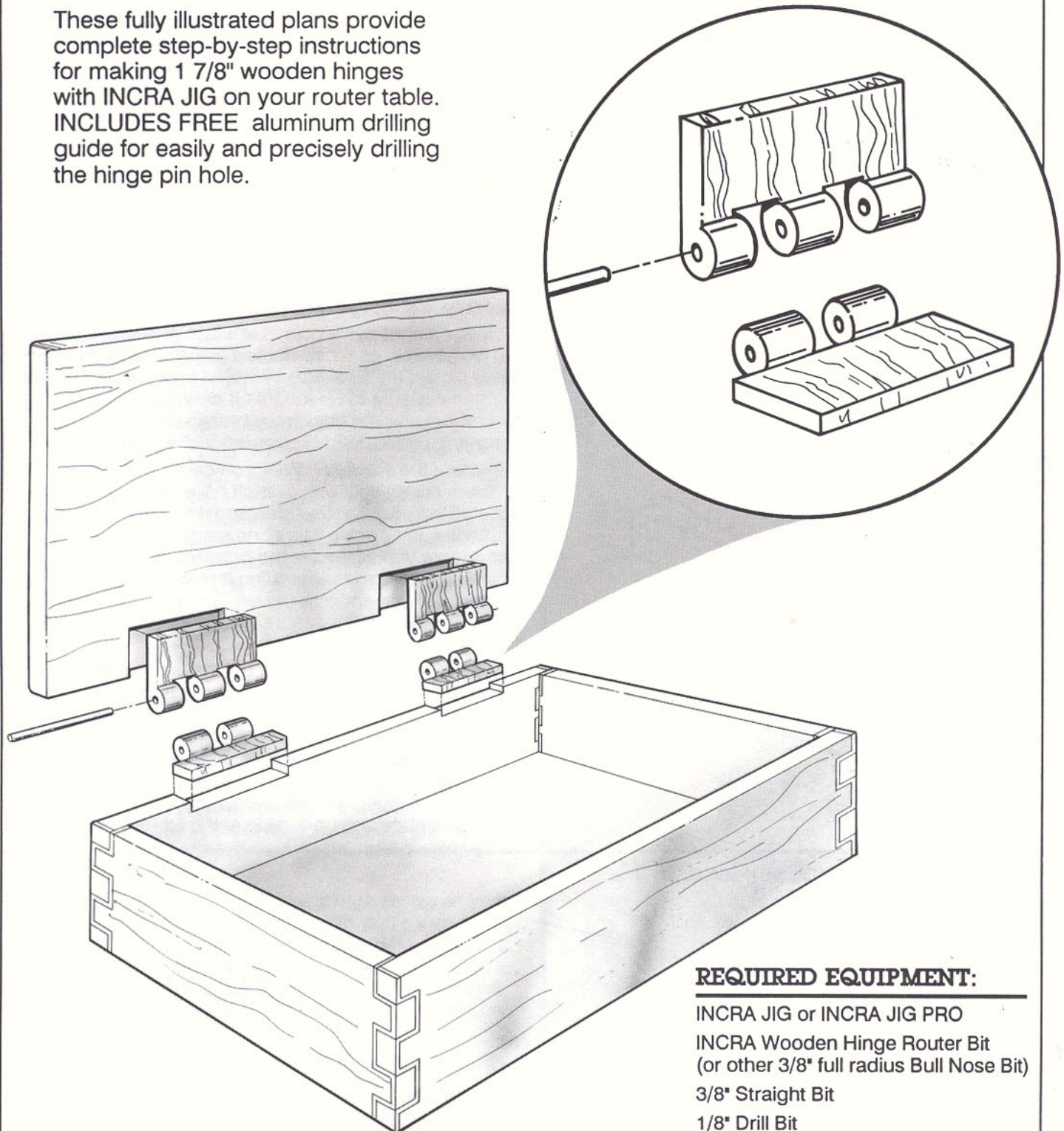


INCRA® WOODEN HINGE PLANS

with FREE Hinge Drilling Guide

These fully illustrated plans provide complete step-by-step instructions for making 1 7/8" wooden hinges with INCRA JIG on your router table. INCLUDES FREE aluminum drilling guide for easily and precisely drilling the hinge pin hole.



REQUIRED EQUIPMENT:

INCRA JIG or INCRA JIG PRO
INCRA Wooden Hinge Router Bit
(or other 3/8" full radius Bull Nose Bit)
3/8" Straight Bit
1/8" Drill Bit
1/8" Brass Rod

SAFETY

IMPORTANT SAFETY INSTRUCTIONS FOR USING THESE PLANS. BEFORE ATTEMPTING TO MAKE THE WOODEN HINGES, READ AND FOLLOW ALL OF THE INSTRUCTIONS AND SAFETY INFORMATION IN THIS MANUAL.

Before using these plans in conjunction with any tool, first read and follow all instructions and safety information in that tool's owner's manual.

USE APPROPRIATE SAFETY DEVICES. Keep hands clear of the blade or bit at all times. When appropriate, ALWAYS use a push stick, rubber soled push block, or other safety device to keep your hands safely away from the cutting tool.

Some of the operations in this manual show the use of shop-built safety devices. Build these safety devices as shown, and ALWAYS use them when making wooden hinges.

ALWAYS work with a full sized hinge blank. DO NOT attempt to cut too small a piece.

The Hinge Pin Drilling Guide included with these plans is designed to be used with a hand drill. Do not use the drilling guide on a drill press.

When using INCRA JIG, make sure that the base is securely fastened to the work surface and the clamping knob is securely tightened before making your cut.

ALWAYS WEAR SAFETY GLASSES and FOLLOW ALL NORMAL SHOP SAFETY PRACTICES.

INTRODUCTION

FIGURE 1

Short dowels or brass rods extend through the opposite sides of the box and into the lid.

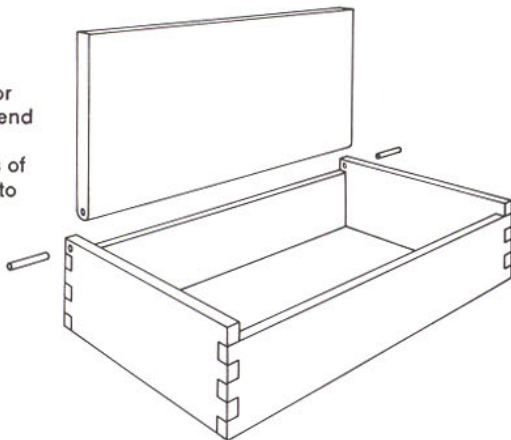
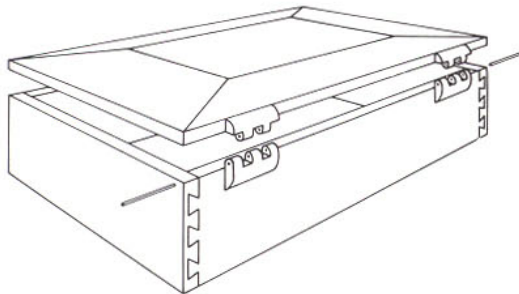


FIGURE 2

Finger joints are glued to the back of the box and lid.



So you've designed and built the ultimate jewelry box, and it is with some apprehension that you approach that final step, installing the hinges.

Metal hinges are a pain. Let's face it. It's not so much the hinge itself, it's those darned brass screws. When you finally do get the pilot hole centered properly, the head of the screw is sure to twist right off during installation. It makes you wonder how many brass screw heads are actually glued instead of screwed in the hinge.

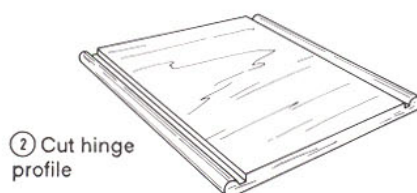
What's the solution? Well, you could avoid the problem completely with a lift-off lid, or perhaps a sliding dovetail top. But let's not sidestep the issue. Some of the best solutions involve little or no metal at all. FIGURE 1 shows how you can solve the problem by using short dowels or brass rods extending through the opposite sides of the box and into the lid. Another approach, shown in FIGURE 2, uses a set of finger joint hinges glued to the back of the box and lid.

