



From the Original Woodworker's Notebook

By
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REGULATOR CLOCK

A NOTE ON SAFETY

*Safety is the responsibility of all woodworkers. Do not attempt any project or procedure without all safety devices intact. Any deviations in stock dimensions and/or any change in project will affect the end result of any project. When circumstances require the use of different materials, alter project dimensions as required.
Read all instructions for any project before starting the project.*

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REGULATOR CLOCK

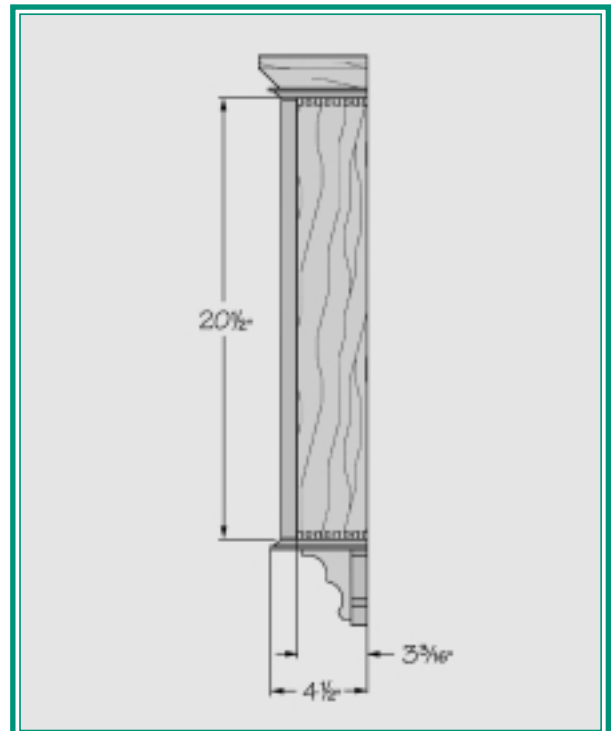
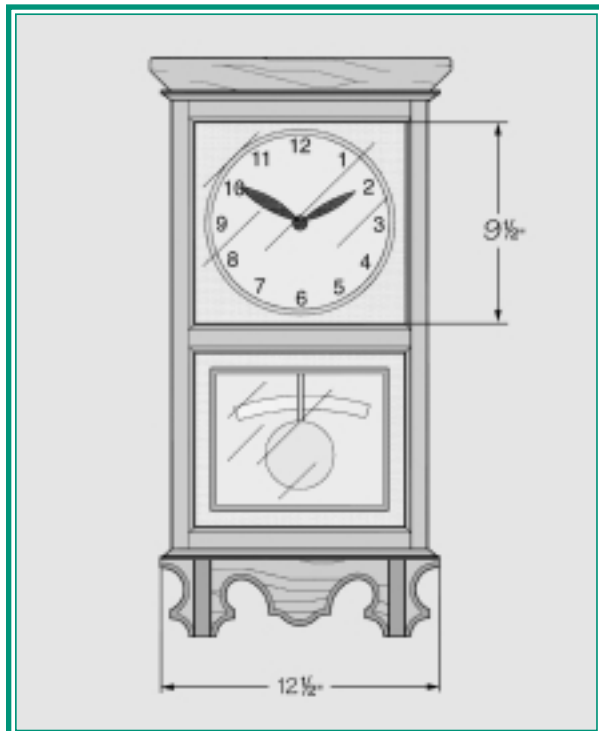
Memories.....

Remember the old clock on the wall at the railroad depot? Maybe you are not old enough for that, well maybe from the movies or the museum. I have always been enchanted by pendulum clocks. There is something comforting and soothing about the rhythmic movement of the pendulum and the look and feel of old oak.

