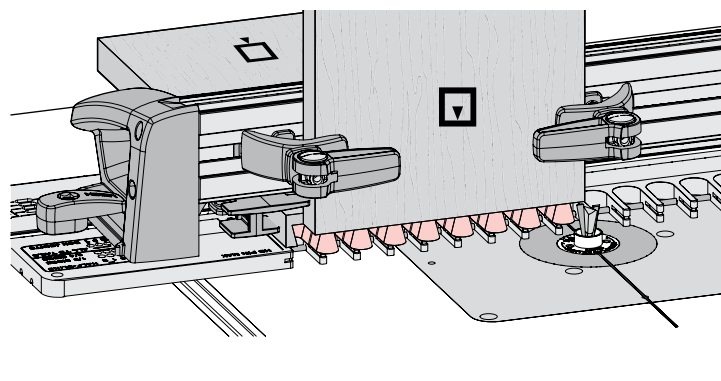
9-19 Finish routing in and out of all template openings. ⚠ The eBush must touch one side of the opening as you enter and the other side as you exit.

TOO LOOSE   TIGHTEN
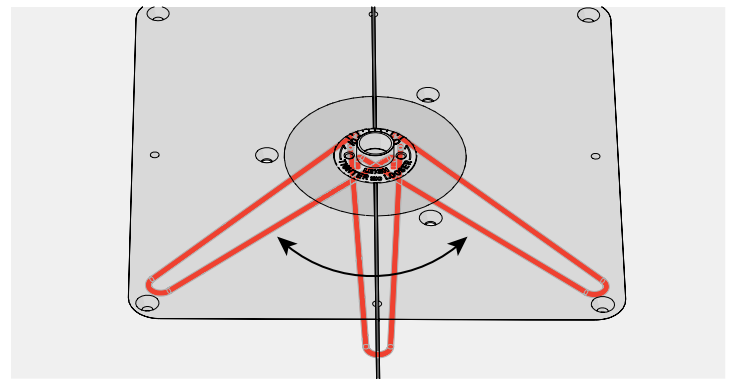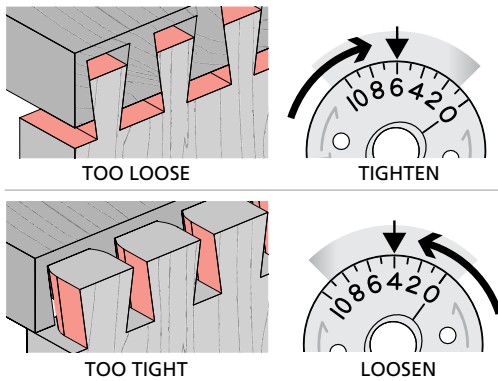
TOO TIGHT   LOOSEN

9-20 Test for Fit If the joint is too loose, turn the eBush to a higher number with the pin wrench as shown in the next step, and *rout two fresh boards.* If the joint is too tight, turn the eBush to a lower number and *rout two fresh boards*. If you max out the guide bushing adjustment and still can't get a good fit, double check that the bit is at the correct depth of cut. See Step 9-2.

9-21 Each increment on the eBush changes the joint glue line fit by 0.002" [0.05mm]. Half an increment, a mere 1000th inch! *Re-tighten the eBush nut after each guide bushing adjustment.* IMPORTANT NOTE: If the joint is still loose with the eBushing set at 10, measure the depth of cut and make sure it matches Step 9-2.

SAMPLE

Leigh 120-500 Bit
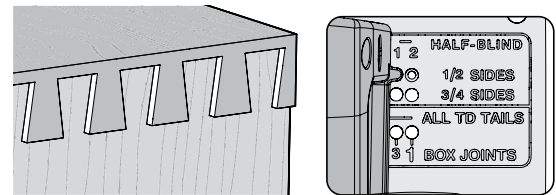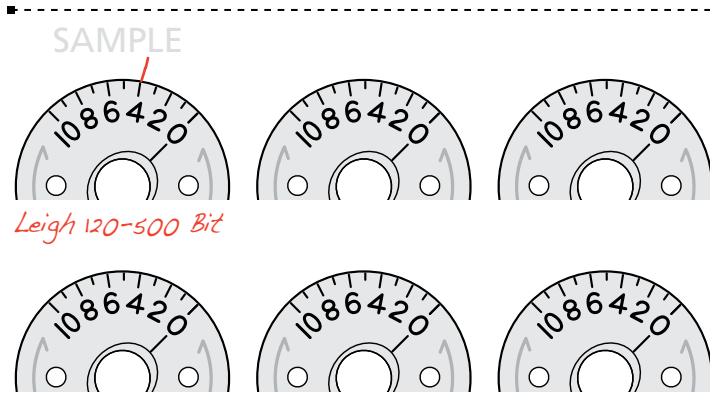
**9-22** Record your perfect fit eBush setting on one of the drawings provided above.

