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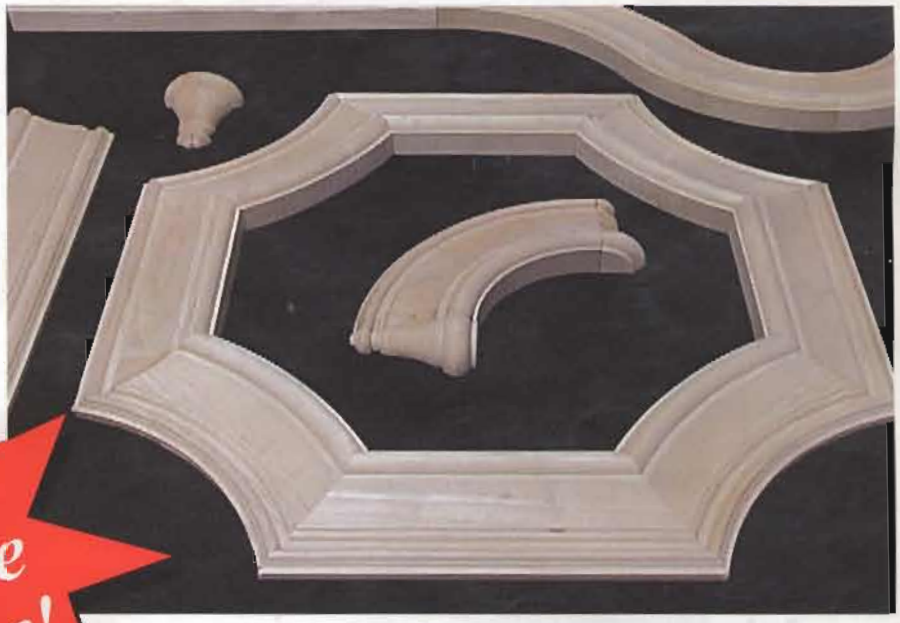
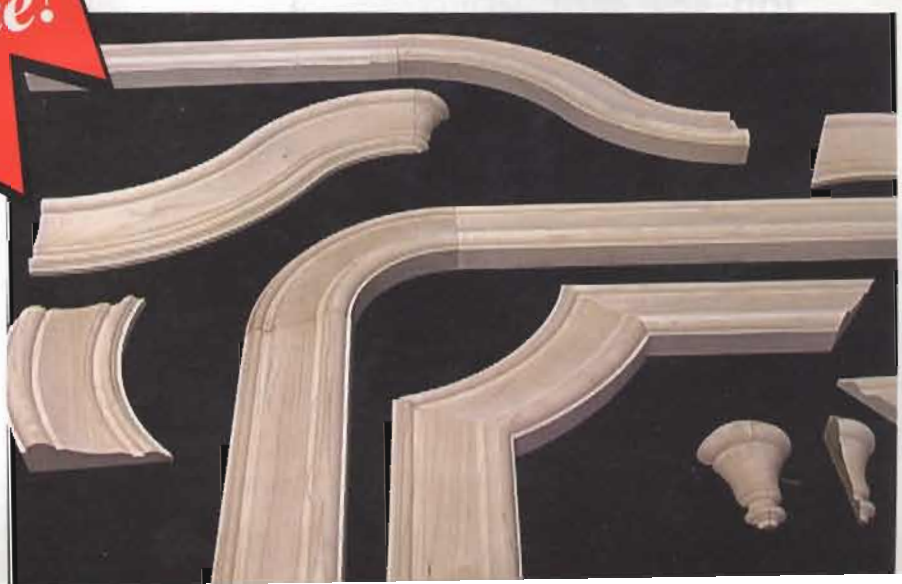
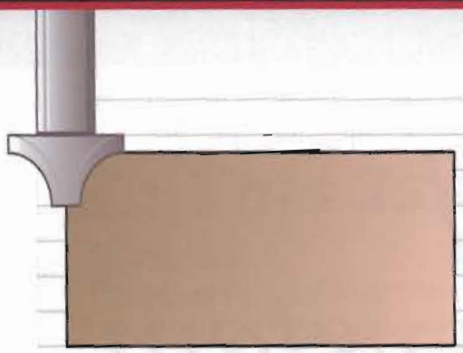
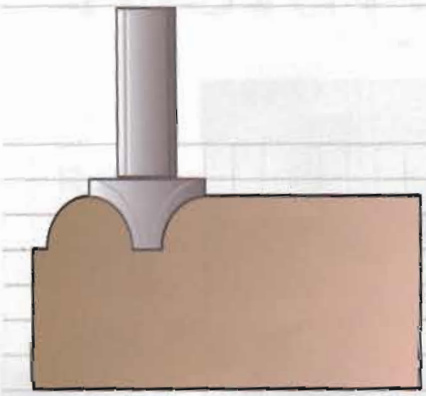