This brings us to the most original and attractive of the hinge options. The opposing hinge leaves are joined with a series of finger joints, drilled and pinned together with a brass rod as shown on the front cover. What makes this particular hinge so unique is its profile. It is shaped just like a metal hinge and therefore allows for flush mounting. The hinge is glued, not screwed, into mortises cut into the back of the box and underside of the lid. See front cover.

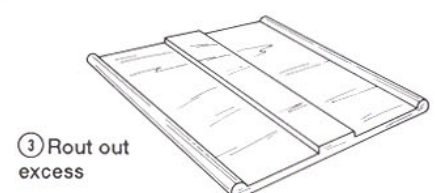
STAGES OF MAKING WOODEN HINGES



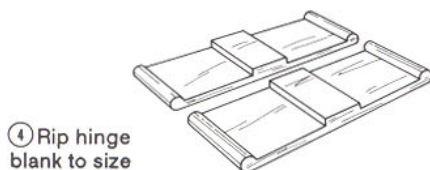
① Round ends of hinge blank



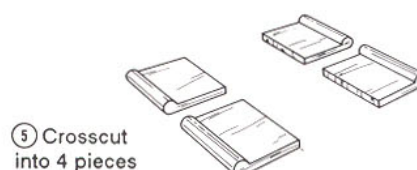
② Cut hinge profile



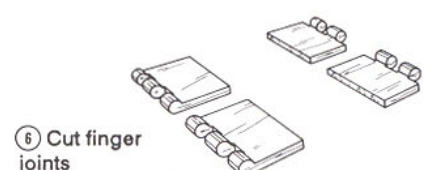
③ Rout out excess



④ Rip hinge blank to size



⑤ Crosscut into 4 pieces



⑥ Cut finger joints

PARTS LIST

1 ea. - INCRA Wooden Hinge plan
1 ea. - aluminum hinge pin drilling guide

MATERIALS LIST

PART	L	W	T	MATERIAL
Auxiliary fence	18"	3 1/2"	1 1/2"	pine
Push block Part #1	6"	3"	1 1/2"	pine
Part #2	3"	1/2"	1/2"	pine
Centering board	6"	1 27/32"	3/4"	hardwood
Hinge blank (makes 2 complete hinges)	4"	5"	3/8"	hardwood
Table saw crosscut jig (optional)	See assembly instructions page 11			

EQUIPMENT & ROUTER BITS

INCRA JIG or INCRA JIG PRO
INCRA Wooden Hinge Bit or other full radius 3/8" bull nose router bit (See paragraph 2 of Hinge Plans, below, for discussion of differences in router bits.)
3/8" straight bit
1/8" drill bit

HARDWARE

1/8" brass rod*, approximately 1 7/8" per hinge.
(Available at some hardware and craft stores, as well as all welder's supply stores.)
2 ea. - #10-24 x 2 1/2" round head machine screws
2 ea. - #10 flat washers
2 ea. - #10-24 wing nuts

***TIP:** Before you buy your brass rod, drill a 1/8" hole in a piece of hardwood. Take this block of wood with you so that you can select the brass rod that fits the best.

HINGE PLANS - GETTING STARTED

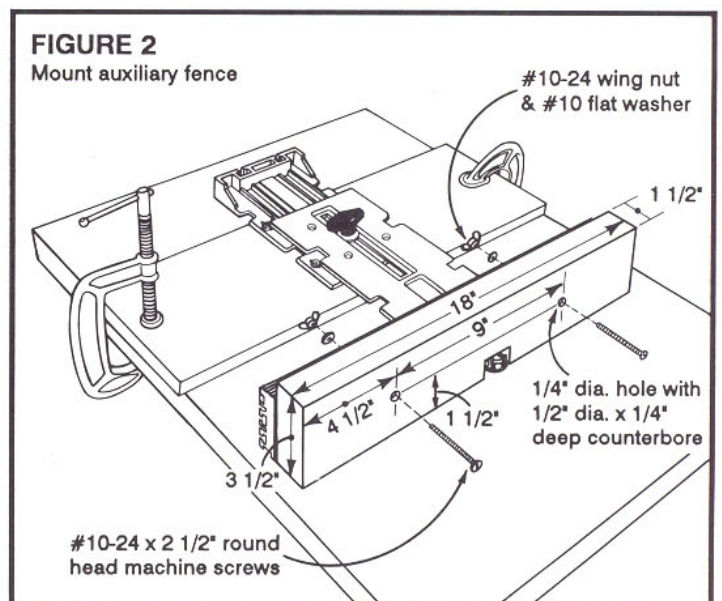
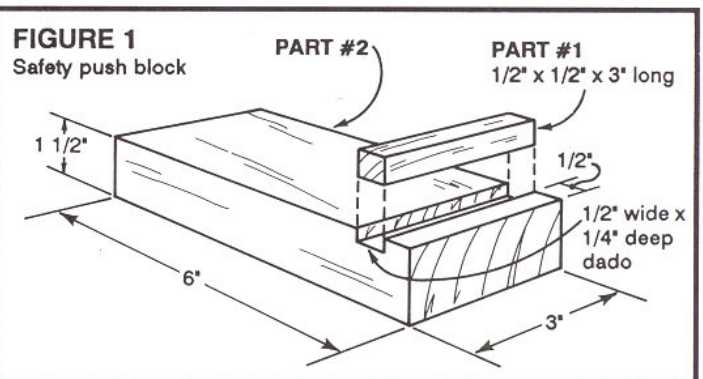
Begin by making the safety push block shown at right in FIGURE 1. After gluing the smaller piece into the dado, sand the edges flush.

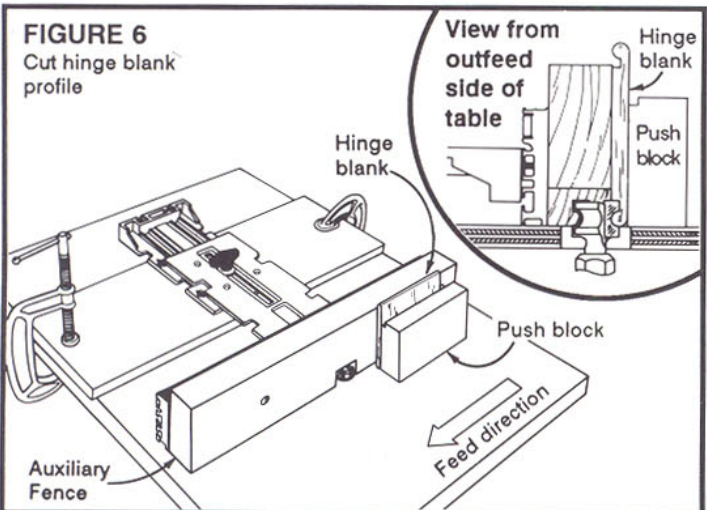
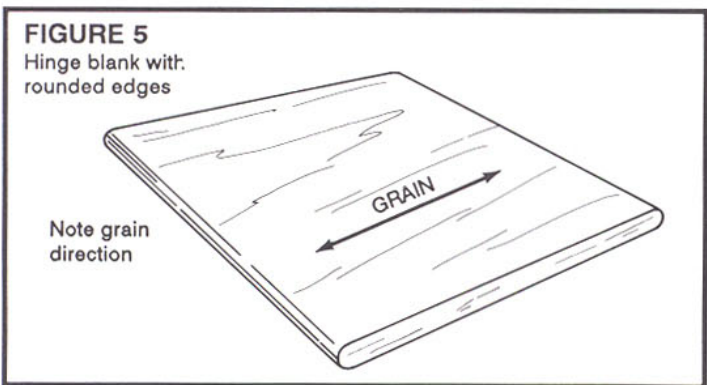
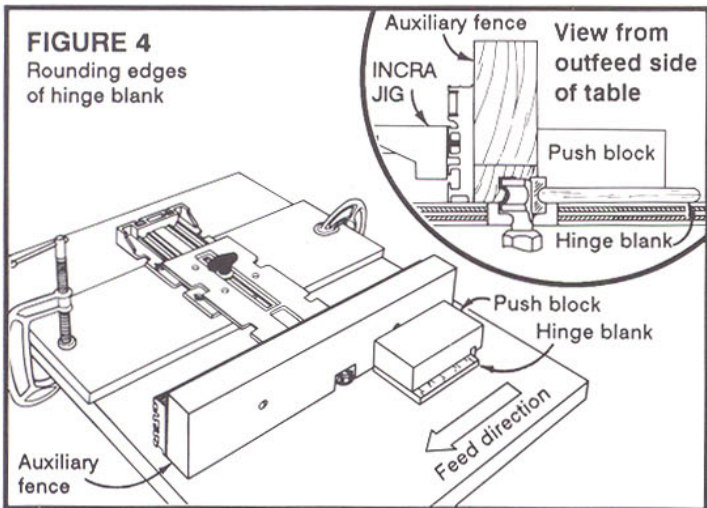
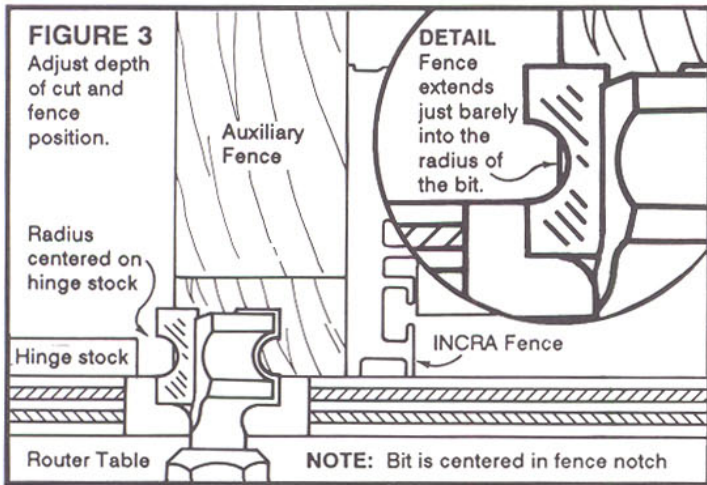
This push block is used in several of the cutting operations as an aid in holding and moving the hinge blank safely through the cut. These cuts will produce various rabbets and slots in the push block as shown in FIGURE 22 on page 8. These cuts do not affect the life or usefulness of the push block. It is designed to use again and again. **For safety's sake, use this push block.**