OVER FLUSH

9-23 Flushness IMPORTANT NOTE: Do not adjust flushness until correct joint tightness in previous steps is achieved.
For *over flush pins*, move the frame pin to a minus ("–") pin position and rout a new test joint. ⚠ *You must re-center the tail board and reposition the side stop every time a reset for flushness is made*. Each pin position changes the joint flushness by 0.013"[0.33mm] Record the pin setting for future use. *Note: Tail board thickness will not affect flushness.*
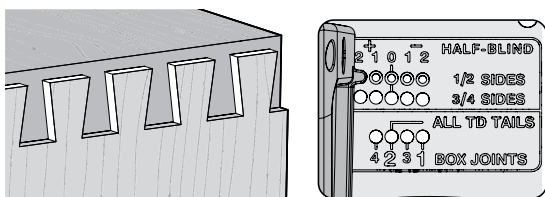

UNDER FLUSH

9-24 Flushness IMPORTANT NOTE: Do not adjust flushness until correct joint tightness in previous steps is achieved.
For *under flush pins*, move the frame pin to a plus ("+") pin position and rout a new test joint. ⚠ *You must re-center the tail board and reposition the side stop every time a reset for flushness is made*. Each pin position changes the joint flushness by 0.013"[0.33mm] Record the pin setting for future use. *Note: Tail board thickness will not affect flushness.*
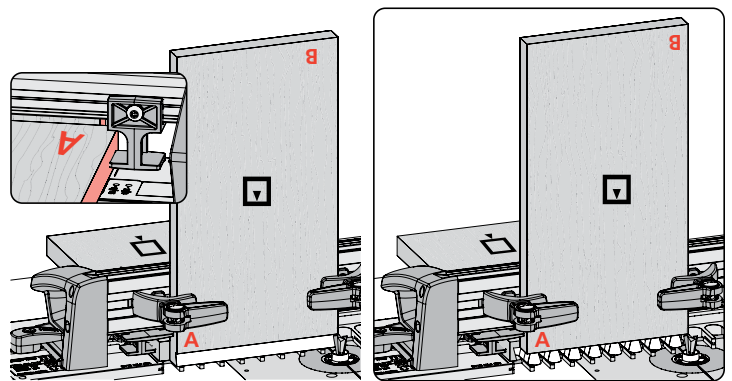