About The Plan

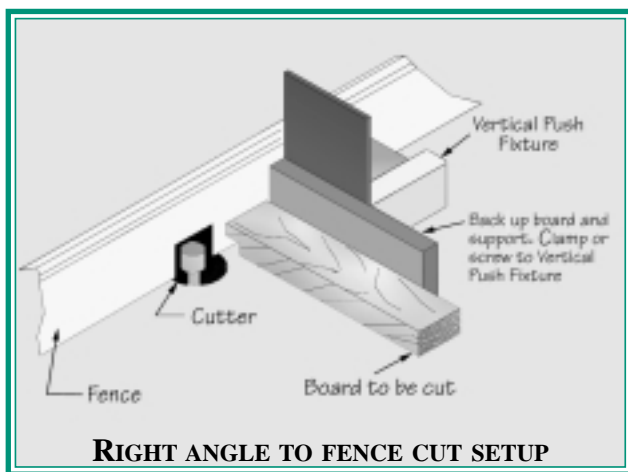
The case material should be red oak. One piece of $\frac{1}{2}$ " stock about 4" wide about 48" long will make the sides, and one piece of $\frac{3}{4}$ " stock 8" wide and 48" long will do for the rest. You will need a piece of $\frac{1}{4}$ " red oak plywood about 12" by 36" for the face and back. A $9\frac{1}{2}$ " dial face and the pendulum movement was ordered from **KLOCKIT Co.** in Lake Geneva Wis. I have provided you with full size patterns for the shelf back and brackets, and a template for the REGULATOR name. The $\frac{1}{4}$ " equally spaced dove-

tails fit the scale of the clock very well. I wanted to make the top and bottom alike and both from one piece of wood. To make the moldings it will be necessary to make the top and bottom as we would a lipped drawer. A $\frac{1}{2}$ " rabbet must be cut in each side for the dovetails. The front must be rabbeted at a minimum of $1\frac{1}{4}$ " to cover the $\frac{3}{4}$ " door and leave a lip. To keep the math calculations and machine movements to a minimum when making the dovetails choose a board width that is close to our needs and will make symmetrical joints. A width of $4\frac{1}{2}$ " width looks good for the outside width and we can use $3\frac{3}{16}$ " for the case width. The front rabbet will be $1\frac{5}{16}$ ". With the rabbets cut, the dovetail pins can be cut as if the total width of the board is to be dovetailed. In other words, on one end there will be no material for the first three cuts and on the other end there is no material for the last three cuts.



Lipped Dovetail Pin Cut

To make a lipped drawer front or any other piece with an overhanging lip the first cut must be a rabbet cut. In most instances this will be a cross grain cut. If the width of the piece (the surface to be cut) is not wider than the length, the piece must be supported along its length when routed. See the *Cope Cutting Guide* in SECTION III. Set the piece against the fence and down on the table. Place a backup board between the cope guide and the piece to be cut to prevent tearout.



