

Using PowerPoint as a Design Tool for Kitless Pens

By Danny Clarke aka More4dan at IAP

I put this together after working on some new pen designs and layouts during the Covid-19 lockdown. I didn't have CAD software on my work computer nor a home computer up to the spec I would need for a decent CAD program. I also didn't want to have to learn new software, I wanted to make some pens. So, I used what I had at hand and I already knew how to operate. I found it worked quite well in fact. Now the challenge to describe in words what I could just show someone in person in a few minutes. At least maybe the effort will help a group of folks to try this or something similar. This assumes you have some experience in PowerPoint. Many of the same drawing tools are available in Microsoft Word.

Here is where I started. I made scaled drawings of the pen components. JOWO Fountain Pen nibs, G2 gel refills, Schmidt FP Ink Converters K5 & K6, Schmidt PRS roller ball nib. Working with a Caliper, I established ODs and lengths of the components. I represented them with simple rectangles in PowerPoint. Under the Drawing Tools Menu, it lets you type in the dimensions of the rectangles to match the measurements of the Pen components.



Here is an example starting with a Schmidt K5 Ink converter for a Fountain Pen.



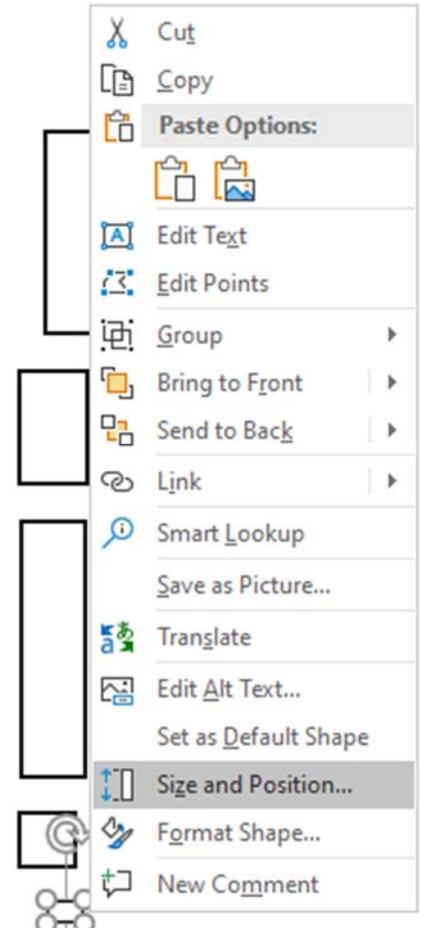
I broke the convertor down into 5 basic rectangles that represent the important dimensions.



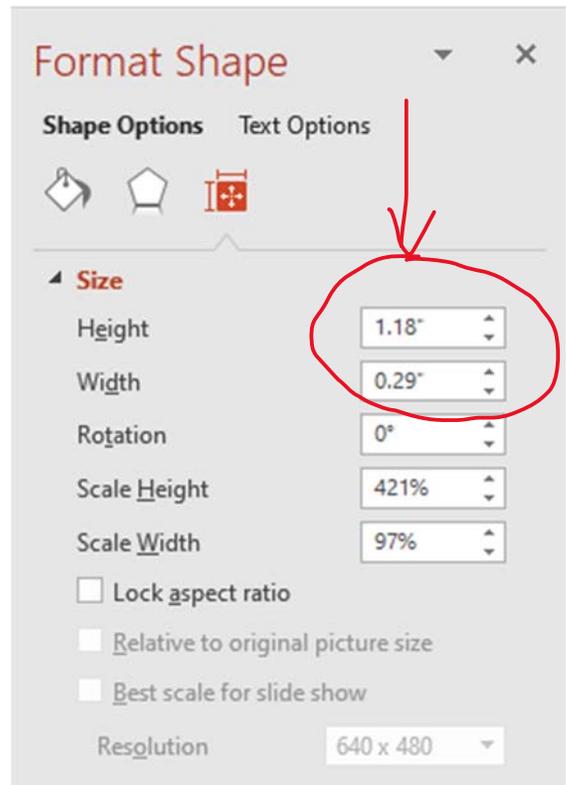
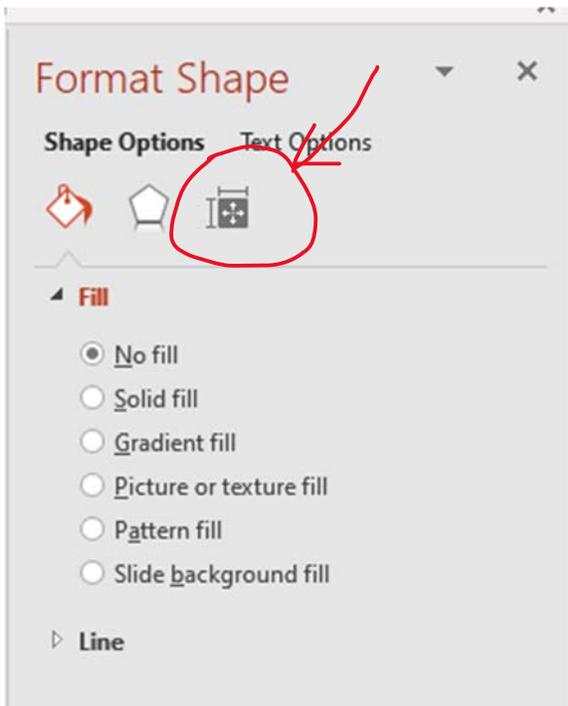
I drew the 5 rectangles in PowerPoint stacking them in space in the right order. Just get them close, we will be sizing them in the next step.