To produce the hinge profile, you will need a 3/8" full radius bull nose router bit such as the INCRA Wooden Hinge Bit. This bit has been specially designed for making wooden hinges. Its unique profile allows you to make a smooth cut without burning the wood. Other 3/8" bull nose bits should perform adequately, but the wood will most likely be slightly burned on one of the cutting operations.

Chuck the bull nose bit in your router and set up on your router table as shown in FIGURE 2. Drill and counterbore the auxiliary fence as shown, and cut the 3/4" h x 1 3/8" w notch for the bit recess. Now mount the auxiliary fence to your INCRA Fence using (2) #10-24 x 2 1/2" round head machine screws and secure with (2) #10 flat washers and (2) #10-24 wing nuts.

NOTE: Your INCRA Fence is pre-drilled for mounting an auxiliary fence.





CUTTING THE PROFILE

Begin with a hinge blank 4" long x 5" wide x 3/8" thick.

NOTE: It is very important that the thickness of the blank be exactly 3/8" of an inch.

Adjust the depth of cut on the bull nose bit so that the roundover is centered on the 3/8" thickness of your hinge blank. (See FIGURE 3.) Sight down the front face of the fence and position the fence so that it **extends just barely** into the radius of the bit. (See DETAIL.) This way the hinge blank maintains full contact with the fence throughout the cut. **REMEMBER, when using a fence setting in which the bit is partially buried in the fence, ALWAYS make sure that the bit is safely centered within the notch.**

With the end grain of your hinge blank against the auxiliary fence, use the safety push block to move the stock through the cut. (See FIGURE 4.)

CAUTION: DO NOT allow your thumb or fingers to wrap around the back edge of the safety push block where the bit will exit the cut.

Now place the opposite end of the stock against the auxiliary fence and repeat the cut. Your hinge blank should look like the drawing in FIGURE 5.

Stand the hinge blank on the rounded end with the face grain against the auxiliary fence and, using the safety push block, move the stock through the cut. See FIGURE 6. Apply downward pressure on the opposite end of the hinge blank to keep the stock against the table.

CAUTION: DO NOT allow your thumb or fingers to wrap around the back edge of the safety push block.

Now repeat the cut on the opposite end of the hinge blank. After you have made this cut, your hinge blank should look like the drawing in FIGURE 7.

ROUT OUT EXCESS

Remove the auxiliary fence and chuck a $3/8"$ straight bit in your router. Set the depth of cut to $3/16"$, and the initial fence to bit distance at $3/8"$ as shown in FIGURE 8.

Place the hinge blank on the router table with the rounded end against the fence and the slots face down. Using a rubber soled push block, move the stock through the cut. Take note of the setting of your INCRA JIG on the molded in reference scale as you will return to this setting in the next step. Now rout 5 more passes, each time moving the fence back $3/16"$. (See FIGURE 9.)

Return to the initial fence setting and repeat the above steps for the opposite end of the stock. Your hinge blank should now look like the drawing in FIGURE 10.

NOTE: Leave the $3/8"$ straight bit in your router for use in a later step.