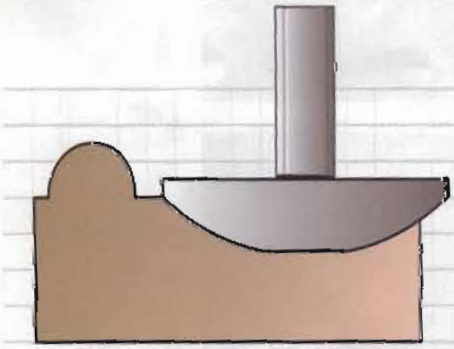


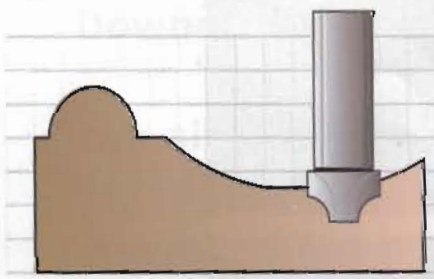
***Molding makes the difference!***

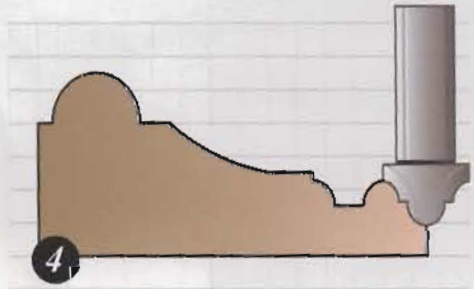
## CUSTOM MOLDINGS











One of the many advantages of creating custom mouldings on the Legacy and/or the new Overhead Router Table is the use of router bits, which are far less expensive and more flexible than cutters for a shaper or moulding machine. The easiest way to layout or design your mouldings is by using the Legacy Design Kit. It includes a very broad range of router bit profiles on templates that you trace onto a grid to design your part. Using this method has two advantages. The first is that you can see what your part is going to look like before you start cutting, if you don't like the design you simply erase it and start over. The second advantage is that the design shows you which router bits to use, as well as the position and how deep to set the plunge for each cut.

In this article we will show you how to create a simple straight moulding. We will then show you how to create swan-neck, arched and rounded corner mouldings all based on the same design. All router bit numbers are referencing Magnate router bits. You can purchase the bits directly on the web at **www.magnate.net** or by calling (800) 279-4570.

The first step is to position the stock in the horizontal vises so that you can reference the edge. For the straight moulding I used a V-groove bit as a pointer. With the y-axis set at 0", I positioned the stock in the Horizontal Vises. Using 0" makes it very easy to position the router for each cut, however, it may not be possible in every situation. For example, if your stock was 8" wide you wouldn't be able to set one edge at 0" on the y-axis, so you would pick an even number like 4" to set the edge of the stock and measure everything from that point.

Once the edge of the stock is positioned at the desired number, you simply read the drawing to see where to position each cut and how deep to set the plunge depth. I didn't take the time to thickness plane the stock to an exact thickness, therefore I referenced the base or bottom of the moulding to set the plunge depth.

To ***start*** this piece I positioned bit no.1276 centered right on the edge of the stock or at 0" in the y-axis and set the plunge depth so that the bottom of the router bit was raised 1" for the base or bottom of the part to make the first cut.

The ***second*** cut is 1" from the edge. Each turn of the handle is ¼" so I simply turned the handle 4 complete turns on the y-axis to offset the 1". The plunge depth is exactly the same and the router bit is the same so I didn't make any adjustments there.