“Right Click” on one of the rectangles that you drew and move your mouse to the “Size and Position...” and select it. An area to the right of the screen will open.



Select the square grey box and you will see boxes that let you enter the height and width for the rectangle.



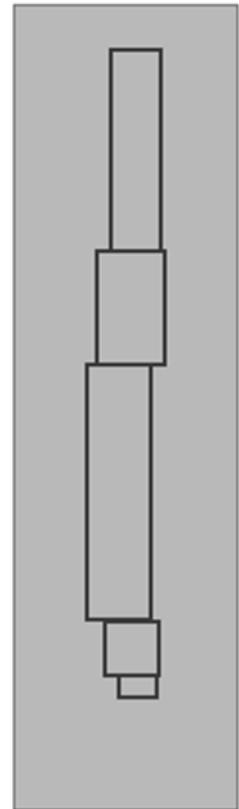


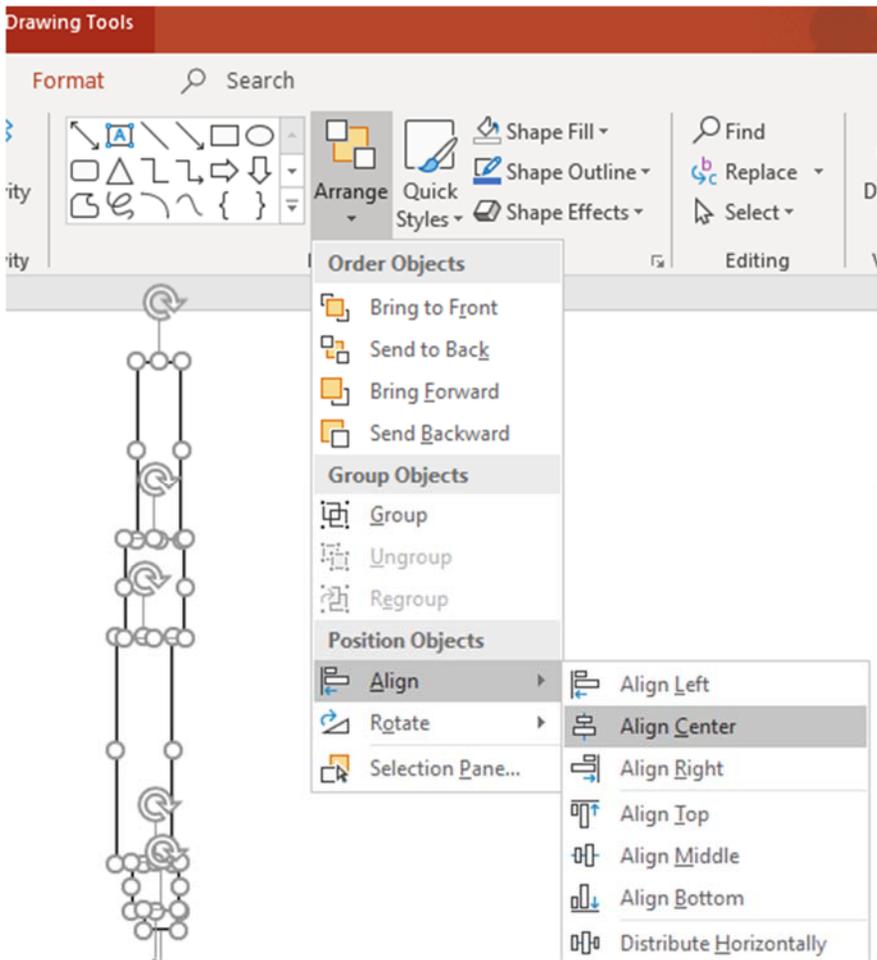
Enter the height and width to match the size of that section of the Converter. You can now click on each rectangle and enter its correct dimensions. Now all the sections are to scale. You can enter the size to 3 decimal places but the display in the box will only be two decimals. (The Engineer in me wants to see all three)



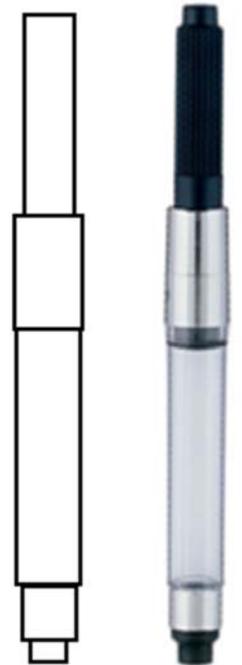
Now slide the rectangles till they are all aligned top to bottom. In PowerPoint you will notice red dashed lines appear when two objects get close to show when they are lined up.

Click and drag a box over the lined-up rectangles. Go to the top of the screen and look for the "Arrange" button. Look down the list for "Align" move your mouse over it and the next list opens, select "Align Center".