9-25 Now rout the box. Left: Insert tail board 1 (corner A). Insert pin board 1 (Inset: corner A). Right: Rout in all openings. *Tail board 1 and pin board 1 are half complete.*
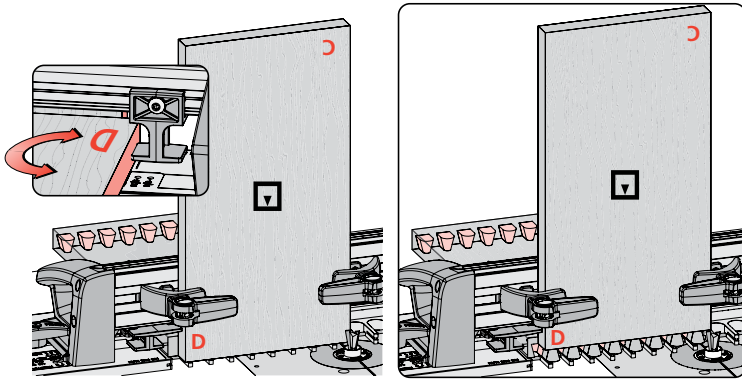
9-26 Left: Remove tail board 1. Insert tail board 2 (corner D). Rotate pin board 1(Inset: corner D). Right: Rout in all openings. *Tail board 2 is half complete and pin board 1 is complete*.
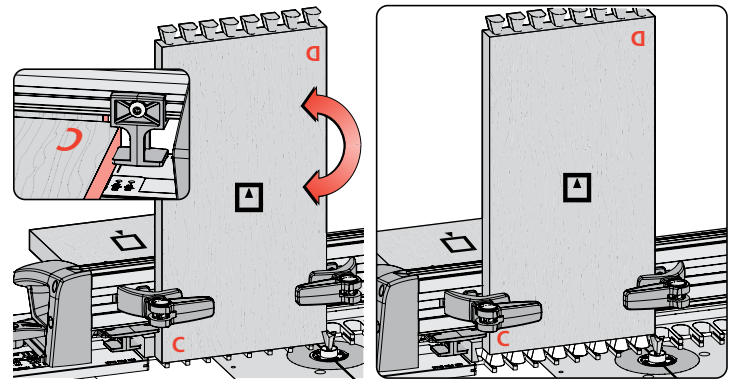
9-27 Left: Rotate tail board 2 (corner C). Remove pin board 1 and insert pin board 2 (Inset: corner C). Right: Rout in all openings. *Tail board 2 is complete and pin board 2 is half complete*.
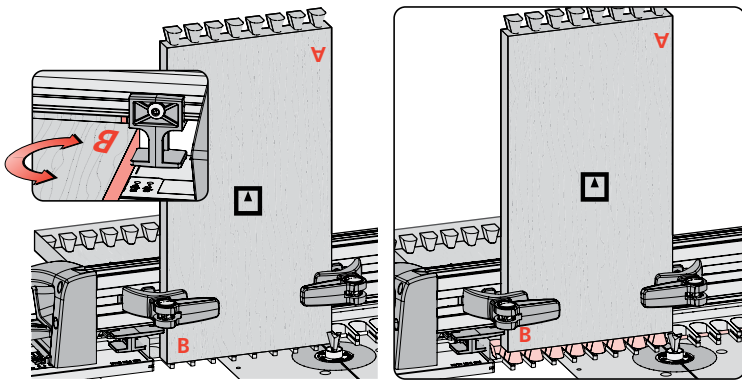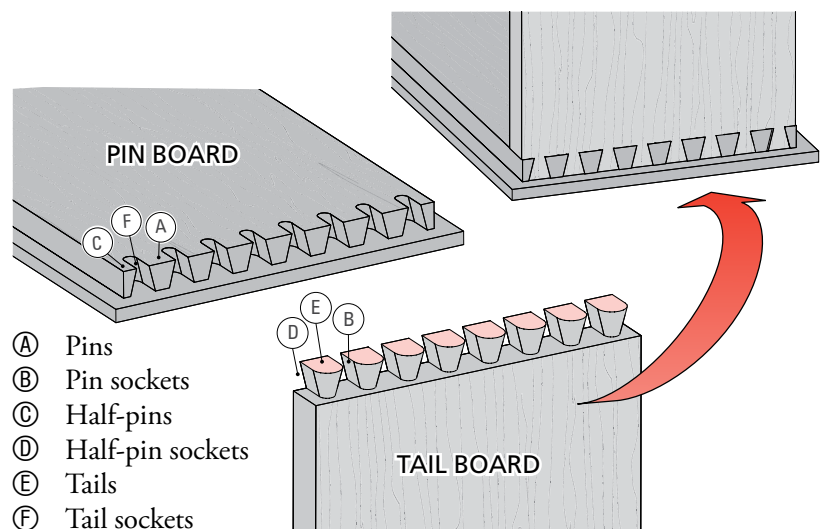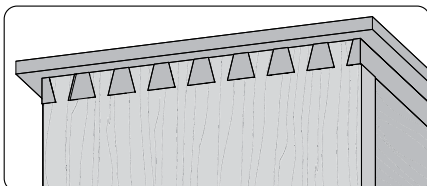
9-28 Left: Remove tail board 2. Re-insert tail board 1 (corner B). Rotate pin board 2 (Inset: corner B). Right: Rout in all openings. *Tail board 1 and pin board 2 are complete*. All four boards are now complete and ready for assembly. ∎
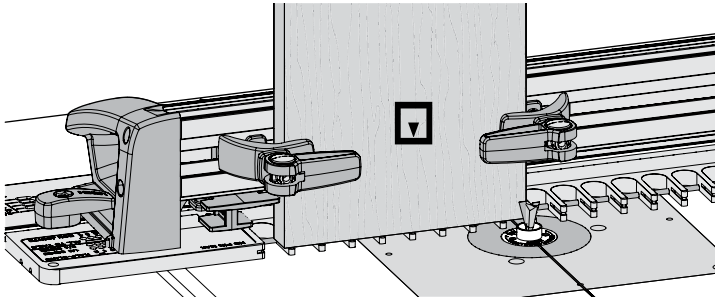
## Rabbeted Half-Blind Dovetails

9-29 Getting Started
Review the drawing, opposite, to get an understanding of how the boards fit together and to learn the joinery terms. Before attempting "rabbeted" half-blind dovetails, first master the techniques of half-blind dovetails. Making rabbeted half-blind dovetails is a **two step process** and requires a shop made limit stop. Follow Steps 9-2 to 9-13 and then continue with 9-30.

