

Clock 59 - Quartz Driven Clock

Construction instructions for Clock 59



Building a wooden clock can be a challenge for the first-time builder, so I have tried on several occasions to make this easier by designing the Beginners clocks, and this has helped to an extent, but it is still something of a challenge taking up weeks of your time. Clock 59 hopes to remedy that by having a much simpler design and using a standard Quartz clock motor to drive the clock without taking out the challenge of you using your own skills to create it.

The clock shown above is only 8 inches (20 cm) tall, having two large wooden gears and two pinion gears constructed from steel dowel pins. These gears convert the 1 rev per hour of the quartz motor that drives the minute hand into the 2 revs per day for the hour hand. The best part is that the clock will run very accurately for months on a single AA battery.

I have tried to keep the design as simple as possible so that you should be able to build it and have it running within a week. So if you ever considered building a wooden clock, I think you will find this a quick and not too difficult introduction to the process.

I supply all the drawings and files you will need to build the clock, whether you are going to cut the parts out by hand, use a CNC machine, or even 3D print the parts. You will need to purchase the wood or the plastic filament for the main components, the steel rod for the pinions and shafts, some plastic sheet for the hands, and of course the Quartz motor (around \$8).

I hope you decide to build this clock, as it should give you such a great deal of satisfaction.

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Equipment

The following equipment is desirable:

CNC Router to cut out all of the Parts

Or 3D Printer using the STL files supplied.

Pedestal Drill or simple drill stand with work holding vice. There is a lot of holes to be drilled and cleaned up after CNC machining and fabrication so the drill is pretty much essential. It may be possible to get away with an ordinary electric drill in a stand but a work holding vice is still necessary.

Drill Bits in the following sizes, Ø3 mm, Ø3.1 mm, Ø3.2, Ø6 mm

Hand tools; all the normal things that are used in the workshop, Files, screwdrivers, hammer, pliers etc.

Consumables

PLA Filament

Sandpaper in various grades from rough to fine

Super Glue

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Materials

The choice of material to build the clocks from is a very personal one and is down to you to decide. I normally build with Hard Maple for the gears and Cherry for the Frame parts.

If 3 D Printing then it would be either ABS or PLA

For all the other parts:-

Ø3mm Drill Rod or Silver Steel 100mm Long for all the shafts and numerous pins.
Ø3 Dowel pins around 25 of them or cut from a longer piece of Ø3 steel or Brass rod.

1 AA Battery

No 4 wood screws 18 mm long

Various diameters of wooden dowel for the Bushes for the gears and spacers.

A quartz high torque Clock movement is needed to drive the clock similar to the one shown below



To drive the clock you need to purchase a Quartz clock movement from the internet.

It needs to be of the type shown here .

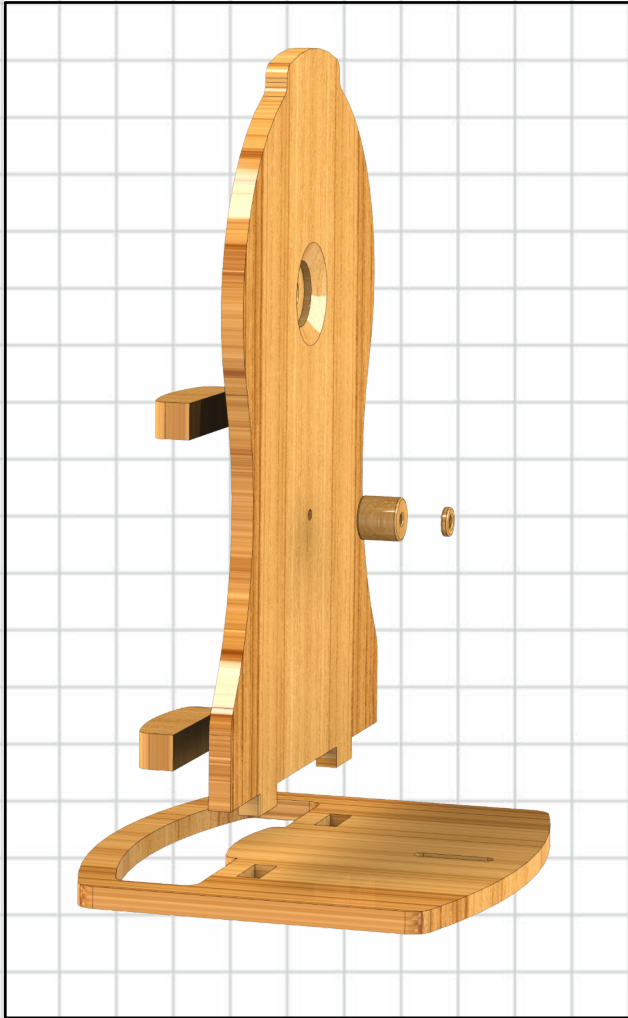
It needs to have a shaft length of around 17 mm and a 8mm thread length of around 6 mm.

