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One Method for Making Custom Cabochons / Finials

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The Cap/Finial component of the Caballero pen kit as well as many of the Jr. Gent style of rollerball kits lend themselves to this modification because the factory installed cabochon can be removed from the cap/finial and replaced with a custom one made from the same blank material as the pen. As with most procedures in pen turning there are multiple methods for accomplishing this. This tutorial only explains one of them – the one that I use.

The main steps include:

- 1) Removing the Factory Cabochon from the cap/finial
- 2) Measuring the Factory Cabochon
- 3) Turning the Cabochon
- 4) Sanding and Finishing the Cabochon
- 5) Gluing the Custom Cabochon into the Cap/Finial

Cabochon Removal Die and Punch

Remove the Factory Cabochon from the cap/finial by punching it out with a punch and die made to help with removal. The following describes a Cabochon Removal Die and Punch Guide. It consists of a small $\frac{3}{4}$ (3/4) inch thick piece of very hard Hickory wood.

First I drilled a counter bore hole about $\frac{1}{4}$ (1/4) inch deep using a $\frac{19}{16}$ (19/16) inch standard drill bit. I used a standard bit so that the bottom of the counter bore would have a natural chamfer towards the center from the bit. This is to help center and hold the factory cap/finial in the die.

Then, without moving the board, I replaced the a $\frac{19}{16}$ (19/16) drill bit with a $\frac{27}{64}$ (27/64) inch drill bit and drilled a through hole down the center of the counter bore. This is the clearance hole for the factory cabochon to go through when it is punched out.

To provide a holder, helpful for holding the factory cabochon to measure its OD, I drilled a $\frac{3}{16}$ (3/16) inch hole off to the side. The peg on the cabochon will fit inside this hole to help hold it when I am setting my divider calipers to the diameter of the cabochon. I then use the dividers to gauge the diameter of the custom cabochon as it is being turned.

I drilled a $\frac{5}{32}$ (5/32) inch hole down the center of a short $\frac{3}{8}$ (3/8) inch dowel. My Wilde PP 532 Pin Punch fits through this hole and it acts as a guide dowel to help hold and center the punch on the inside of the cap/finial. I added a couple of wraps of blue painters tape (masking tape) around one end of the guide dowel to make it fit a little bit tighter on the Diamond Knurl cap which has a slightly larger inside diameter. It can simply be flipped over to fit smaller cap/finials.



Although a Transfer Punch or Pen Disassembly Punch would work, I use a $\frac{5}{32}$ (5/23) inch Wilde brand pin punch and a rubber/plastic mallet to remove the cabochon. The factory cabochon is usually press fit tightly into the hole and does not readily come apart, so it can take several rather sharp blows with a mallet (or hammer) on the punch to get it to break loose.

So far I have tested it with the Exotic Blanks Diamond Knurl, Smitty's Pen Works Caballero (from Exotic Blanks), and the Legacy Upgraded Junior Gentleman kits.

Measure the diameter of the factory cabochon after it has been removed. A micrometer or measuring caliper can be used to determine the diameter of the cabochon.

I have found the factory cabochons to be in the range of 10mm or about 0.40-inches give or take. Instead of using a measured dimension I use an empirical measurement by setting a small 3-inch divider type caliper to the diameter of the factory cabochon and then I use the caliper to gauge the diameter of the new one as it is being turned.



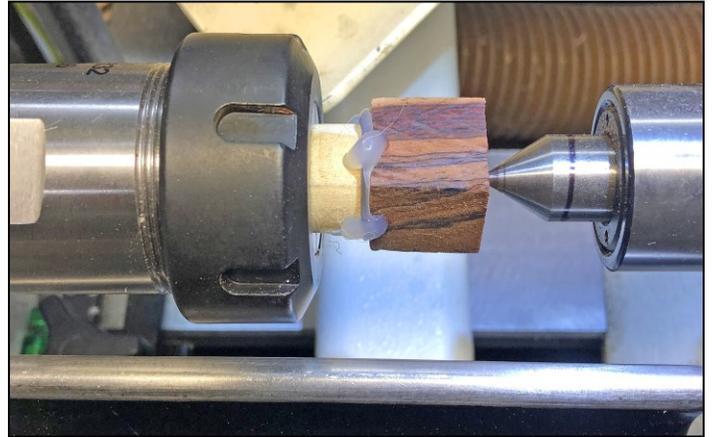
Although the nearer the custom cabochon is to the size of the factory one the better it will fit in the cap/finial and the better it will look on the finished pen, I often err on the side of under sizing it slightly. This allows for some thickness added by the finish and I have learned from experience that it is better to have the custom cabochon slightly undersized than to have it fit too tight. A slight undersize is hardly noticeable because it sets down inside a recess in the cap/finial.