PIN BOARD

TAIL BOARD

Ⓐ   Pins
Ⓑ   Pin sockets
Ⓒ   Half-pins
Ⓓ   Half-pin sockets
Ⓔ   Tails
Ⓕ   Tail sockets

*Rabbeted Half-Blind Dovetails cont.*

9-30 *Note: The pin board and tail board are routed separately for rabbeted half-blind joints.* Center and clamp a *test* tail board in the jig. Adjust the side stop to touch the right edge of the board and tighten. If you have already determined joint tightness for the dovetail bit you're going to use (in Step 9-22), you don't need to redo the test fit procedure. *Important note:* Choose a bit from Step 9-2 with a depth of cut less than the rabbet thickness.
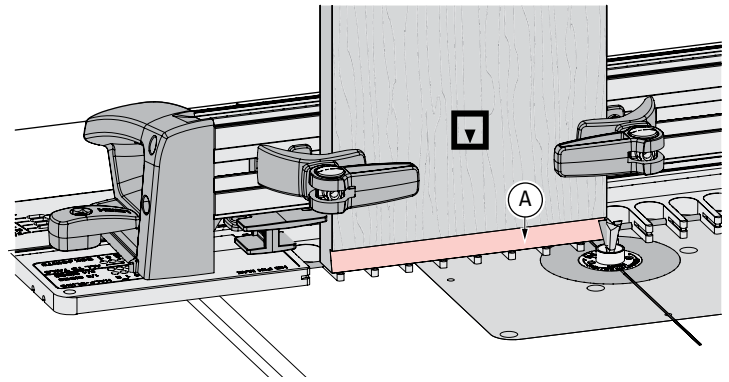
9-31 Make a very light, shallow climb cut, moving the jig right to left Ⓐ. This will leave a nice clean shoulder.
⚠ *The bit will tend to drive the jig to the right, so make the cut light and with a firm grip.*
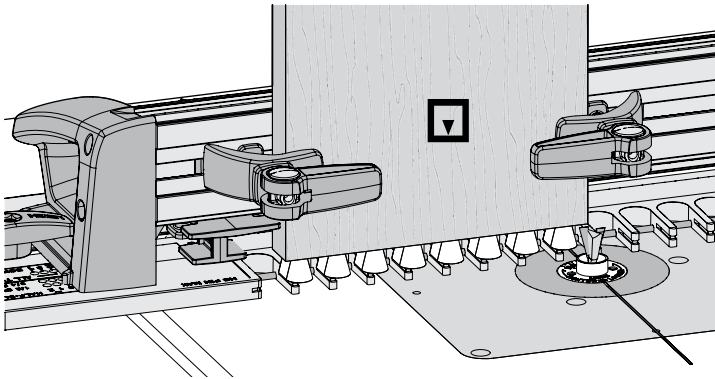
9-32 Finish the tail board by routing in and out of each template opening, keeping the guide bushing in contact with all template finger surfaces. Remove the tail board.
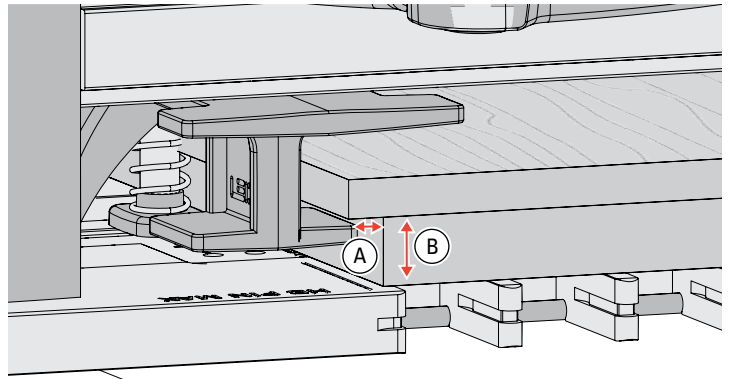