It needs at short Ø4 mm thread on the end and come with a small M4 brass nut to fit on that end to secure the motor in place on the clock.

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Step 1 Assembling the Frame Parts



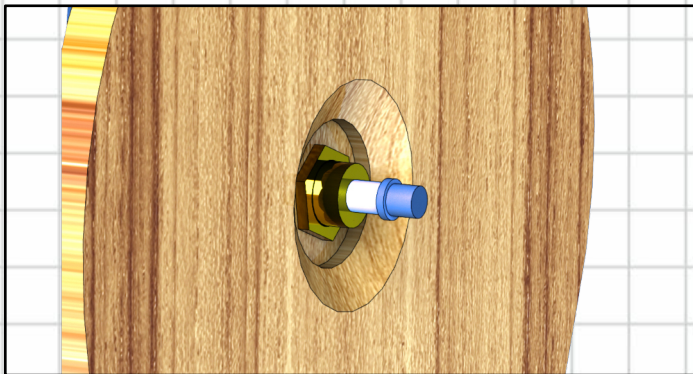
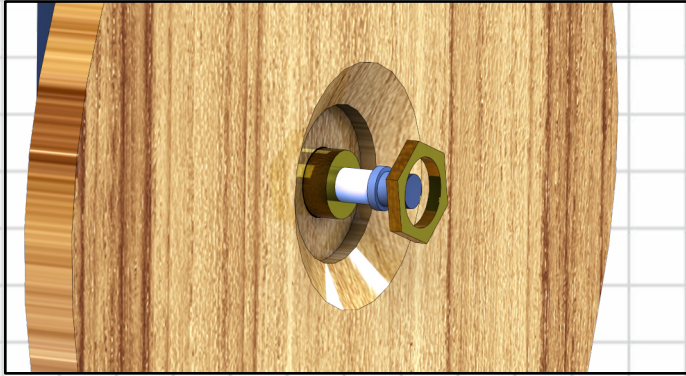
First task is to assemble all of the frame parts as shown in the picture above. The Back frame is the first slotted into the base and glued in position, make sure to use a set square to ensure the frame is Square to the base. The Gear spacer is next, It should be glued to the back frame using a $\text{Ø}3$ pin to centre it over the hole. The small protrusion at the front is the 2mm spacer fitted when the shaft is fitted here.

