

Building a Slip Joint Folder

By Steve Culver, Master Smith

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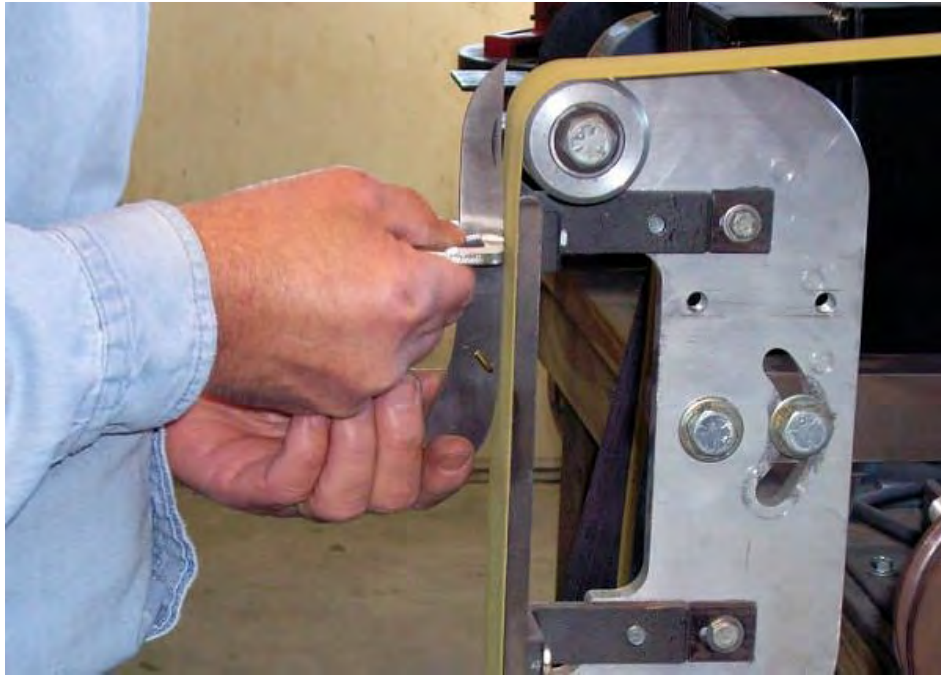
Part 2 of 2

This is part 2 of 2 of Building a Slip Joint Folder by Steve Culver, Master Smith.

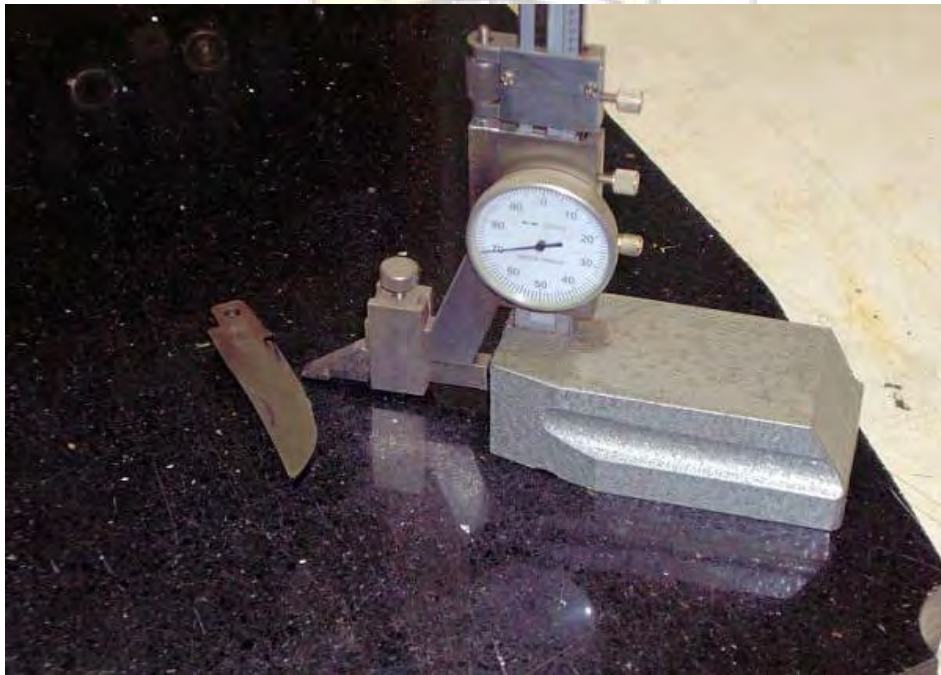
Assembling the folder using a drill press was a trick was shown to me by Gary Crowder. A wood spade bit with the pilot point ground off is placed in the chuck and the knife is positioned on a board with a groove in it. The spade bit presses the spring down into the groove in the board allowing you to insert the pivot pin without pressure from the spring.



