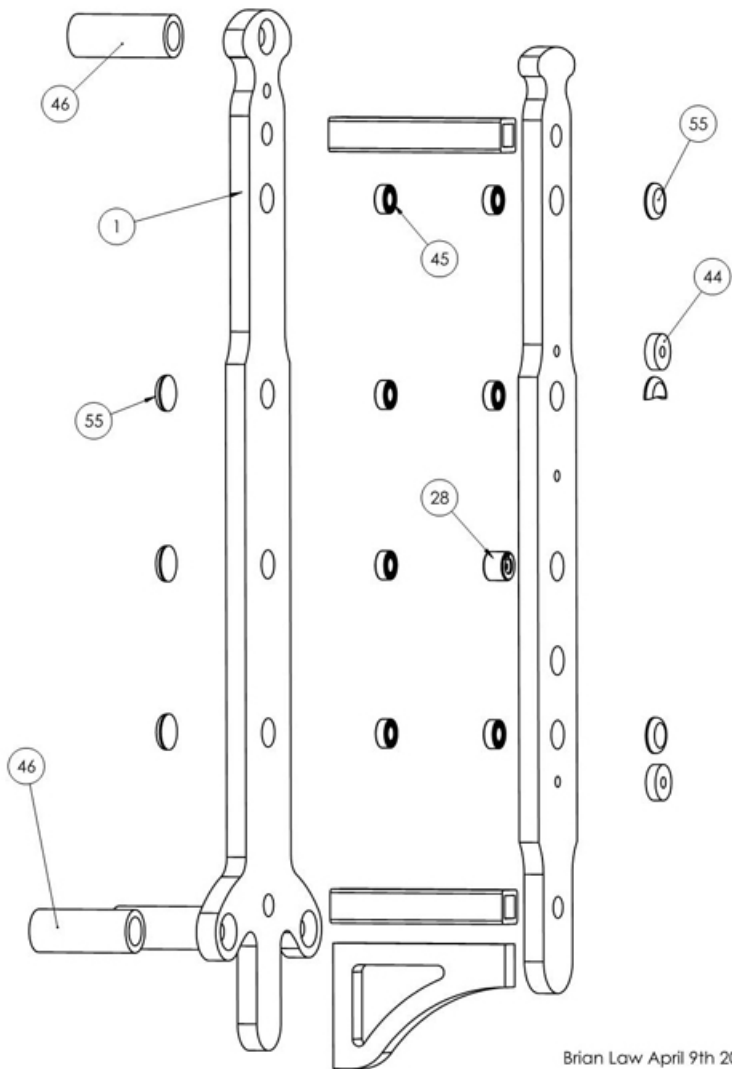


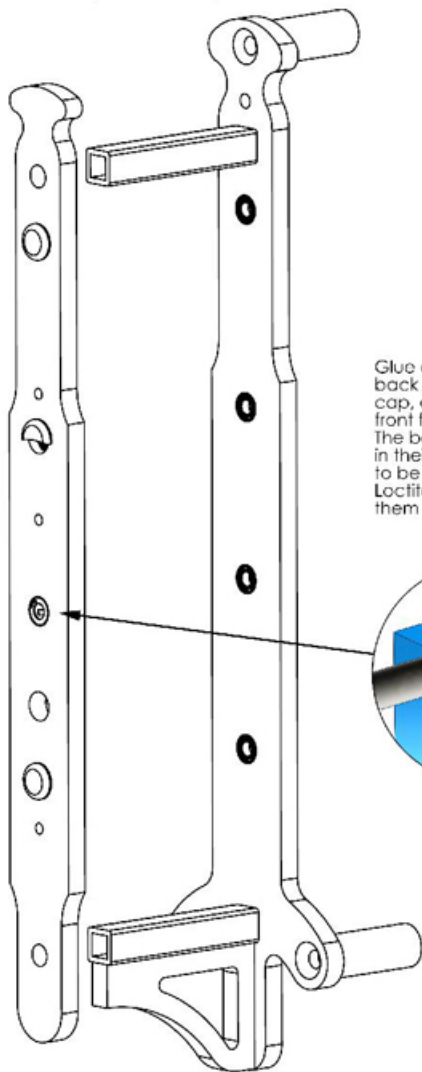
Brian Law's Wooden clock 19 - All Plastic Assembly Sequence