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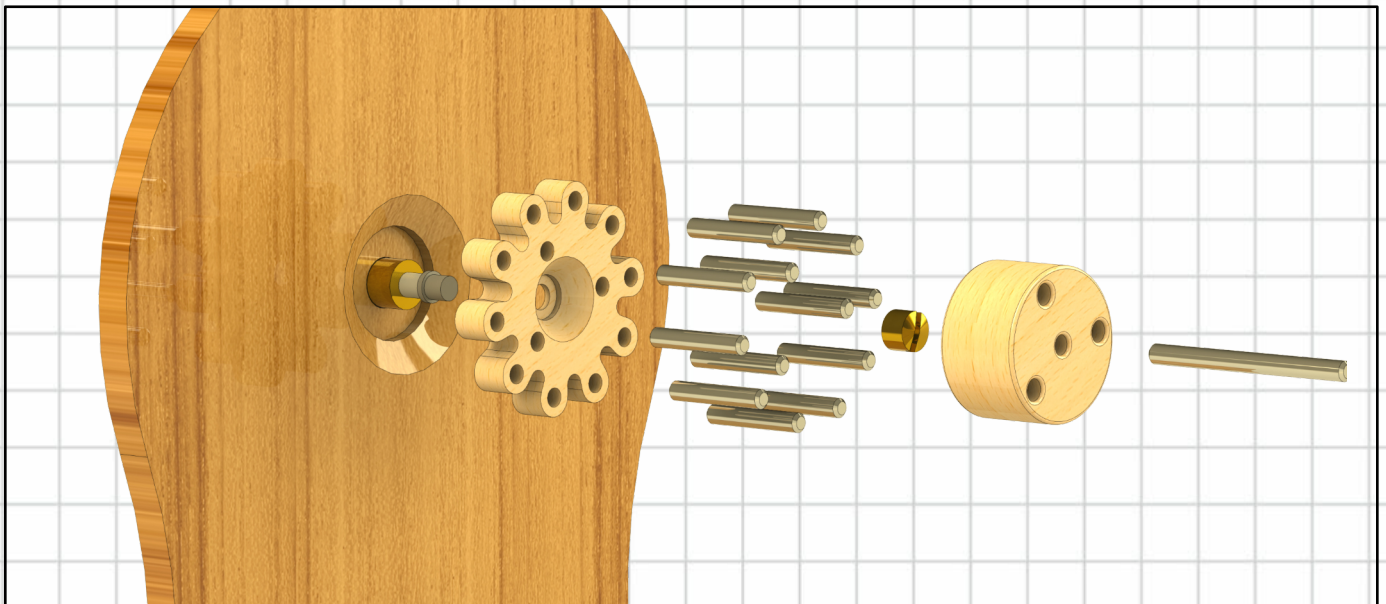
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Step 1 Assembling the Frame Parts

Step 2 Assembling the Quartz motor



The Quartz motor is fitted onto the back-frame from the rear through the Ø8 mm hole, and then secured using the 8 mm nut supplied with the motor.