FIGURE 7
Hinge blank profile

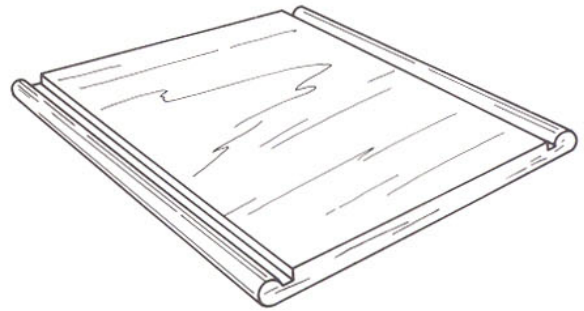


FIGURE 8
Set depth of cut and fence to bit distance

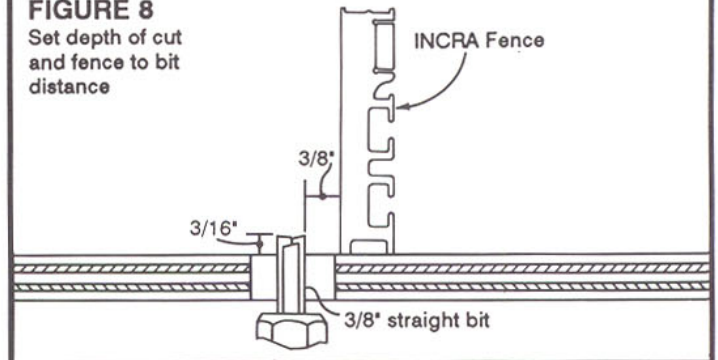


FIGURE 9
Rout out hinge blank

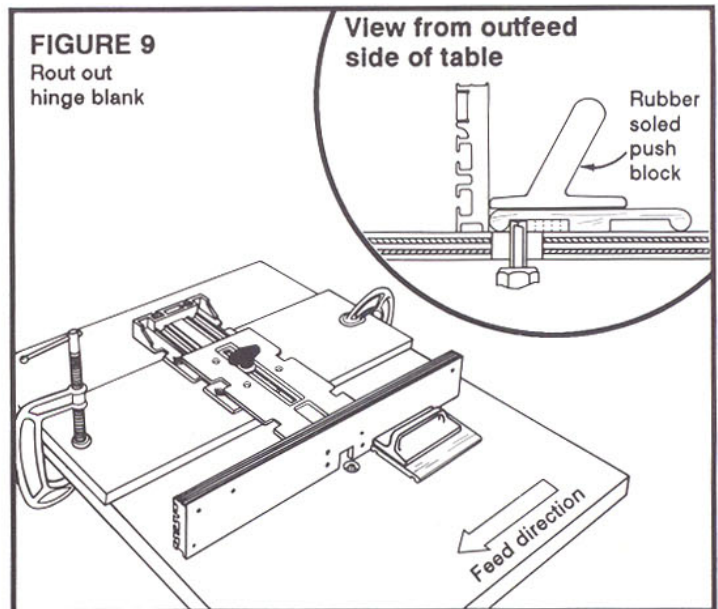
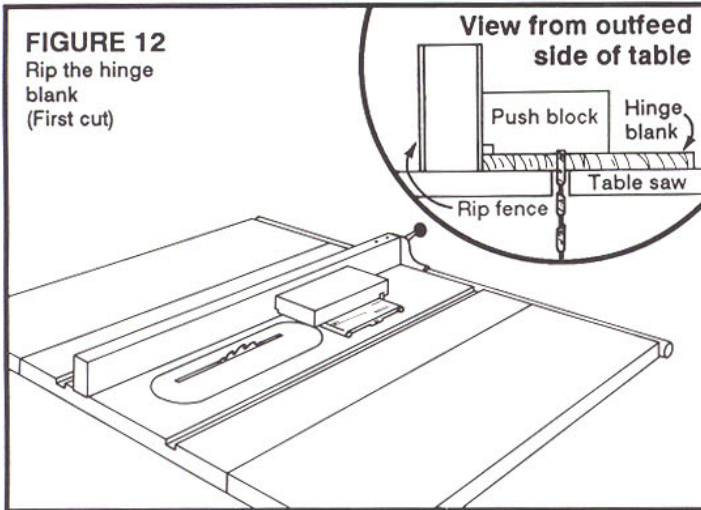
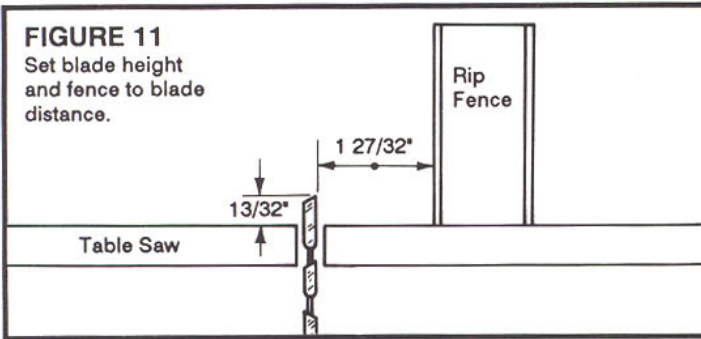


FIGURE 10
Completed hinge blank



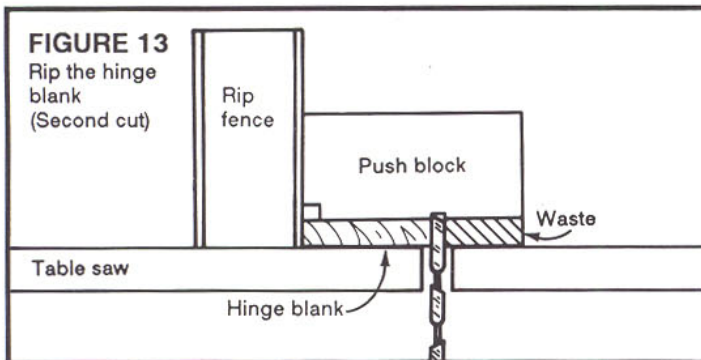
CUTTING THE HINGE LEAVES

At your table saw, raise the blade to $13/32"$ and set the fence to blade distance at $1\ 27/32"$. See FIGURE 11.

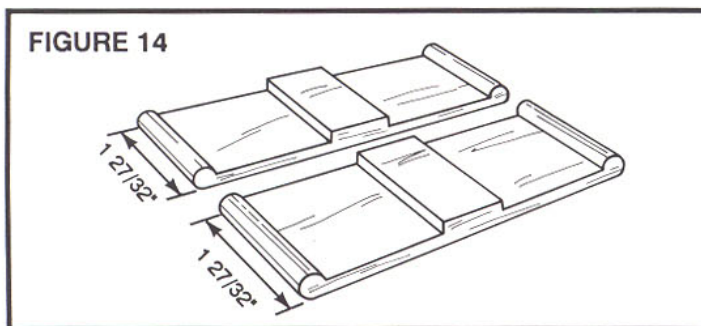


With the slots facing down, place the hinge blank on the table saw. Position the side of the blank against the fence and using the safety push block, rip the hinge blank. (See FIGURE 12.)

CAUTION: DO NOT allow your thumb or fingers to wrap around the back edge of the safety push block.

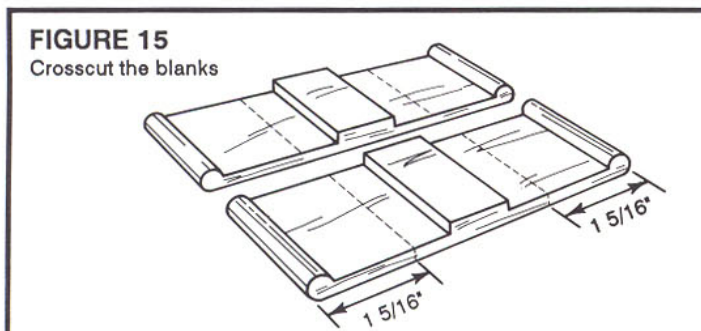


After the first pass, advance the remainder of the hinge blank to the fence and, using the safety push block, cut the remaining piece as shown in FIGURE 13. Discard the waste.



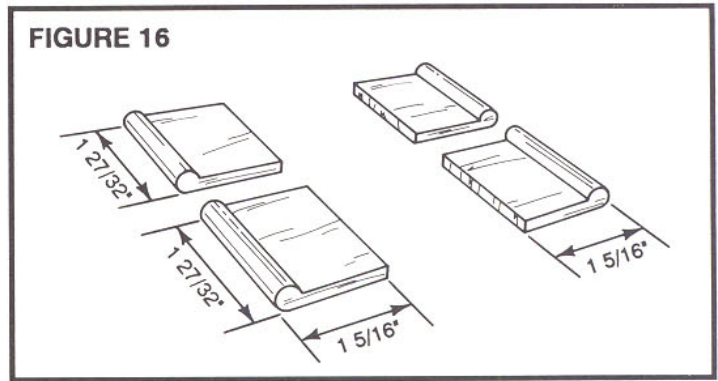
You should now have two hinge blanks resembling the drawing in FIGURE 14.

With the same fence to blade distance ($1\ 27/32"$), raise your table saw blade to $13/16"$. Using a good push stick, rip a 6" long piece of $3/4"$ hardwood to be used in a later step as a centering board.



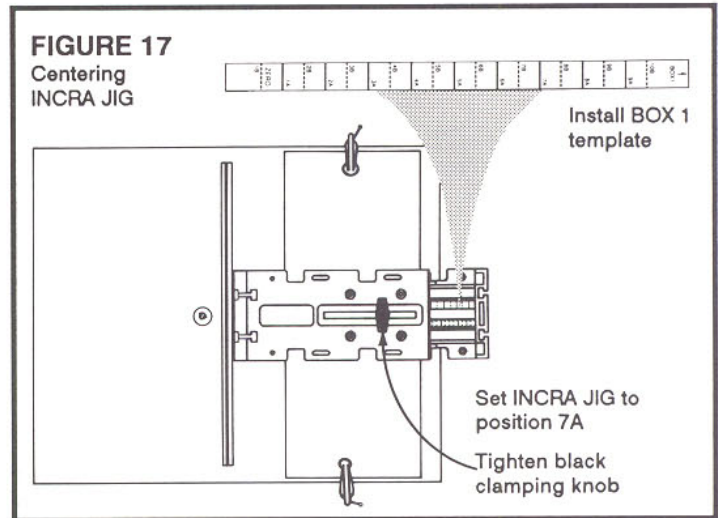
Now, as shown in FIGURE 15, crosscut the two hinge blanks into four pieces (hinge leaves) each $1\ 5/16"$ long. You can make this cut with a fine tooth hand saw, a scroll saw or a band saw. If you wish to use your table saw for this cut, use the hinge crosscut jig described on pages 11 and 12 to safely hold the hinge blank during the cut.

Your 4 hinge leaves should now resemble the ones drawn in FIGURE 16.

