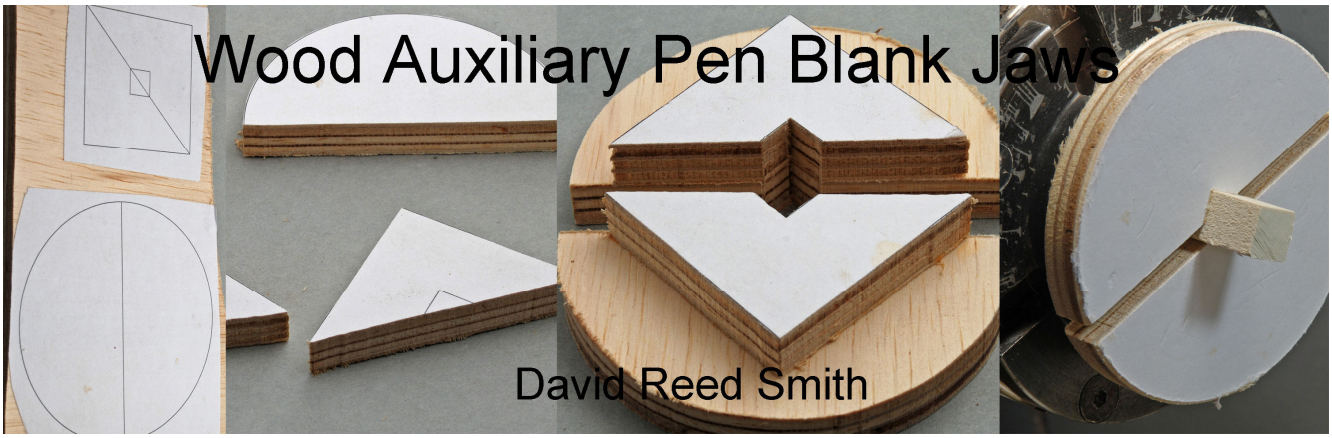


Wood Auxiliary Pen Blank Jaws

Introduction

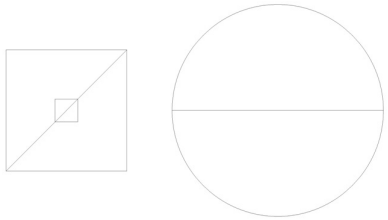
In 2009 I wrote an article on making aluminum auxiliary jaws for drilling pen blanks. Prior to writing that article I tried several versions in wood, but was unable at the time to come up with a set that was sufficiently accurate. Recently I thought of another way that might work and decided to try it, even though PennState Industries has come out with a dedicated pen blank chuck. As I still get a few inquiries about the metal aux jaws, I've written this up, for those of you who think it's a good idea but don't drill pen blanks or other small spindle blanks enough to make it worth while to buy a dedicated chuck.

Although one can use a #1 jaw set with a 4-jawed chuck to drill pen blanks, it's a pain to change the jaws, and if the blank isn't truly square the chuck can hold it askew to the lathe axis. The wood auxiliary pen blank jaws solve this problem as they will work just fine with the #2 jaws that are probably already on your chuck. The aux jaws have a V-notch that grabs the blank by two opposing corners and thusly will align the blank properly even if the blank isn't quite square. Each aux jaw registers on two of the #2 jaws. It works well with One-Way profiled jaws. It is possible that other jaws that are strictly arc shaped might dent the sides of the aux jaws after use and not close smoothly.

Briefly, the pattern for the jaws is printed out and temporarily attached to 1/2" plywood. The jaw pieces are cut out and the two pieces of each jaw are glued together, then the V-notches are cut. Magnets are added to make it easier (fewer hands needed) to load the jaws. To use the aux jaws, the jaws are placed in the chuck and held against the metal #2 jaws by the magnets. The blank to be drilled is placed in the V-notches of the aux jaws and the chuck is tightened.

Making the Jaws

The pattern for the aux jaws is shown in Drawing1. Download Drawing1 as a pdf and print it out full size (making sure that page scaling is set to none). Cut out the pattern pieces and attach them to 1/2" plywood with spray adhesive or post-it note glue as in Fig01. 1/2" plywood is ideal because it is just thinner than the depth of the jaws.



Drawing1 The pattern for the auxiliary jaws.

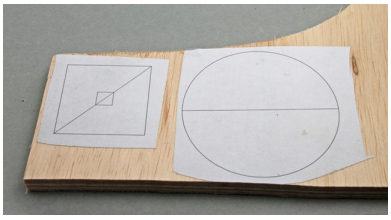


Fig01 After attaching the pattern to 1/2" plywood.

