

Slim Euro-Style Pen

Introduction

The Euro-style pen is a quite common design in pen kits, and all manufacturers have a version. There are quite a few variations. Some are obvious, like the center band styling, refill type or coating color. Others are hidden, e.g. construction methods, quality of the mechanism or the coatings. And then there are subtle variations like shape and heft. Over the years I have made most of the designs, learned to appreciate the differences in the various kits and chose my favorites. But one day I wanted to make a design I could not find on the market... a thin Euro style that would appeal to more women, and using platings that were not available at the time for that style, like black titanium, black enamel etc. This drove the development of the style of pen I am showing here, my Slim Euro Pen. Recently I started dressing up the centerband, creating my Sweetheart Pen. Typically I make it from pink ivory and elephant ivory, often using African blackwood or ebony for the centerband.

The Sweetheart Pen uses slimline parts, the most common and least expensive pen parts on the market, available in the most choices of coating. In this article I will go through the design considerations for the pen, and show how I make the centerband and the finial.

Pen design

The nib end is 0.331", of course, the diameter of the Slimline nib. I want to make a smooth transition from the nib, matching the slope of the wood to the slope of the nib, so the lower body pen needs to have a little more body to allow for that smooth transition. The centerband recess puts on another restriction. I do not like to have a gap between the barrels where one can see the transmission, so I overlap the barrels. I use a 3/8" (0.375") recess cut into the centerband; therefore, to allow a little clearance, I turn the upper part of the lower barrel to about 0.372". The lower part of the cap is turned to about 0.445". This diameter is driven by the step I want to see between the 2 pen barrels: I find a step of about 0.030" to 0.040" pleasing. I also want to avoid making the overlapping section too fragile. The other end of the upper barrel is turned to 0.380". The restriction here is the clip: I don't like to see the bend in the clip too close to the body, because of functionality and looks. The clip ring (somewhat

depending on the manufacturer) is up to 0.340" and I again want some wall thickness to avoid this area being too fragile. So I chose about 0.380" which leaves about a 0.020" rim wall and still looks good with the clip. The overall pen is considerably thinner than commercial kit designs. I use a long tube for the lower barrel, because I find the pen looks a little more elegant in the stretched design.

Centerband

I have been making wooden centerbands for a long time. Here I wanted to dress it up some. Last spring I ran into Ken Nelsen, a laser-engraver and pen turner, and out of some of the things Ken has been playing with came the idea for this centerband. We did a fair bit of experimentation to find out what worked. Initially I completed the cap with the centerband, sent it to Ken for laser-engraving, then finished it, inlaying parts that he cut for me, or filling the pockets he cut with crushed stone. But this adds a lot of cost to a pen, and was out of proportion to the price I wanted to hold. So we arrived at the method I am describing here which cut the cost down quite a bit.



Fig. 1: These two barrels have just come back from the engraver. They will yield 14 center-bands Also shown are hearts lasercut from ivory to fit the heart pockets perfectly.

I start by turning a barrel to a diameter around .45", just above the desired final diameter. I do this on a loose 7 mm brass tube. Ken Nelsen engraves this barrel with a repeating pattern using a jig he built. I made an extra long mandrel for Ken's jig so he can do several barrels at a time reducing cost further. The pattern is repeated on a .280" period along the barrel. Then the barrel is rotated 60 degrees on the jig, and the next pattern is burned. So out of a single 2" barrel I get 7 centerbands, and up to 4 barrels can be done at the same time, with 6 burns **Fig. 1**). Previously 6 burns were needed to make a single pen barrel. Since the major time involved in this is rotating the barrel, and lining up the pattern, there is a considerable savings in time (and therefore cost) compared to doing a single centerband on a finished barrel. Ken

also adds a mark between the designs to help with parting in the right place. On the barrels shown here that mark is a little small, for better visibility we'll increase that next time.

To separate the centerbands, I hold the barrel in a collet in my Beall chuck, and part off individual centerbands using a home-made cutoff tool. Commercial narrow parting tools are available, down to 1/16". That is still .067", and I wanted to reduce kerf loss more. So I made a tool from an old piece of band saw blade I had laying around.

Fig. 2 shows a commercial narrow parting tool made by Crown; in front of it is the tool I made and a piece of 3/4" band saw blade. The teeth are ground off on a grinder, the angle is cut with a, an abrasive disk in a Dremel. Note that my tool is unnecessarily long; if I ever wear it out, I'll make a short one (less blade extending in front of the handle). Rings being parted off can be

seen in **Fig. 3**

The centerband rings from the 2 barrels are shown in **Fig. 4**. The rings have a little tearout when the tool breaks through, but this is easily removed and does not show on the finished pen. The center-bands are 1/4" wide, which works well with the size of the heart design. This is also where the periodicity of .280" comes from: the



Fig. 2: A commercial narrow parting tool, a homemade even narrower parting tool, and the saw blade from which it was made



Fig. 3: Parting off the centerband with the narrow parting tool



Fig. 4: The centerbands ready to be used

kerf loss of my parting tool is .030". A standard parting tool works also, of course, I would just get 10% fewer rings out of a given length of wood.

