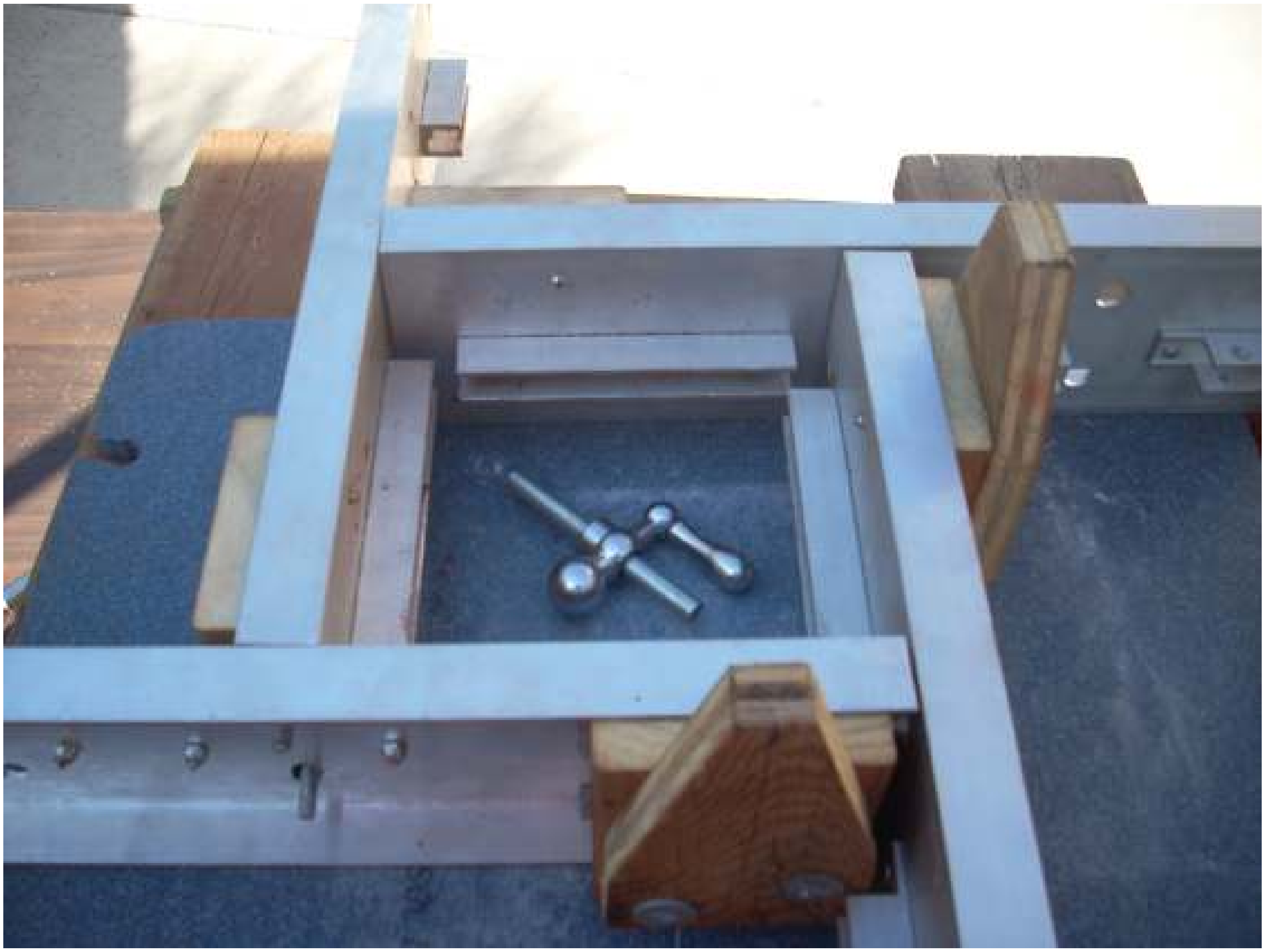
Casting Ball Cranks

By R. G. Sparber

09/18/2008

I have always liked the look and feel of the ball crank on my Craftsman® Atlas® lathe. My own ball crank pattern made out of turned wood parts looked clunky. The solution was obvious: use this ball crank as my pattern. All I had to do was remove it from the lathe and slide a 3/8” diameter rod through the hole.

The first step was to assemble the flask. My furnace can be seen in the background with its new lid. The old lid kept falling apart so I broke it out and cast a new one. So far, so good.



The smallest size was a bit cramped but would have worked. I decided to not fight it so went with the next size up.

I rammed up a blank drag and inverted it. The pattern was then pushed down into the Petrobond.