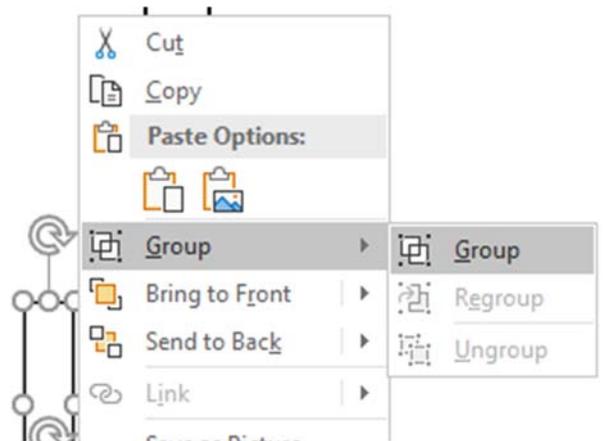




Your Schmidt K5 converter will now look like this, drawn very close to scale.

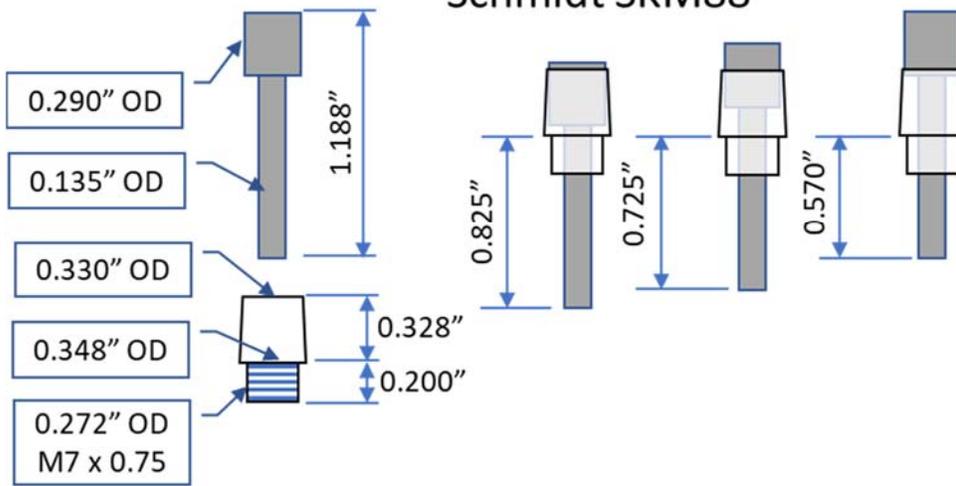


The next thing you need to do is to drag a box over this again selecting all the components. Then right click on one of the rectangles while they are all highlighted. You will see a menu open. Select "Group" and then "Group". This now lets you move the entire object together and not leave pieces behind.

