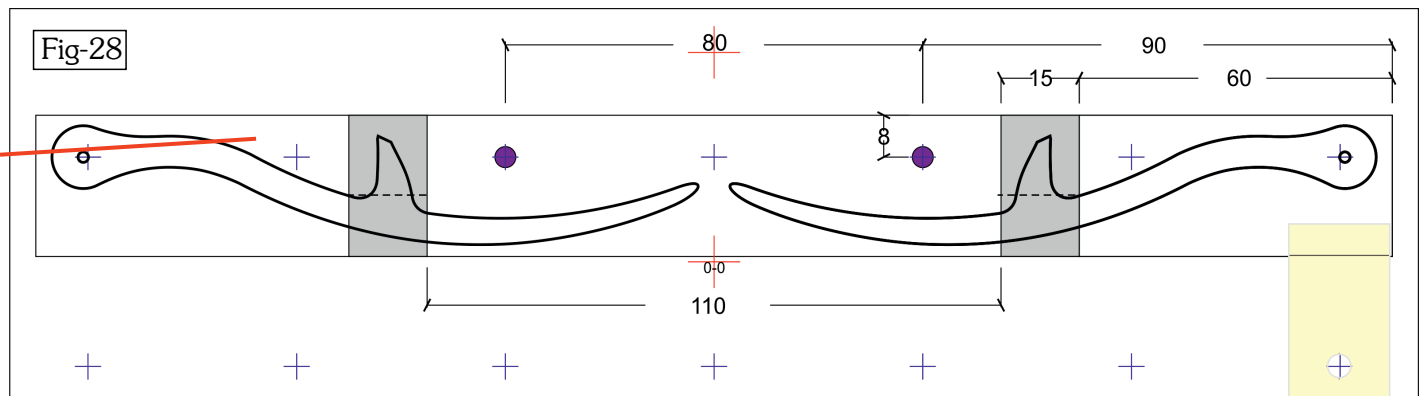


Having made headway with getting the Pendulum swinging, I decided to re-visit the first item I made using the Denford but this time using some of the tricks/methodologies learned along the way. Particularly in respect of extra material for clamping and Holding Tabs.

To some extent this extra knowledge gave me more confidence than was due :(( I'd decided that clamping with two screws into the sacrificial table and more material all around warranted a deeper cut.

Fig-28 is a drawing of two 'Latches'. The purple dots are the clamping holes and the grey areas are where the African Blackwood 'Teeth', with Bridle joints, are glued into place. It took me quite some time to accurately machine the blanks for the teeth and cut the Bridal joints but I was well pleased with the way the finished blank came out. On my mill I only drilled one of the fixing holes and used that to clamp the blank on the Denford Table so that I could manually position the Motor to  $X = -40$ ,  $Y = 20$  (using the MDI facility in Mach3) and then drill the second hole. This method makes sure that there is no chance of getting a hole in the wrong place due to inaccurate positioning on my mill. This wouldn't normally be a problem if I could have drilled both holes without re-mounting the blank but I can't get the centre of the head 170mm ( $90 + 80$ ) from the main pillar.

I could have turned the vice through  $90^\circ$  of course but setting that up square again would take longer than the more pragmatic approach.



All was going well for the first two cuts around the left-hand image but on the third cut at 1.5mm deep !!! the blank couldn't stand the strain and broke away at the red line. I'll be able to cut the right-hand version out using 0.5mm deep cuts but I'll add a clamp at the bottom right corner (lemon block) as well so that may recover that.



Or maybe not! — even including Tabs didn't stop the Latch breaking away during the final roughing cut. The Latch is 8mm thick at the widest part and I had a piece of Maple at 8.5mm so hoped that with 2mm 'Tabs' it would hold but regrettably not. Back to the drawing board.

Having to think about how to cut the Bridal Joints  $\frac{1}{2}$ mm offset because, with this arrangement of two identical components, I'm cutting them out from opposite sides, I took a radical approach and re-arranged the next attempt so that both were cut from the same side.