9-33 Rabbeted Drawer Fronts: Provided the rabbet on the drawer front is less than ⅜" [9.5mm] wide Ⓐ and more than ⅜" deep Ⓑ, the side stop, as previously set on the drawer side, is correctly positioned for the rabbeted pin board.
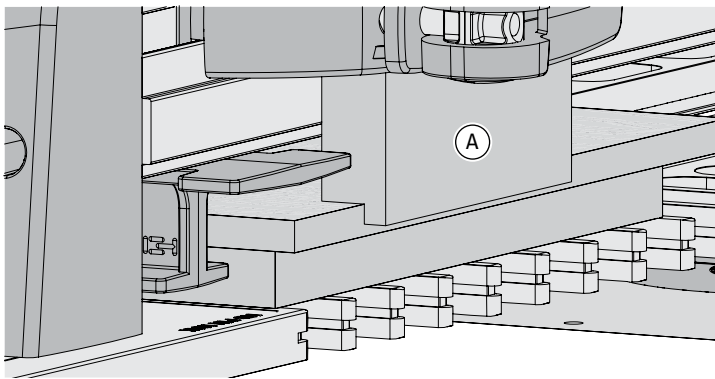
9-34 Front Limit Stop: You will need to make a scrap limit stop Ⓐ. **See the next step** for instructions on how to make the front limit stop.
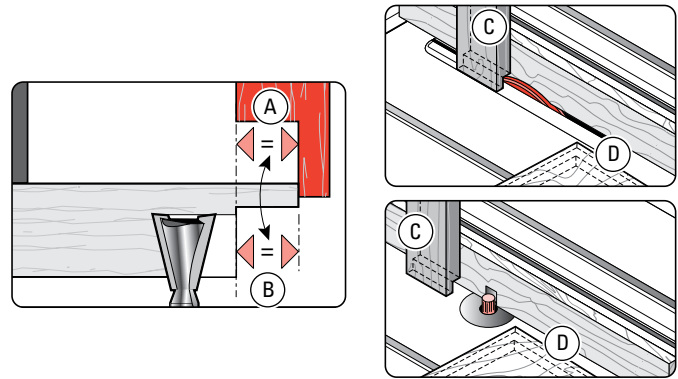
9-35 Left: The rabbet in the scrap limit stop Ⓐ must be exactly the same width as the rabbet on the drawer front Ⓑ. An easy and accurate way to make the limit stop, is to rabbet the end vertically over the router bit or table saw blade Ⓒ immediately after horizontally machining the rabbet in the drawer front Ⓓ.
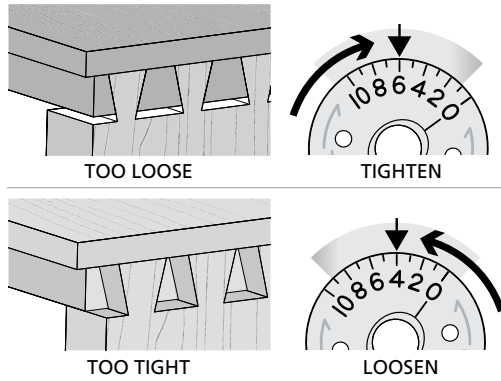
Rabbeted Half-Blind Dovetails cont.
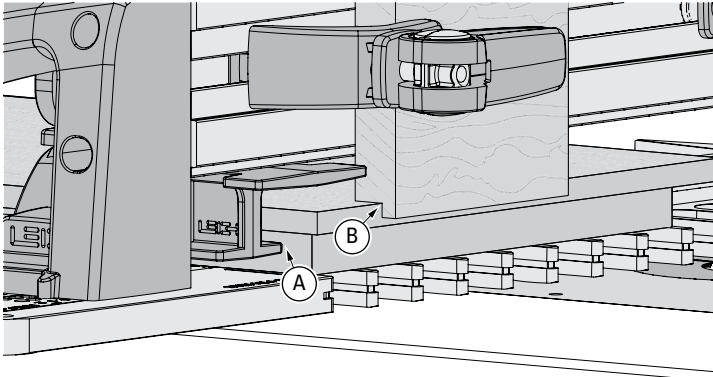
9-36 Clamp a *test* pin board in the jig against the side stop Ⓐ, bringing it forward until it rests against the shop made limit stop Ⓑ.
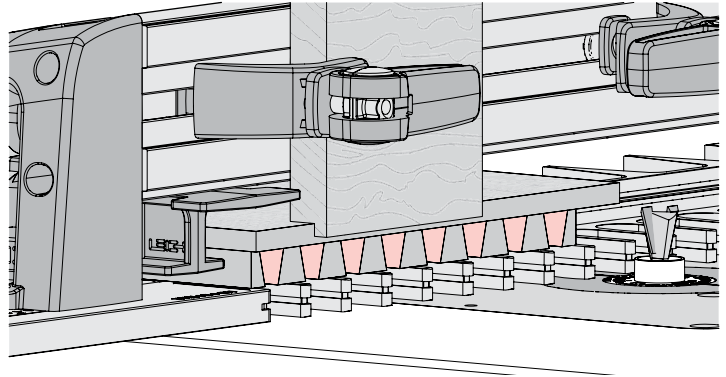
9-37 Rout in each template opening. ⚠ The eBush must touch one side of the opening as you enter and the other side as you exit.

