Machining the Feed Crank

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The feed crank is one of the simplest parts on the shaper. That does not mean I machined it without a hitch.

Things started off well. I used the protractor pattern plus a 1 1/4” diameter sprue with center pin for the feed crank pattern. Why make yet another disk? The resulting casting was about 3 5/8” diameter so would need to be turned down to 3 1/8”. The shank would be less than the 1 7/8” specified by Gingery but I didn't see this as a problem.

The casting came out usable. The center of the bottom was a little higher than around the end. This is probably because the melt dropped down the sprue and struck the sand at the bottom of the mold. That pushed down the sand resulting in a bulge in the casting.

The broken edge of the mold permitted a small amount of melt to flow out at the perimeter along the cope/drag line.

The first step was to put the bulged face on my belt sander to get it a bit smoother. Then I sawed and sanded off the blobs around the perimeter.

The sprue was sawed off at about 3/4”. That leaves plenty of room for a finished length of 1/2”.

Next it was time to assess how best to machine the casting. Someplace inside this rough casting is a perfect feed crank. The trick is to find it.

Here I have mounted the casting by its shank and used my cutter to see how far out the plate is to the OD of the shank. It was out about 0.1”. The plate is a little under 0.5” and I must cut a 1/4” slot in it. Not much extra metal for truing it up. Even though there is not a lot of extra metal on the shank, I decided to preserve as much of the plate as possible at the expense of the shank.

My sanded face of the casting became my reference surface. I will later re-cut it to be true.

I did not take pictures of the next few steps mostly because I forgot.

I step drilled the hole to 5/8” and then bored out to 0.8”. Yup, 0.8”. It should have been 0.750” but by the time I had my boring bar set right, I was over. I also ended up with the hole not centered in the hub. This was not a big deal and I was able to turn it to my advantage (no pun intended). The thick part would hold my set screw. It worked out well. I used a 1/4-28 set screw because that is what was at hand.

After screwing up the bore, I mounted the casting on a 3/4” mandrel. Not the best arrangement since the cutting force did tilt the casting a little. I ended up having to do clean up cuts after repositioning the casting and re-tightening the set screw.

The next step was to machine the 3/4” slot. This is an easy task on a mill/drill. Since Gingery just used the cast in slot, I figure this is not a critical machining task. I just eyeballed it.

Here you see the finished feed crank. Note that the bore is not centered in the hub. It may not look great but works OK. What is important is that the bore is perpendicular to the bottom face. You can see some surface imperfections which are not pretty but the part is usable. These are not gas bubbles.

I took more metal from this face and you don't see any surface imperfections. That is why I claim I don't have gas bubbles in the casting.

All that is left is to bolt down two strips of CRS to form a 1/4” wide T slot and make a sliding nut. Then, as Gingery says on page 70, “On to Bigger and Better Things”. The tool head and down feed are next. I have the rough castings in hand so I will be just machining for a while.

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