I then carved down until the center line of the pattern was exposed. After dusting, the cope was added and rammed full of Petrobond.

Here is the cavity formed in the drag. The gate has been cut from the ball over to the sprue imprint.

The cope's half of the imprint came out just as clean. The white circle is the end of the sprue. After pulling the sprue pin, I carved it into a funnel.

An old flask was rammed up to hold a second copy of the ball crank.

It would have been an uneventful pour except my thermocouple died as the melt was going through its phase change. Gasp! I had to judge the time to pour by actually looking at the melt. While I waited for the melt to be ready, I made up a new thermocouple and was able to use it just before the pour. Luckily I was at about the right temperature (700C).

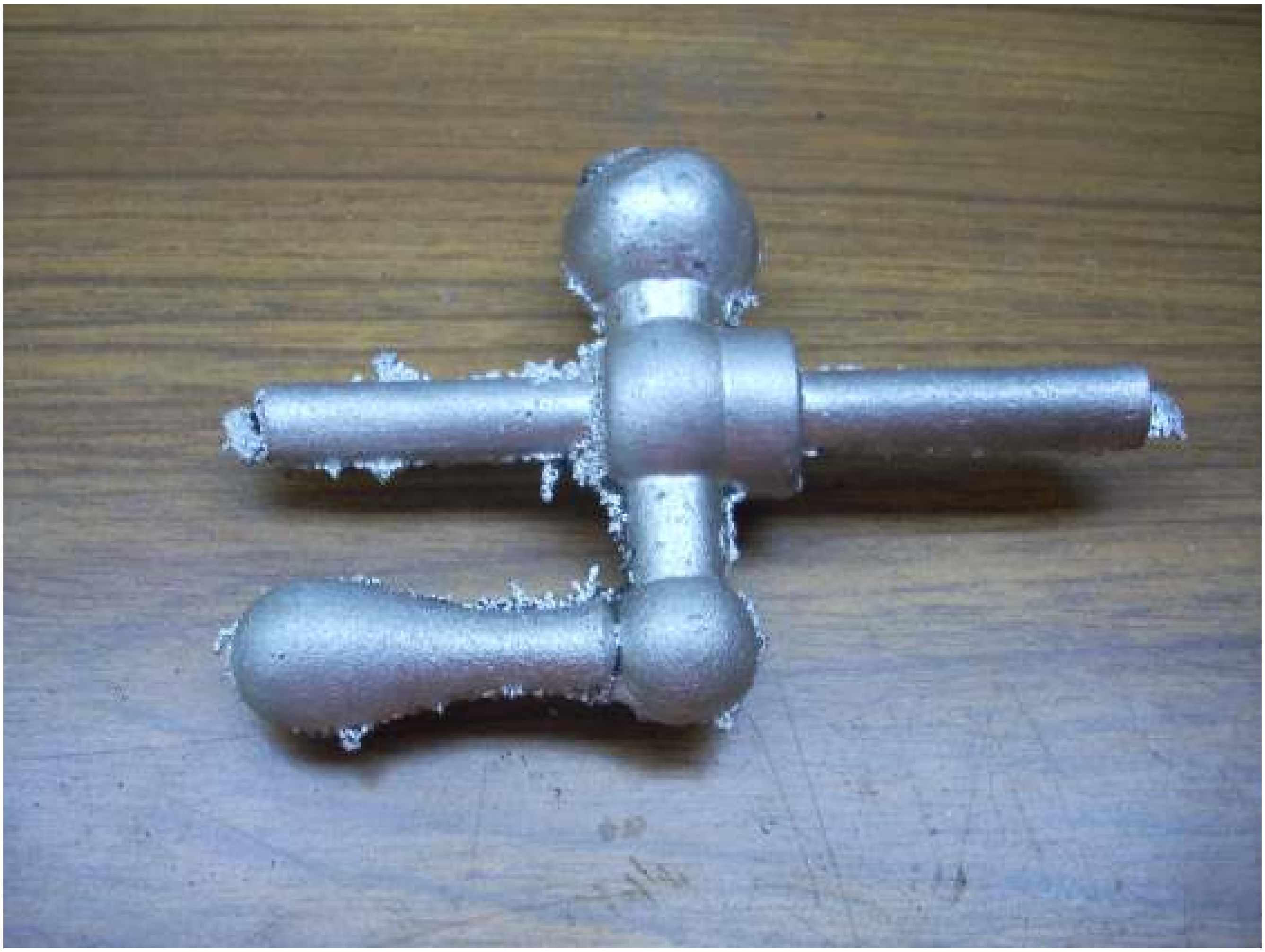
Most of the metal poured into the flask ended up in the sprue. The ball crank cavity is actually rather small.