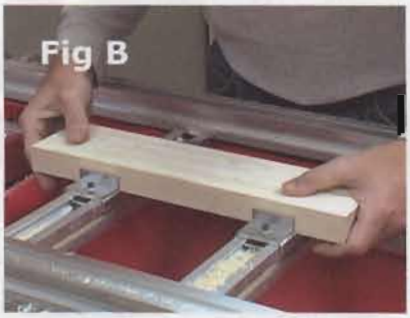
For the ***third*** cut I changed to bit no.5565 and positioned it at 2 3/8" from the edge (5 ½ turns on the y-axis handle) and raised the bit 5/8" from the base or bottom of the moulding to set the plunge depth.

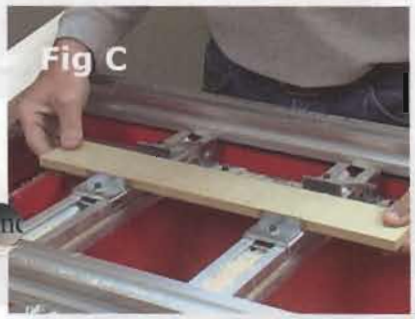
For the ***fourth*** cut I changed to bit no.1274 and positioned it at 2 11/16" from the edge (10 ¾ turns on the y-axis handle) and raised the bit 3/8" from the base or bottom of the moulding to set the plunge depth.

For the ***fifth*** and final cut I changed to bit no.3933 and positioned it at 3 3/8" from the edge (13 ½ turns on the y-axis handle) and raised the bit 1/2" from the base or bottom of the moulding to set the plunge depth.

Note: For the arched and corner mouldings (page 10 & 12) the bit is centered at 0" on the y-axis and the offset is set in the x-axis. For the swan neck moulding (page 7) the offset is controlled by the templates.

# Straight Moldings

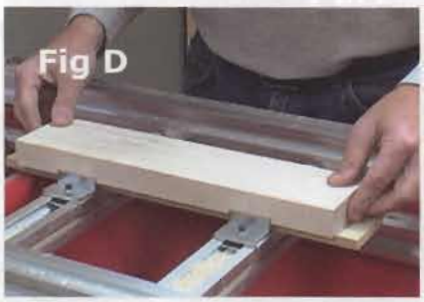

**A** Start by removing excess material with the table saw.

**B** The material is then placed in the horizontal bench vises.

**C** Where necessary, lift the material up from the vises with a spacer.

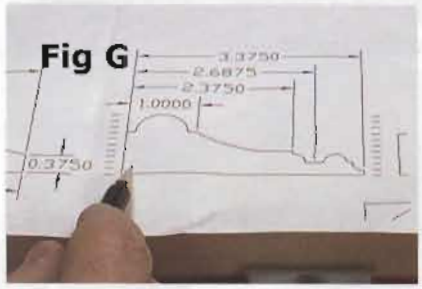
*Matching up different router bit profiles and sizes allows for a wide variety of molding designs.*

**D** This spacer will allow the material to be placed higher on the vises to avoid hitting the cam-locks with the router bit.




**E** The plunge depth is set to cut the proper depth.


**F - G** The router bit is positioned along the y-axis (short axis) to correspond with the drawing which represents the shape of the molding.

## CUSTOM MOLDINGS


Fig H

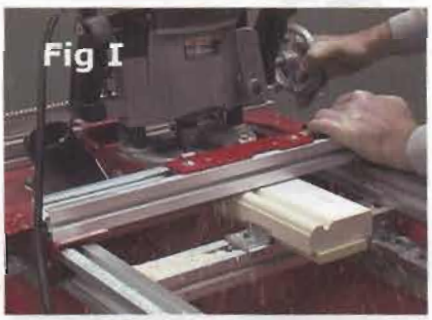


Fig I


Fig J


Fig K


Fig L

**H - J** The router is plunged down on one end (off of the work-piece), and slid along the length of the material, allowing the bit to create a profile. These cuts may need to be made in 3-4 passes, depending upon the size of the cutter.

**K - L** An end view of the part after the bead has been completed, and material has been removed in preparation for the cove to be milled in the center section.