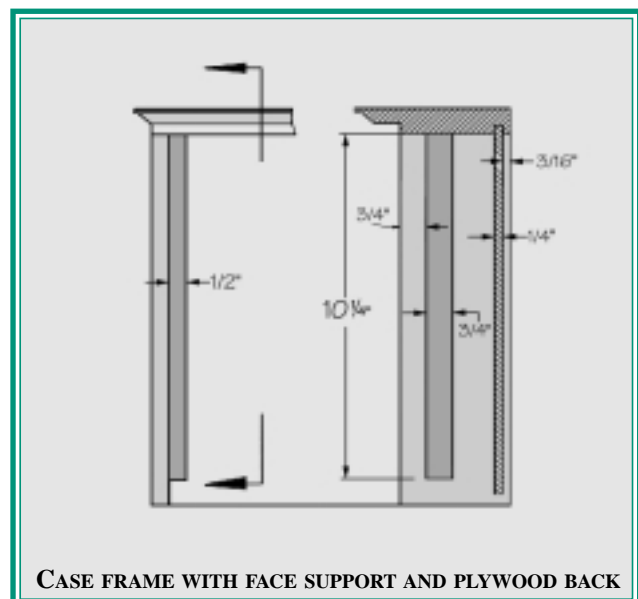
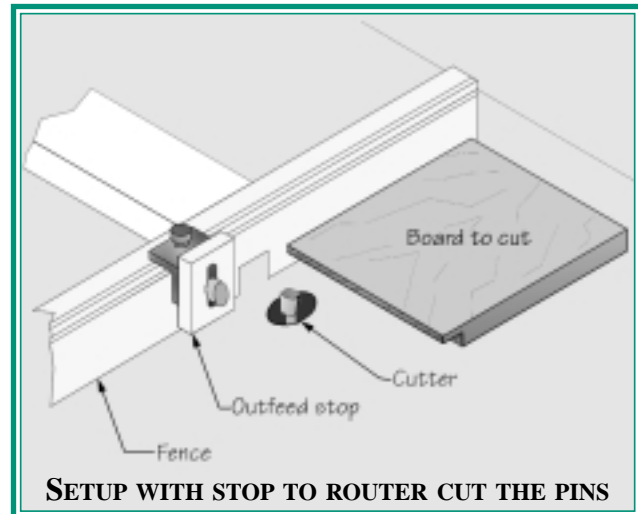
Zero the machine fence to the outside of a $\frac{3}{8}$ " or larger straight router bit. See SECTION I, *Setup* for instructions for zeroing the machine. Install an inch reading template, such as an outfeed template, in the machine. Set the template zero under the cursor. Cut the $\frac{1}{2}$ " wide by $\frac{5}{16}$ " deep rabbet in the end grain first and then cut the $1\frac{5}{16}$ " rabbet in the side last. Remember, make two boards, one for the top and one for the bottom. Remove the outfeed template from the machine and install it in the outfeed side of the fence. Install the $\frac{1}{4}$ " equally spaced dovetail template. Replace the straight cutting bit with the $\frac{1}{4}$ " dovetail bit. Re-zero the fence to proper position for cutting the dovetails. Determine the proper depth of cut (see SECTION II *Joinery*).