I need to jump ahead and mention the recessed clip design. I want to hide the clip ring inside the body to avoid an unsightly gap between upper body and finial. I find it easiest to cut the pocket for the clip ring now, before I start turning. The recess serves as an aid in judging how far to

turn, I do not use a correctly sized bushing. I modified a pen mill to cut a .340" diameter recess. (I shape the cutter on a metal lathe, using a Dremel flex shaft held in the tool holder as a cheap tool-post grinder.) **Fig. 5** shows the tool and the recess I cut with it. (One could also use an 11/32" piloted counterbore for this).

I make a tenon on the cap barrel by turning down to the brass tube (**Fig. 6**), glue the new ring on, and fill the design. Sometimes I add an ivory spacer. I fill the pattern with hearts laser-cut from thin ivory by Ken, or use crushed stone bound with CA. There are a lot of design possibilities!

One of the custom touches I add to my pens of this style is the overlapping centerband I mentioned above. To make the recess, I use a 3/8" piloted counterbore with 1/4" pilot available from industrial supply houses like MSC, J&L, Enco and the likes. The pilot needs to be turned down to fit inside a 7mm tube. I do this on a metal lathe, but it can also be done by holding it on a drill chuck in your woodworking lathe and carefully filing or sanding. The tool and the

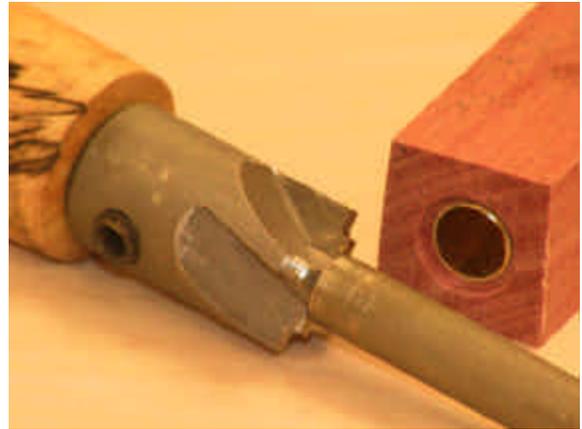


Fig. 5: Using this tool, I make the recess that hides the clip in the top of the pen



Fig. 6: These are rough-turned penbarrels. The cap barrel has had a tenon turned to receive the centerband

resulting recess can be seen in **Fig. 7**. On this pen I am using an ivory accent ring to separate off the centerband, and I fill the hearts with crushed turquoise.

Wooden finial

I have been making wooden finials for a while, using a little mandrel available from Crafts Supplies USA (CSU). Unfortunately, my success rate using their instructions was unacceptably low. What I describe here is the technique I have arrived at after many trials. It works very well for me.

First, why make wooden finials at all? They give your pens a custom touch, and they afford you some design options not available with the stock parts. I was making Euro-shape pens using slimline kits, and was not convinced by the look when I used a slimline finial. On a Euro-shape pen, the cap has a curve, and the transition to the square-sided finial always looked odd to me, it really killed the smooth line of a Euro-style pen, in my eyes.

I considered making finials simply by turning a finial with a tenon that fits into the brass tube. I know people are doing it, but I just found that approach hard. I thought it would be tough to get a smooth transition from finial to cap barrel. When I saw the little cap stud mandrel appear in CSU's catalog a few years ago this seemed like the right solution for me. The CSU finial system is meant for 7 mm Euro style pens. To use it with a Slimline clip, you have to get an additional part. That part is the finial adapter from a 7 mm Euro kit (item 3 in **Fig. 8**) While not a catalog item, I have not had any problem buying small quantities of (20-50) of these from CSU. Berea also sells



Fig. 7: The centerband is glued up with an ivory spacer. nother recess has been cut using the piloted counterbore shown



Fig. 8: The materials and tools used to make a custom finial. (1) wood blank, (2) cap stud, (3) finial adapter fitting, (4) cap stud mandrel, (5) homemade bushing, (6) bottom tap in handle

parts for all their pens, and their finial adapters are compatible with this system. The challenge is incorporating the Slimline clip, more on that later.