Cut out the pieces with a scroll saw or bandsaw with a fine blade as in Fig02. Cut outside the line when cutting out the square and circle, but cut on the middle of the line when cutting the square and circle in half. Do not cut out the V-notch at this time. Spread wood glue on the triangular pieces and clamp each triangle piece to a semi-

circular piece as in Fig03. Try to get the triangular piece more or less centered in the semi-circle, but be sure to accurately align the longest side of the triangle pieces with the straight side of the semi-circle. The faces with the paper patterns should be facing out. Allow the glue to cure.

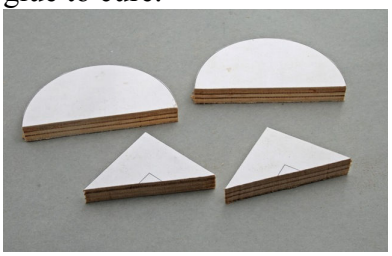


Fig02 After cutting out the aux jaw pieces.

Fig03 Clamping the aux jaw pieces together.

Remove the jaws from the clamps. Cut out the V-notches with a scroll saw or fine toothed bandsaw. Be as accurate as you can, as this is the critical step. The jaws with notches cut are shown in Fig04.

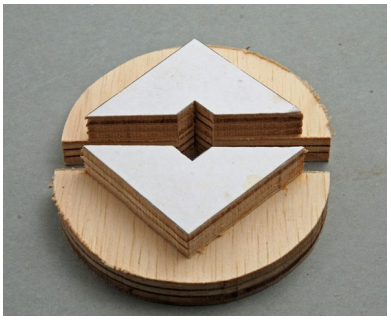


Fig04 After cutting the V-notches in the aux jaws.

Select or cut a 1/2" square pen blank to enable testing the jaws for accuracy before investing more effort. Place the pen blank in the V-notches and tighten the chuck around the aux jaws as in Fig05. Each short triangle side engages a single metal jaw (see Fig05 which shows how the triangle pieces interface with the metal jaws without the semi-circular pieces in the way), while the back surface of the semi-circular pieces register on the tops of the jaws. You'll have to hold the pieces in place by hand while tightening. Turn on the lathe at a moderate speed and use a pencil to mark the largest diameter as in Fig05. Turn off the lathe and check to make sure the circle is equidistant from all four sides or within an error you can tolerate. If it is not you can try to tweak the jaws by resawing the V-notches or by filing. Make sure the sides of the V-notches remain perpendicular to the faces of the jaws.

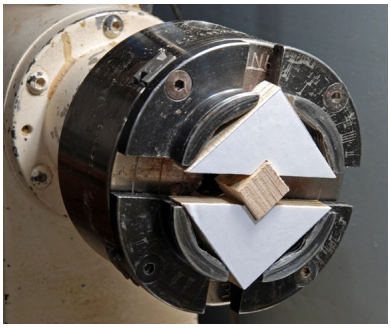


Fig05 How the aux jaws are held by the metal jaws..

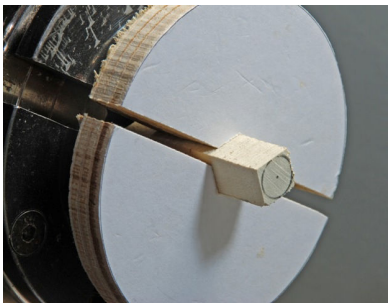


Fig06 Checking the aux jaw set for accuracy by marking a sample pen blank.

When you are satisfied with the jaw set, turn on the lathe and use a bowl gouge to true up the rim of the aux jaws as in Fig06. Beveling the edges slightly will make them more finger friendly. Remove the aux jaws from the chuck.

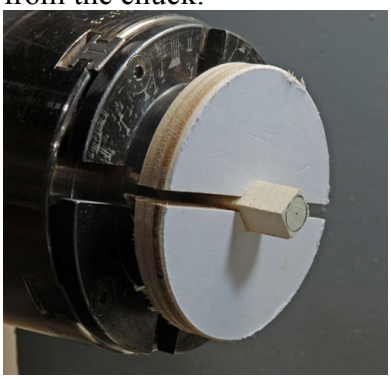


Fig07 After turning the rim of the aux jaws true.

Take the jaws to your drill press and insert a 1/4" Forstner bit in the chuck. Drill a hole 1/8" deep adjacent to and in the middle of each short triangular edge as in Fig08. Use CA glue to glue a 1/4" diameter 1/8" thick rare earth magnet in each hole as in Fig09. You can use a steel rod (smaller than 1/8") to hold the magnet for insertion. Place a drop of CA glue on a piece of masking taper (to protect your work surface) and roll the magnet in the drop of glue. Then insert the magnet in the hole.