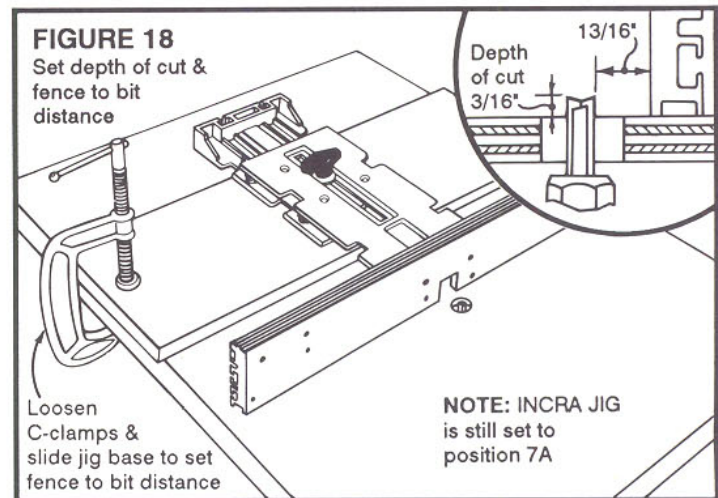


CENTERING YOUR INCRA JIG

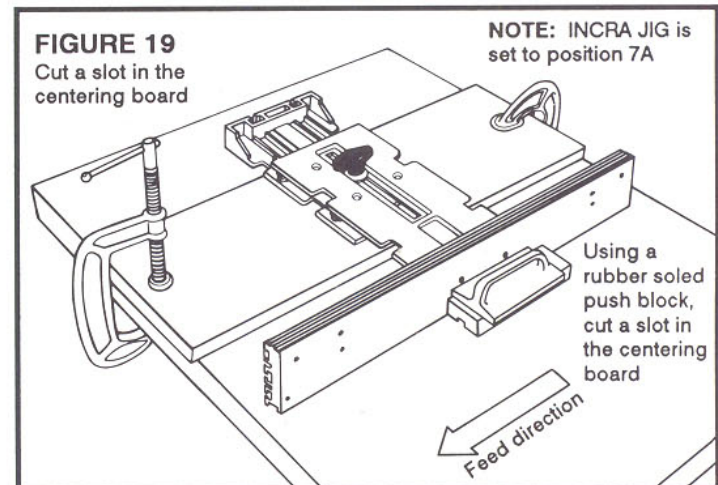
Back at the router table, install the "BOX 1" template from The Official INCRA JIG Handbook and Templates in your INCRA JIG template slot. Open the INCRA JIG to cut location 7A on the template and lock it in place by tightening the black clamping knob. (See FIGURE 17.)

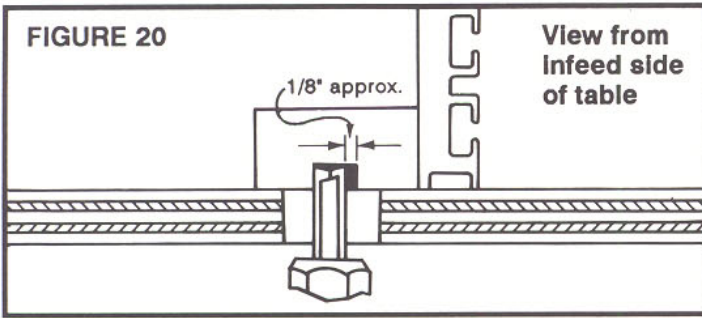


Raise the 3/8" straight bit to a 3/16" depth of cut. Now loosen the two C-clamps that secure the INCRA JIG mounting base to your router table. Slide the INCRA JIG and mounting base unit over until the fence to bit distance is 13/16". Make sure the bit is centered in front of the notch in your fence, then tighten the two C-clamps. (See FIGURE 18.) **REMEMBER, your INCRA JIG should still be locked in at cut location 7A on the template.**

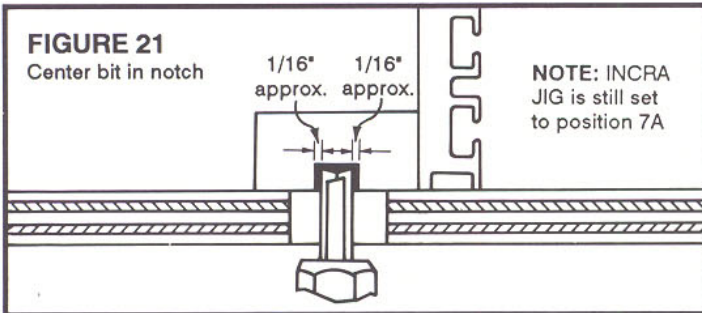


Using the centering board that you cut earlier, (6" L x 1 27/32" W x 3/4" T), cut a slot along its entire length. As shown in FIGURE 19, be sure to use a good rubber soled push block for this operation. Now, with the slot you just cut still facing down, flip the board around so that the opposite side of the centering board is against the fence. Then make a second pass. This second pass will widen the slot that you cut on the first pass.

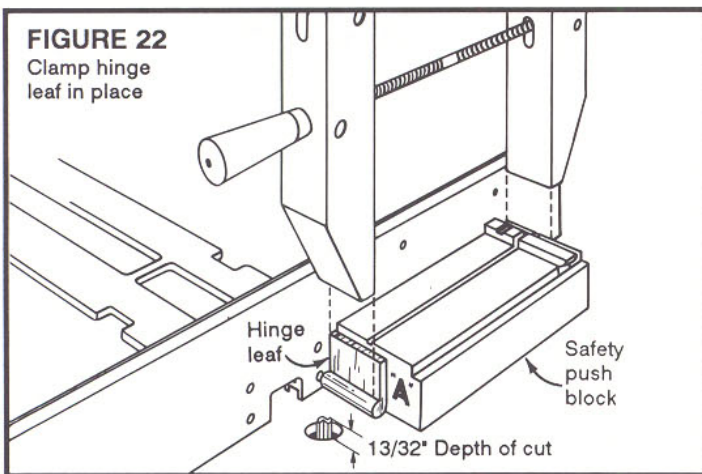




With the router unplugged, position the bit at its widest cut angle. Place the centering board against the fence with the bit just inside the slot cut in the previous step. When viewed from the infeed side of your router table there should be a gap of about 1/8" between the right side of the bit and the right edge of the slot. (See FIGURE 20.)

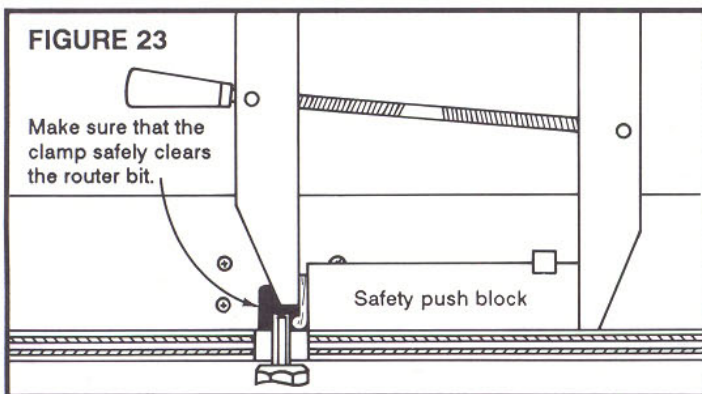


Loosen one of the two C-clamps that hold the INCRA JIG mounting base to your router table and tap the mounting base toward the bit until the router bit is centered in the slot on the centering board as shown in FIGURE 21. Now retighten the C-clamp. Make sure that the bit is still centered in front of the notch on your fence. Again, the INCRA JIG should still be locked at cut location 7A on the template. You have now positioned the fence so that cut 7A on the template will be placed in the CENTER of any stock that is 1 27/32" wide.

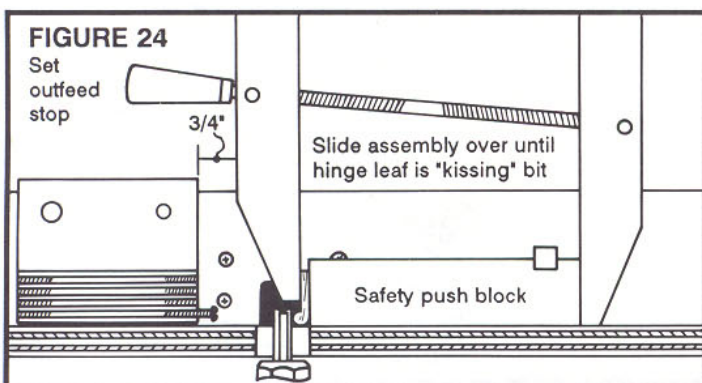


CUT THE FINGER JOINTS

At the router table, raise the depth of cut to 13/32". Mark one end of the safety push block "A" and the other end "B". The "A" end will always serve as a backing board for the "A" series of cuts, and the "B" end will always serve as a backing board for the "B" series of cuts. Place the safety push block against the fence with the "A" end facing the router bit, and place one of the hinge leaves on the front of the push block as shown in FIGURE 22. Now clamp the hinge leaf in place with a wooden handscrew clamp, making sure the hinge leaf, the safety push block and the handscrew clamp are all against the fence.