**M** A 3rd bit is used to create a deeper cove and bead detail.

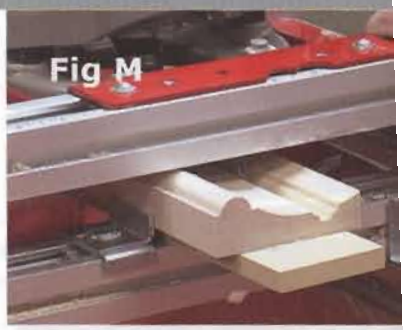


Fig M

**N** On the adjacent side is the fourth cut which completes the molding.


Fig N

**O - P** The finished molding looks like the drawing laid out prior to starting.

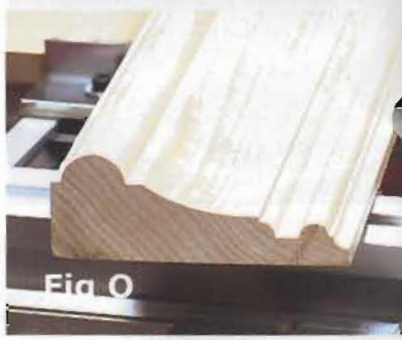


Fig O

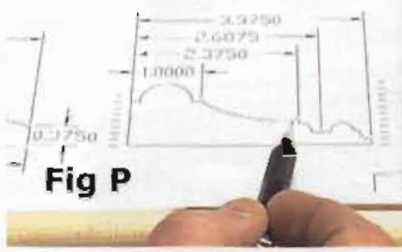
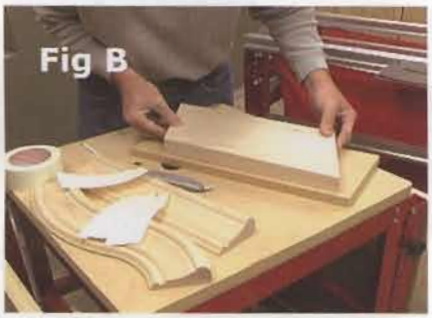


Fig P

*a $529 value!*

# *WIN A FREE OVERHEAD ROUTER*

***Design and create your own molding project using the horizontal bench vises or linear milling table - send in your photos by the 30th of September to be eligible to win.***




CUSTOM MOLDINGS

# Swan-neck Moldings

*Note. This article shows the new revised template following system which has a changeable, drop in pin. See page 9 for more details. If you are using the standard template follower these steps will be a little different.*

**A** Start by preparing stock large enough to cut the final molding out of. You will use a straight router bit to cut the curved edges in your mill so add a little extra material to the width and length.

**B** This stock will be secured to another waste block using double sided tape.

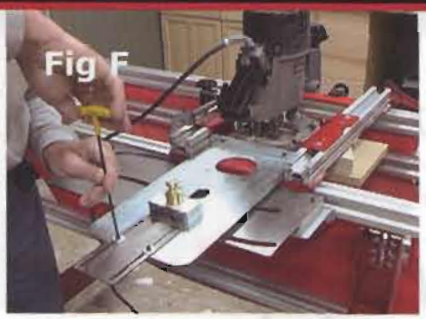
**C** This combination can now be placed in your horizontal vise. Next mount swan-neck molding template #1 on your mill. You will use the same template to create both the left and right side of your swan-neck molding so check the orientation before milling.

**D** Next slide the carriage so that the drop in stylus pin holder aligns with the top slot of the template and drop the 1/2 inch stylus pin into the holder and into the slot.

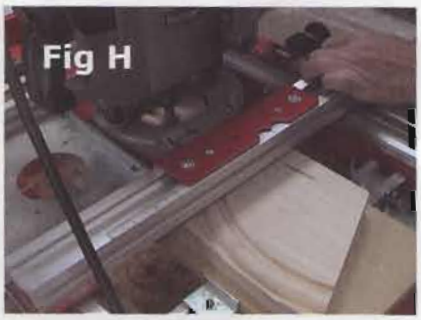


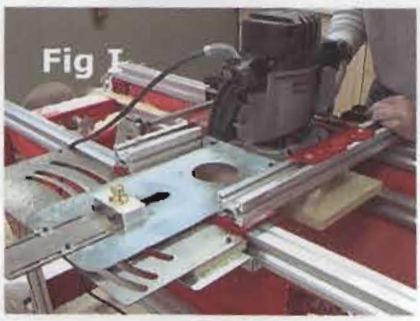
**E** Loosen the screws on the pin ajustment plate and shift the carriage in or out until the router is just past the edge of the material. Tighten the screws and move the carriage along the slot watching to be sure that the router does not go off the edge of your prepared stock. If this happens loosen the screws, make another adjustment and check again.