TOO LOOSE   TIGHTEN

TOO TIGHT   LOOSEN

9-38 Test for Fit If the joint is *too loose,* turn the eBush to a higher number as shown in the next step, and rout the other end of the test board. If the joint is *too tight,* turn the eBush to a lower number and rout the other end of the test board.
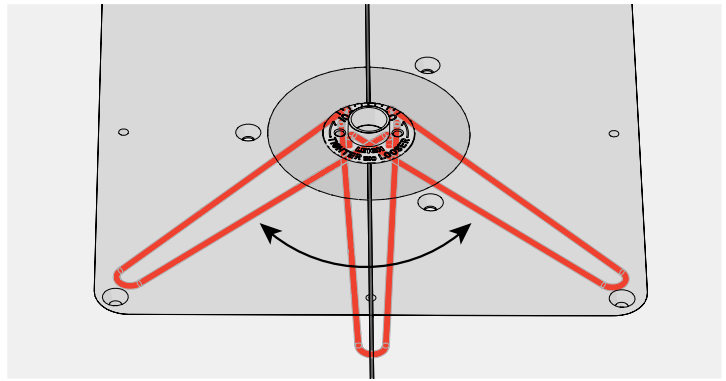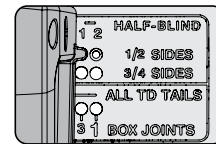
9-39 Each increment on the eBush changes the joint glue line fit by 0.002" [0.05mm]. Half an increment, a mere 1000th inch! *Re-tighten the eBush nut after each guide bushing adjustment.*
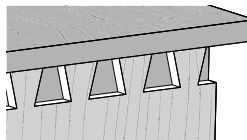

SAMPLE

Leigh 80-500 Bit
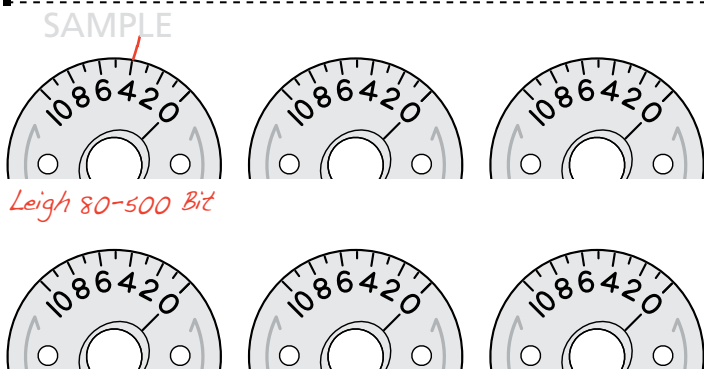
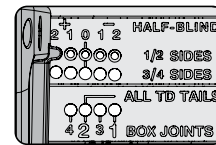**9-40** Record your perfect fit eBush setting on one of the drawings provided above.
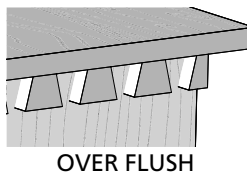
OVER FLUSH

UNDER FLUSH

For over flush pins, move frame pin to a minus ("-") pin position and rout a new test joint.

For under flush pins, move frame pin to a plus ("+") pin position and rout a new test joint.

9-41 Flushness ⚠ **IMPORTANT NOTE:** Do not adjust flushness until correct joint tightness in previous steps is achieved. Follow steps shown. *You must reposition the side stop each time a reset for flushness is made.* Each pin position changes the joint flushness by 0.013"[0.33mm] Record the pin setting for future use. *Note: Tail board thickness does not affect flushness.* ∎