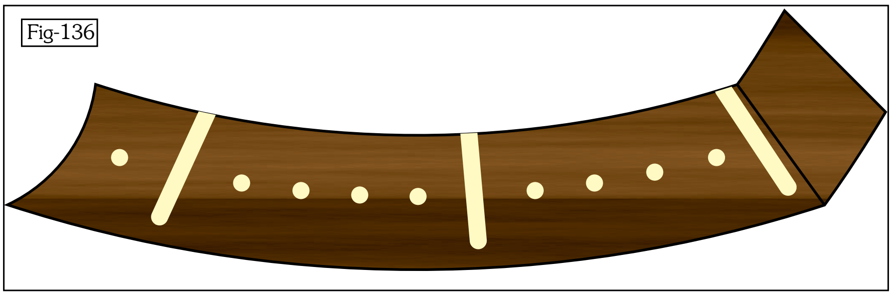
That was not as onerous as I thought - I still have Walnut in the original plank, the table saw is still set up (it often resides tucked under a bench-top since I don't use it that often) and the Denford still has the Dial Blank Jig fitted.
I took the opportunity to re-surface all of the Dial blanks down to 5.5mm, leaving just 0.5mm excess over the finished size so I don't have to mess about making the depth of the joints cut from opposite sides different, I'll make them both 2.75mm. This will also help to make sure that when I cut the slots for the Hour Battens and holes for the Minute Dots I can afford to go 2.5mm deep to make sure that they won't be trimmed out of existence when I do the final surface skim.

27th Nov

I decided that it would be good to have the Battens available before I start machining the Dial parts. I had initially thought to make the Battens on the Mill but sanity prevailed and I realized that it made much more sense to cut them on the Denford and once I started the drawing saw that making two together - end to end - would also be more efficient. Fig-136 is a drawing of the Dial Section A with Maple Hour Battens & Minute Dots to show the potential problems that I'm likely to encounter.

Fig-136


You'll notice that the Batten on the right is very close to the joint. This particular joint is in fact at the 12 o'clock position which has two Battens - one each side of the joint line - with only 3mm between the battens at the closest point, so having the Batten in place before I cut the joint will afford some protection to the Walnut.

With this in mind I created a drawing of the Battens as in Fig-137 after preparing a small piece of Maple - 150mm x 48mm - and skimming the surface down to 3mm thick. This would be sufficient to make 24 Battens (in case there were 'failures') and I only need 16 . . . . . well that's what I thought . . . . What I actually need is 16 for **each** Dial - so in reality I need 64!

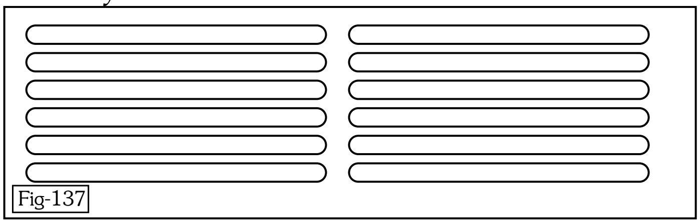


Fig-137

When I created the G-Code, I set 'holding tabs' in the centre top and bottom of each Batten pair thinking that this would be sufficient to hold them all in place and would be where they would be separated. The reality was that cutting right through the 3mm caused some 'chatter' at the bottom right of the first column but that only lost one so I left the Denford to complete the second column. Coming back a while later I wasn't pleased to see the mess in Fig-138. At least I didn't come back to find a broken cutter! That was very welcome since it is a brand new 1.5mm Ø Up-Cut router bit with a flute length of 12mm which I found along with a 4mm x 22mm flute and a 2mm x 22mm flute at reasonably sensible prices. I will be able to rescue 16 Battens but of course I need to make another 48. For these I'll reduce the depth to 2.8mm, that will be plenty to fill the 2.5mm deep slots I have designed into the G-Code for the Dial Sections though.