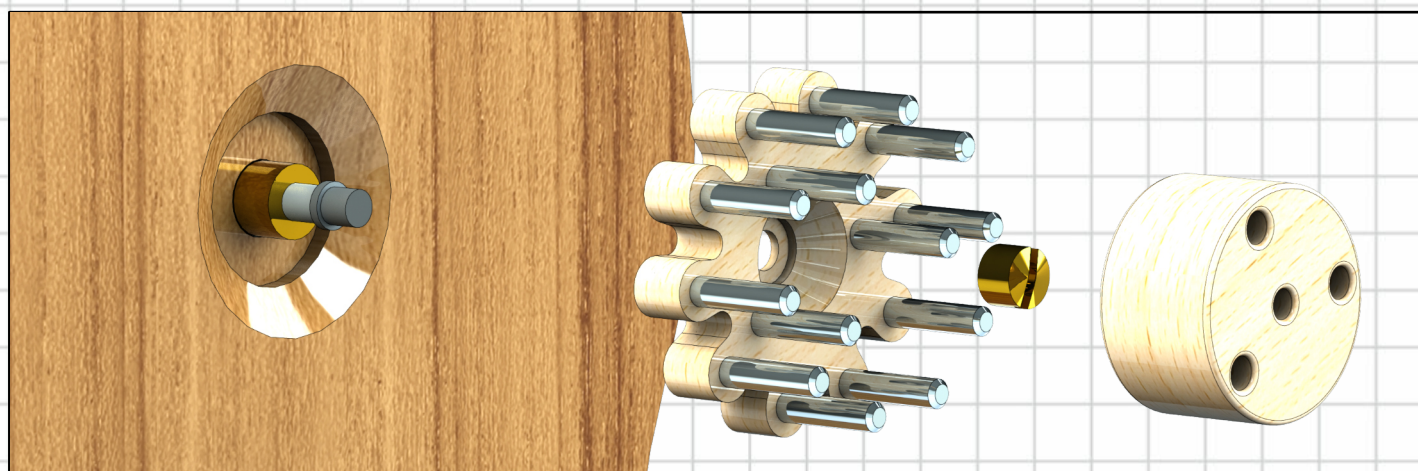


The parts for the assembly sequence for the gear assembly of the top shaft are shown here.

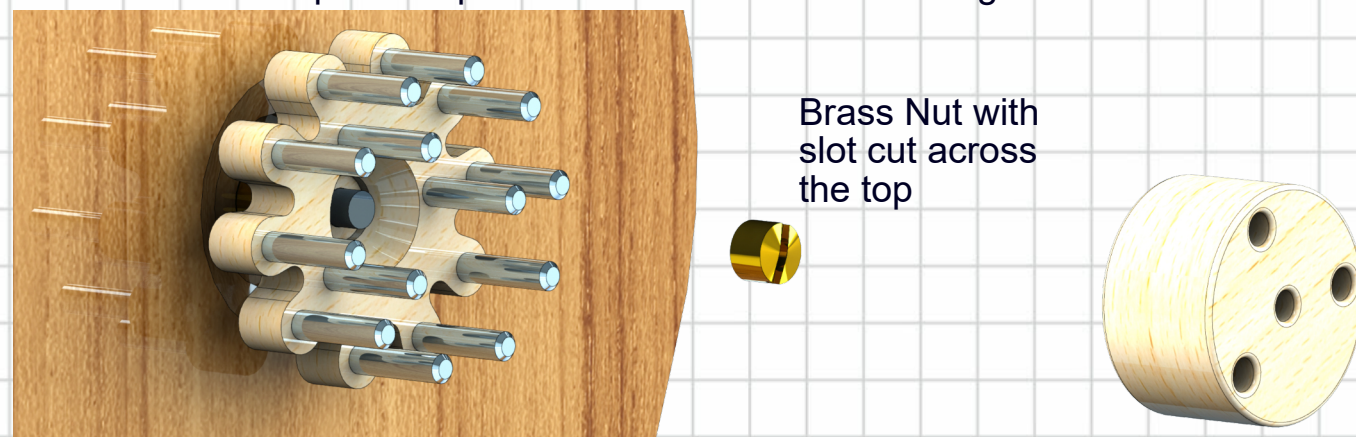
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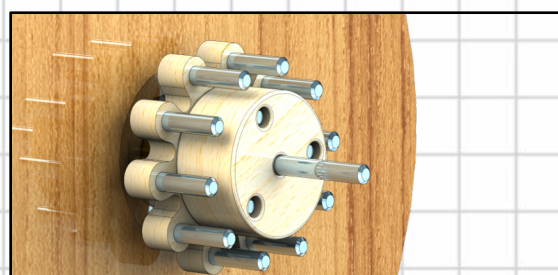
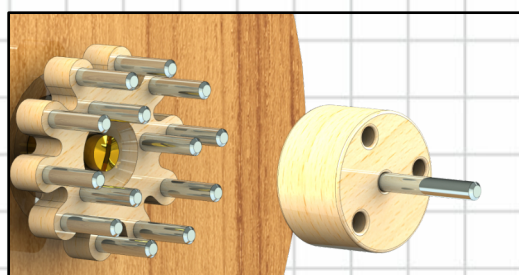
Step 3 Assembling the 10 toothed pinion gear



