

8TH JAN

First day in the workshop this year - though, to be honest, I have done some 'fettling' of the gears while sitting at my office desk and waiting for the PC to finish a task - most of the time has been spent on End-of-Year Accounts and VAT return.

I've finished all the CNC machining (well I thought I had! see below) so now it's a matter of dealing with the surface finish on the Gears and Frame, starting with sanding to 320g, then applying Sanding Sealer, de-nibbing and finishing with MC Wax.

I'd assembled some of the gears/pinions along with their bearings and taking these apart to do the sanding proved somewhat difficult - even though they had not been glued - and one pairing didn't want to be parted at all and the Pinion disintegrated. With a second, I pressed the bearing deep into the pinion (with a bench press) such that I'll have to break that apart to retrieve the Bearing — so, I now do have to do some CNC work to make two more!

The 'fettling' that I did at my desk was just cleaning up the Gear Teeth. I made a 'stick' roughly the shape of the tooth profile, glued a strip of 240g abrasive to it and simply went around each tooth to remove any remnants of wood fibre that would potentially cause a 'bind' with the mating Pinion or Gear.

Taking the photo' for Fig-185 proved 'interesting' -- I only have two hands :) ... but I suspect you can fully understand what I was doing.



9TH JAN

Made two new Pinions but scrapped one by trying to take too big a cut when machining the boss so had to make yet another!!

I still have quite a few Gears to 'fettle' and although I made another abrasive stick it really is a chore :( This led me to think about a better option which seemed to be a thin 'flap wheel' - or, better still - an abrasive 'worm wheel'.

To sand the faces I'm using 50mm Ø abrasive discs attached to a pad by Velcro so I've had an idea to make a disc with velcro on both sides which will take the same discs. It might be somewhat more aggressive than my 'Fettling stick' so will need care but I have found 50mm Ø self adhesive Velcro discs which should be with me early next week so I can soon make a thin double sided abrasive disc which I can mount on a rod in the lathe. I'll have to punch a 20mm hole in the centre of the Velcro & abrasive but that shouldn't present much of a problem as I've previously made hole punches for Copper & Silver up to 10mm.

12TH JAN

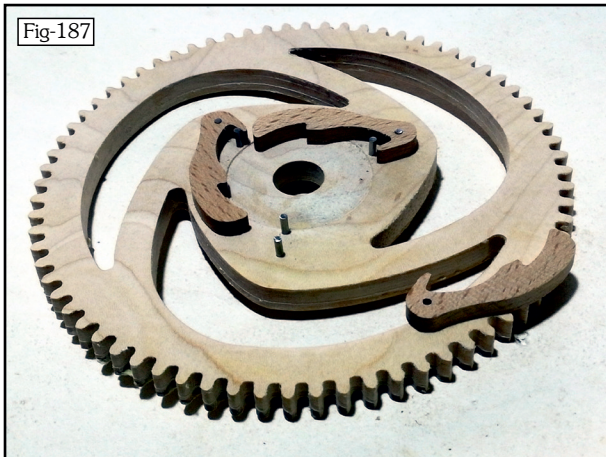
All the Gears have now been 'finished' with Sanding Sealer and had a final sanding with 400g so now I can start real assembly.

One of the most important things that I hadn't made were the Escapement Pins so whilst I was waiting for the sanding sealer to thoroughly dry I made these. I had bought in 3m length of 2mm Ø Stainless Steel and had originally determined to hold that in a 2mm Collet on the lathe and feed enough to part off 14mm long pieces but I had a better idea. To hold the steel in the lathe I would have needed to cut it into shorter (600mm max) lengths and even then by the time I'd parted most of that length off there would have been a short length that could no longer be held but it occurred to me that I could drill a 14mm deep 2.1mm Ø hole in a block of Aluminium and use that to saw off the 120 pins I needed.



I started by using a Jewellers piercing saw but the 4/0 blade was blunt after only 3. They are intended to be used on Silver/Gold/Copper/Brass etc. so there was no real surprise that Stainless Steel took its toll. Once I'd changed to a small Hacksaw I was cutting them off at a regular length in moments. I also needed 24 off at only 10mm long so a second hole soon sorted that and after a mornings work I had all the pins ready to be pressed into the pre-drilled holes.

The shorter pins are for the Drive Gear Pawls and only 6 in each so that's where I started the assembly. I'd drilled the holes at 1.9mm Ø since I didn't want to glue the pins in so I considered a 0.1mm interference sufficient. A problem immediately became apparent when I found that I couldn't hold a pin above the hole and in a position to apply pressure from the Arbour Press so I had to open each hole out to 2mm but only for the first 1mm. Doing this by hand is not the easiest job I've had to do and I broke a drill leaving about 2mm in one of the holes :( That took quite some time to get out! In Fig-187 you can see two of the pins ready to have the third Pawl dropped on.



With the holes widened, I could just press the pin in by hand and then use the Arbour Press to force them in leaving the 5mm height I needed.

My next job will be to put 30 in each of the Escape Wheels but I think I need to find a better way to open the holes in them.

My experience with the Pawl Pins made me think to use the milling machine to 'carefully' open the tops of the holes in the Escape Wheel. The potential danger would be that the drill might 'snatch' which would remove the grip afforded by the original 1.9mm Ø hole. In fact I found it quite easy to just tweak the top 1mm and after I'd done a few I made sure that the pins

would hold. Not remembering how many holes I'd actually re-cut, I continued and found that because these pins are 14mm long, it was easy to hold them well enough to hammer them home into the original holes without using the Arbour Press. One end of each pin was still 'as sawn', often with a small burr where I hadn't sawn quite through and been able to break the pin off the stock, but I had smoothed the other end off to get it in the jig. This meant that they all needed to be levelled in the same way that I'd sanded the Gears - with the 50mm Ø pad in the mill - but using 60g abrasive with a final skim using 240g.

Fig-188 is the complete Escape Wheel and Fig-189 a close up of the trimmed pins.



13TH JAN

The glue-up of the Escape Wheel to the spacer and Pinion can now be done but I'd forgotten that the spacer also needed to be finish sanded & sealed!

The fact that the Spacer and Pinion are already mounted on the spindles made it easy to deal with that but I had to strip them for the glue up and ream the bore again to clean out excess glue.

I've received the 50mm Ø Velcro discs and made the thin disc sander that I mentioned on Saturday. Using two back-to-back would have been ideal but by the time I have even a thin backing card that the Velcro can be glued to it was too thick so I've had to settle for a single sided option and go round each Gear twice - turning them over for the second pass.

The rest of today was spent mostly in glueing together the 'pairs' of Gears but also finishing off small details that I hadn't done on the Winding Drums. I still have to make the cord ends so that's likely to be tomorrow.