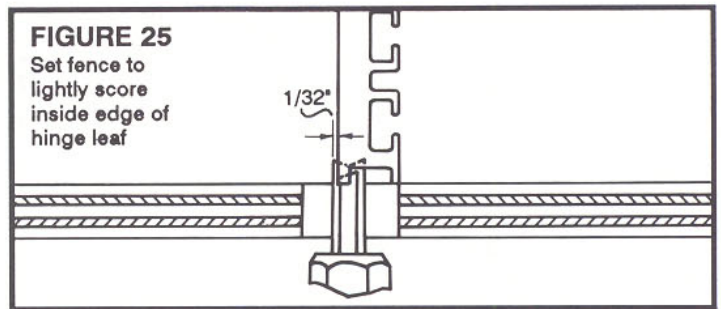
When clamping the hinge leaf in place with the wooden handscrew clamp, ALWAYS lift the front clamp jaw so that it safely clears the router bit. (See FIGURE 23.) This way you will avoid cutting finger joints in the end of your clamp.



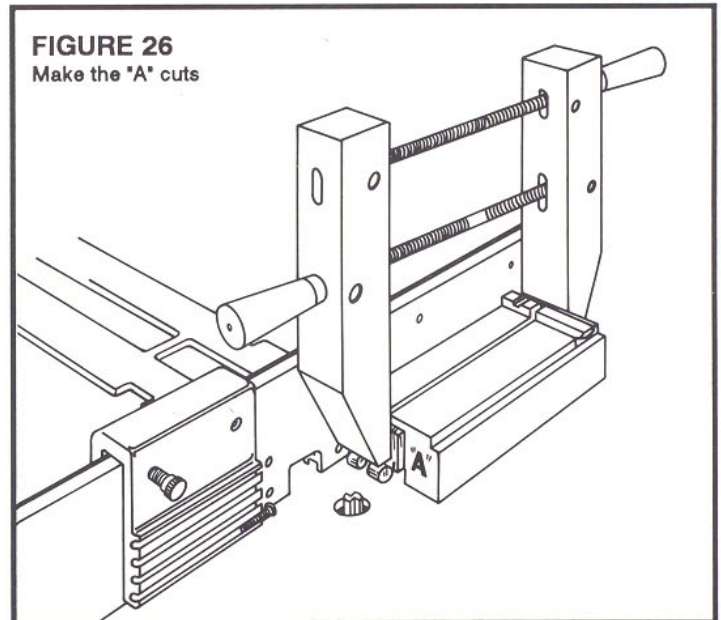
Using an INCRA Stop or a block of wood, set an outfeed stop. To do this, slide the hinge leaf clamping assembly up to the bit. Then clamp the stop 3/4" away from the forward edge of the clamp as shown in FIGURE 24.

NOTE: Make sure the wooden handscrew clamp is against the fence so that it will contact the INCRA Stop.

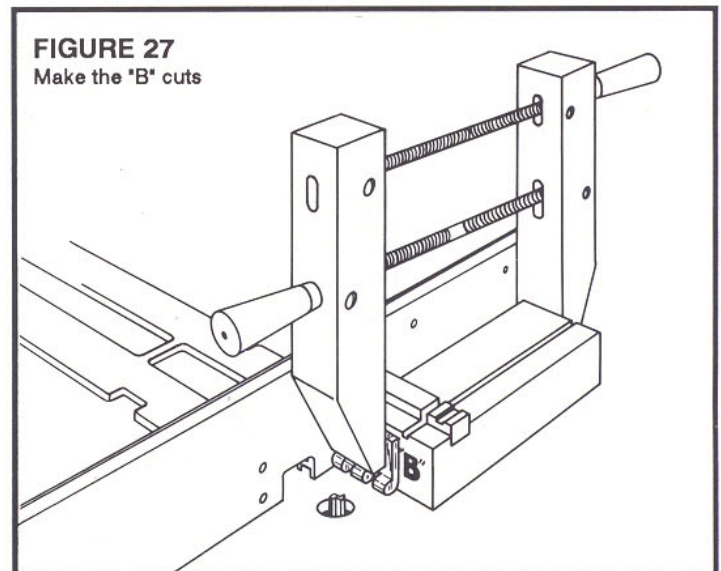
You are now ready to cut the "A" slots in your hinge leaf. (Cut locations 6A, 7A & 8A on the template.) Before cutting at location 6A, lightly score the inside edge of the hinge leaf. To do this, loosen the black clamping knob and move the top half of the INCRA JIG to position the fence so that the router bit is recessed in the notch on your fence. Leave about 1/32" of the bit exposed for the initial cut. (See FIGURE 25.) Lock the black clamping knob in place and make the cut.



It is always best to work up to cut 6A in several light passes. After cut 6A, make the cuts at locations 7A and 8A on the template as shown in FIGURE 26. Repeat this operation for one of the remaining three hinge leaves. This gives you two hinge leaves with the "A" cuts.



Now turn the safety push block around so that the end marked "B" faces the router bit. Clamp one of the two remaining hinge leaves to the push block and make the cuts at location 7B and 8B on the template. (See FIGURE 27.) Repeat this operation for the last hinge leaf.

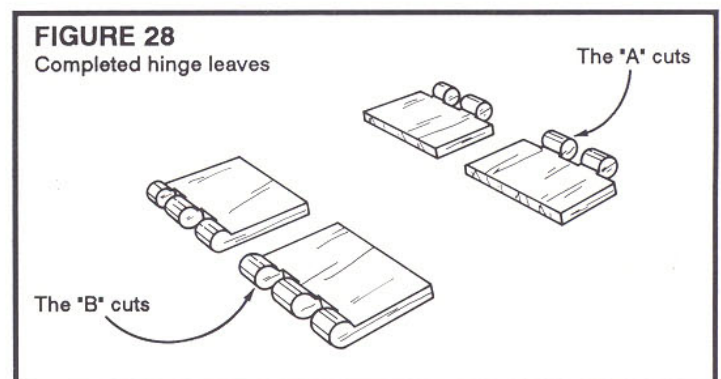


You should now have four hinge leaves resembling the ones shown in FIGURE 28, two with the "A" cuts and two with the "B" cuts.

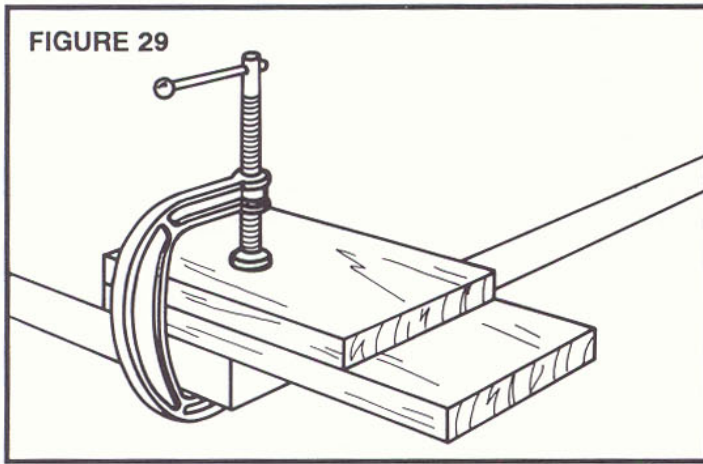
NOTE: FIGURES 17 through 28 describe the process of setting up for and cutting 3/8" equally spaced finger joints on the hinge leaves. These steps refer to the use of the BOX 1 template from The Official INCRA JIG Handbook and Templates. The use of this template greatly simplifies the task of positioning your INCRA JIG for the cuts.