Stage 1 Collect together all frame parts and fittings ready for assembly



Brian Law's Wooden clock 19 - All Plastic Assembly Sequence

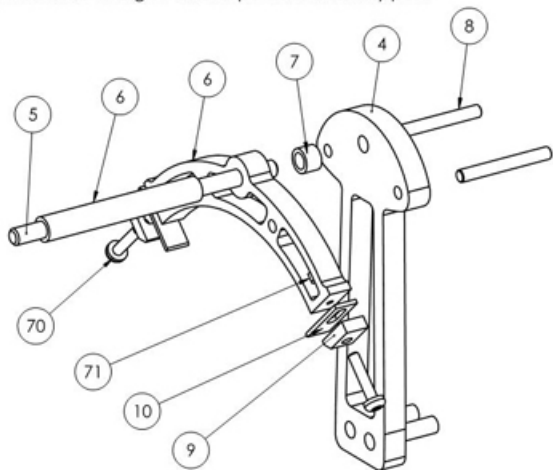
Stage 2 Assemble and glue all frame parts



Glue all the acrylic parts to the back frame, and the bearing cap, and dial supports to the front frame. The bearings are to be a tight fit in their holes and if they appear to be loose after fitting use Loctite or equivalent to glue them in place.

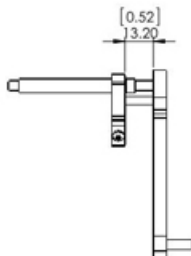
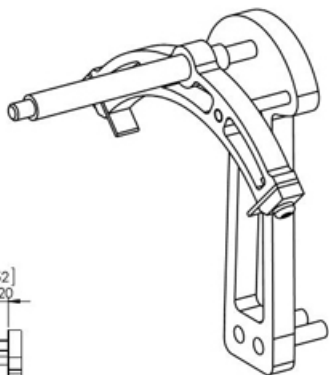
Brian Law's Wooden clock 19 - All Plastic Assembly Sequence

Stage 3 Assemble and glue all Escapement assembly parts



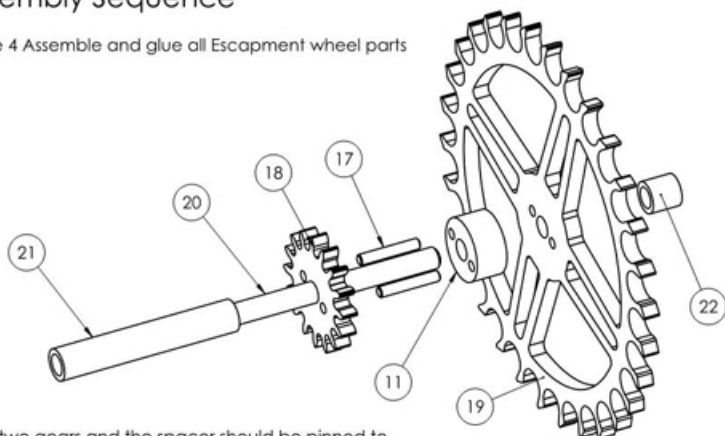
Fit the both pallets to the escapement using the clamp plates, nut and screw. Thread the main shaft through the the sleeves, escapement and the Yoke. Finally fit the Yoke connector pins until flush with the back face of the Yoke, this should then have spaced all the items correctly.

Before final assembly into the back frame the yoke will need to be slipped of again so the the main shaft can be fed through the hole in the frame.