Next lift the stylus pin out of the outer slot and move it to the inside slot and test again to make sure that the router stil stays on your prepared stock. You are now ready to start milling your swan-neck molding.








**F** Template #1, currently on your mill, is used to mill the outside edges of the molding. Now that you have used it to make sure all your cuts will be on your prepared stock, remove it and replace it with template #2. To create this molding you will need 3 templates.

**G** Your first two cuts are the outside two slots of template #2 using the round over bit.

**H** Your next cut is the small round over bit using the inside slot of template #2.

**I** Set the depth of the cut using the plan shown on page 4 and make the third round over cut. This is a deep cut and you will need to make several passes to get to the final depth.

**J** Template #3 will be used to cut the large cove along the middle section of the molding. Use the outside slot for this cut.

**K** Use the inside slot of template #3 for the detail cut along the bottom edge of your molding.

**L** Now that the basic shape of your molding is complete all you need to do is switch to template #1 and use the two slots and a straight bit to cut the edges of the molding.

**M** Remove the finished molding from your waste block and you are ready to start the opposite side or your swan-neck, broken pediment molding.



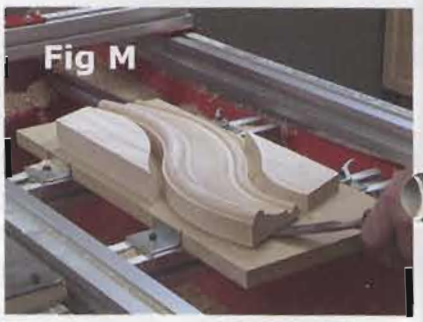



Fig A


Fig B


Fig C


Fig D

CUSTOM MOLDINGS

# Arched Moldings

*To create arched moldings to match the straight and swan neck moldings you will need to use the circle cutting center and a shop made turntable.*

**A - B - C** Mount the circle-cutting center to your bed rails and place the turntable on the circle-cutting center. This turntable will support the stock you mill in arched sections.

**D** Lay out the molding locations on the turntable and then mount the stock to the turntable using double-sided tape. In this example we only cut stock for the four curved sections needed for our project. As you see the angles for the miters are already cut on our blanks, eliminating the need to cut an angle on a curved piece of stock. Like a swan-neck molding your stock will have to be oversized to allow for the curved shape of the molding and some waste on the width.

*Note: If you are planing to make large quantities of arched moldings you may want to add vaccum clamping to your turntable.*


Fig E

**E** You are now ready to mill the stock profile using the same technique discussed in straight molding. You will reposition the router on the X-axis to make each cut on your molding and as you can see Tracy is slowly rotating the turntable to make each concentric cut.


**F** You will have to add the step of cutting the edges of your molding with a straight bit just as we did in the example of the swan neck molding.

You can really get creative in the ways you can combine your straight and curved moldings. For example;

shown here is a molding combination with the large profile to the inside of the frame but by reversing the order of your cuts the large profile could be moved to the inside edge of the curved molding which would move this detail to the outside of the frame. Whether you are creating trim for a unique shaped window, or detailed molding around a light fixture or niche, you will find this techinque can be used in almost every home improvement or furniture building project.


Fig A

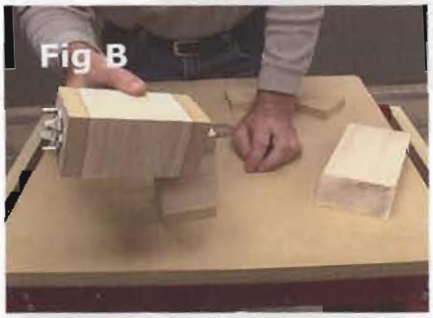


Fig B


Fig C


Fig D


Fig E



# Corner Moldings

*Turning the corner on a molding is usually accomplished using the traditional miter cut. For a smoother more attractive corner try this technique.*

**A** Prepare four pieces of stock about 1/2 inch longer than your straight molding is wide. These should have the grain going across the width not the length and cut to a right angle (90 degree and 45 degree cuts as shown).