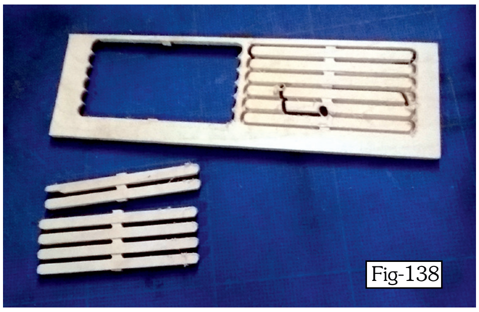
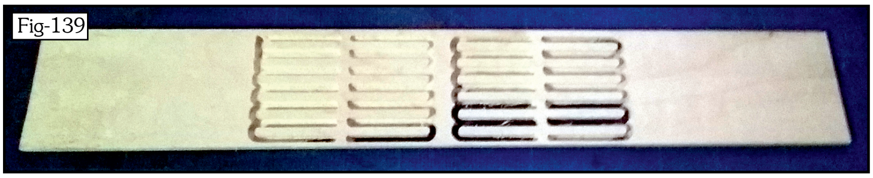


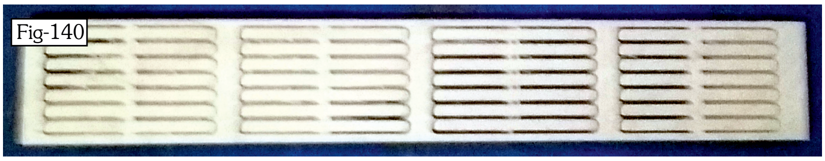
Fig-138

That did not go well!! When I saw the first cut I thought it was a little wide but let the process continue. It was a fortuitous that I kept a watching brief while doing other work because it was suddenly obvious that the X axis had stopped working again!! I was able to stop the run before too much damage was done but then noticed that my initial suspicion that the cut was wider than the 2mm that I expected from a 2mm End Mill was true. In fact the brand new 2mm cutter actually cut a 2.6mm wide swathe. This meant that the Battens were in fact not 4mm wide as designed and drawn, but just over 3mm. I can only surmise that the length of the cutter (22mm) means that at 15000rpm there is some 'whip' which is somewhat disconcerting but may only be a problem when the depth of cut is small - in this case it was 0.5mm.

I've now re-visited the CamBam file and modified it to specify my existing short 1.5mm end mill and am in the process of cutting the second batch. I can recover half of the first 24 Batten blank due to the way that CamBam organized the cutting order (Fig-139) but I'll still need to prepare another thin Maple blank to make another batch.

Fig-139


28th Nov



At last I have successfully cut a sheet of 28 - increased from 24 because with a 1.5mm cutter it was possible to get another row in - and another 14 from the first blank.

D'oh! - - - The astute among you will notice that when I dressed this morning I put my 'Stupid' head on :(Though that might be true of yesterday as well! I've mentioned making batches of 24 and 28 Battens, but if you look at Fig-140 carefully you'll see that there are 56 Battens so with the extra blanks I've made, and without counting my first two failed attempts, I've actually made 128 - and taking account of the fact that I've cleaned off the 'Holding Tabs' on the linisher by hand so there may well be some variance in the finished width I can at least select the best when I come to fit them into the Dial. I also sat and watched as my Fly-cutter ran into the clamps :(I simply thought "it'll change direction before it reaches those" - - - - Oh no it didn't.

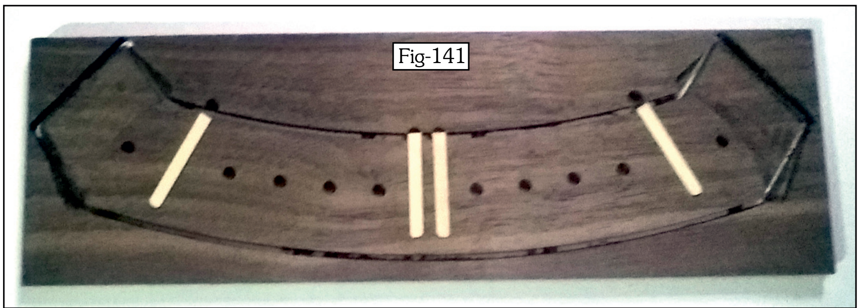
I can now prepare the G-Code for the Dial sections so I'm starting with 'C', which is at the bottom and has 4 Battens, 10 Minute Dots & two joints all cut from the front. The only thing it has on the back is a hole for the Dial Locating Peg.