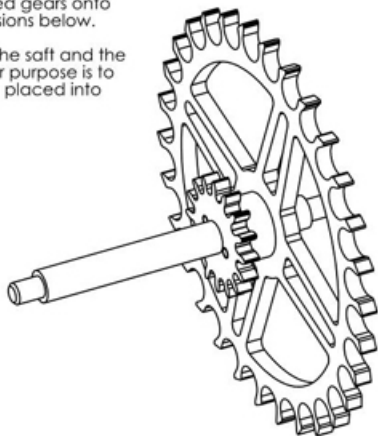
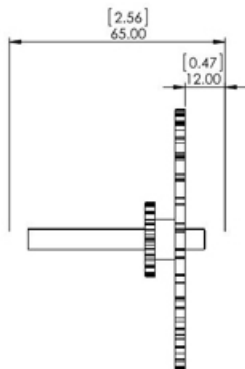
Brian Law's Wooden clock 19 - All Plastic Assembly Sequence

Stage 4 Assemble and glue all Escapement wheel parts



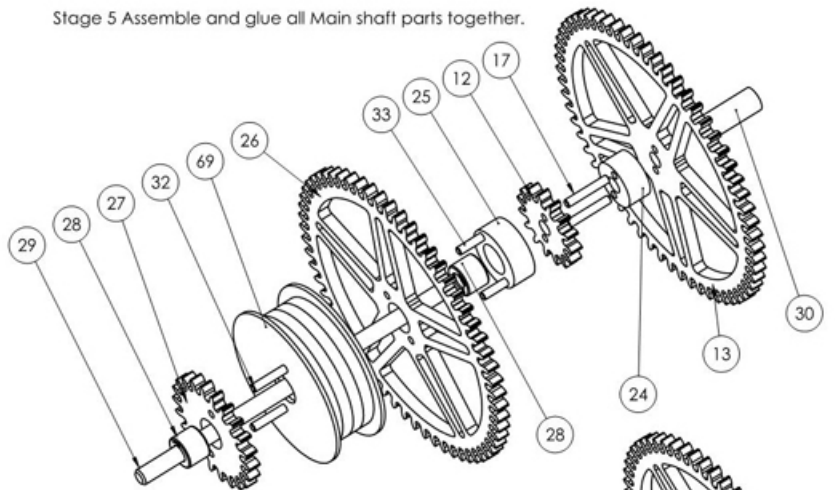
The two gears and the spacer should be pinned together using the two steel pins. The parts can be glued as well if preferred. Position the assembled gears onto the shaft and position as per the dimensions below. The sleeves can now be fitted.

Note the Gears should be a tight fit on the shaft and the sleeves can be either loose or tight, their purpose is to maintain the position of the gears when placed into the clock assembly.

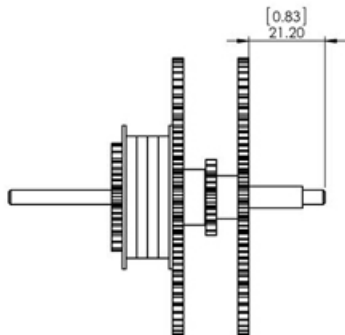
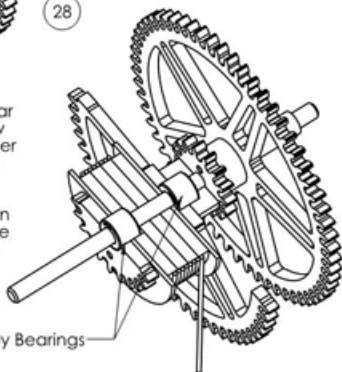


Brian Law's Wooden clock 19 - All Plastic Assembly Sequence

Stage 5 Assemble and glue all Main shaft parts together.



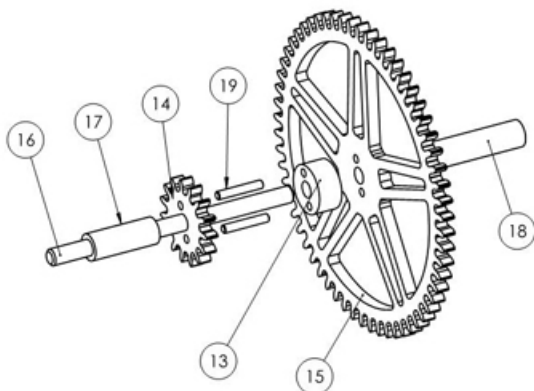
Fit gear 27 to drum 69 with pins 32, these are to be a loose fit on the shaft. Fit the Oneway bearing 28 into gear 27 and glue in place with Loctite. See instruction below for orientation before gluing. Now fit gear 26 and spacer 25 with pins 33, again these are a loose fit on the shaft. Fit the oneway bearing using loctite, again read instructions below. Now fit Gear 12 and spacer 24 and gear 13 together with pins 17. These are to be loose fit on the shaft. Mount all units onto shaft 29 along with sleeve 30. The sleeves may be either loose or tight as they are only there to position the gears within the frame.



