

# Tom's Tool Box – November 2009

## Pin Routing – Part 2

by Tom Walden

### *Drill Press Magic*

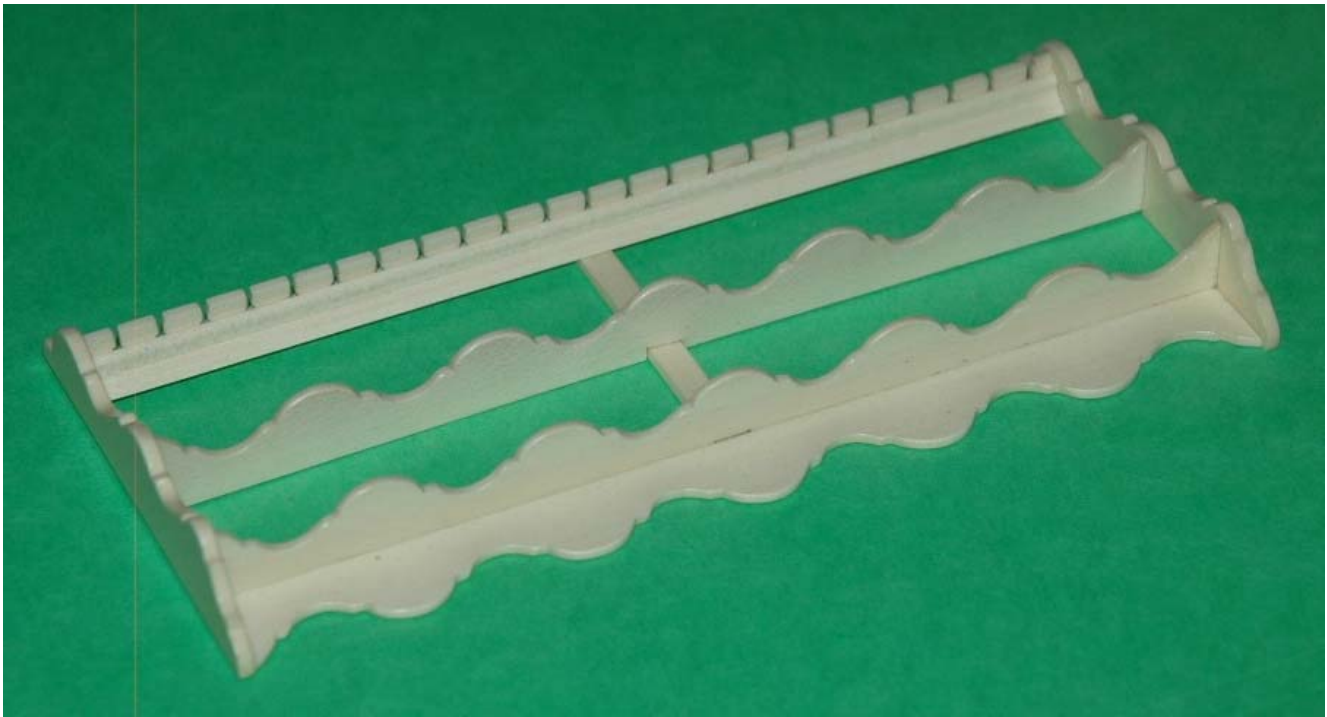
As many of you are aware, I teach a workshop called “The Magic of the Drill Press” at a few miniature shows throughout the year. The main reason that this workshop is so successful is that I teach hands-on absolutely unbelievable amazing drill press techniques. I have often been asked to make a video of my workshop, however this takes time in itself – plus some sort of studio to do it properly. Plus, I enjoy eating and supporting my family, thus I must work fulltime first.

So since I do not have the time to create a video or teach at very many shows, I will try to teach you some of my drill press magic in this article. However, keep in mind that nothing works better than hands-on learning – especially on a drill press. You get that warm fuzzy feeling while learning this stuff live, and you get to smell that sawdust while doing it too.

Although I teach quite a variety of drill press techniques, for the next two articles I am going to concentrate on that mysterious subject of pin routing. This is really a science in its own for us miniaturists, and this subject could really extend into many months. The initial hard part you will have is understanding the entire concept.

Some of my students catch on right away. Yet for others, pin routing does not click for them until the end of the workshop. So do not become disillusioned if you do not understand pin routing until you have read this article more than once – and actually done it yourself. However, once you do, you will have a whole new world of capabilities available to you.