However, if you do not have the BOX 1 Template, substitute the following dimensions on the molded-in reference scale for setting your INCRA JIG:

- | | |
|-------------|-------------|
| 6A = 4 1/2" | |
| 7A = 5 1/4" | 7B = 4 7/8" |
| 8A = 6" | 8B = 5 5/8" |

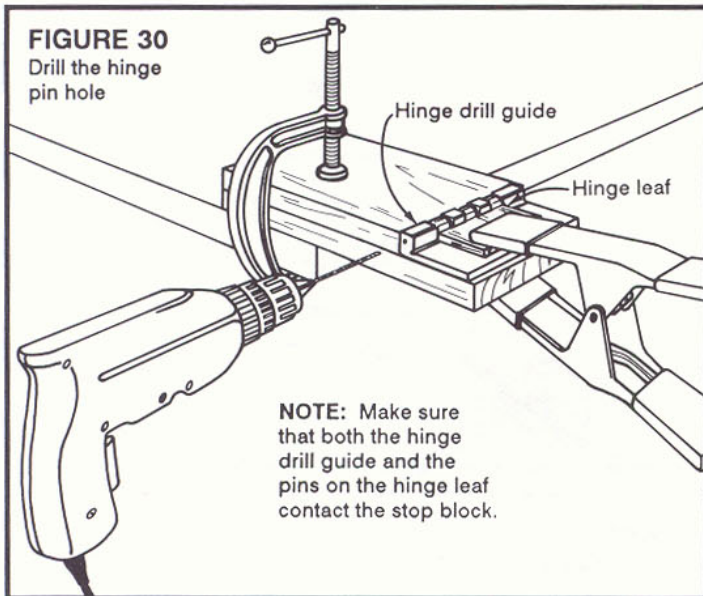


DRILL THE HOLES



Most standard 1/8" drill bits are not long enough to drill all the way through the drill guide and hinge leaf, so the method presented below allows for drilling from both sides of the drill guide. Longer 1/8" drill bits can usually be found at your local hardware store if you wish to drill the pivot pin hole in a single operation.

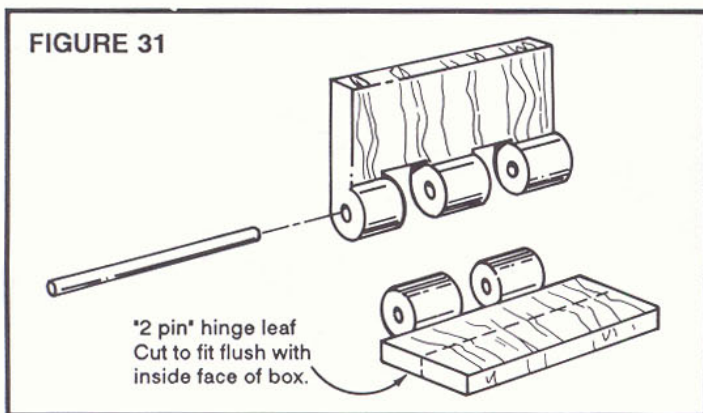
Rip a piece of 12" long scrap stock to 3 1/4" wide. Then crosscut to yield 2 pieces, one 7" long and the other 5" long. Stack the two boards and clamp to the edge of your router table or work bench as shown in FIGURE 29. The shorter top board will act as a stop to butt the hinge drill guide and hinge against during drilling, and thus insure that the pivot pin hole is properly aligned and centered.



Butt the hinge drill guide against the stop block and slide one of the 4 hinge leaves into the fingers of the drill guide. **Both the hinge drill guide and the pins on the hinge leaf should contact the stop block.**

Clamp the hinge leaf and drill guide to the lower board making sure both the drill guide and hinge leaf remain in contact with the stop block. Now using a 1/8" drill bit and a power hand drill, drill the hinge leaf from both ends of the drilling guide. (See FIGURE 30.) Repeat these steps for the remaining hinge leaves.

TIP: Back the bit out several times during the drilling process to clear the chips out of the hole. Failure to do so might cause the chips to pack in the hole and break the hinge.

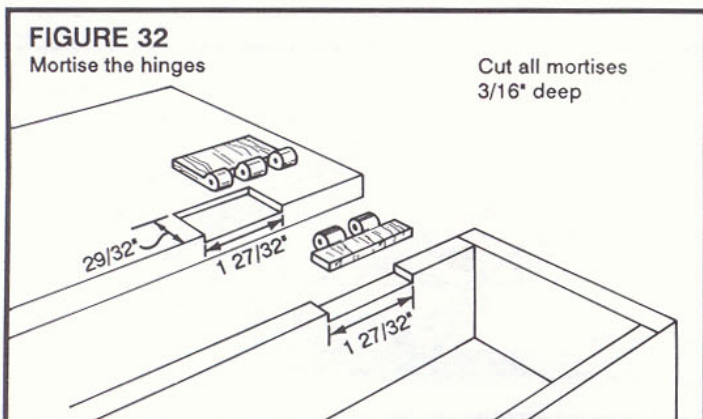


Cut the 1/8" (outside diameter) brass rod to 1 7/8" long and install as shown in FIGURE 31.

TIP: After drilling all of the hinge leaves with the 1/8" drill bit, carefully ream out the "2 pin" hinge leaves with a 9/64" drill bit. This allows the hinge to open and close more easily and allows movement to compensate for misaligned mortises. **DO NOT** use the drill guide for this reaming process.

Depending on the thickness of your box-making stock, the hinge leaf to be installed in the back will need to be cut shorter with a fine tooth hand saw. After installation, sand or rasp the hinge flush with the inside face of the box.

INSTALLATION



Cut the mortises in the box lid and back as you would for any brass butt hinge. (See FIGURE 32.) The common method is to outline the hinges with a pencil, rout out the majority of the waste, and chisel the remainder out to the line.

You'll find another method described in the INCRA Fence System owner's manual which uses the positioning ability of an INCRA JIG in conjunction with an INCRA Stop to rout the mortises on your router table.

TIP: Cut the width of the mortise a little undersize and sand the hinge on your belt sander until you get a perfect fit. This final sanding will also sand the ends of the brass pin flush with the sides of the hinge.

Now simply glue the hinges in place.

HINGE CROSSCUT JIG (OPTIONAL)

Build and use this Hinge Crosscut Jig to safely hold the hinge blank while crosscutting on the table saw. (Refer to FIGURES 15 & 16 on pages 6 & 7.)

MATERIALS LIST

PART	L	W	T	MATERIAL
Jig base	11"	11"	1/2"	plywood
Fence	11"	2 3/8"	3/4"	hardwood
Stop block	4"	1 7/8"	3/4"	hardwood
Clamp arm	5 5/16"	1 7/8"	1/2"	hardwood
Safety Guard	6"	5"	1/4"	Lexan®

HARDWARE

- 1 ea. - INCRA Miter Slider™
- 1 ea. - #10-24 x 1 3/4" carriage bolt
- 1 ea. - #10-24 T-nut
- 1 ea. #10-24 wing nut
- 4 - #6 x 3/4" woodscrews
- 2 - 1 1/4" drywall screws