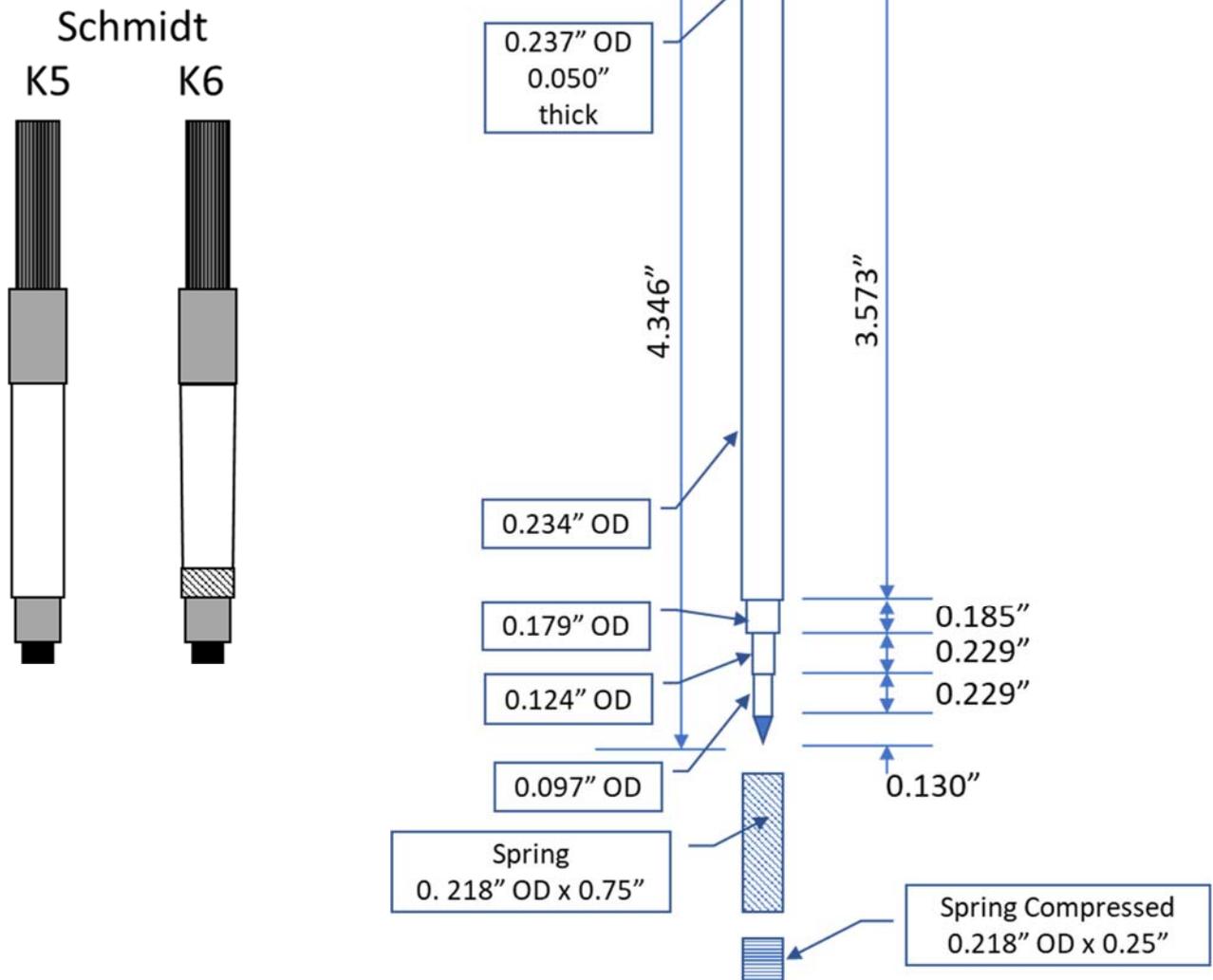


I did this for all the components of the pen I was designing. This let me stack up pieces to visualize how they go together and to see what size to make things. Here are some more examples using this technique. For many I added dimensions to the drawings in PowerPoint based on what I measured with the caliper. Each Dimension required that I draw each line and add the text separately. Here is where a CAD program would have helped a lot.

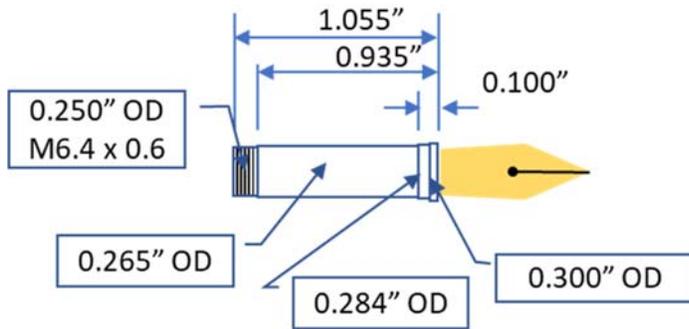
Schmidt SKM88



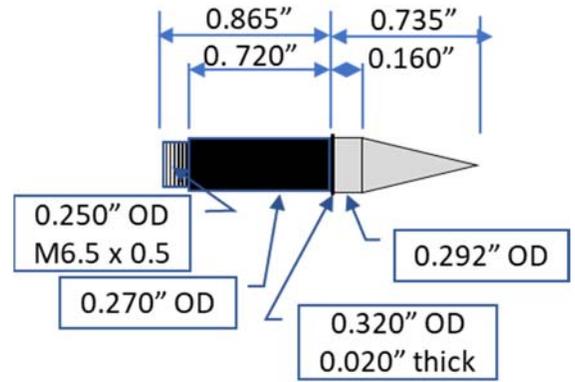
Pilot G2



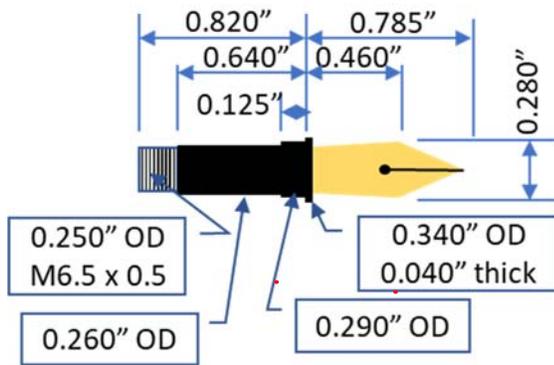
#5 Bock



Schmidt PRS (#5)