**B** Place the four pieces with the 90 degree coners in the center and the widest edge on the outside of a new square block. Use double sided tape on the edges to keep them together while milling.

**C** Add a waste block to each end. This will allow you to mount your hubs without putting holes in the edges of your molding and give you room to make trim cuts on the ends. Add an index hub to one end, and make a small hole, 1/4 inch deep in the opposite end for the dead center.

**D** Place the stock between centers as you would a normal a turning operation.

**E** Follow the plan to create each step of the molding profile around the circumference of the stock. While milling straight molding you made your adjustments in the Y-axis but on corner moldings you will move the carriage in the X-axis to locate each cut.

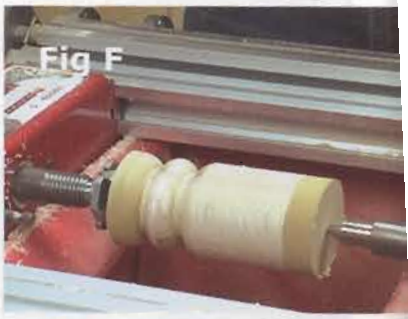


Fig F


Fig G

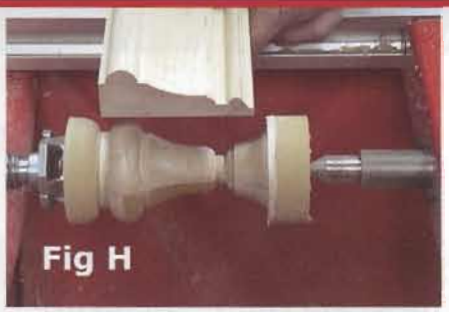


Fig H


Fig I


Fig J


Fig K

## CUSTOM MOLDINGS

**F** Shown here are the two large round over cuts.

**G** Add the large cove cut.

**H** As you can see the profile is coming along nicely with only one detail cut left.

**I** After cutting the final detail around the four peices use a straight bit to cut the final width. You will not want to cut clear through the molding as your finish part may be damaged as you cut through the center line of your moldings so make this cut just deep enough to give you a nice straight line to sand to after your through milling.

**J** Remove the molding from the mill and carefully pry apart the four milled sections. Sand to finish length and you are ready to turn a corner in style.

**K** Combine straight, contoured, arched and corner moldings to create an amazing range of finishing details for your next project.

Any project can be enhanced with the addition of molding, and by using these four techniques; straight, contoured (swan-neck), arched and corner molding, even a simple box can be transformed into fine furniture. Add these moldings to kitchen cabinets, case work, boxes and tables. Use them around the house to add that traditional look to trim, paneling and built in case work. You can even tackle a big project like a new mantle piece over the fireplace, well you get the point, the sky's the limit.

## *Technique Video and Templates Available*

If you found these articles helpful, a project video covering all four techinques is available for $29.00. If you would like to create the swan-neck molding shown in the article, a set of 3 templates for a 14" long molding is available for $35.00. Because of the many requests for precision templates we have begun manufacturing box joint templates, dentil molding templates, carving templates, and lettering templates. These templates can be found on page 9. Watch our web-site for more templates coming soon.

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*At the end of the day, what is it that I really want to accomplish in my woodshop?*

**New! Overhead Router Table**
see page 44

## No other tool can do more for your woodworking!

*Do I have the correct tools in my shop to help me achieve my objectives?*


# Creating Custom Moldings & Casings with the Linear Milling Table

*The value of using the Legacy as an overhead or inverted router table for milling custom moldings or matching existing moldings is unsurpassed. Creating moldings on a traditional router table is next to impossible due to the simple fact that once material is milled away from underneath you begin to have an unstable base that is difficult, at best, to keep level to the table. The new Linear Milling Table (that mounts to any of the models which use the extruded aluminum rails) is an inexpensive yet powerful solution to solving the need for custom moldings. For example, a recent bathroom addition in my 1895 home required just 40' of molding. Of course it was important that the door casings match the existing design in the rest of knifes to be made at the local mill, the house. Being a do-it-yourselfer, and not wanting to pay for custom knifes to be made at the local mill, I set out to create my own using the Legacy with the linear milling table attachment.*