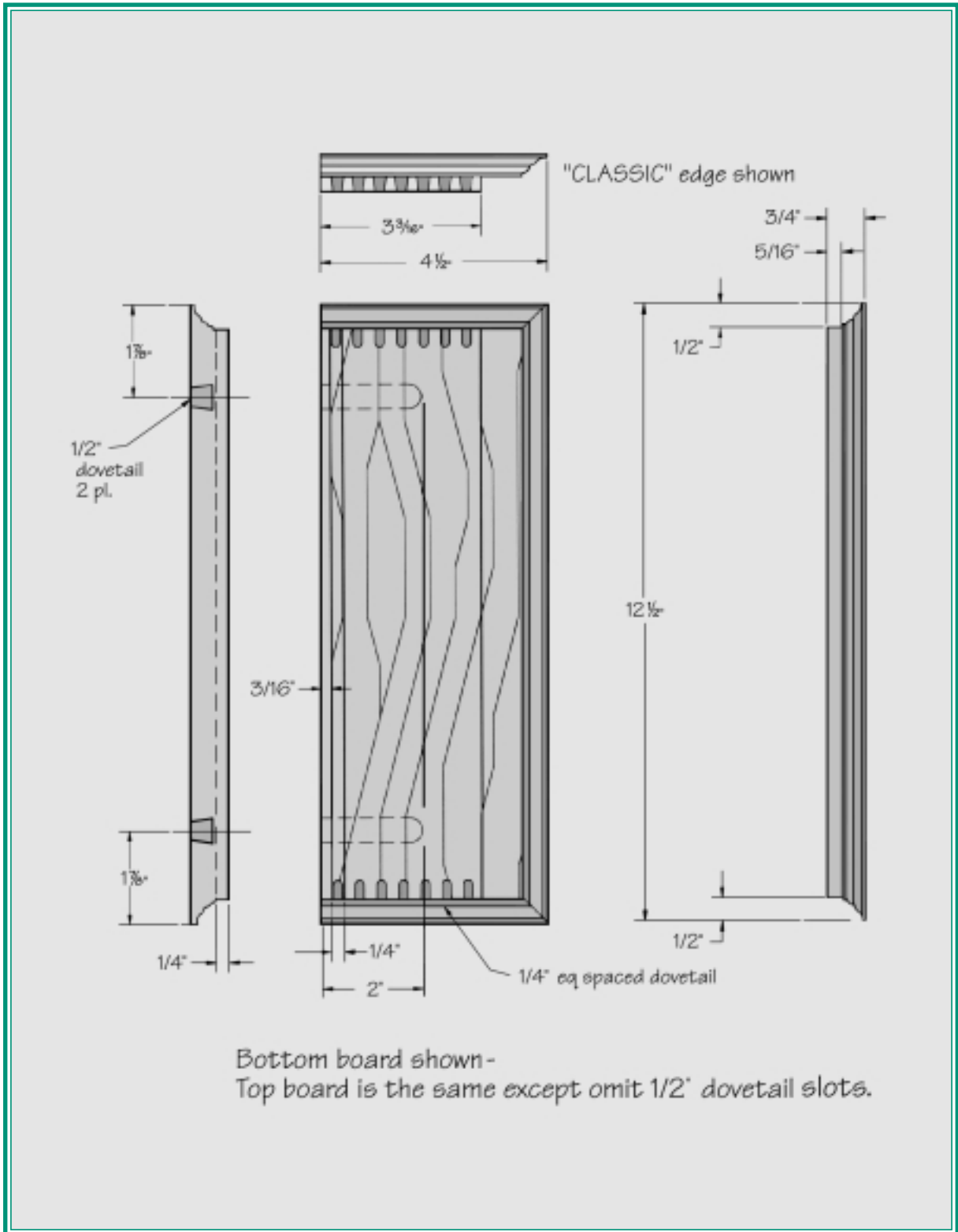
The outfeed stop location must compensate for the lip. (see Section II Lipped front drawer) In our case this will add $\frac{1}{2}$ ". The effective length of the pin cut will then be 1" instead of $\frac{1}{2}$ ".