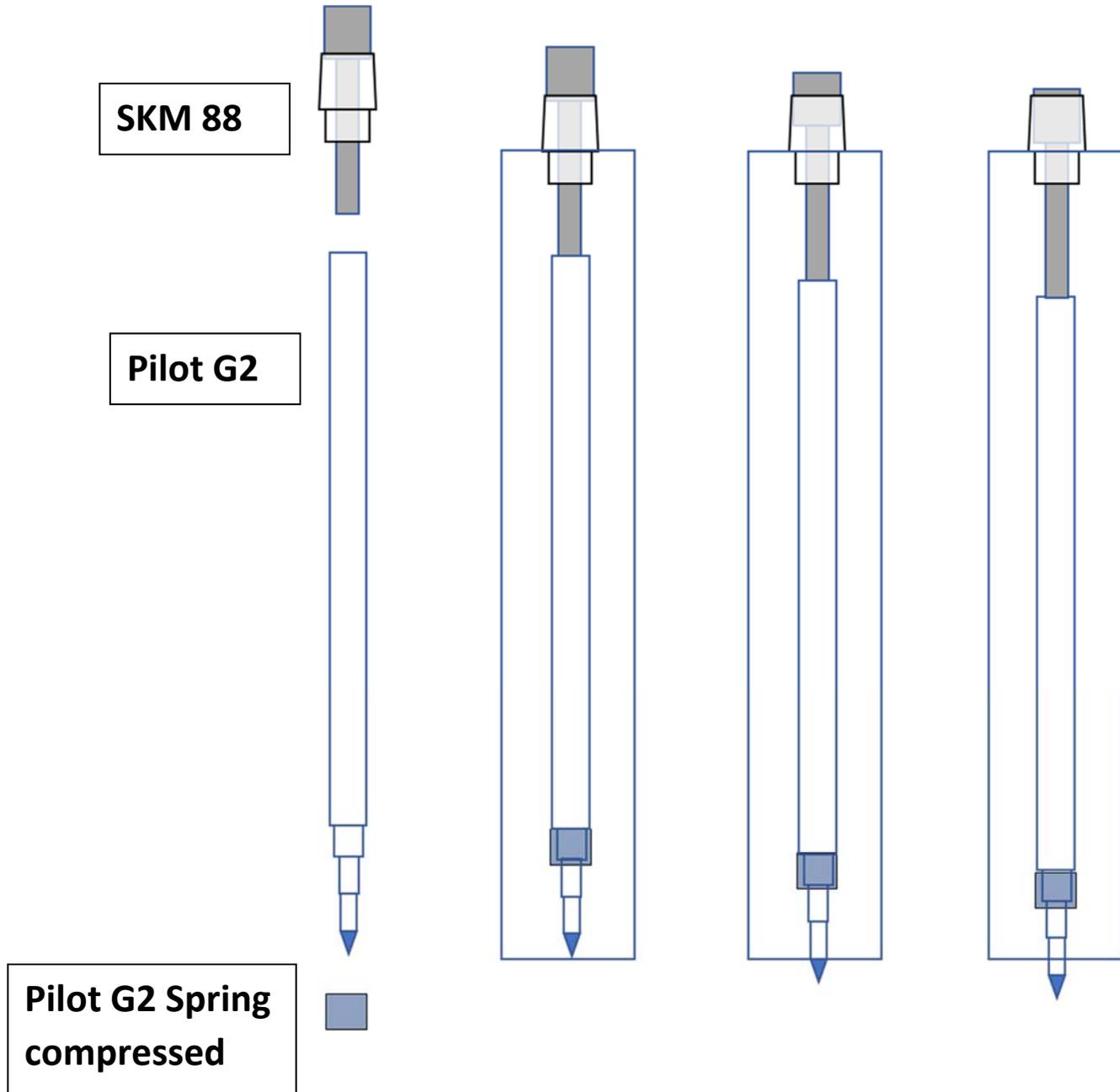


#5 JOWO FP



Designing a Pen

So, let's now put some stuff together to help do a pen layout. Starting with the type of pen and associated components. This one will be using a Schmidt SKM88 all metal click mechanism and the ink cartridge will be a Pilot G2. I've made a couple of these in the past before going through this method with mixed results. It took a couple nose cones, some too fat, some turned through to the holes drilled in them. I also couldn't get the lengths quite right. Thank goodness the SKM88 can be adjusted by sanding down the push pin a bit to get the pen tip to retract all the way into the nib. It can't, however, be lengthened to get the tip to stick out of the nib. There you must shorten the barrel.

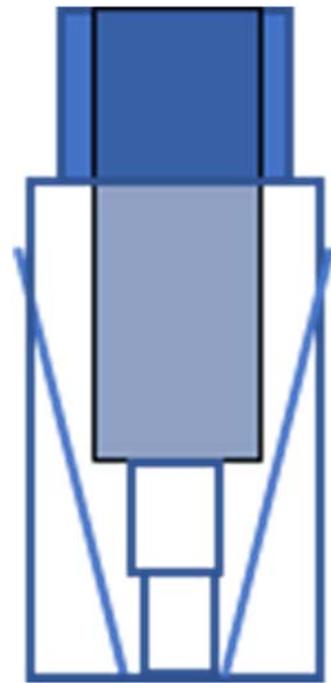


I draw a box to represent the body and nib length and can adjust it so when the button is up, the tip is in. When the button is in the middle position the tip is out. When the button is all the way down, this sets the design for the inside of the nib setting the depth of the holes drilled for each step. Now I have the total length of the pen body and nib. I could just add the length of the G2 and the part of the SKM 88 that protrudes below the mounting surface, and the clip thickness with the button up, plus a bit for the tip to be recessed.

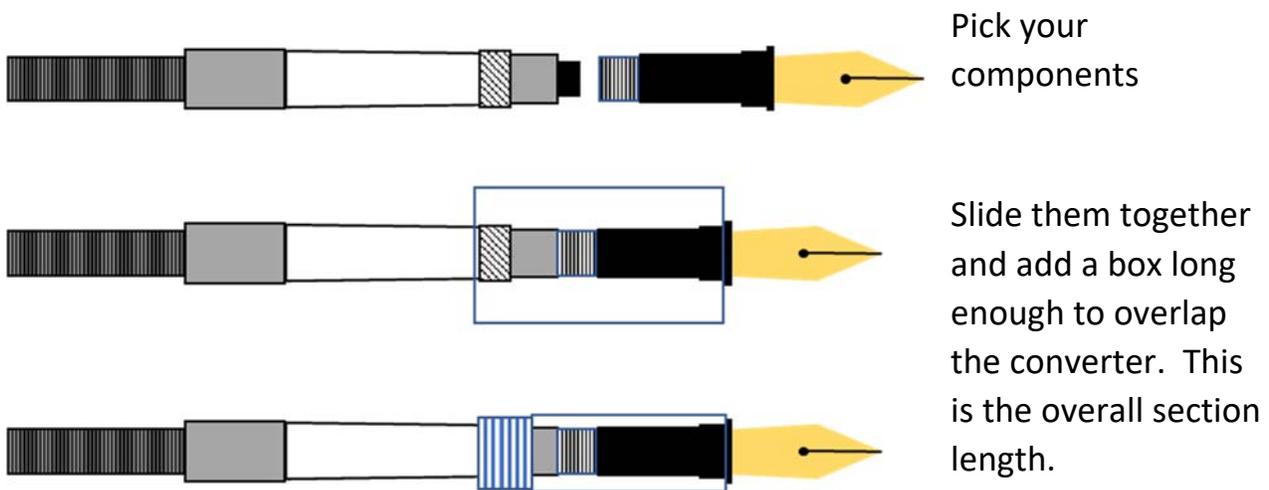
Setting the angle for the tip design isn't so easy to do without some Trig. Here in PowerPoint you can just place some lines to help.

