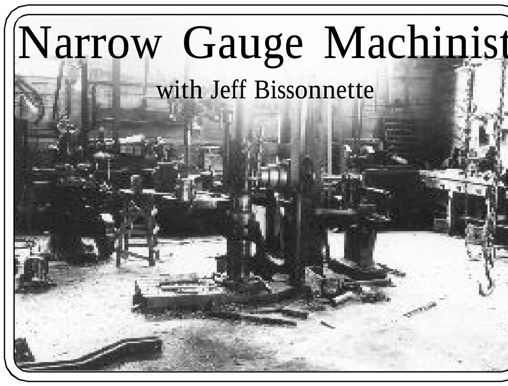
Narrow Gauge Machinist

with Jeff Bissonnette



Flywheels and Crankpins...

Ok, so you can by a quality commercially made flywheel for what? Say, 2-5 bucks? So why would you spend the time to make one? Simple. You may find yourself needing a custom OD (outside diameter), bore, or a specific shape to fit a given application. Or, maybe you just want to make one or two for practice. Whatever the case, here's my method for making my own true running, wobble-free, flywheels.

The first step is to determine the maximum OD of the flywheel and then choose your raw stock accordingly; just make sure that it is at least 0.020" oversize, allowing for final finishing later. I first rough cut the stock to length using a hack saw; that way it is more manageable, and doesn't require using a steady rest to cut to length on the lathe. After chucking up the brass blank (Photo 1) in the three-jaw chuck, I take a few light cuts across the face of the blank to smooth and square the face. Next a center drill is used to center drill the material, followed by boring a rough hole using drill bits.

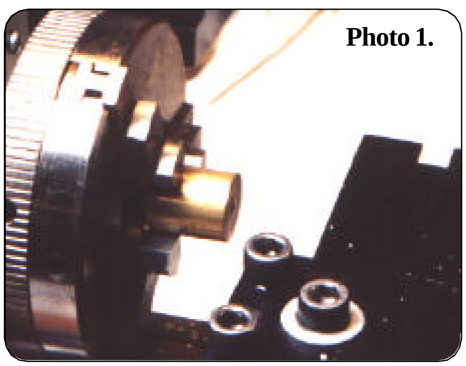


Photo 1.

After determining what the finished bore/shaft diameter will be, use the appropriate diameter drills to drill through the flywheel blank (Photo 2). Once I get to a drill size roughly 0.007" smaller than the final bore of the specific shaft that the flywheel will be mounted on, I switch to a reamer that will create a bore that is a light press fit.

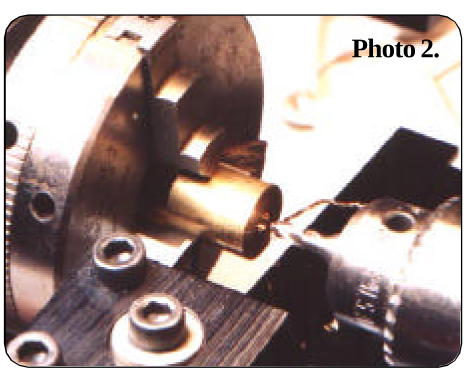


Photo 2.

When reaming, remember to use cutting oil and a very slow speed!! If I plan to use a universal "cup" on the shaft and want to hide it partially or totally inside the flywheel, now is when I usually counter-bore the flywheel for it. The easiest way I've found to do this is to use an end mill that is slightly larger than the OD of the universal "cup" that is going to be used. The idea is to leave maximum material on the flywheel for effectiveness. Once the appropriate end mill is chosen, it is chucked in the tailstock and the counter-boring step is executed to the necessary depth. With that step completed, a parting tool is used to cut the flywheel to length (Photo 3).

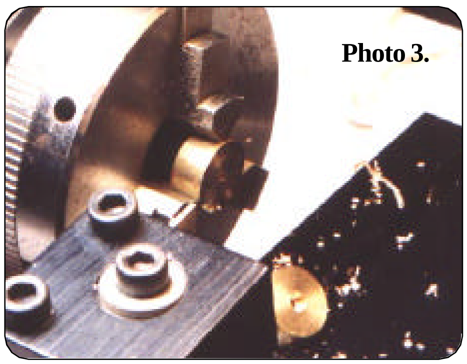


Photo 3.

Once done, remove excess material from the chuck and insert a short length of 1/8" OD, plus or minus, scrap brass or steel rod. The scrap rod is used to make a mandrel that runs true with the rotation of the lathe spindle. The material is turned down until the OD of the mandrel is slightly less than the bore of the flywheel (0.0005" or so). The idea is that the flywheel should slide onto the mandrel, but there be little or no slop. Sometimes it takes me 2-3 tries to get the right OD, but it is important get it right here, so have patience and keep trying. Once the proper fit is achieved, ACC the flywheel onto the mandrel and turn the OD of the flywheel to the final dimension and/or contour. Remove the mandrel/flywheel from the chuck and soak in Acetone or apply heat with a torch to separate. There you have it! A true-running, wobble free, custom-made flywheel (Photo 5).

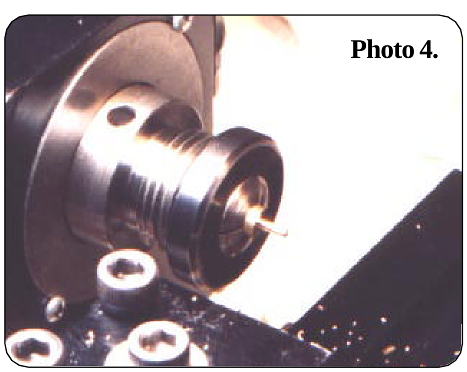


Photo 4.

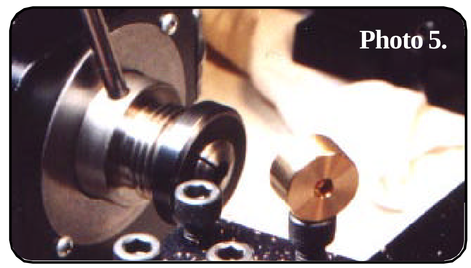


Photo 5.

Crankpins for the Project Engine...

Please refer back to my first two columns on driver construction where I covered making crankpins as well as some basic commentary on materials and methods used. For crankpin material, you can't beat NWSL's steel axle shaft stock. It's one of the "leaded" steels that machines, drills and taps easily with a very good surface finish that improves when oil and 1200 grit emery paper are used to polish the surface.

All of my crankpins press fit or are ACC'd into their drivers, cranks or counterweights. I DO NOT thread my crankpins in because a threaded crankpin does not accurately locate into a threaded hole, nor do they seat squarely once "home." I prefer to drill/ream the holes for crankpins and then ACC them or lightly press them into place, using a tapped hole through the crankpin with a retaining screw to hold the side/main rods in place, or, as in the case of some of my locomotives, I step the end of the crankpin to receive a small 000-120 washer, which is soldered into place to retain the side rods.

That sums up this installment of the project engine. Next time, I'll assemble the various subassemblies and start on the cylinder saddle, cylinders, crosshead and guides.