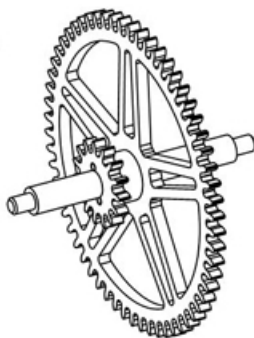
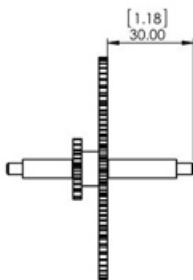
In this part sectioned view the two one way bearings can be seen. These bearings allow movement in one direction only. This allows the drum to be turned backwards to wind up the clock and not transmit that winding action into the other gears on the shaft. When the weight is pulling down on the cord turning the drum clockwise this bearing will grip the shaft and turn it. The second one way bearing is mounted the opposite way around so that it locks onto the shaft whilst the drum is locked to the shaft so transmitting the torque to the rest of the gear train. The arrows you see on the oneway bearing indicate that the bearing will lock when the casing is turned in the direction of the arrow. It is important to mount these bearings the right way round and also to use a bearing locking agent like Loctite to ensure no slipping of the gears under load.

Brian Law's Wooden clock 19 - All Plastic Assembly Sequence

Stage 6 Assemble and glue Intermediate Gear assembly

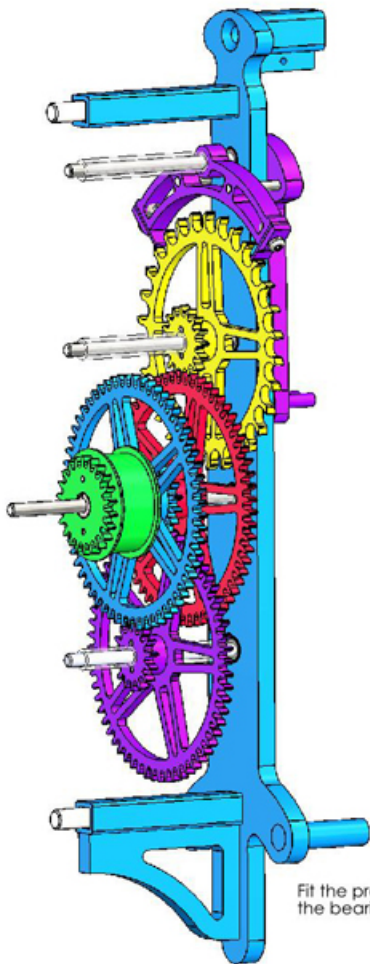


Fit together parts 13,14 and 15 using pins 19, these may be glued as well as pinned. This gear sub assembly should be a tight fit on the shaft 16 when fitted next. Finally fit sleeves 17 and 18. The sleeves may be either loose or tight.