This is done with the drawing with button in the down position and the compressed spring on. The holes in the nib will need to be drilled for these 3 steps. To measure in PowerPoint, just draw a straight line between two points, then go to the menu that shows the object dimensions for the line (same as the one for the original rectangles before) and it will show the length.

I draw a line eyeballing the angle to 'miss' the holes and measure the angle from the print. I use this in setting the angle on my compound slide on my metal lathe. If turning by hand you can measure the diameter at different distances from the end to check while turning. This sets the minimum size you can safely turn the nib.



You can use the same method for setting up a Fountain pen. Starting with nib and converter to lay out the front section.



The front of the section is determined by the ID of your Cap threads and the back by the section to body thread. The length of the section out past the threads is up to you. Longer the section grip, the longer the cap will have to be, and shorter the body can be. Shorten the grip and the converter pushes further into the body making it longer while allowing you to shorten the cap. Now that you have the section, you can use it to design the cap.

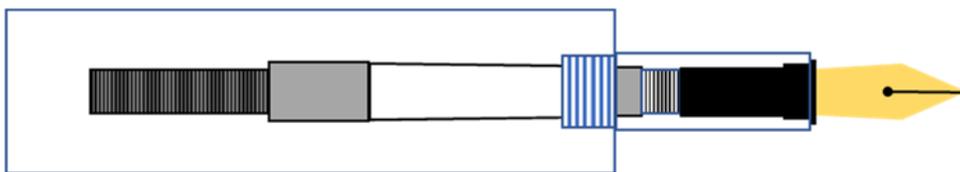
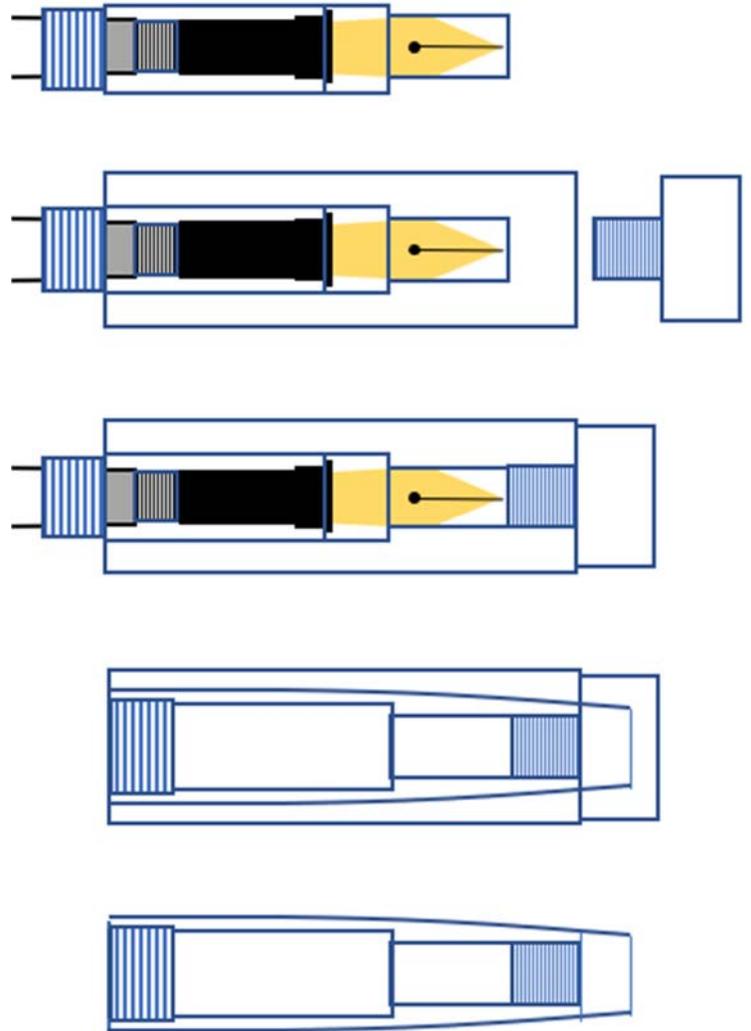
Now you can draw boxes for the Cap thread Tap drill and to give clearance in the cap for the section and the nib that have diameters to match drill bit sizes.