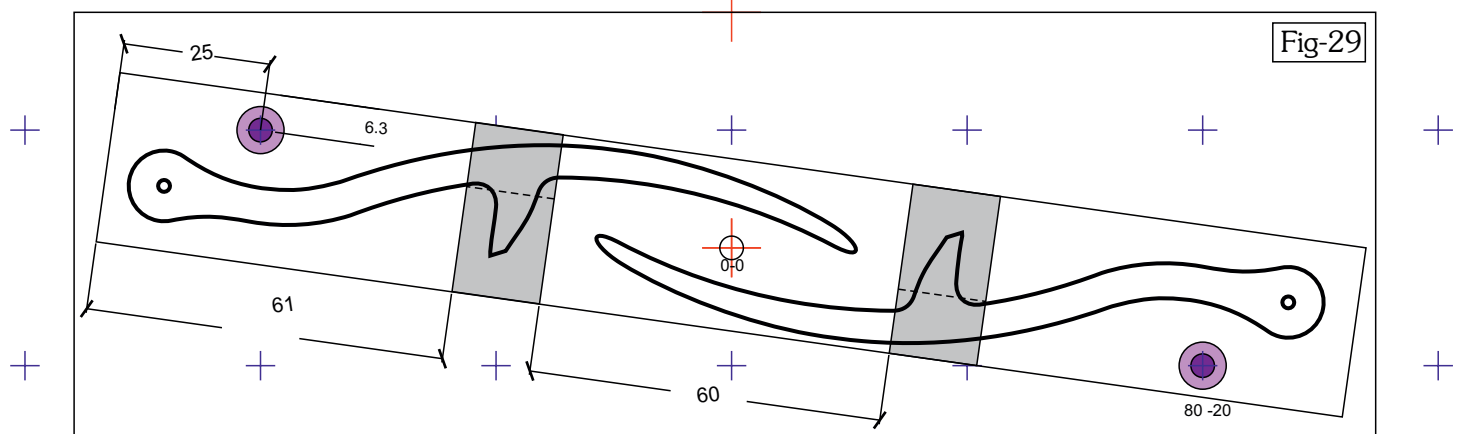


Fig-29 shows this new arrangement and will be cut from 10mm thick stock so that cutting to 8.5mm deep will retain 1.5mm throughout the base, obviating the need for tabs. It does mean that I'll have to saw the components out and machine the 1.5mm off in a second operation in the Mill (not CNC) but I have to do that for the area which has to be 6mm thick anyway.

After some perseverance I now have two 'Latches' at size - that is assuming the second ops come good. I'm now considering whether I can trust the blank to retain its integrity if I turn it over on the Denford table and mill away

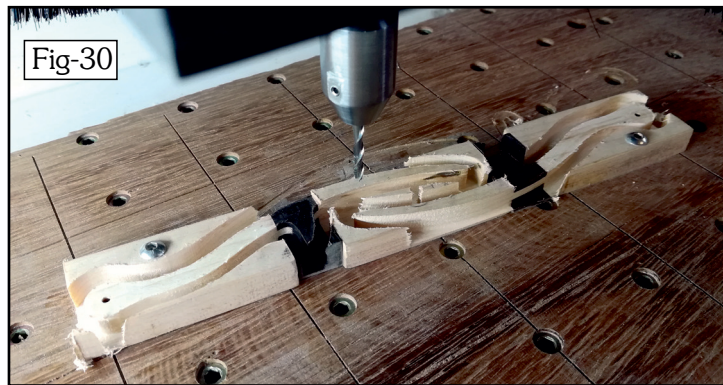


Fig-30

the area that needs to be only 6mm thick - see Fig-31 which shows the Latch looking from the Pivot end.

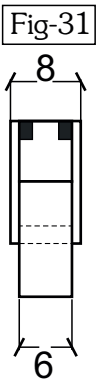


Fig-31

Turning the part machined blank over was a simple matter though naturally because it had been turned 8° clockwise to provide a suitable location for clamping holes aligned with the 40 x 40mm grid on the Denford table, it had to be rotated 8° anti-clockwise. This meant that the drawing also had to be

adjusted before re-exporting to .DXF files for import into CamBam to create new G-Code files. No problem with that and I did attempt to CNC machine the second side. That went well up to the point that there was a breakthrough which left the component partially 'free' - I'd forgotten that by removing material from the first side, the component was not supported except by the 8mm wide part which was still attached to the main part of the blank - fortunately I was able to abort the CNC run and avoid any damage to the Latch since I was being ultra cautious setting the depth of cut to only 0.25mm.

Manual - non CNC - second operation work was therefore needed and I now have two usable Latches!

After 3 days work I think I can now move on to the next component hoping that the lessons learned will come in useful.



Fig-32

24TH SEPT

Up to now I've been able to work with my existing timber stock and I recently bought some Maple offcuts that will probably make all the gears I need. What I don't have is anywhere near enough Walnut so this morning I've made contact with a local(ish) - about 20 minutes drive away - timber yard who do have Walnut boards available.

Naturally, under the current restrictions they have a strict regime as far as customers visiting their site so I have to make an appointment (they have only 3 per day!) to go and select a board. I can see my Bandsaw and PT will be getting some serious use :)

The 5mm Ø x 1m long carbon fibre tubes (Pendulum Rod) and the Bearings have arrived but I need to get some 2mm Ø Stainless Steel for the many pins that are needed.

Now started to look at the Frame and I do have sufficient Walnut to start the centre uprights. It's a bit of a shame that 315mm + 330mm is a tad greater than the 620mm length of Walnut I have so I've taken two slices off the billet. The width has been sized on the Router Table and only the ends, joints and recesses for the Bearings will be done on the Denford but first I need to determine the best way to clamp the blanks to the table.

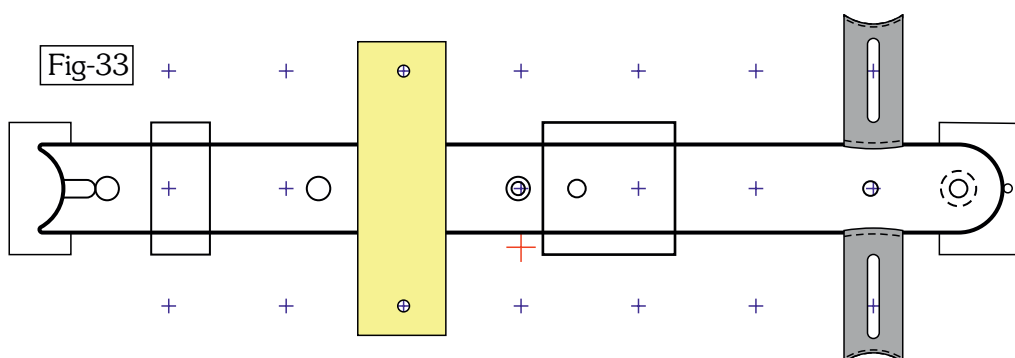


Fig-33

This should work.

The Grey clamps are already part of my milling armoury and I'll make a wooden 'bridge' - the Yellow block - with a slot to hold the blank in the correct orientation and clamped with two screws.