To turn the custom cabochon it must be held in some kind of chuck on the headstock of your lathe. To facilitate this, the piece of blank can be attached to a temporary or sacrificial piece of material such as a $\frac{3}{4}$ -inch wooden dowel. Although epoxy can be used, I have found that hot melt glue makes an adequate bond and it does not require an extended cure time like epoxy does.



Although I rarely do this, a belt sander or bandsaw can be employed to round the scrap piece before turning it. This helps remove some of the bulk and reduces the impact forces from tools turning before the blank becomes round.

Although there are several ways of holding the material, with a Wood Worm screw, a Bottle Stopper mandrel, or in a set of pen jaws, I fit the 3/4-inch dowel into an ER32 collet chuck. If there is enough material I usually bring a live center in the tailstock up to support the blank until it is turned down to the desired diameter, however the tailstock dimple will need to be cleaned up.



After the blank has been turned to the correct diameter, a profile can be added to the top edge of the cabochon usually as a radius / round-over or as a chamfer sort of like what is on the factory cabochon.



Sand and apply a finish to the cabochon while it is still being held on the lathe. Use the sanding and finishing regimen that you will be using to finish the blanks. After finishing use a parting tool to cut the material down leaving a small tenon connecting the cabochon to the scrap. Although the diameter of the small tenon should probably be measured, it is sufficient to estimate it as long as you are confident that it is small enough to fit through the hole in the cap/final.

Although the cabochon could be parted all the way off, cutting it off with a fine toothed pull saw will give better control of the little piece being parted off. (I have had several dropped on the floor or sucked up by my dust collector).



Glue the custom cabochon in the cap/finial by first scratching the inside plating from the cap/finial a little in order to improve adhesion. Although a sharp knife blade will work for this, the sharp point of a scratch awl works great. After test fitting the cabochon in the cap/finial, apply a small amount of epoxy on the cap/finial being very careful not to use too much as it will produce squeeze out around the cabochon that can be difficult if not impossible to remove without damaging the finish.



Note that although gluing the cabochon into the cap/finial could also be done as the final step in the assembly, after the cap/finial has been pressed in, it is much easier to match up the wood grain or pattern by orienting the cap/finial after the cabochon has already been glued in.

Adding a custom cabochon can really add a nice polished and customized look to a finished pen. I hope the information in this tutorial can help you develop a regimen for making custom cabochons using the equipment and tools you have in your workshop.



19-January-2025 Revision (Improved Punch Guide)

Through use, I found that the $\frac{3}{8}$ " inch wooden dowel I was using for a punch guide was prone to splitting when the taper on my $\frac{5}{32}$ " Wilde PP 532 Pin Punch would hit it after the factory cabochon came free. Fortunately, the wraps of blue tape usually kept it from falling into pieces.



The old $\frac{3}{8}$ " wooden Punch Guide (Pictured on the Punch)

Using a left over bit of Alumilite blank and a $\frac{1}{8}$ " x $\frac{3}{4}$ " Fender Washer, I made a more robust punch guide. Since I use this procedure with more Diamond Knurl Rollerballs, I made the Punch Guide specifically to fit the cap/finial of that model although it could easily be modified to work with other kit models that have smaller cap/finials by simply adjusting the dimension that fits inside the cap/finial.

I chucked a rather colorful Alumilite scrap into a $\frac{3}{4}$ " collet chuck and turned one end down to $\frac{13}{32}$ " (about 10.5mm) and did trial fits until it fit nicely inside of the cap/finial from a Diamond Knurl Rollerball kit. I then reversed the piece holding it with a $\frac{7}{16}$ " collet, I center drilled and then drilled a $\frac{5}{32}$ " through hole. (The center drill left a nice little and necessary countersink on the hole as well). Finally, using the punch as a guide and centering device, I epoxied the $\frac{1}{8}$ " x $\frac{3}{4}$ " Fender Washer onto the guide for reinforcement. The remaining punch guide is significantly more robust than the $\frac{3}{8}$ " inch wooden dowel version and it works great.



The new, more robust metal and plastic Punch Guide (Pictured on the punch)

A Note about the Definitions I use: Although the formal definition of a Cabochon is related to jewelry and is "a gemstone that has been shaped and polished", a looser definition is "a small polished decoration with a smooth rounded finish". Since the term "finial" is defined as "a distinctive ornament at the top of an object", I use the term Finial or Cap or Cap/Finial to reference the component or assembly that is pressed into the top of the pen. And although it is almost never made from a gemstone but is instead made of a material that complements the pen, I refer to the rounded decorative piece sitting on top of a Cap/Finial as a Cabochon.