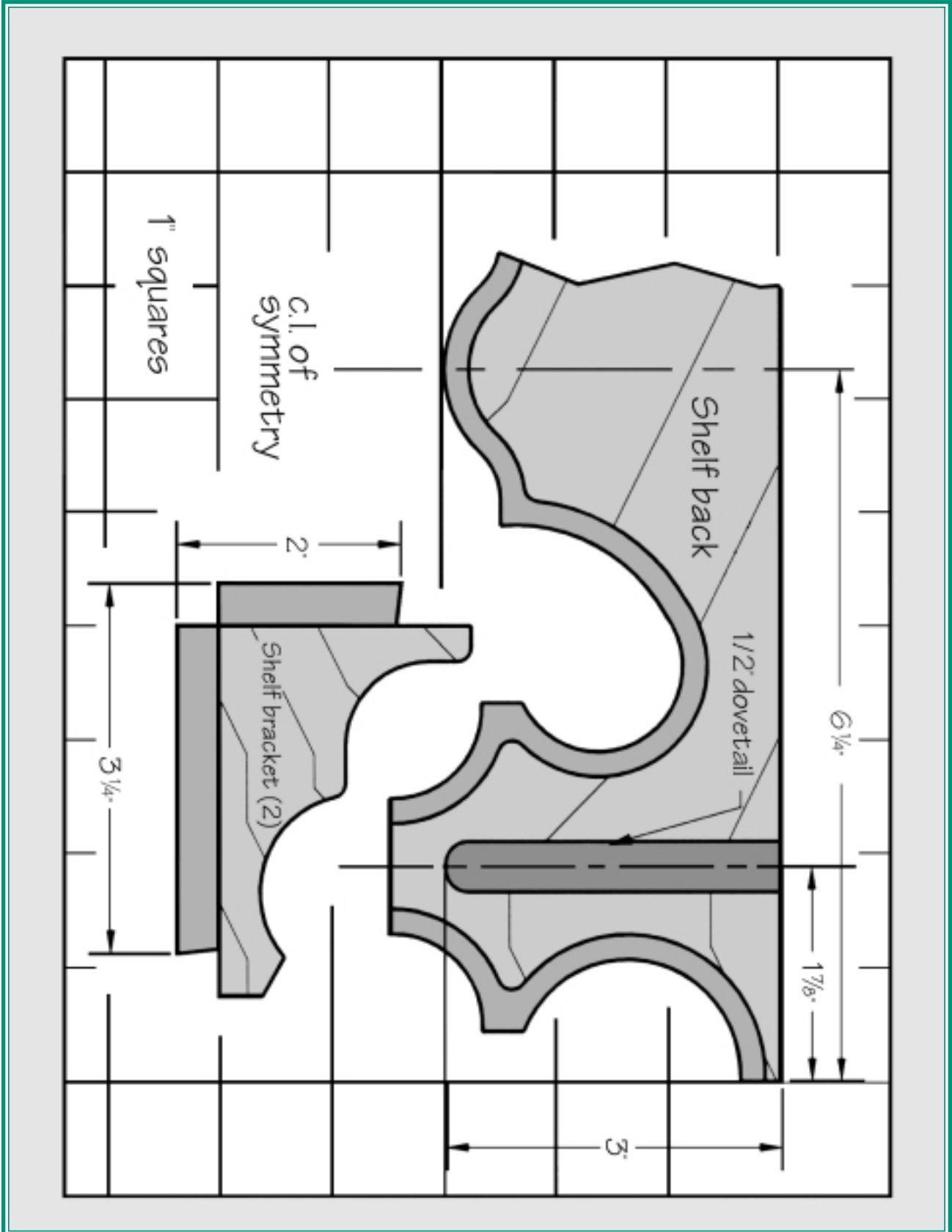
The tails and the rabbet on the side pieces will be cut as detailed in SECTION II.

NOTE:

Cut the three pieces for the top, bottom and the shelf back to the $12\frac{1}{2}$ " length at the same time in the same setup. It is important that they be exactly the same length.







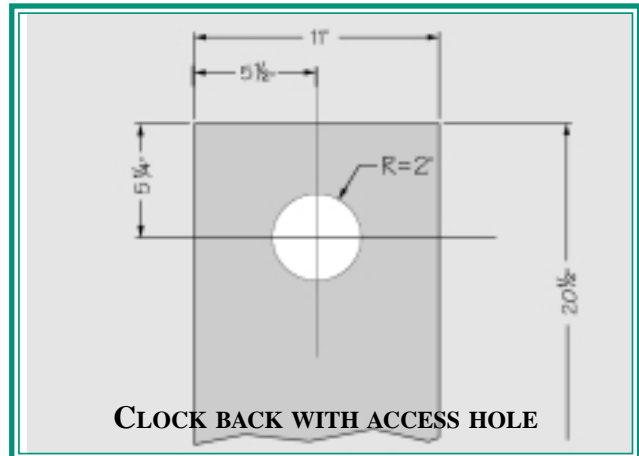
Case Construction

With top and bottom pieces dovetailed select one of the pieces to be the bottom and set the other aside. Install a $\frac{1}{2}$ " dovetail bit in your router and set it to the proper cutting height per the Handbook. Zero the **IPM-1** fence on the **CENTER** of the cutter (see SECTION II **Setup**). **CLINCHER** will be zeroed at center. Install outfeed fence scale template in the machine and set zero under the cursor. Move **IPM-1** fence to read $1\frac{7}{8}$ " on the scale and lock the fence. Cut the $\frac{1}{2}$ " dovetail in the bottom side of the bottom piece and in the blank that will become the shelf back. Unless you are using the 16" **IPM** machine or the 18" **CLINCHER**, it will be necessary to move your machine setup to make the second dovetail in the two workpieces. The second dovetail is more than 10" from the end of the board. (I keep pieces of material cut to exactly 1", 2", and 4" widths to be used as gauge blocks, marked and stored for use when needed) After making the first cut, without unlocking the **IPM** safety clamp knob, loosen the knobs supporting the **IPM** and back it away from the cutter. Install a gauge board of exactly 1" between the cutter and the fence to move the fence exactly 1". Tighten the knobs to lock the machine setup in place. Loosen the fence lock knob and move the fence to read $7\frac{3}{4}$ " on the scale. Double check as this should give you $8\frac{3}{4}$ " between the centers of the two dovetails. If you are using the **CLINCHER**, set the fence to read $8\frac{3}{4}$ " on the scale. Cut the two pieces.