Now I can hear your rusty (or well-oiled) wheels turning trying to envision what pin routing is really about. What good is it??? However, since pictures speak better than words – let me first show you an example of what I have made using pin routing techniques. In Figure 1 is an Empire Buffet shelf unit. Every curve on each shelf, and every curve on each side panel - were all shaped with a pin routing pattern jig (for each). Obviously you could have cut all 3 similar shelf sections with a scroll or jeweler's saw, but they would not be a matching set. With pin routing technology – all 3 shelf sections would be shaped identically the same - a huge benefit and also mini-eye candy.



**Figure 1 – Shelf Unit Shaped with Pin Routing Jigs**

In Figure 2 you can see the pin routing pattern jig that I created to shape each of the shelf pieces. The straight board above it slides perfectly into the jig – and it **MUST** be very snug. The board must not be allowed to move around even the slightest amount while in the jig in order to cut a perfect shape. Thus the pattern itself is underneath the board to be cut. The jig is then move along the cutting bit using the pattern to guide the cutting action via the pin.



**Figure 2 – Pin Routing Jig for Shelf in Figure 1**

I made and used a separate jig for the side pieces. But the same principals apply here too. A blank board is slid into the jig and cut according to the pattern in the jig. This particular piece is a little harder to cut because the pieces are 3/32" thick.

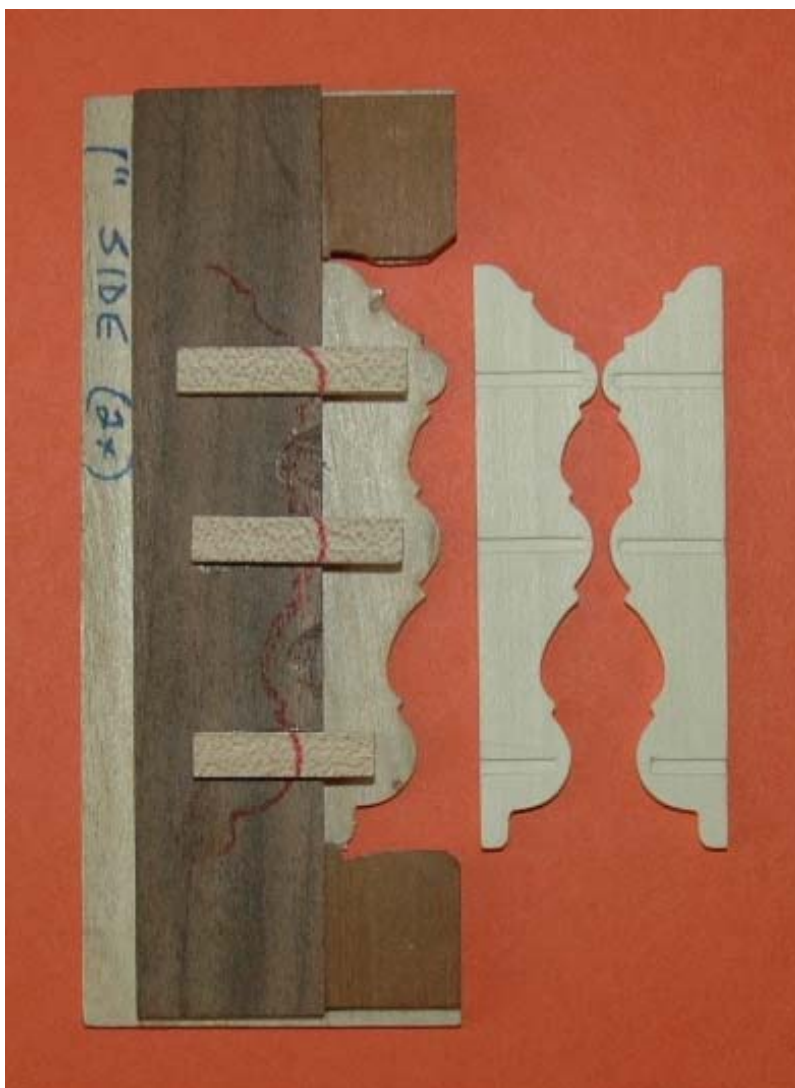


Figure 3 – Pin Routing Jig for Sides in Figure 1

### ***The Mystery of Pin Routing Unveiled***

You can now see what can be accomplished via pin routing – and this is just a drop in the mini-bucket. There are very few projects I make anymore where I do not use some sort of pin routing technique/jig. But before we move on, you now need to refer back to my July 2008 article (available on my website if you do not have it).