With the knife in the open position, the back of the knife is ground flat, leveling the blade, spring and top of the liners. Now comes the (hopefully) final fitting of the blade to spring. The tang is ground to set the top of the spring level with the top of the liners in the half-stop and closed positions. If the blade tip is not positioned correctly in the handle when the knife is closed, the kick is ground to correct that. This requires a lot of disassembling the knife, grinding a few thousands off, reassembling the knife, taking it back apart to grind some more, put it back together.....you get the idea. All of this I do with assembly pins and an old pivot bushing. There will be some difference in the size of these pins and bushing compared to the knife's final parts. Later in the knife's construction, I will use new pin stock and the actual pivot bushing that will be installed in the knife. Final adjustments may have to be made at that time.



The edge of the blade is covered with layout dye and is scribed for grinding. This is done to center the edge on the blade and give me a target to grind to when doing the actual grinding of the blade bevels. The blade is now .120 thick, so I set the height gauge to .070 and scribe the edge of the blade with the blade resting on one side, turn the blade over and scribe again. The result is two lines spaced .020 apart down the center of the blade.



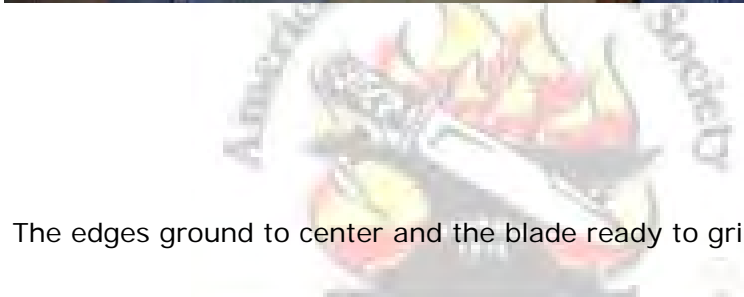
The scribed lines on the edge of the blade.



The blade is then fastened to a brass bar that I use for grinding folder blades.



The edge of the blade is ground at about a 45 degree angle down to the scribed lines.



The edges ground to center and the blade ready to grind the bevels.



Grinding the bevels on the blade.



Sanding the ricasso and tang on a sheet of 400g paper glued to flat material.



Hand sanding the blade.



The finished blade.



Sawing excess from the handle material. The handle slabs need to be thinned and it is easier for me to tell when I have ground them to the correct thickness if I first have the slabs cut to the basic shape of the handle.



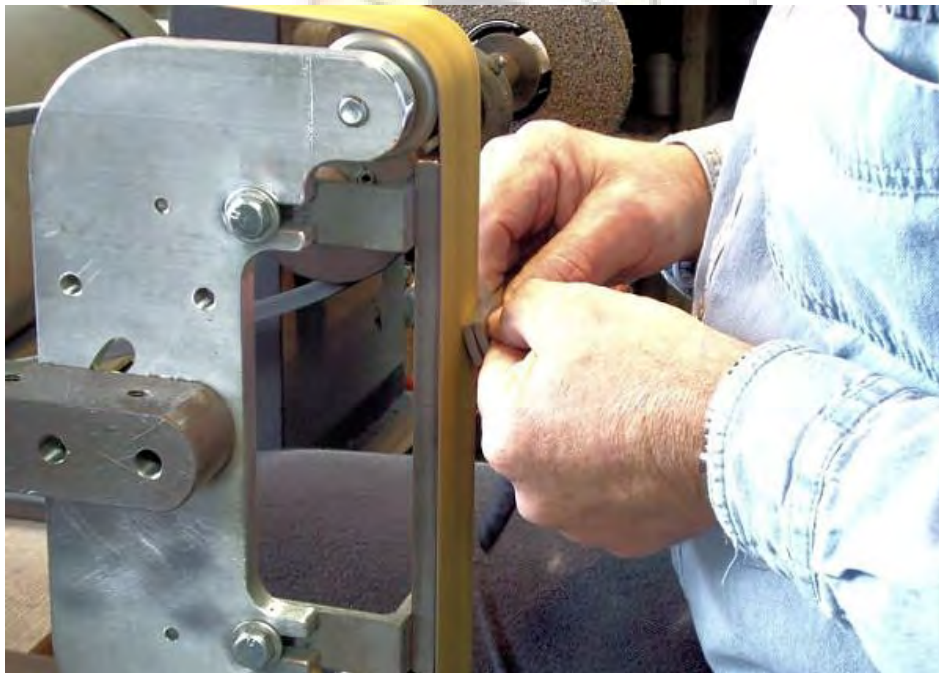
Grinding the handle slabs to the correct thickness.