Cut two pieces $2\frac{9}{16}$ " wide by $3\frac{3}{4}$ " long from $\frac{3}{4}$ " oak stock. These two pieces will be used for the shelf brackets. With the $\frac{1}{2}$ " dovetail cutter still installed reset your **IPM-1** to the original zero position. Cut the dovetail pins on the two bracket blocks as shown in the drawing. Cut a small amount off each side until you have a smooth sliding fit in the slots you just made. Take advantage of the fine adjustment control to ease in on the cut.

Cut out the shelf back and the shelf brackets with a band saw, jig saw or saber saw. Use full size drawings for the pattern.

Install a molding cutter bit in your router (I used a CLASSIC bit) and cut the molding on the top and bottom pieces as shown in the drawings. Set up your table saw to cut a groove $\frac{1}{4}$ " deep $\frac{3}{16}$ " in from the edge. Cut a slot in both sides and the top and bottom. Move the fence slightly and repeat the cut to get a slot $\frac{1}{4}$ " wide. Sand the sides and top and bottom pieces.



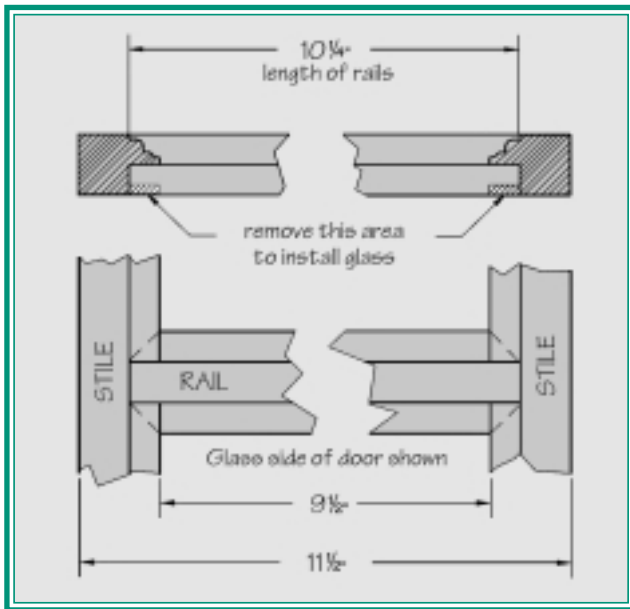
Cut a piece of $\frac{1}{4}$ " oak plywood 11" wide x $20\frac{1}{2}$ " long for the back. With a saber saw or a circle cutter in a drill press cut a 4" diameter hole $5\frac{1}{4}$ " down from the top and centered in the back as shown. The hole will provide access to the clock movement and the battery. Cut a 5" diameter cover from scrap $\frac{1}{4}$ " plywood for a cover, and fasten to the back with a couple of small flat-head screws.

Apply glue and assemble one side to the top and bottom. Slide the back into the slot, making sure the 4" hole is at the top, and install the other side with glue. Clamp the sides and ends. Check the case for squareness and set aside to let the glue dry.

Cut a piece of $\frac{1}{4}$ " oak plywood $10\frac{1}{2}$ " x $10\frac{1}{2}$ " for the face plate. Drill a hole in the center of the plate to fit the movement thread. Sand and set aside.