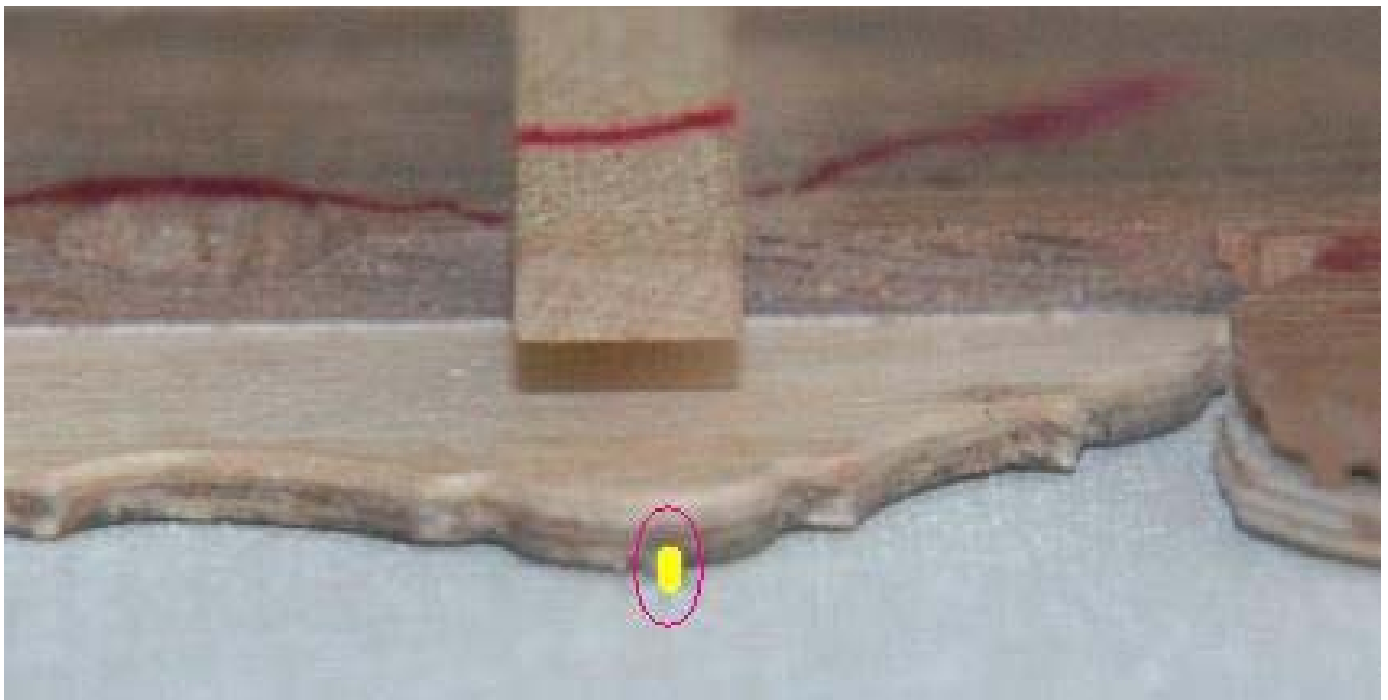
In this article I gave you a brief introduction into the world of pin routing. I also described how to make your own pin routing jig. The article also shows you some more sample pattern jigs – even one that makes very thin cabriole legs. So if you can, please read that article first in conjunction with this article. Between both articles you should get a much better understanding of pin routing techniques. Next month we will build an actual pattern jig.

As a brief summary – a pin routing jig is basically just a #19 nail protruding 3/64” through a 3/8” thick board that is the width of your drill press table. This pin is then used to guide a 1/32” end mill bit sitting directly over top the pin (previously a #19 nail). The overhead bit is positioned exactly over top the center of the pin with just barely any clearance. After all, we want to cut completely through the wood, but not into the pin itself – or break your bit.