The main components plus the tools I use can be seen in **Fig. 8** The unique component of the system is the small double-threaded stud (item 2). One end (the coarser, larger one) bites into the wooden finial. The other end screws into the finial adapter. A special mandrel (4) makes it easy to turn these. The mandrel can be held in a drill chuck, I prefer to use my Beall collet chuck. Item 5 is a bushing I made up, it is .380" and serves as a reference when turning the finial, but it is not necessary.

The CSU instructions tell you to drill a 1/8" hole 3/16" deep and screw in the stud. These dimensions simply don't work in any hardwood. For a while I was drilling oversize and simply epoxying the stud in, but getting them in straight proved to be a challenge, and after having some of them come apart when turning I gave up on that. I start by making little squares from scrap, like the end of pen blanks. Thickness is about 3/8". I mark one corner so I can place them repeatedly into my drilling jig in the same position. I align the top of the square with the top of the jig, and use the drill press's depth control to drill 3/16" deep, using a 9/64" bit. I do this for a series of squares. Because I align the top even with the jig, I get the same drill depth on each square. **Fig. 9** illustrates the drilling. I

use a twist drill for that; it's too easy to expose the small hole made by the center of a pilot bit during turning. I have tried various drill sizes in the past, and attempted to screw the stud directly into the wood. Sometimes it worked, but different woods required different hole sizes. It is nearly impossible to screw the stud directly into a hard wood like ebony, or a plastic, at any hole size. Once I started cutting the threads using a tap (item 6 in **Fig. 8**) I started getting consistent success.

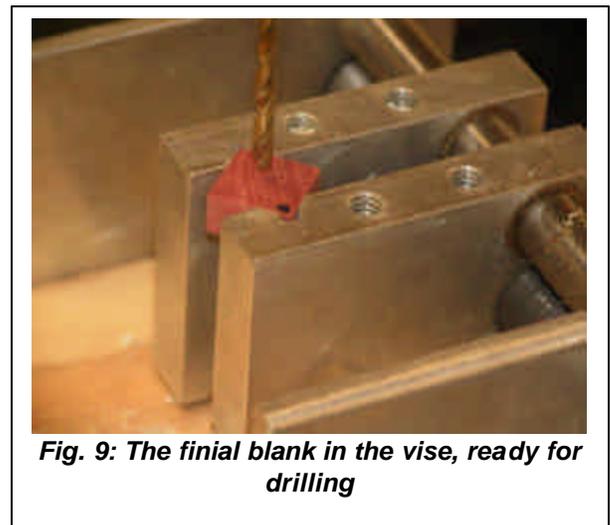


Fig. 9: The finial blank in the vise, ready for drilling

The thread is metric, M5x0.8. Because the hole is blind, you need a bottom tap. Such taps can be obtained from industrial supply companies (see sources). To cut the thread I put the tap in a tap holder, put a blank back into my drill vise in the same orientation (this is why I marked one corner) dropping it down to the bottom this time. My tap wrench has a centered hole drilled in the top, and it happens to be 9/64" so I just leave the same drill bit mounted and lower it into the tap wrench (see **Fig. 10**). This keeps the tap straight. (Of course, a hole could be drilled into a tap wrench that doesn't have one, or a different size locating pin could be used.) Keeping slight downward pressure on the quill, I rotate the tap wrench exactly 3 1/2 turns.

Depending on your hole depth and the exact bottom tap you may find a different number of rotations work for you. Then I back out the tap and am ready for the next square. In the past I mounted the tap in the drill chuck, kept moderate down-pressure on the quill, and rotated the chuck by hand, using the markings on it to count turns. I find my new approach works better for me.

Now I simply screw the stud into the hole (**Fig. 11**).

It's a good idea to use a minute amount of epoxy.

Even though that is not necessary for turning, it gives a little extra peace of mind for later. I often use a finial adapter (item 3 in **Fig. 8**) to give me a better handle on the stud screwing it in.

To make the finial, the square blank on the stud is simply screwed onto the mandrel. You can put the same bushing used to turn the cap end onto the mandrel to help with turning to the