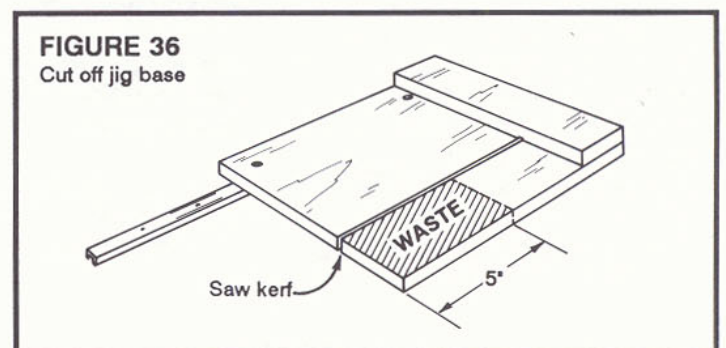
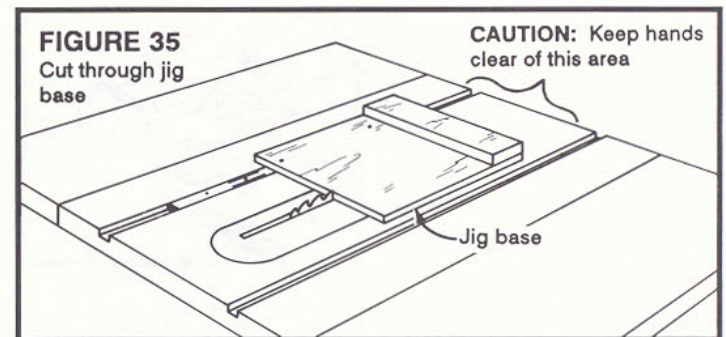
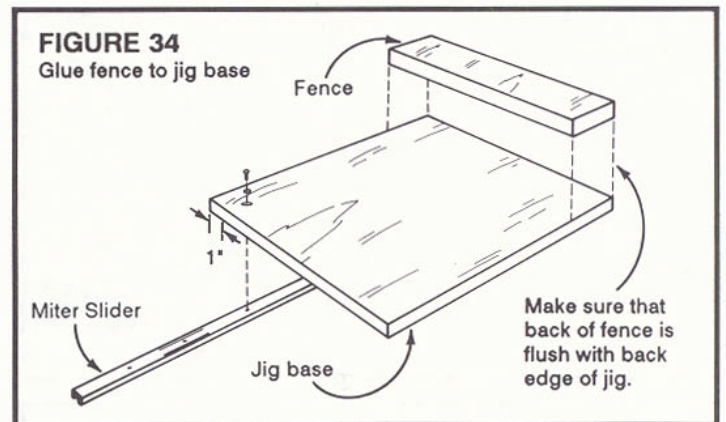
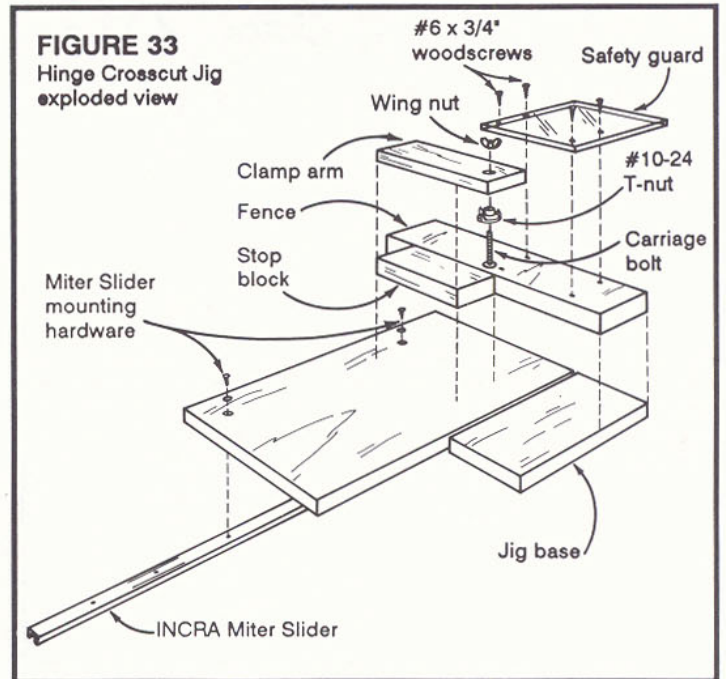
MAKE THE JIG BASE

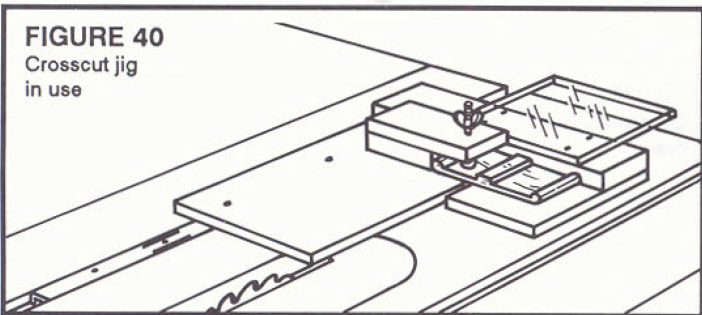
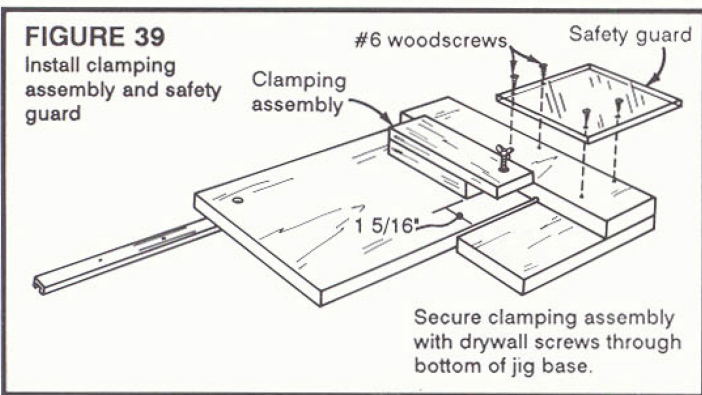
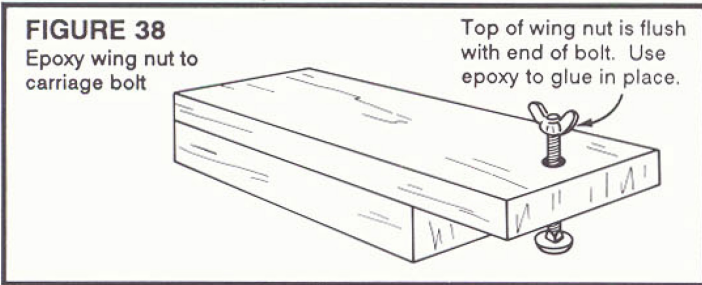
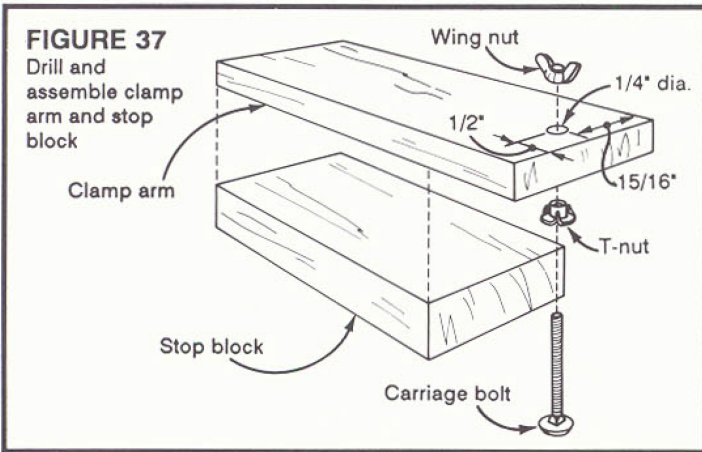
Mount an INCRA Miter Slider 1" from the right edge of your jig base. Now glue the fence to your base. Make sure that the back edge of the fence is flush with the back edge of your jig base. (See FIGURE 34.)

Raise the blade on your table saw to 9/16" and, with the Miter Slider engaged in the right hand miter slot, make a cut through the jig base. (See FIGURE 35.)

CAUTION: Be sure to keep your hands clear of the area where the blade exits the back edge of the jig.

With a bandsaw or hand saw, cut off the front 5" of the jig base on the left side of the sawblade kerf as shown in FIGURE 36.





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Optional Hinge Crosscut Jig (continued)

MAKE THE CLAMPING ASSEMBLY

Layout the drill center locations on the clamping arm as shown in FIGURE 37, and drill a 1/4" diameter hole. Insert the T-nut and screw in the carriage bolt. Now glue the clamp arm to the stop block making sure the sides and back edges are aligned flush. The clamp arm should overhang the front of the stop block by 1 5/16".

Apply some epoxy cement to the last 1/4" of threads on the carriage bolt and screw on the wing nut until the end of the bolt is flush with the top of the wing nut. (See FIGURE 38.)

Position the clamp assembly adjacent to the fence so that the stop block is 1 5/16" away from the saw kerf on your jig base. Secure the clamping assembly in place with (2) 1 1/4" drywall screws penetrating up from the bottom of the jig base. Now add the Lexan® safety guard. Center the guard over the saw kerf and screw to the top of the fence with (4) #6 woodscrews. (See FIGURE 39.)

To use the hinge crosscut jig, raise the blade on your table saw to 11/16". Place the jig on the table saw with the Miter Slider engaged in the right hand miter slot. Insert one of the hinge blanks under the head of the carriage bolt and butt the blank against the stop block. Now tighten the clamping assembly by turning the wing nut clockwise until the head of the carriage bolt presses the hinge blank to the jig base, then make the cut. (See FIGURE 40.)

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