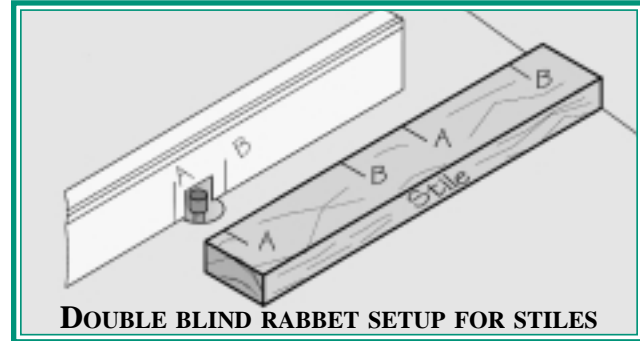
DOOR CONSTRUCTION

The door will require two pieces of $\frac{3}{4}$ " stock 1" wide and 36" long and one piece $1\frac{1}{4}$ " wide by 12" long. There are two ways to make the door, one with a rail and stile cut, and the other by mortise and tenon. The door construction I will describe here will be rail and stile. You will need a rail and stile bit set, either two bits or a stackable set in the design of your choice. Set up the bit set per the instructions that came with the bit. Cut the two 1" x 36" pieces as stiles. Cut both sides of the $1\frac{1}{4}$ " x 12" piece as a stile. Use your sliding crosscut saw table, square off one end and cut two stiles $20\frac{9}{16}$ " long. The length of the rails will be $\frac{3}{4}$ " longer than the inside of the stiles (see diagram). Cut the three remaining pieces to this length. To make the rails and stiles see *Rail & Stile Bits* (Section II, **Frames and Panels**).



The next step is the addition of the glass rabbet on the inside of the door stock. Remove the wood indicated in the diagram. The wood can be removed all the way across the top and bottom rails and both sides of the center rail. The rabbet in the stiles will have to be a stopped or blind cut (See drawing, pg IV-65). It is in fact two blind cuts in each stile. On each stile place a pencil line where the rabbet must stop, where the rabbet of the rail intersects the stile as shown. Transfer

this line to the top side of the stile. With a square block of wood mark the front and rear edges of the router bit on the fence insert or on the fence as shown in the diagram. Take very shallow cuts;



red oak splinters very easily. Align the pencil line on the stile with the line on the outfeed side of the bit on the fence and cut until the next pencil line on the stile lines up with the line on the infeed side of the fence as shown.

Glue and clamp the door assembly being sure to line up the top and bottom rails with the ends of the stiles. Check for squareness and set aside to dry. When the door assembly is dry square up the corners of the blind rabbets with a sharp chisel. Cut the mortises for the hinges in the right hand stiles and the matching mortises in the right hand case side.

Cut two $\frac{1}{2}$ " x $\frac{3}{4}$ " x $10\frac{1}{4}$ " strips from pine or other soft wood and glue to each side of the inside of the case $\frac{3}{4}$ " in from the door edge of the side. These strips will support the face plate. Install the face plate with a small flathead brass screw in each corner.

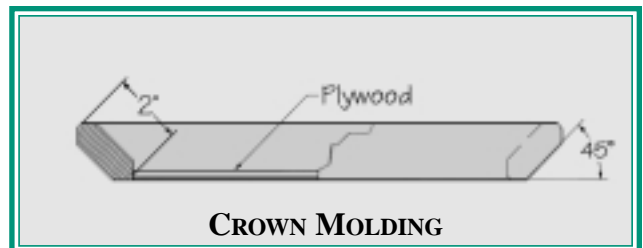
The crown molding will be made from a piece of red oak cabinet facing (actual dim $\frac{3}{4}$ " x 2") chamfered 45 degrees on all four corners edges. Cut the molding in a miter box and cut to fit flush with the outer edge of the top or $\frac{1}{4}$ " in from the edge. Cut a piece of $\frac{1}{2}$ " plywood or solid stock to just fit the inside of the molding. Glue up the crown molding around the block and glue the completed subassembly to the case when dry.