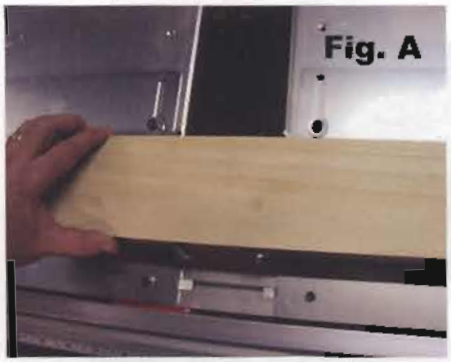


Fig. A

*With the tables attached to the Legacy, the adjustable fences were positioned to the same width as the material being milled (Figure A).*

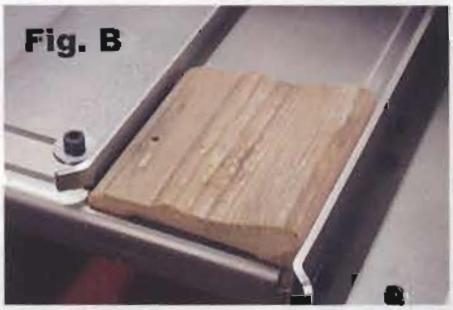


Fig. B

*I was able to use a small section of the existing molding as a template (Figure B) for both the z-axis (the plunge depth of the router), and the y-axis (across the width of the material). Where existing router bit profiles can be used the process is simple and straightforward. On areas where the shape cannot be produced using existing cutters, a 2" diameter core box bit works best. The bit is plunged down on the profile (Figure C) of the existing*


Fig. C

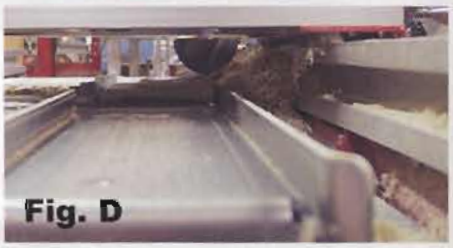


Fig. D


Fig. E


Fig. F

*molding and the router depth is locked into place. With the router locked into place on the y-axis screw, the material is then fed through the table and the router bit mills the corresponding section. After the cut has been made, the template is then placed back on the table (Figure D, E, & F), and the router is moved across the stock (y-axis) one-half turn of the handle, or 1/8", and*


Fig. G


Fig. H

## MILLING TIPS:

**1.** Start with material that is as straight as possible and try to complete the job as quickly as possible to avoid dealing with twisting material. The longer the material sits, (i.e. overnight) the greater the chance of twisting.
**2.** Use the DynaGlide lubricant on the tables to keep the material moving smoothly between the fences.
**3.** Keep the milling tables as close as possible, yet far enough apart so as not to be hit by the router bit. The infeed and outfeed tables can be positioned further out (10" - 20").
**4.** Use some type of feather board to hold the material down on the tables. This will help insure clean and consistent cuts.
**5.** Give yourself an extra 6"-12" of material on the ends for bad cuts caused by lifting material. The weight of the opposite end can force the material up into the cutter resulting in rough ends.
**6.** The stock can be fed from either direction. Remember that the router bit rotates in a clockwise direction. The bit is therefore either undercutting or climb-milling the material, the cleanest cut is achieved on the climb-milling side of the material, however the bit may pull the material through the table faster than is desired. A featherboard can assist in adding drag to the material.

