



Introduction

I have a nice 1/4" Sorby spindle gouge. It works very nicely provided the tool rest is close to the work. However, if for some reason (near pommels, tail stock in the way, etc.) I can't get the tool rest close, then it quickly becomes unusable. It just doesn't have a big enough cross section to resist vibration. This article tells how to make a small detail spindle gouge with a large enough cross section to resist vibration.

The June meeting of the South Central Pennsylvania Turners was a workshop held at the SCPT President's home on making turning tools. Valen Frye had set up his homemade forge and led us through the hardening and tempering process. This was quite a revelation for me. As an unrepentant tool fetishist, I've made many tools, but as I've always regarded hardening and tempering as impenetrable mysteries, I have always had to limit myself to grinding. Unhardened steel is much easier to shape. You can still grind, but you can also saw, file and drill, and it all goes much faster. In particular, grinding a consistent flute for a gouge with home shop tools is a very iffy procedure. But as long as you don't try to go too deep, drilling is easy.

Shaping

I started by cutting off about 8 inches of 3/8-inch drill rod. It might have gone faster with a cut-off wheel on my angle grinder, but I used my hacksaw just because I could.



Cutting the Oil Hardening Drill Rod to length with a hacksaw.

Next I put the rod vertically in my vise and used a center punch to mark it for drilling. I didn't calculate the hole placement exactly, but put it about as far off center as I could without worrying about breaking out the side. The drill size depends on the size flute you want. A 1/4 inch drill will give a flute about the size of my Sorby gouge. Use a smaller drill if you want a smaller flute.



Center punching the end of the Drill Rod.

I clamped the rod vertically in a drill press vise and mounted a drill bit in my drill press and drilled down a little over an inch. To avoid over-heating the bit when drilling this relatively deep hole I slowed down the drill press speed, used a cutting fluid, and backed the bit out often to clear chips.



Drilling the end of the Drill Rod to shape the flute.

For the next step I mounted the rod in my collet chuck, leaving about 3 inches protruding. If you don't have a collet chuck you could use a drill chuck as long as you secure it in your headstock spindle with a drawbar. A three or four jaw chuck would also work. I turned the lathe on at a slow speed and used a file to taper the last inch and a half or so of the rod until I had cut about half way into the drilled hole at the tip.



Filing a taper on the Drill Rod while the lathe is turning slowly.

Then I locked the spindle and used the file to flatten the top exposing the whole flute. You could use a grinder for both of these operations if you're in a hurry as long as you clean any wood chips out of the way of the grinding sparks first.

The gouge is now almost formed. But before hardening, while shaping is still easy, I roughed out the bevel on a bench grinder and hand sanded with some sanding cloth wrapped around a drill bit to smooth out the flute a little.

Hardening

I'm not yet ready to admit (to my wife, or even myself) that I'll make enough tools to make it worthwhile to make a forge, so I used a Propane torch to heat the tool for hardening. Do this outside. I put on gloves, gripped the tool with locking pliers and put the big head on my torch.



Heating the tool to cherry red with a torch.

I heated the last couple of inches to a cherry red (double check by touching the tool to a magnet. If the magnet attaches, shake it off and heat some more). When the tool was hot enough I quenched it in a coffee can half full of used motor oil. Do use a metal container. Let the tool cool in the oil, then clean it.



Quenching the hot tool in oil.

You can get test to see if hardening was adequate by trying to file the tool. The file should bite down on the unheated shank part, but skate across the hardened tip area.



Testing for hardness with a file.

Double check to make sure that all the oil is cleaned off (the smell will give you away even if you spouse isn't home now) and pop the tool in the oven. Set the oven to 300 degrees, and leave the tool in there for an hour. This will temper the steel, leaving it hard enough to sharpen, but not so brittle that it will break. After removing it from the oven, leave it in a safe place such as the sink or a concrete floor to cool.

Using

While you're waiting for the tool to cool you can make a handle for it. Since this tool is round stock, just drill a hole the same size and press the tool into the handle. A final sharpening on the system of your choice and you're done. I like the result. It cuts just fine, and doesn't bounce like my store bought tool does when the tool rest isn't close to the work. Granted, I won't be able to sharpen it forever because it's not hardened to the shank and the flute doesn't go that far. But it's a special purpose tool and it must have cost me 60 cents in consumables to make.



The finished gouge.



A comparison of the store bought and homemade gouges.

This article appeared in the December 2001 issue of More Woodturning. Another way to make a more rigid detail gouge is to leave the shaft full thickness and use a small drill (or vertical mill if you have one) for the flute as advocated by Mike Darlow. This also works particularly if you want a very small flute.