

Design and making Magneto Cam Rings (part 1)

The points cam ring in the BTH magneto on my Mk I KTS is very worn and needs renewing. Last summer, I tried to get a replacement without success. I got my last replacement cam ring (a few years ago) from Dave Lindsey; he informed me that the guy who made his cam rings was in his eighties and in hospital. So I started looking into trying to make my own cam rings.

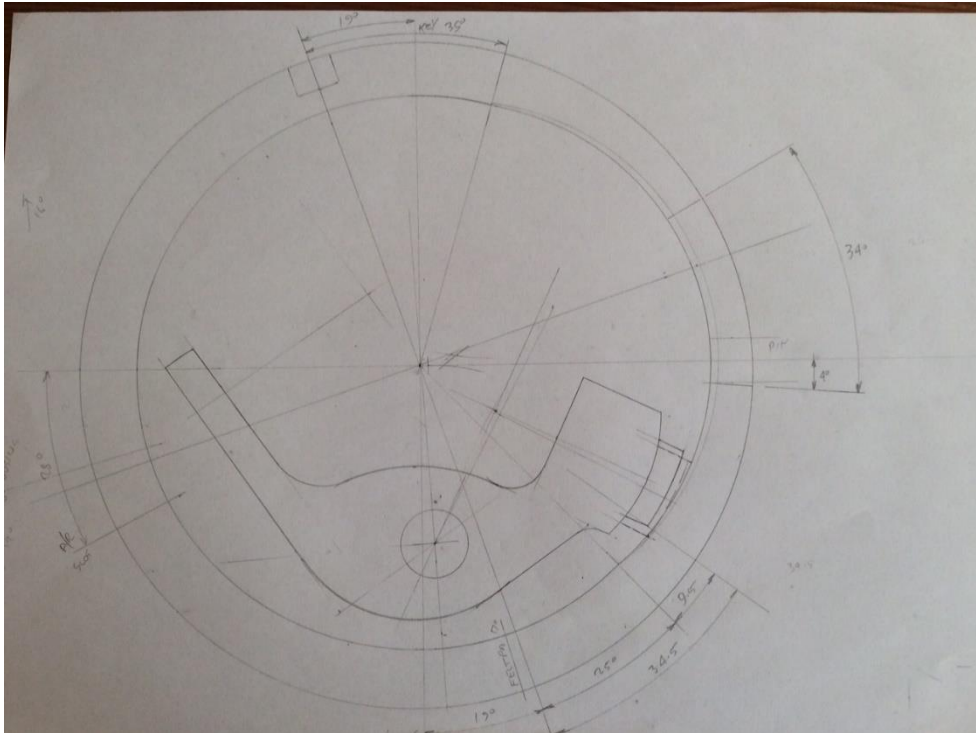
I spent a lot of time last Christmas measuring and drawing the BTH magneto to establish the relationship between the points operating arm, cam ring cut out, armature pole plates and magnet pole plates. I already had a reasonable understanding on how this should all tie up, but there was also useful information on the internet. I drew it all out four times full size from which I produced a manufacturing drawing. The attached photo of my drawing is for the magneto on full advance and the points at the point of just opening.

The next issue was getting some cam rings made. The original rings are case hardened (carburised). The carburising process distorts the component, such that an oversize blank has to be made first, then hardened and ground to size. Small engineering firms with necessary grinding machines to do this, are now very few and far between and the cost for a small batch, such as mine, would be prohibitively expensive. Looking at the cam rings, the only surface that needs to be wear resistant is the inside diameter where the heel of the points arm rubs. So I decided to tuffride the cam rings; this is a low temperature nitriding process, which produces a hard surface but is only microns deep. The advantage of this process, is that the distortion of the component is very low and it can be machined to the finished size, prior to hardening. While the depth of hardness is very shallow and longevity may not be as good; unless I take my bike to Mars and back, I think they will last a good few years.

I only have a Myford lathe and I knew I would struggle to produce consistently the tolerance and concentricity on the diameters and the points cutout on the cam ring, but I should be able to machine the various slots required. I had, and still have, a good relationship with a local machinist that my last employer (before I retired) use. They have a CNC lathe and could produce the cam rings (sans slots) quite readily.

So, this where I am with the project, I have had a small batch of cam ring blanks made (see photo), I have purchased the necessary woodruff cutters etc., and I am currently making some simple jigs and fixtures. The cam ring blanks have been made from a nitriding steel (EN40B), and I have located a heat treatment company that can do the tuffriding (fingers crossed they survive the current pandemic). I am still a long way off getting finished cam rings, but it is a good start.

I have also made some cam ring blanks to suit a square ML magneto (the other cam ring in the photo), as fitted on my 29 KSS. These cam rings are 1 mm bigger on the outside diameter compared to a BTH cam ring and are narrower. The inside profile is also 1 mm larger, but I have made this same as for the BTH magneto, so that I can use a BTH points assembly (try and find an ML points assembly?). The points end casting on my ML magneto is not correct. I have a correct (manual advance and retard) casting which needs machining, and I can work out 90% of the machining for this casting. However, does any one have an original finished points end casting that I could measure? I don't need to borrow it as it will only take 30 minutes to measure it.



Since submitting the original article Chris has made progress on cutting the slots in the rings as shown in the photo below - Jon