*locked into place with the stop collars to prevent the router from repositioning itself while the cut is being made. (Note: The y-axis handwheel is best locked with the handle positioned straight up or straight down - as seen in Figure G. The screw thread is 1/4", therefore one full rotation of the handle moves the router 1/4", and one half turn of the handle moves the router 1/8", etc.)*

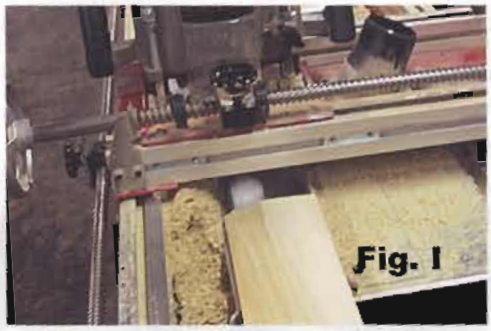


Fig. I

*This process is repeated across the width of the material until the profile has been created (Figure J).*


Fig. J

*Where possible use the bits that will give you the proper profile (Figure K & L).*

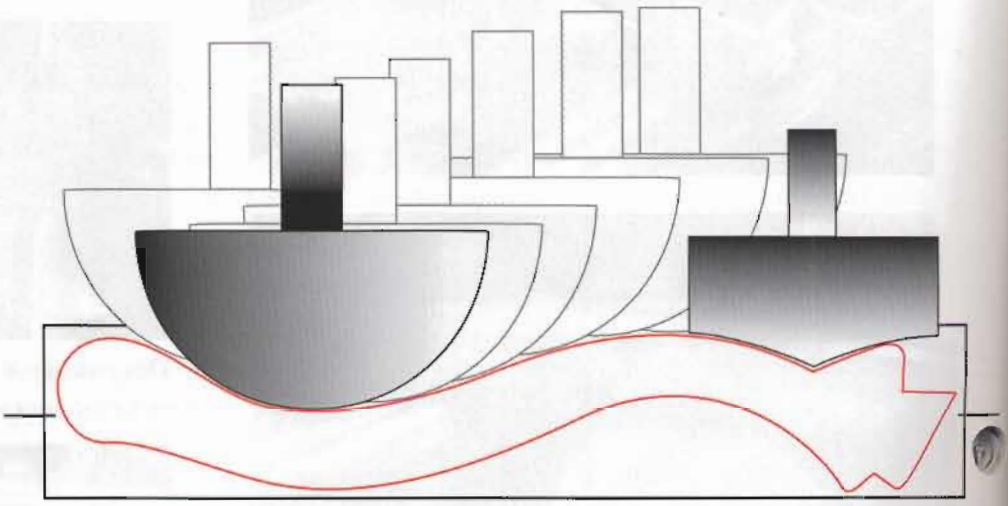

Fig. K


Fig. L

## TECHNIQUES

The technique using the linear milling table is specifically for feeding longer lengths of stock under the router. An equally effective method (given your material can be in shorter lengths) is to create a flat milling table out of 3/4" mdf. This table would measure 14 3/4" wide, and could be as long as the x-axis movement of the router. The template (pictured left) is mounted adjacent to the stock being milled (leave a 2" - 3" gap between the stock and the template so that you can start the router up without hitting either).

The drawing (pictured right) shows a combination of two bits; the profile of a rope molding bit, combined with the 2" core box bit to create the curved shape. You can see the peaks left in the material between the core box cuts. These peaks are easily removed with a little sanding, which will blend the cuts to a smooth profile.



*Editors Note:* The linear milling technique evolved from a problem that Richard Miller (San Francisco, CA) needed to solve. Richard owned a *Woodchuck Ornamental Mill* (The Woodchuck was the original ornamental mill created by *Phantom Engineering, Inc.* and could be considered the grandfather to the current *Legacy* models), and as a retired builder, was interested in making a cabinet based on a window design that he had seen in England, called an oriole window, similar in style to a bay window in this country. The problem: how to make the 14" wide crown molding on the bottom of the window (left). Understanding the 3-axis (x, y, & z) capability of his Woodchuck and with the help of Tracy Anderson, Richard conceived a way of milling the length of flat stock needed by following a pattern that was cut to the shape of the desired molding. A table was made to mount to the adjustable bed rails of the machine. This table would hold the flat stock into place while the router was ran back and forth along the length of the stock. The pattern was positioned on one end of the flat stock (similar to the photo pictured above left) and would determine the depth of the cut at its desired point along the y-axis (the short axis). The molding was completed in about 3 hours time. After Richard completed the molding he became curious as to what other shops would charge to have it made. The final bid on the molding alone was $1500, with a 2-3 week lead time. All that is left is to ask yourself - *what's my time worth?*