Then add a box for the blank and for the finial that threads in to hold the clip. Pick a size thread that will work with your clip

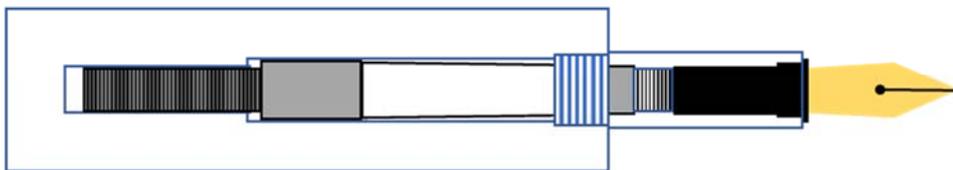
Merge the cap and finial and check for clearance for the nib. You may have to shorten the Finial thread length or drill a recess in it for space for the nib.

Then you can layout a cap profile that leaves minimum wall thickness to check when turning the cap profile.

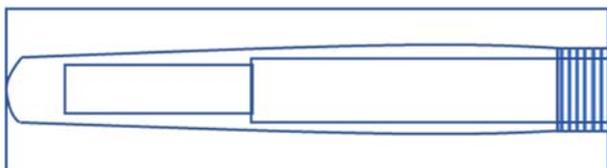
The OD at the clip will need to be sized for the clip used. Here is what the final cap would look like.



Now we use the Section and Converter for laying out the Pen Body.

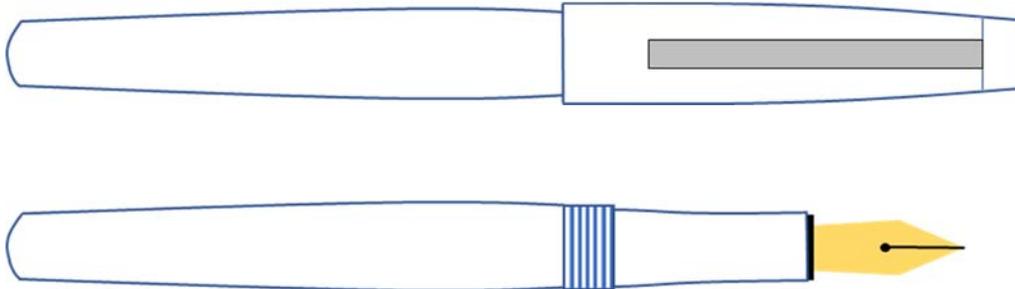


Layout the holes for clearance for the section threads and the Ink Converter.



Profile the body for turning restrictions.

Now you can put the cap and body together to see the final shape and check proportions.



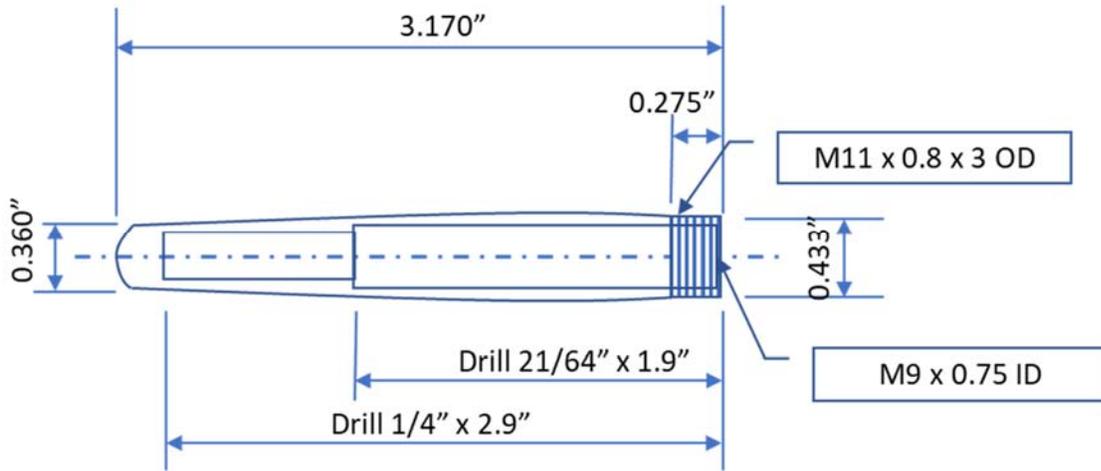
The clip dimensions will also limit the OD at the intersection of the Cap and Finial.



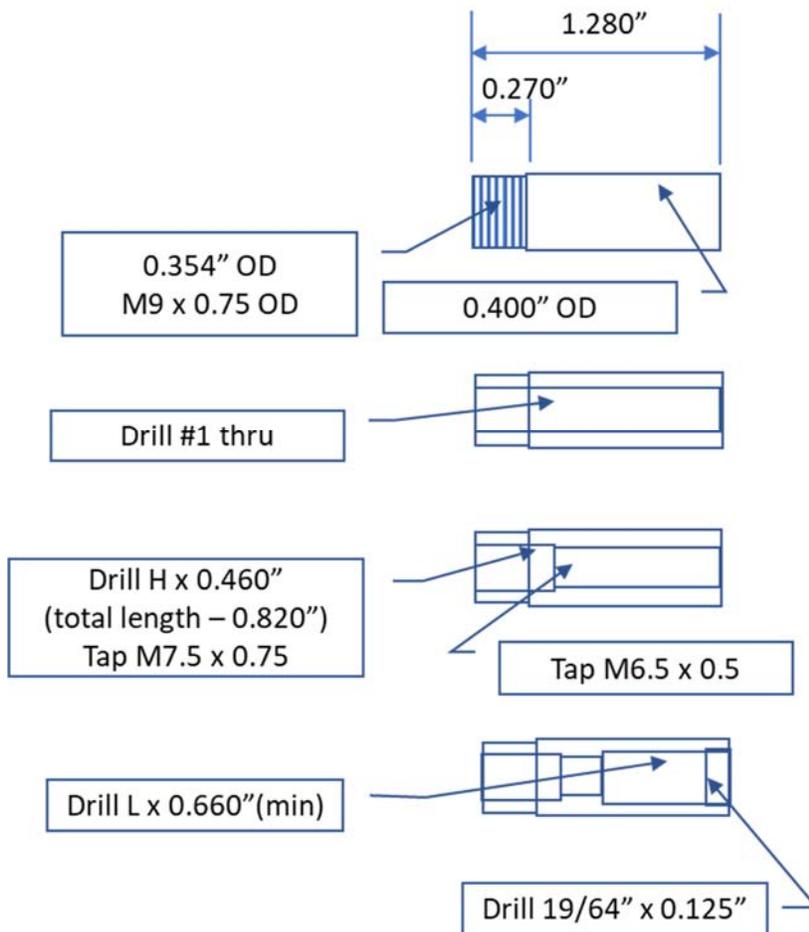
You can even play with colors and shading to get a better feel of the final look.

