Reuleaux-Galileo Clock **W.I.P.**

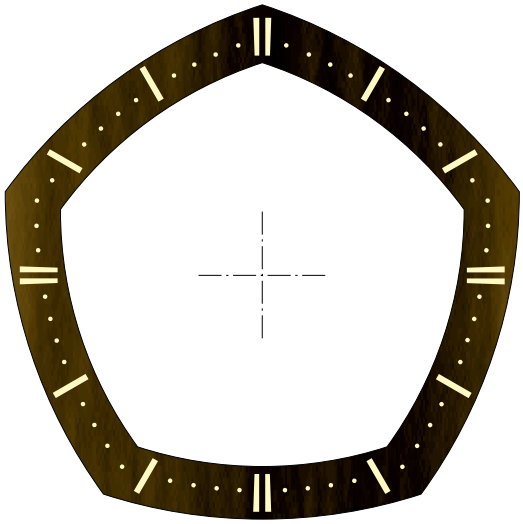


Fig-1

In another thread about using CNC where I mentioned a Clock build it was suggested that since I hadn't started making the components for this clock (the drawings are done though they are subject to modification) that I should do a W.I.P. Not having done a one before I'll treat it as I might like to see a W.I.P. detailed. It may well prove to be more or less detailed than others. Please do let me know if you think I'm being too 'sketchy' with the build - or for that matter too verbose!

The genesis of the project is three-fold. First, I bought a Denford MicroCompact CNC Router in July so was looking for a suitable project, Second, for some time I've been aware of the Reuleaux Polygons which have a constant 'Diameter'. The most familiar object(s) of this shape are likely to be the current UK 20 & 50 pence coins which are Reuleaux Heptagons, The Wankel engine piston is a Reuleaux Triangle and the polygon I use is a Pentagon. Fig-1

That is why I'm using this shape for the Dial. It presents some problems regarding the Minute and Hour markings but they are not insurmountable, particularly when using CNC.

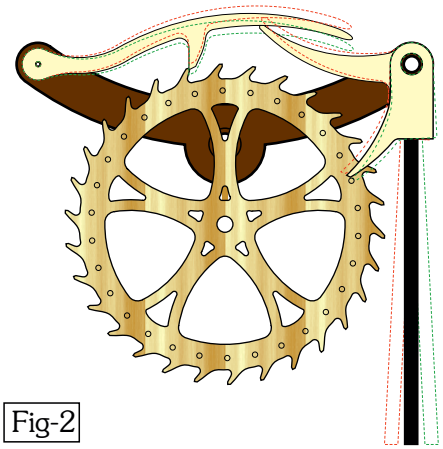


Fig-2

Third is the escapement devised by Galileo Fig-2 which I learned about just after buying the Router. This looked to be interesting in-as-much-as though it is not as 'active' as a grasshopper escapement, it has a certain 'life' which isn't there with (say) a 'Deadbeat' escapement.

Galileo used a 12 tooth Escape Wheel and probably a short Pendulum which gave him about 6 hours between windings - hardly convenient. I'm using a 30 tooth Wheel and a 1m long Pendulum, add to that a 25mm dia winding drum and a 72 tooth drive wheel and I hope to get a 26 hour run with a 1.8m drop for the weight.

The parts list shows just over 100 items but in reality there are about 150 individual components since I've only recorded one item as 'Escape Pin' but naturally there are 30 of them, and since the materials are mostly wood, care needs to be taken about the direction of the grain so some components are in fact multi-part - viz: the Dial is five separate pieces, mainly because 340mm is beyond the capacity of my Router.

Having done the detailed drawings - as I would for any project - both 2D in CorelDRAW! and 3D in SketchUp I'm now ready to move on to create the toolpaths for those items which will be made using the CNC Router and that means exporting DXF files from Corel for import into CamBam which will create the G-Code. Though I have done some testing to gain knowledge by writing G-Code manually but only for very simple shapes.

There are many components which will be turned on my lathe, without CNC, but I'll add them in as I make them just to fill in the gaps as-it-were. Using CNC I've already found that it is wise to prepare the basic materials to closely prescribed dimensions and position the blanks accurately on the Router Table. The [Machine co-ordinates] of the Denford are X= -200/+200, Y=-100/+100 and Z= 0/-100 mm so I've made a point of setting CamBam up with that same [Work-Space]. The Z position will be reset for each component, using a 'Touch and Zero' methodology. Since Gears will be a big part of this project, I've made a peg to fit in the X=0,Y=0 position on the Router Table and that will also be used as a datum for many of the other components.

The first part I've attempted is the [Latch] which needs to be a composite item made from Ash and African Leadwood. I want the grain to lie along the length but the 'Tooth' needs to have the grain perpendicular to eliminate the possibility of 'tip' breakage. I made up 4 blanks and have trashed two of them for a variety of reasons.

Fig-3 is a photo of an uncut blank in position on the Denford Table.

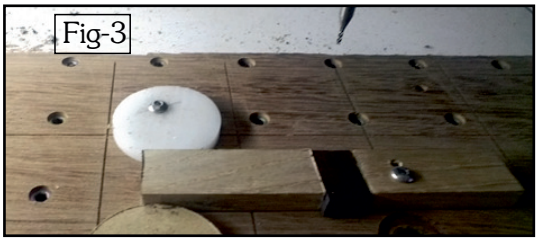
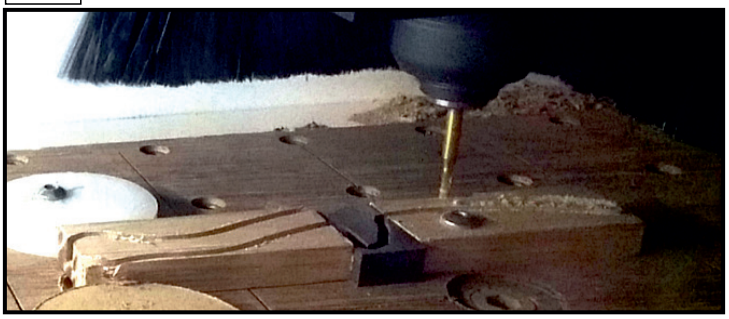


Fig-3

Fig-4



PART CUT BLANK

Fig-5

FINISHED PART 1 - LATCH

After three attempts where my decision to prepare the blank at the same thickness as the finished component proved to be suspect (wrong!) I did get one made. The blank was not only held in place by a screw into one of the thread inserts in my sacrificial table but also with double sided adhesive tape. Even so, that wasn't enough to hold it in place, by the time I'd made the rough cut leaving only 0.3mm at the bottom. With my third attempt I did a rough cut (leaving 0.2mm) to half the depth and a finish cut before doing the second rough cut to full depth followed by the second finish cut.

I'm not totally satisfied with this Latch and I will make another using Maple or Beech rather than Ash. I might also use African Blackwood instead of Leadwood for the tooth since I can already see some wood fibres at the point of the tooth and suspect that Blackwood, being closer grained, will retain the edge better.