The Door Glass

Measure the openings in your door and get two pieces of single strength glass. Paint the glass as shown on pg IV-65. All painting will be done on the inside of the glass. Start by masking off the lower glass 1" in from each side. Leave a $\frac{1}{4}$ " gap and mask off another square as shown. The resulting $\frac{1}{4}$ " wide line will be painted gold or brass. I have had the best luck using model car paint. It will take about three coats to cover well. The upper glass will have an 8" inside diameter $\frac{1}{4}$ " wide stripe as shown. Apply masking tape to the inside of the upper glass and mark off the center of the glass. With a compass draw an 8" and 8 $\frac{1}{2}$ " circle on the tape. With a sharp (new) Exacto blade cut the tape on the lines and remove the $\frac{1}{4}$ " wide strip of tape. Paint the line with the model paint. When the stripes are dry remove the masking tape. Place the bottom glass inside up on the REGULATOR pattern. With a very small (0000) brush freehand trace the pattern on the glass with the model paint. Any succeeding coats can be done without tracing the pattern. Paint the area outside of the gold stripe on both glasses with either black or dark green paint.

If all the painting scares you there is an alternative. Buy four pieces of glass, two of each size. Buy lightweight poster board in the color of your choice and in gold. Cut the lower glass frame and the upper glass circle from the poster board and from the gold. Align the posters inside the door on one piece of glass and place the other glass on top. If you can find some gold rub on or stick on letters, apply them to the inside of the back glass.

The door glass can be secured in the door with clear silicon sealer, brads or a small molding and brads.



Finishing

If a darker color is desired apply stain to all the wood parts. Finish with at least 2 coats of water based varnish. DO NOT stain or varnish the dovetails on the shelf brackets. After finishing apply glue to the dovetails and install the brackets into the shelf back. Apply glue to the remaining dovetail and install the brackets and the shelf back to the clock bottom.

Install the dial face and clock movement per the vendors instructions. Install the door hinges and a latch.

Add a hook eye to the back, hang it on the wall, start the pendulum and sit back and watch.....

MATERIAL REQUIREMENTS

<u>ITEM</u>	<u>DESCRIPTION</u>	<u>QTY</u>	<u>SIZE</u>	<u>MATERIAL</u>
1	Sides	2	1/2" x 3 ³ / ₁₆ " x 20 ¹ / ₂ "	Red oak
2	Top & Bottom	2	3/4" x 4 ¹ / ₂ " x 12 ¹ / ₂ "	Red oak
3	Shelf Back	1	3/4" x 3 ¹ / ₂ " x 12 ¹ / ₂ "	Red oak
4	Bracket	2	3/4" x 2 ¹ / ₂ " x 3 ¹ / ₂ "	Red oak
5	Door Rails	2	3/4" x 1" x 20 ¹ / ₂ "	Red oak
6	Top & Bottom Stiles	2	3/4" x 1" x 10 ¹ / ₄ "	Red oak
7	Center Stile	1	3/4" x 1 ¹ / ₄ " x 10 ¹ / ₄ "	Red oak
8	Crown Molding	1	3/4" x 2" x 28"	Red oak
9	Back	1	1/4" x 11" x 20 ¹ / ₂ "	Red oak plywood
10	Face Board	1	1/4" x 10 ¹ / ₂ " x 10 ¹ / ₂ "	Red oak plywood
11	Face Support Strip	2	1/2" x 3/4" x 10 ¹ / ₄ "	Pine
12	Clock Face Glass	1	10 ³ / ₁₆ " x 10 ³ / ₁₆ "	Glass
13	Pendulum Glass	1	measure to fit	Glass
14	Hinges	1 pr	1 ¹ / ₂ " x 2"	Brass
15	Latch	1	Small	Brass
16	Movement, clock	1	pn 11903	Klockit, Inc. - P.O. Box 636 Lake Geneva, WI 53147
17	9 ¹ / ₂ Dial Face	1		