Once I was happy with the design I went ahead and made dimensioned drawings calling out the Drill sizes with depths and threads. Now I can just print out the drawings and take them to the shop.

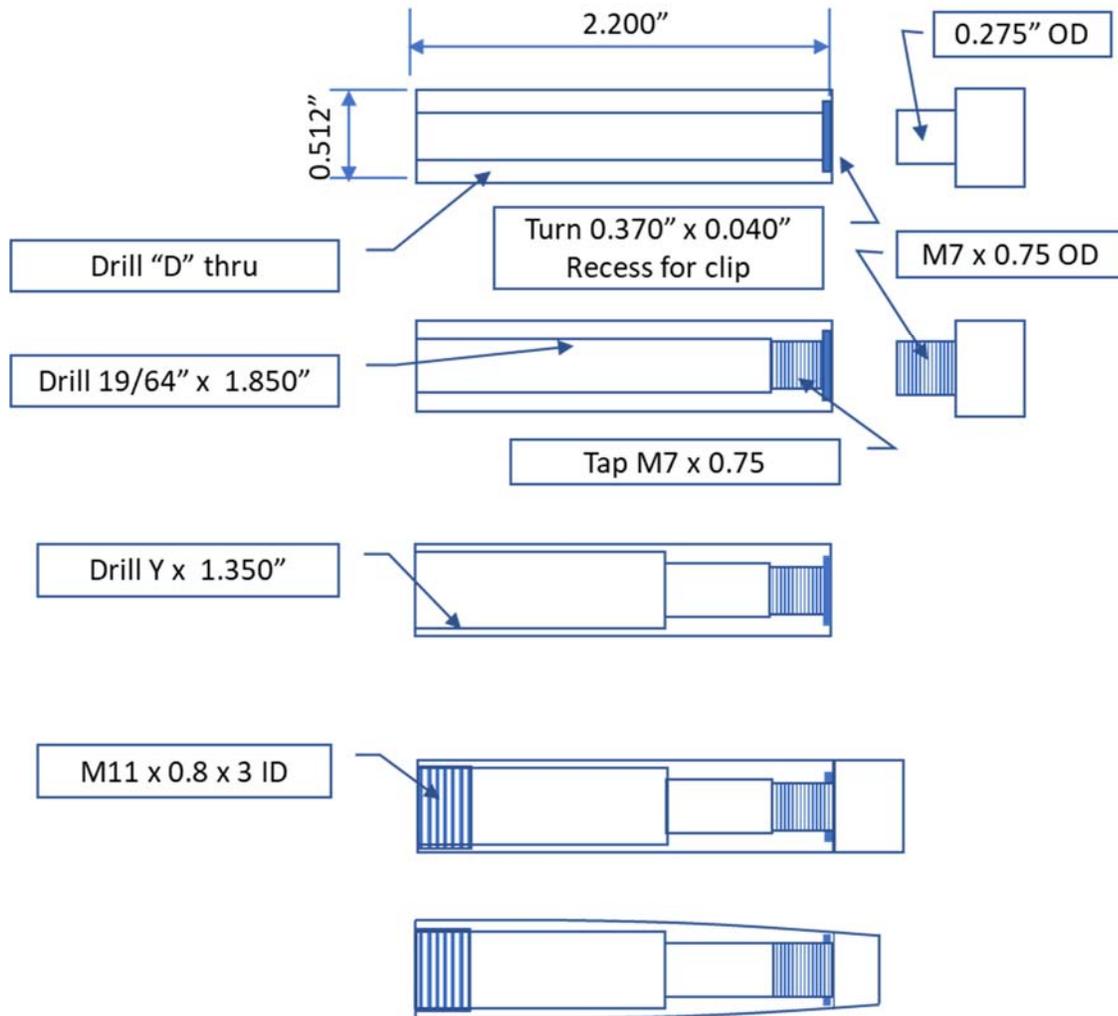
Pen Body for a JOWO #5 Fountain Pen And a Schmidt K6 Converter



For #5 JOWO FP



Cap for JOWO #5 FP with Recessed Clip



Clip from a PSI Seam Ripper Kit



Click Pen based on Schmidt SK88 Clicker Metal Pen using Pilot G2 Refill