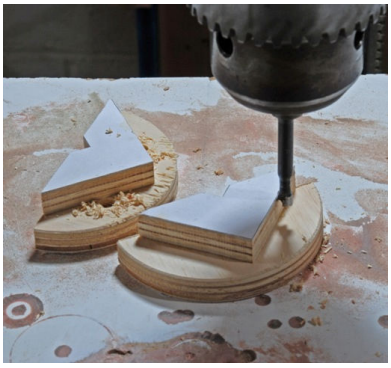


Fig08 Drilling holes for mounting rare earth magnets.

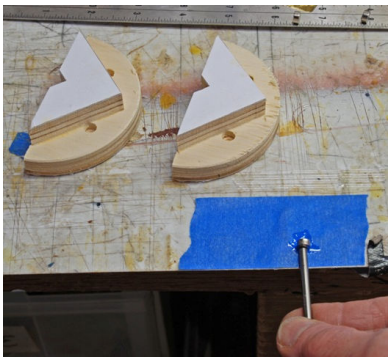


Fig09 Gluing the magnets in place with CA glue.

Fig10 shows the completed wooden auxiliary pen blank jaws.

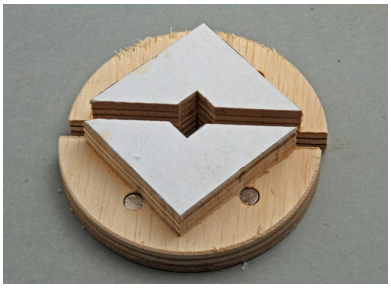


Fig10 The completed aux jaws.

Using the Jaws

To use the aux jaws, mount your 4-jawed chuck on the lathe and place the aux jaws in the chuck as in Fig11. The short sides of the triangles each register on a metal jaw. The magnets will pull the aux jaws against the faces of the metal jaws.

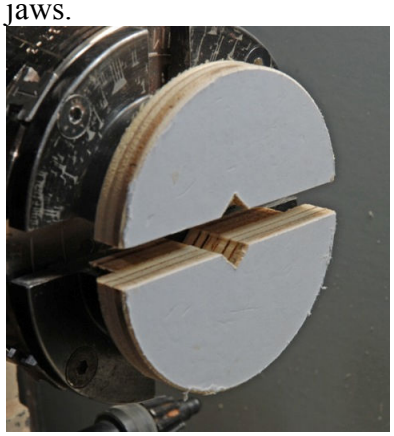


Fig11 The aux jaws mounted in the 4-jawed chuck.

Place the pen blank or other spindle blank you wish to drill axially in the V-notches of the aux jaws and tighten the chuck as in Fig12. If the blank is small enough, recess the blank into the chuck so that the jaws grip the blank more or less in the middle, as in Fig13.

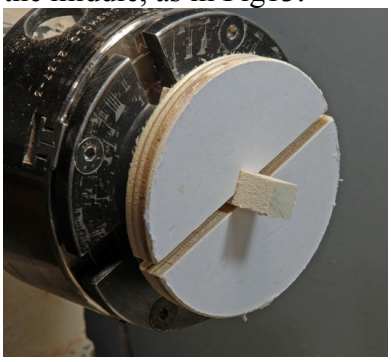


Fig12 The aux jaws with a pen blank mounted for drilling.

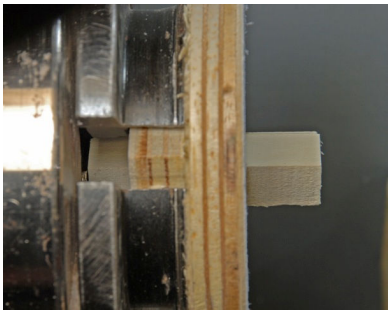


Fig13 The blank will be held more securely if the jaws grip the blank in the middle.

The blank is now ready for drilling. If you are using a drill bit with a standard 115 degree or 135 degree point, you can insure that the drill doesn't deflect off-center when starting by creating a centered dimple with a spotting drill or combined drill and countersink. A second drill chuck makes this less bothersome. Spur point drills should start themselves well if not engaged violently. Fig14 shows the drilling set-up. Fig 15 is a composite picture of

the front and back of my 1/2" square test blank.

Fig14 Ready to drill.

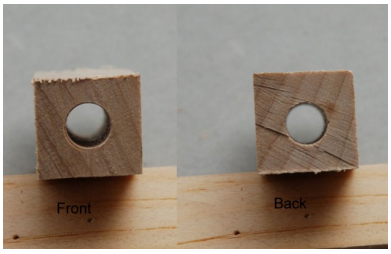


Fig15 The front and back of a test pen blank after drilling with the aux jaws.