A 1/16" hole is drilled towards the front of the liners to hold the front of the handle material.



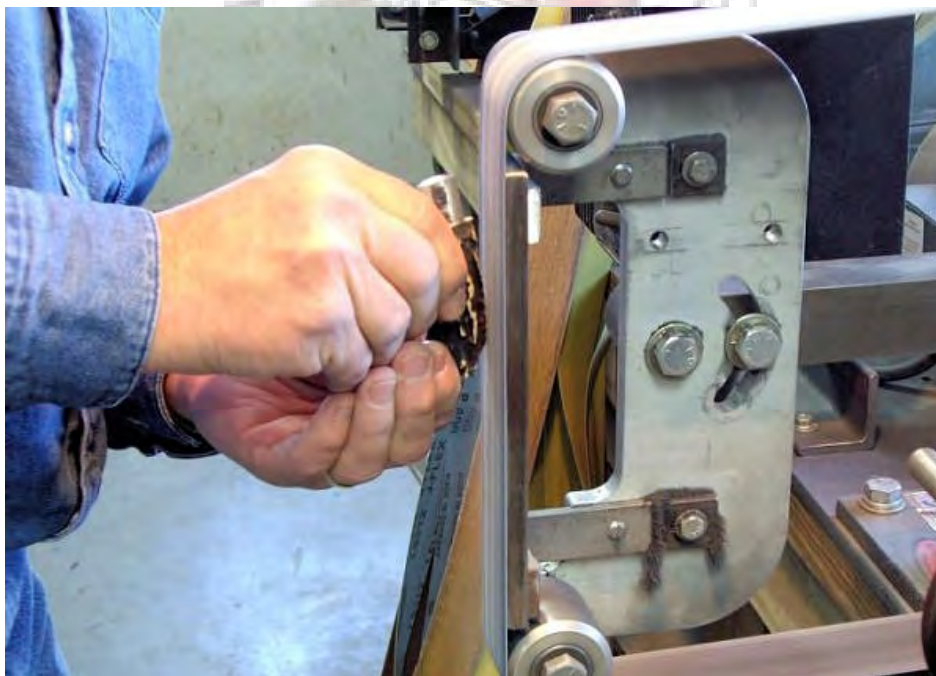
The bolsters are contoured before the handle material is attached. This is done to minimize heat build-up on the handle material during final shaping.



Adhesive is applied and the liner/handle assembly is clamped to a steel plate to minimize warping as the adhesive sets up.



The handle material is ground down to the liners.



The liners are flattened on a disc sander.



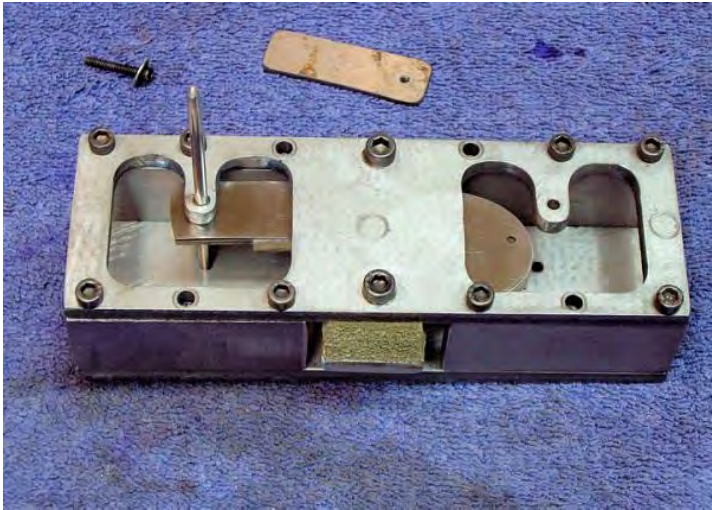
The disc sander marks are removed by hand on a flat block with sandpaper glued to it.



