

# Making Pens with Inlays

By Jim Lambert

The following article is meant to teach pen turners how to put inlays in their pens. It is not intended to teach the basics of pen making. I would like to acknowledge William Lee for getting me started and showing me how to work with inlays.

There are several ways to create inlays in pens and other small items. The methods range from using high priced laser engravers to manually cutting the pieces free-hand. The technique you choose must be based on your budget as well as your woodworking skills. With a laser engraver, cutting inlays can be as easy as printing a picture on a piece of paper. Unfortunately, these versatile machines will generally set you back \$10,000 or more.



*Americana Ballpoint Pen – Masur Birch with two African Blackwood Shark Inlays*

Creating inlays free-hand is well within my budget, but I'm afraid my hand-eye coordination isn't what it once was. The use of templates makes the job significantly more accurate and repeatable if your skills are not considerably better than most. The method I use to create inlays involves using a machine designed to put inlays in pool cues. This machine is from Unique Products, Inc. and can be seen on their website, <http://www.uniqueinc.com/>. It is basically a Dremel-type tool connected to a pantograph. The inlay machine costs close to \$2,000. This might not be within your budget, but there are methods to cut the inlays and pockets without this machine. I would like to see one of the metal-working gurus among us design a similar machine just for pen making. This could bring the cost down considerably.

One of the more economical options involves hiring a laser engraver operator to cut your inlays and pockets for you. This adds tremendous versatility as a laser engraver can use virtually any image you can find on the computer. This is considerably easier than making templates for each shape you want to inlay into a pen. If you do not know of a laser engraver operator, simply ask in one of the IAP forums, and we'll get you connected. You can read Ken Nelson's article on creating the beautiful Stars & Stripes pen on the IAP website.

The technique I will be describing can be duplicated and modified to suit your needs based on the equipment available to you. If you develop alternate methods of accurately cutting inlays and pockets, please share this information with me, and I will update the article as the techniques are developed. Forward your technique to [jim@woodpens.com](mailto:jim@woodpens.com).

## Templates

The use of templates allows accurate, repeatable cuts in both the inlay material and the pockets for the inlays. High density plastic works very well for templates. The design may be cut into the plastic using a Dremel tool, laser engraver, CNC machine or even by hand. Since there is a 2:1 reduction in size by the pantograph, the shape in the template needs to be twice the size of the desired inlay. A maximum height of 1/2" in the template ensures the actual inlay on the pen does not exceed 1/4". If 1/4" were exceeded, the top and/or bottom of the inlay may be cut off during the final turning of the pen.



A depth of approximately 1/8" works well. This half of the template will be used for cutting the pockets into the pen blank. The other half will be used for cutting the inlays. To make this half, simply pour T-88 epoxy made by System Three into the first template, and place your backing board or melamine over the epoxy. Clamp the template securely and let dry overnight. When the T-88 is dry, you can separate the two templates. To the left, you can see the pocket template on the inlay machine and the matching inlay template below it.

Alternatively, you can hire a good laser engraver operator to make both pieces for you. Fortunately, you only have to make the template once or any given shape.

## Inlay Materials

The material used for your inlays may come from a variety of sources. I typically use material that is approximately 1/16" thick. You can cut your own material or buy ready to use inlay slabs. Below are some examples including Turquoise Tru-Stone, Mammoth Ivory, African Blackwood and black paper sheet inlay material. I have also used mother of pearl. Carbide end mills have no problem cutting it.

One of my favorite sources for inlay material as well as carbide end mills is Atlas Billiard Supplies ([www.atlasbilliards](http://www.atlasbilliards)). I use CA glue to attach the inlay material to Plexiglas with the paper backing still attached. The Plexiglas should be cut large enough to allow it to be clamped in place without the clamps getting in the way of the Dremel or cutting tool.



## Initial Turning

The first step of this process involves all of the normal steps of turning a standard pen. You choose your pen style and wood or other materials, drill the blanks, glue in the brass tubes and square the ends of the blanks. You then mount your blanks on the mandrel.



Turn the blanks slightly oversized. I typically stop turning when the blanks are about 1/32" larger than the bushings. If a tenon is required for the pen style you are making, then it is a good idea to cut it before the pocket is cut into the blank. This makes centering the inlay between the center band and finial easier. Remove the blanks from the lathe, keeping the proper orientation between the two blanks. The blanks are now ready for the inlay pockets to be cut.