Having been caught out by the new 2mm End Mill cutting at 2.6mm I thought it wise to do a test cut with the 4mm cutter which came from the same source. Slightly annoyed that I missed the part in the description that said 4mm shank - I had expected either 1/8" or 6mm - it is 4mm, and I don't have a 4mm collet! One of the advantages of having a reasonably equipped workshop is that I can make tools, jigs and fixtures pretty much as and when needed so 15 minutes on the lathe and mill and I now do have a holder for 4mm shank tools to fit a ½" collet. I'm sure that is running 'true' but the test cut showed that the 4mm End Mill cuts a slot 4.3mm wide - good job I checked!

This means a re-think as far as the G-Code is concerned so I'll now use a 1/8" cutter and an inside profile MOP rather than an Engrave MOP - I now have to do a test to make sure the 1/8" cutter rings true.

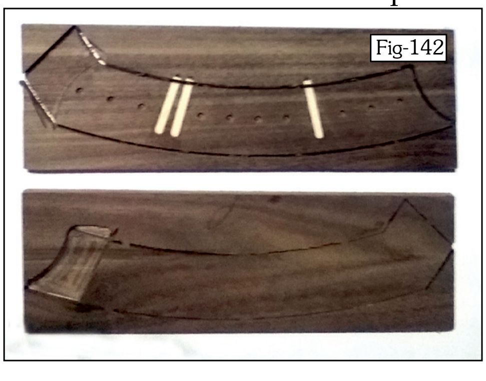
29th Nov

I do hate it when 'tests' are inconclusive. A slot drawn at 4mm wide cut with my 1/8" (3.175mm) End Mill set at 3.175mm for a profile MOP finished up at 4.3mm wide but a drilled hole was 3.2mm Ø!! A hole drilled in the same way with the new 4mm End Mill was 4.6mm. The next test was a 4mm slot cut with the tool diameter set at 2.6mm which produced a slot just a smidgen over 4mm. Thinking outside the box I then mounted the 4mmØ Single Flute TCT cutter which I've had for some time and did a test drill with that - - - Spot on at 4mm! I didn't bother with a test 'slot', I'm happy to go with the 3.175mm mill being called 2.6mm.



It now feels as though I'm moving forward again since I have the section C of all four Dials cut out and with Battens, Minute Dot holes and Joints all cut. Fig-141 shows the Maple Battens in place. These aren't glued in yet but I will do that on the A & E sections before I cut the joints for the reasons I mentioned on the 27th

I pressed on with Section D which needed a joint cut on the second side and this did cause me a small problem - it seems that every new component raises yet another 'issue' that I hadn't considered - naturally, cutting right through a blank, even though I am putting in 'Holding Tabs' means that the blank is not as solid, so when I turned it over to cut the second joint the grip afforded by the clamping was no where near as high as it was for the solid blank when I cut the first joint. The first time I noticed that this was an issue was at the first cut at 1.3mm deep and the blank just moved with the cutter in the X axis! I was able to abort the run and clamp both ends but I still reduced the cut to 0.4mm - it just took that much longer. By now I had glued the Battens in so I had to cut them back to level on the Linisher otherwise the depth of the second joint couldn't have been controlled.



I did get all four Dial D sections completed before Strictly and F1 needed my attention though.

30th Nov

The second operation clamping issue made me re-think how I organized the order of operations for the next part - Section B - and I realized that there was no reason that I couldn't cut the second joint before cutting the outline, so that is how I organized the G-Code for this and all subsequent sections.

That modification to the cutting order was a definite benefit and I now have four of the five sections complete - well as far as the machining operations are concerned, I still have to break them out of the blanks and clean up the joints but hopefully tomorrow will see the Dial ready for glue-up or at least I should be in a position to set up a glue-up jig.

1st Dec

An auspicious day since I entered this world 79 years ago - how time has flown and what changes I've seen – or not ?? in 1941 death was all around but so it is today - very different reasons but the bottom line is the same.

I have now finished the last section of the Dial but the manual clean up and final fitting of all the joints - just niggling small (less than ½mm) adjustments to the length of the half-laps so that they 'nestle' into each other - on only one Dial has taken me most of the afternoon. Fig-143 is the first Dial simply laid out without glue. It was very satisfying to measure the width and height at within a millimetre of the designed 340mm, by the time it is glued up I anticipate that it will be spot on.

Fig-143