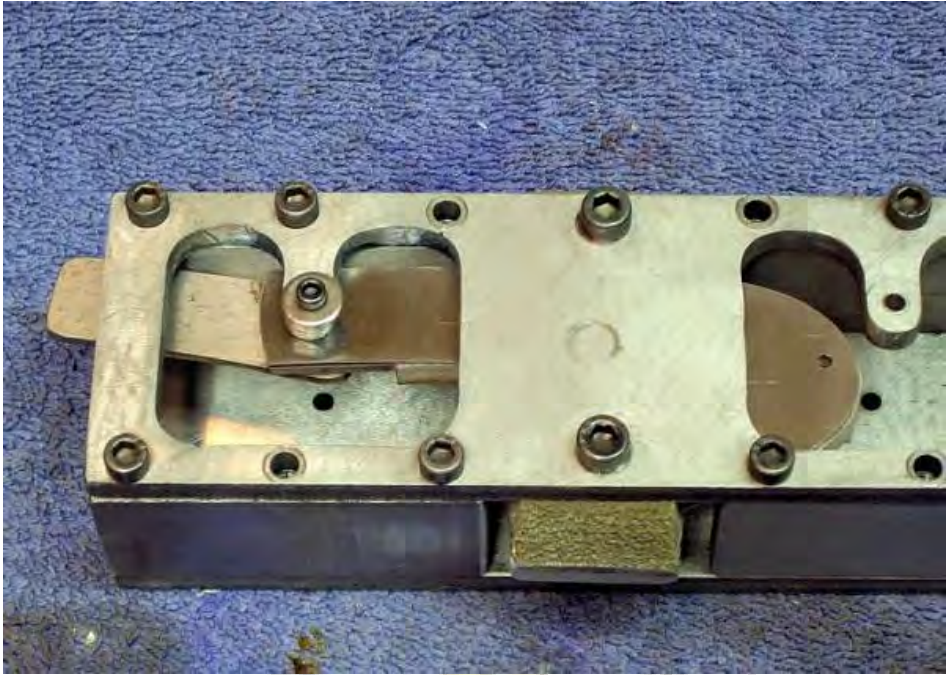
The pin holes are drilled through the handle material, while held to the bottom of a jig in my milling machine vice. I hold the assembly by hand so the drill bit will center in the holes in the liner. The jig assures that the holes go straight through and are not angled.



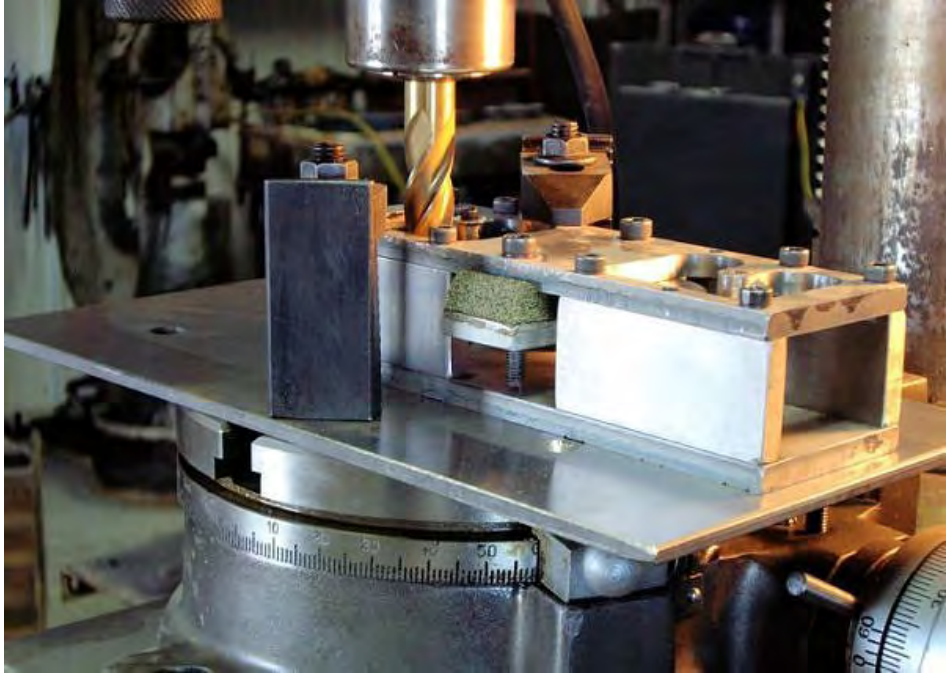
This is where my process differs from what I have seen other folder makers do. Most makers mill the tang reliefs in the liners at the start of the construction process; before the bolsters are attached and the handle material glued on. In my experience, the liners are prone to warp during the build-up of the handle assembly. As the tang reliefs are quite shallow, flattening the liners after the reliefs are milled can result in cutting away some of the relief. So, I decided that I would prefer to cut the reliefs after the final flattening of the liners. To do this, I built a jig that holds the handle assembly for milling. A piece of drill rod through the pivot hole is used to locate the handle assembly in the jig. Then a clamp in the jig is tightened to hold the handle assembly.