Much to my amazement, both cranks came out rather nice.

Notice that I left the rod imprint empty so received a cast in rod. It will be used to hold the crank in the lathe.

I did have a problem with cope/drag registration. This problem was pointed out to me by someone on one of the Yahoo club sites. My alignment “pins” on my flasks are too sloppy. Rather than using large tapered flats, I should use close fitting pins that are tapered on the ends. This is the first time that it has really mattered. Not a show stopper, just more obvious on these small parts.

The bandsaw was used to remove the sprue and the larger pieces of flash. A belt sander cleaned up one end of the rod.



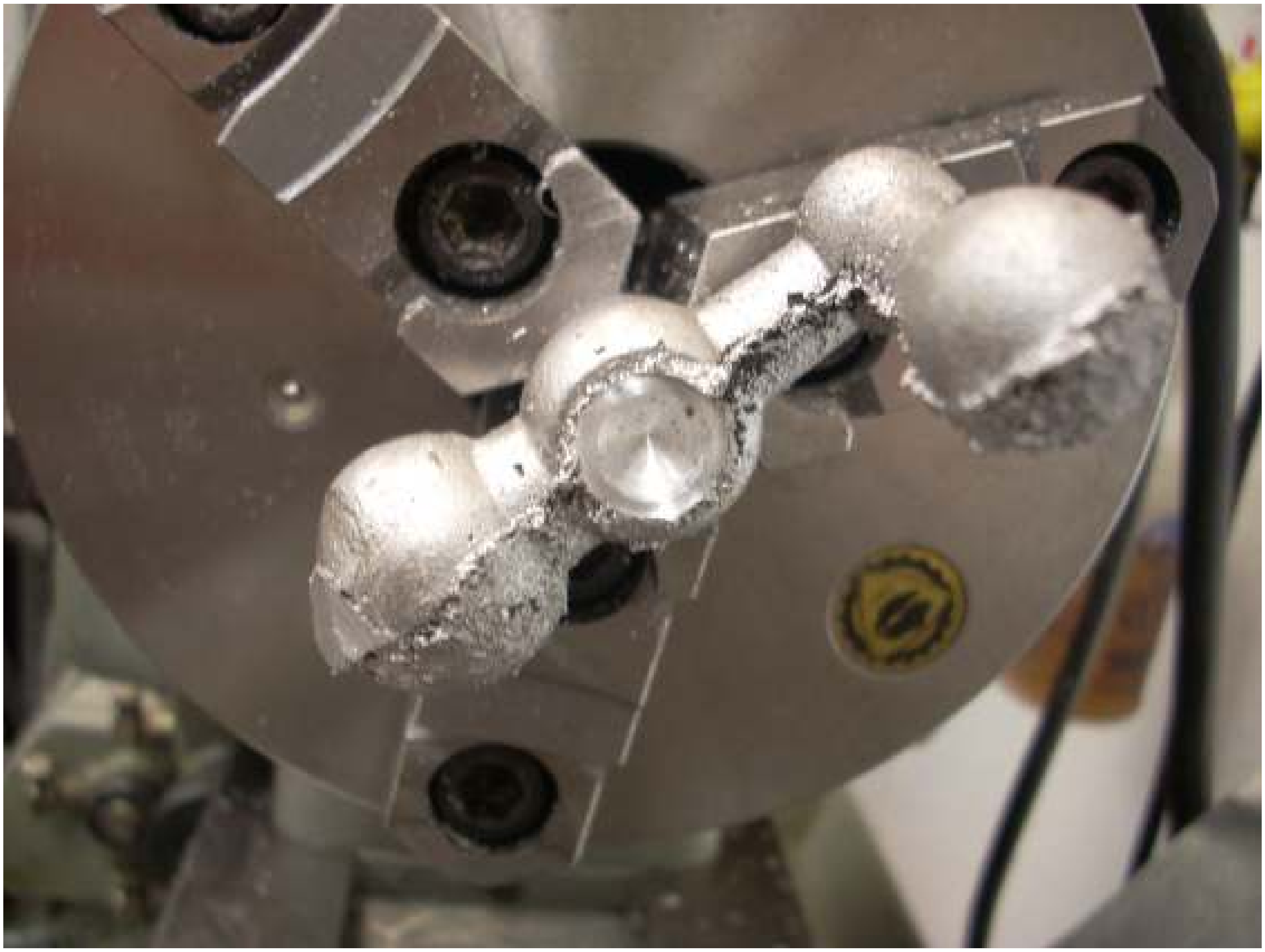
The right end of the rod will go into my lathe chuck. The left
end will be cut off next.