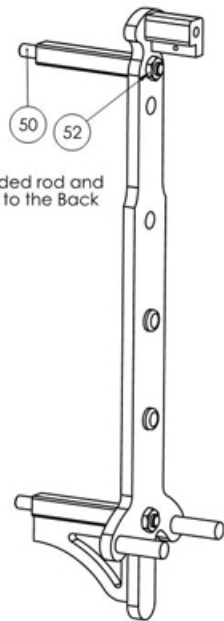


Brian Law's Wooden clock 19 - All Plastic Assembly Sequence

Stage 7 Assemble Gear sub-assemblies to the Back Frame



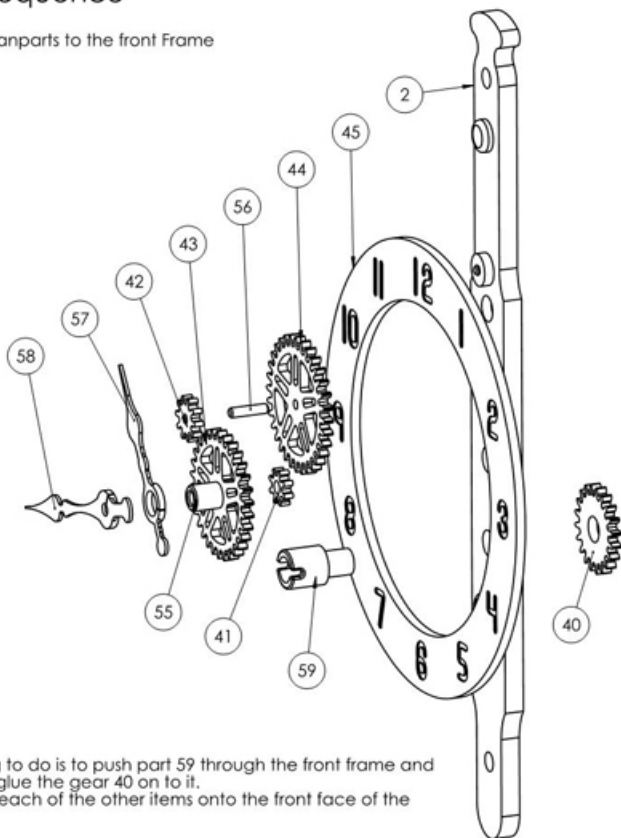
Fit the previously assembled sub assemblies into the bearings on the Back Frame



Fit threaded rod and locknuts to the Back frame.

Brian Law's Wooden clock 19 - All Plastic Assembly Sequence

Stage 8 Assemble anparts to the front Frame



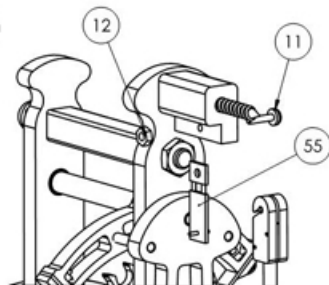
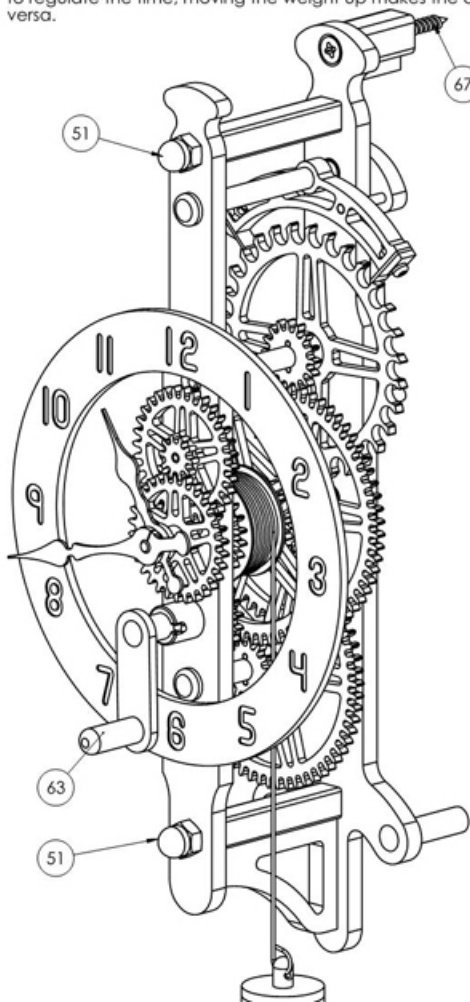
The first thing to do is to push part 59 through the front frame and then fit and glue the gear 40 on to it. Then mount each of the other items onto the front face of the front frame.

SCALE 1 : 1.3

Brian Law's Wooden clock 19 - All Plastic Assembly Sequence

Stage 9 Assemble and Front frame to the rest of the clock

Fit the assembled front frame to the rest of the clock taking care to align each of the shafts with their bearings. Secure the front frame using the two domed nuts. Wrap cord around the drum and attach the weight. The weight should be filled with lead approx 1 kilogram. After the Pendulum has been fitted screw the clock to the wall with screw 67. Use the winder 63 to wind up the clock, give the pendulum a little push and fingers crossed the clock will continue to tick and keep good time. Adjust the position of the weight on the bottom of the pendulum to regulate the time, moving the weight up makes the clock go faster and vice versa.