## Cutting Inlays

I now cut the inlays from the slabs glued to the Plexiglas. The material is held firmly in place by two clamps. It is important that the material does not move as the Dremel cuts through it. Using the inlay machine, the stylus is guided around the perimeter of the template. This drives the Dremel tool in the pantograph to cut the inlay material. On this pantograph, there is a 2:1 reduction in size. It will take three or more passes successively deeper into the material until the paper backing on the Plexiglas is cut through.

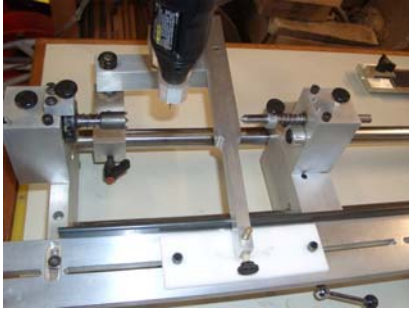


The inlay can then be carefully pried from the Plexiglas using a small flat tip screwdriver. The backing should come up with the inlay. The inlay slab should be moved such that the next inlay will be cut without overlapping the hole from the previous. Repeat this process until all of the required inlays have been cut.



## Cutting Pockets

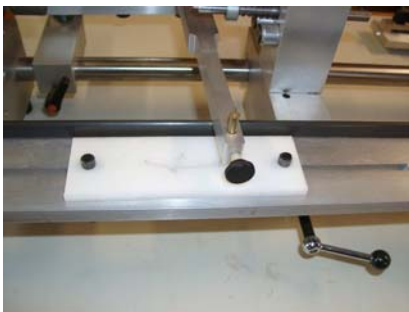
The inlay template should now be replaced with the matching pocket template. The flat base for cutting inlays is removed and the tailstock slides closer to the headstock. There is a 24 point index on the head stock which allows for easy alignment for a variety of pocket patterns. I have cut 2, 3, or 4 inlays into the cap of a pen. Many more combinations are available with this indexing system.



I have maple spindles cut to size for all of the pens I put inlays into. The spindle fits snugly inside the brass tube so it does not rotate while cutting the pockets. A drop of water on the spindle will make it swell enough to form a tight fit. With the maple spindle in place, the tailstock is slid against the right side of the pen barrel and locked in place against the headstock.



Now, the stylus is guided on the inside of the pocket template. Again, three or more passes are made successfully deeper into the barrel. I try to cut deep enough to scratch the surface of the brass tube, but not cut through it. The deeper you cut, the less likely you are to cut off the top or bottom of a tall inlay.



You can see part of the tube has been reached inside this pocket.



## Inserting Inlays

I have completed cutting the inlays and the pockets. For this project, I have two shark inlays for each of the three pens. The pockets were cut 180 degrees apart so that one will be on each side of the pen clip. I now put a coat of thin CA glue inside the pocket and on the bottom of the inlay. Without delay, I press the inlay into the pocket and press firmly with the pen press.



A small piece of wax paper between the inlay and the pen press will prevent gluing the two together when the excess glue is squeezed out. When all of the inlays have been pressed into place, give them a good coating of thin CA glue to fill any gaps. A shot of CA accelerator will speed the drying process here.

You can see the paper backing from the Plexiglas on the inserted inlays. This will come off when turning to size.



## Final Turning

Once the glue has dried in the pen barrels, you now go back to the lathe and finish turning them to size. If the inlays protrude much from the barrel, I use coarse sandpaper to make the edges smooth before turning. This may prevent a disaster if the skew catches in the inlay. Carefully turn the upper and lower pen barrels as you normally would.



I like to use a CA finish on pens with inlays. The CA will fill any voids or gaps and give a glass-like finish. When the finish dries, simply assemble your pen in accordance with the kit instructions. I like to give the pen a coat of Renaissance Wax for a slick appearance and to keep it free of finger prints.

## Examples



*American Classic Ballpoint Pen –  
Cambodian Burl with Mammoth Ivory  
Inlays*



*American Classic Ballpoint Pen – African  
Blackwood with Mammoth Ivory Inlays and  
Accents*



*El Grande Rollerball Pen – Afzelia Xylay  
with African Blackwood Inlays*



*American Classic Ballpoint Pen –  
Bloodwood (Cardinal Wood) with  
Mammoth Ivory Inlays and Accents*