Before I can drill the 3/8” hole through the crank, I must get a flat surface so the drill bit does not skid off center.

The belt sander on the left face gave me a fairly flat surface.

A 3/8” drill is positioned to drill the through hole.

You can clearly see the difference in finish between cope and drag. The cope is nice and smooth and the drag was a bit rough. I believe this was due to the fact that the pattern was pounded into the cope so compressed the Petrobond and gave a strong, smooth surface. The drag was gently rammed down so as to not stick to the cope.



I drilled down a little bit and then used a ½” two flute end mill in the drill chuck to form a land that was true with the hole.

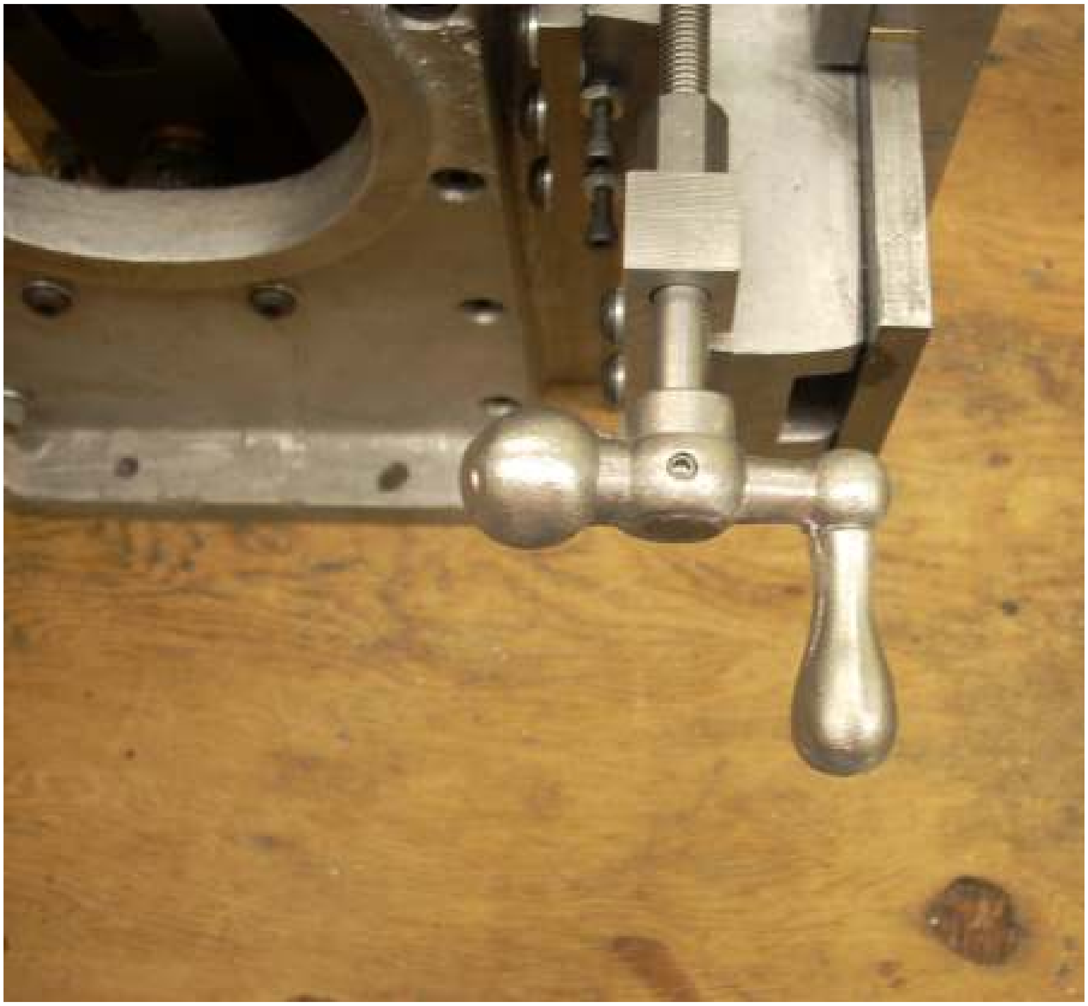
I drilled until the ball handle was cut free from the cast in rod.

The part is now ready for a clean up on the belt sander and with a wire wheel.

It looks a bit rough but not bad.

The last step was to drill and tap for the set screw. I chose to use 10-32 set screws because I had two of them in my junk drawer.

The down feed still needs a few parts before it is complete.



The cross slide on the left side is done. Gingery shows a second crank on the right side but another version of the shaper didn't have one. I can always cast a third crank later if needed.

I will finish up the down feed next time.

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