Attach the Suspension 55 Using the Screw and Nut, and then hang the top of the pendulum onto the pin at the bottom of the Suspension.

Equipment

The following equipment is definitely required.

CNC router or Laser Or Waterjet

This is not really a project for a Scrollsaw, well I don't think it is anyway, as the gear teeth are very small and the accuracy requirement quite high.

Pedastall Drill and work holding vice. There are lots of holes to be drilled and cleaned up after CNC machining and fabricating, so this drill is essential as well. It may be possible to use an ordinary electric drill in a special stand but a vice for holding the work is still essential.

Drill bits

Drills in the following sizes will be necessary.

- Ø 2.0
- Ø 3.0
- Ø 3.1
- Ø 4.0
- Ø 4.1
- Ø 8.0

A Ø8 Reamer for cleaning up the Bearing holes in the front and backPlates.

Small files

Wet and dry in in various grades

Scraper for cleaning rough edges.

Hack saw

Liquid Solven Cement for bonding Plastic parts.

Plus all the usual hand tools for use in the workshop, screw drivers clamps etc.

Some equipment that is not essential but makes it easier to produce quality work would be:-

Small bench Lathe

Small bench Milling

Bandsaw

Sanding Disk

Clock 19 Equipment requirements

See drawings for all other dimensions.

Brian Law
1-April-2014
Brian@woodenclocks.co.uk

Materials

Acrylic sheet 3mm thick

3 sheets of A4 material 210 x 297mm or larger is the minimum amount needed to cut all the parts on the plans.

Acrylic sheet 6mm thick

1 sheet A4 or larger required if you, you may wish to make all your parts from 3mm and band two sheets of the thinner material together instead, if you do add a couple of sheets to the 3mm material.

Plastic sheet 2mm thick

Only needed for the hands so get the minimum sized sheet you can. You may want to use 3mm Acrylic and thin a section down to 2 mm to save buying this.

Plastic sheet 1mm thick

Only needed for the Pallets so get the minimum sized sheet you can. Acrylic can be used by thinning down a 3mm section as above, but this may be better in ABS or Polypropylene.

Acrylic Tube $\varnothing 12 \times \varnothing 8$ bore - 150mm

Acrylic Tube $\varnothing 6 \times \varnothing 4$ bore - 200mm

Acrylic Tube $\varnothing 40 \times \varnothing 36$ bore - 100mm

Acrylic Square Tube 9.5mm x 9.5mm - 150mm

Acrylic Bar $\varnothing 8$ - 30mm

Acrylic Bar $\varnothing 6$ - 125mm

Silver Steel $\varnothing 4$ - 350mm

Stainless Steel Bar $\varnothing 3$ - 250mm

Stainless Steel Bar $\varnothing 2$ - 150mm

Stainless Steel Threaded rod $\varnothing 6$ - 200mm

Carbon Fibre Tube $\varnothing 4 \times \varnothing 3$ - 1100mm (may have to get $\varnothing 4 \times \varnothing 2$)

Venitian Blind Cord to hang weight $\varnothing 1.2 \times 2$ mters

Bearings $\varnothing 4$ Bore x $\varnothing 8$ O/Dia MR84zz - 9

One Way Bearings $\varnothing 4$ Bore x $\varnothing 8$ O/D x 6mm HF0406 -3

Domed Nut $\varnothing 6$ mm Brass - 2

Lock Nut $\varnothing 6$ mm - 2

Woodscrew $\varnothing 4.5 \times 60$ mm - 3

Bolt M6 x 8mm - 1

Screw M2 x 8 - 2

Nut M2 - 2

Note!These are the minimum amounts of material need to construct the clock, I used more during the development and you may be advised to buy more any to make allowance for problems you experience. You may also need to buy more as there will be minimum quantities for som items.

Clock 19 Material requirements

See drawings for all other dimensions.

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1-April-2014
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