Ironically this single jig will work with 90% of any pattern jigs that you make. The only time you would need a different jig is if you are using an end mill bit of a different diameter than our standard of 1/32”. If that is the case, then find a small flathead nail the same diameter as your bit and create a new pin routing jig for it. Since the cabriole legs I cut are 1/4” square, I need a more powerful and longer cutting bit to shape those beautiful legs. Thus the need for a wider pin in my pin routing jig.

In Figure 4 you will see a pin (painted yellow) with a pattern jig butted up to it. When in use, there would be an end mill bit directly over that pin – plus a piece of wood inside that jig. At that time the pin is no longer visible from overhead. Thus you must have a visual picture of the pattern you are cutting in your mind. Then you move the wood back and forth, in and out, using the pin to guide where you cut the wood. Eventually your piece of wood will be cut exactly to match your pattern jig.

You will NOT cut your pattern jig as the pin will prevent that – although some of my students have tried to. You just need to make sure you hold the wood tightly in place while cutting. But you will learn that from experience. I know you are probably dizzy trying to understand this concept about now, but until you actually do some pin routing yourself, you will probably remain dizzy.



**Figure 4 – Pin Routing Jig Showing Pin (painted yellow) in Use**

## ***Cutting a Perfect Circle Using a Pin Routing Jig***

One of the most amazing secrets people learn in my workshops is how easy it really is to cut perfect circles/holes – with a simple pin routing jig. First mark the backside of the board to be cut at its center point for your circle. Then use the bit to drill just part way into your board – unless of course you want a small hole in the middle of your table, then you can drill the hole all the way through.

Now position the pin on the pin routing jig the exact distance from the end mill bit for the radius of your table top (or window opening, or wheel). Make sure everything is clamped in position, then flip the board over and position it so that the tiny pin hole you just drilled fits right on to the pin itself. You should now be able to spin your piece of wood on that pin. You should also be getting the jest of how this works now too.

Now turn on the drill motor and lower the cutting bit about 1/64" into the wood and lock the height in place. Then using fingers from both hands, slowly spin the wood clockwise. Also keep it flat as you spin it. Once around the circle, lower the bit another 1/64" – and repeat this process until you are completely through your wood. You can see an example in Figure 5.



**Figure 5 – Cutting a Perfect Circle with a Pin Routing Jig**

If you look at Figure 6, you will see the finished cut circle. I flipped it over so you can see that my X marks the spot for the center of my circle (I can now erase that if need be). I have circled the pin itself and painted it black to show you its location in relation to the cutting bit while the wood was being spun and cut. The sample was just 1/16" wood, whereas table tops are typically much thicker, and would thus take many more laps around the circle to completely cut through it.



**Figure 6 - Finished Circle Showing X Marking and Pin**

What to cut a wheel instead? Using the same wood I just cut, simply move the pin closer to the cutting bit and cut the circle piece itself. You are now cutting a circle within the circle (concentric circles, aka a wheel). Pretty slick, huh? And it only costs you a couple bucks to get the bit and make the pin routing jig itself.

And you are not limited to a flat edge for the circle piece if cutting a table top. If you look at the table top in Figure 7 – once the circle itself was cut, I then used the same setup to cut a concave edge around the entire top. All I did was change to a round ball router bit. Again I cut the edges in layers to prevent the wood from splintering or shattering. You could have used a beading bit to cut a convex/rounded edge instead. There are many variations of this method that you could play with - now that you know the basic concept – start playing!



**Figure 7 – Adding a Concave Edge to a Table Top**

In this article you learned how to use a pin routing jig and cut perfect circles with the same jig. I have used pin routing jigs to shape things such as the outer edges of table top radios, odd shaped table tops, fretwork for radio grills, cabriole legs, 4-side tapered legs, and dozens of other things.

Okay, this completes part 2 of a 3-part series on pin routing (part 1 was actually the July 2008 article). Next month I will discuss how to actually make your own pin routing pattern jig to cut the fretwork for a tiny radio speaker grill. The same concept can be used to make most other pattern jigs also.

You may contact me directly for comments and/or suggestions for future tool articles at: [tom@TomWalden.name](mailto:tom@TomWalden.name) . Visit my web site at [www.TomWalden.name](http://www.TomWalden.name) to see some of the furniture and flooring I have made using the techniques discussed in these articles. If you wish to see me in action teaching one of my drill press workshops, I will be at the Philadelphia Miniaturia in November, or Orlando (Molly Cromwell) in February.