After the clamp is tightened, the drill rod is replaced by a bolt through the pivot hole to hold the assembly firmly.



The jig is placed on a rotary table in the milling machine and the reliefs are then cut.



Temporary assembly pins are used to align the handle assemblies and the bottom of the handles are finished.



Excess handle material is ground away to prepare for pinning.



The front handle pin hole is chamfered on the inside.



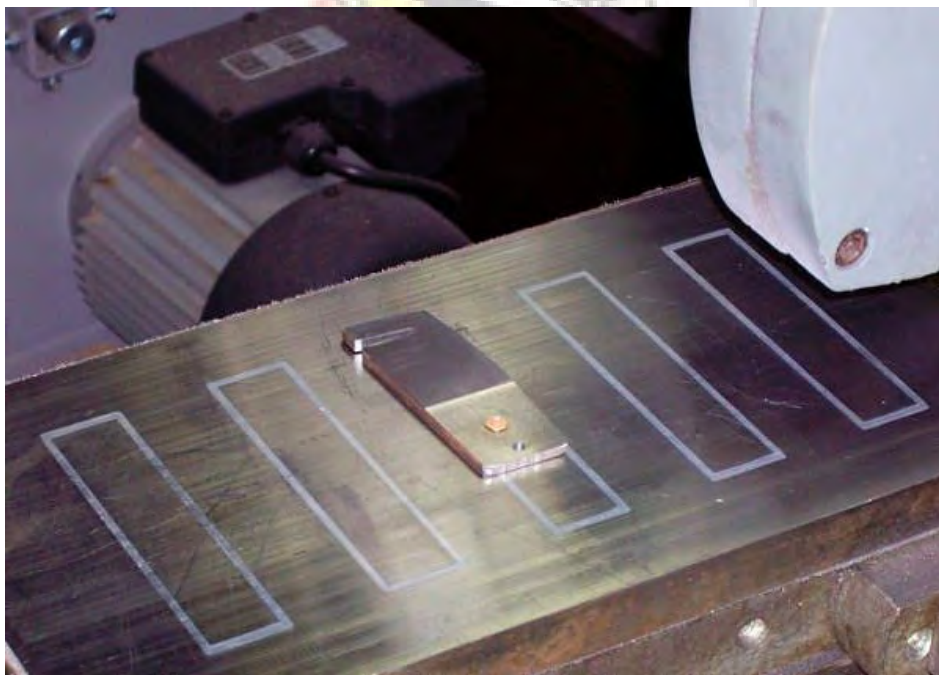
Setting the front pin in the handle material.



The other pin holes are reamed with taper pin reamers to about 2/3 of their depth.



I cut the pivot bushing to length using the surface grinder.



Setting the pins.



The knife pinned and ready to finish grind.



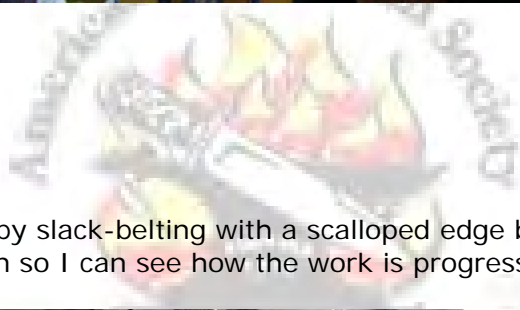
The inside of the knife is packed with tissue paper and covered with tape to prevent grinding grit from getting into the pivot area.



The back of the knife is finished first.



The sides of the knife are shaped using the rotary platen.



Smoothing and finishing by slack-belting with a scalloped edge belt. I run the belt upside down so I can see how the work is progressing.



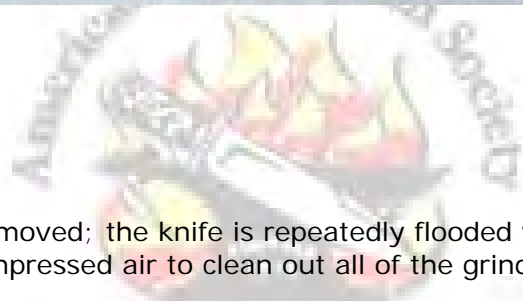
Next, I switch to a well worn 400g belt for additional smoothing of the finish. I also run it upside down.



Buffing the handle material on my home-built variable speed buffer.



The knife is thoroughly cleaned with WD-40.



With the tissue packing removed; the knife is repeatedly flooded with WD-40 and blown out with compressed air to clean out all of the grinding grit.



Paste wax is applied to the handle material.



Sharpening by hand.



The finished knife.



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