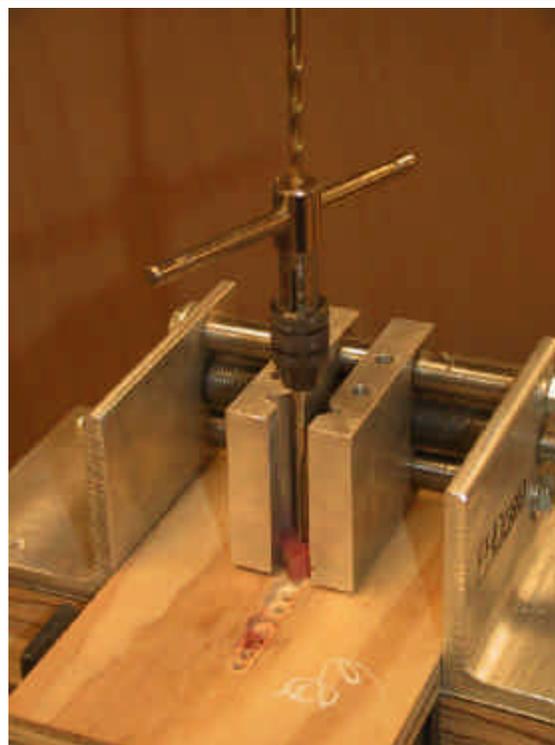


Fig. 10: Tap the blank, using the drill to keep it square



Fig. 11: The finial blank, ready for turning

correct size, or add a sizing ring made from some stable material. Because it can rotate freely you won't be sanding into it and it'll last for a long time. It's only a rough visual aid anyway; I am not consistent pen to pen, and make each finial to match the particular pen.

10 seconds with the spindle gouge transform the square into something that resembles the finial. I am turning a cylinder basically, rounding it over slightly, just hogging off material, staying outside the desired shape.

Now I turn the final shape. I like using a pyramid tool for that, because it lets me swing the whole arc without having to reposition the tool rest. (see **Fig. 12**) The scraping cut leaves a great surface, and is very forgiving.

The nice thing is I can unscrew the finial any time and try it on the pen, coming back to the exact same centered position on the mandrel. This way I can make sure that the diameter matches perfectly, and that there is a nice smooth transition from the cap barrel to the finial without a break in curvature. Here it is, ready for finishing (**Fig. 13**)

I use a small grinding stone held in a Dremel tool to cut a slot for the clip to exit (see **Fig. 14**)

This method of making the finial using the tap has worked extremely well for me. I can quickly make one finial at a time, or prepare a batch up through rough turning.

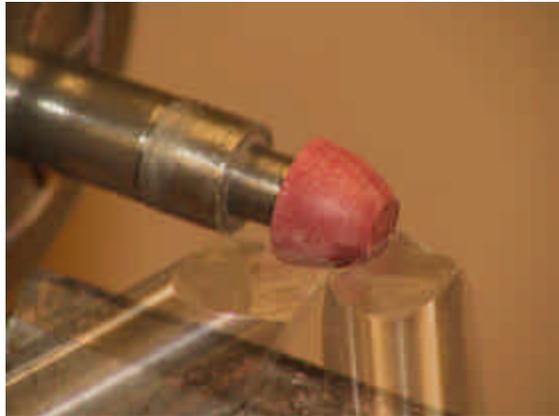


Fig. 12 The pyramid point tool easily shapes the finial, able to swing the full arc



Fig. 13: The completed finial, ready for finishing



Fig. 14: A slot for the recessed clip has been cut using a Dremel tool

Summary

The last picture (***Fig. 15***) shows some finished pens. I am very pleased with the design. I have shown you the design considerations that went into the shape, and detailed the custom centerband I developed with Ken Nelsen. I have also shown you how I make wooden finials using a method that works for different types of materials, including hardwoods and plastics. Despite the somewhat lengthy description it actually goes relatively fast. It is a little more work than a standard kit design, but not that much more, and results in a pen that stands out from the crowd and is a consistently good seller for me.



Fig. 15: Some completed pens showing different centerband options

Sources and Bill of Materials

Black titanium Slimline kit: Berea Hardwoods www.penkits.com

Long brass tube for front barrel: Hardwoods www.penkits.com, no item number, ask for replacement front tube for 7mm roundtop.

Pen blanks: many sources; I got my last batch of pink ivory from Woodturningz www.woodturningz.com

Cap Stud mandrel: Crafts Supplies USA www.penturnerscatalog.com item 155-2102

Cap studs: Crafts Supplies USA www.penturnerscatalog.com item 050-753

7 mm finial adapters: Crafts Supplies USA www.penturnerscatalog.com or Berea Hardwoods www.penkits.com, no partnumber (ask for finial adapters for their 7 mm Euro-style kits)

M5x0.8 bottom tap: Enco www.use-enco.com item 325-5171

3/8" piloted counterbore: Enco www.use-enco.com item 368-1024, the matching 1/4" pilot is item 368-3116

Pyramid tool: Crafts Supplies USA www.penturnerscatalog.com item 988-1023 (there are also smaller versions available that work equally well, I imagine)

Centerband laser engraving: Kallenshaan <http://www.kallenshaanwoods.com>

Crushed stone: Arizona Silhouette www.arizonasilhouette.com