Next all the dowel pins are press fitted into the 10 Toothed gear base



The 10 toothed gear are fitted over the threaded end of the Quartz motor



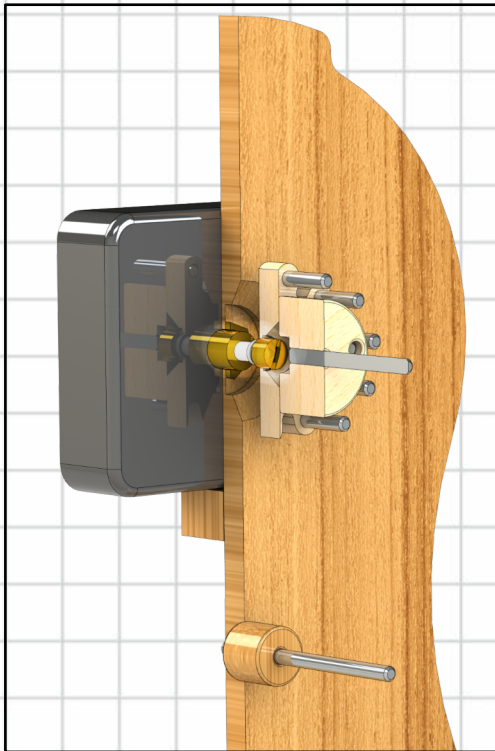
The brass nut shown above is screwed onto the end of the protruding threaded shaft of the motor. The slot is cut in so you can use a small flat bladed screwdriver to screw it onto the threaded shaft, may need to use something to hold the nut on the screw driver blade whilst you do that.

When that is done fit the short shaft into the Minute Bush up to the countersink inside. Now locate the bush onto the three centre pins and push fully into place as shown. Note, the three pins are not equally spaced.

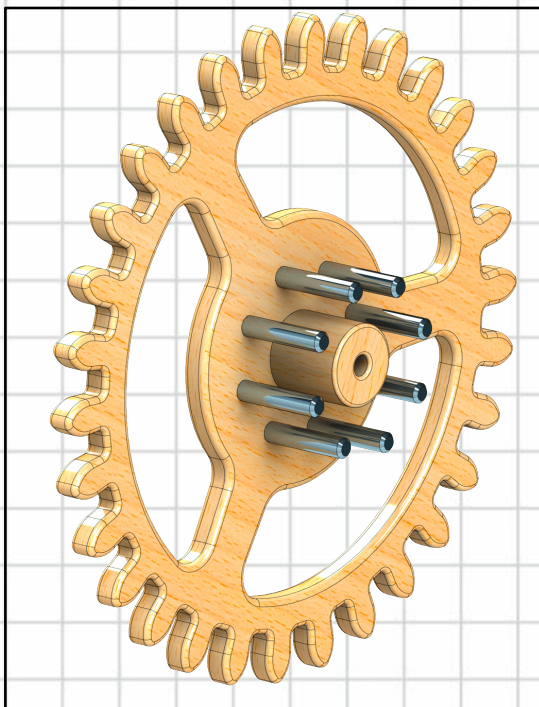
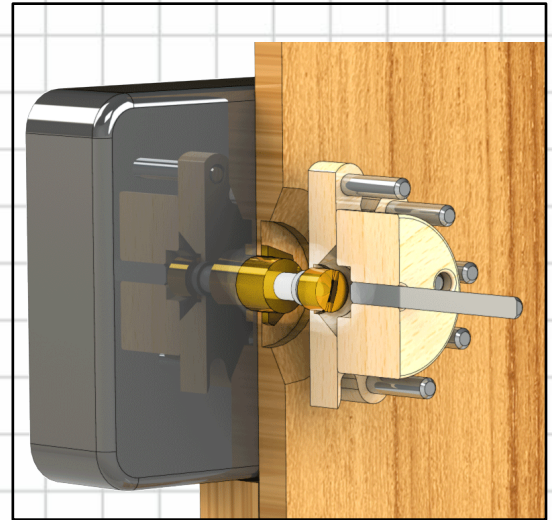
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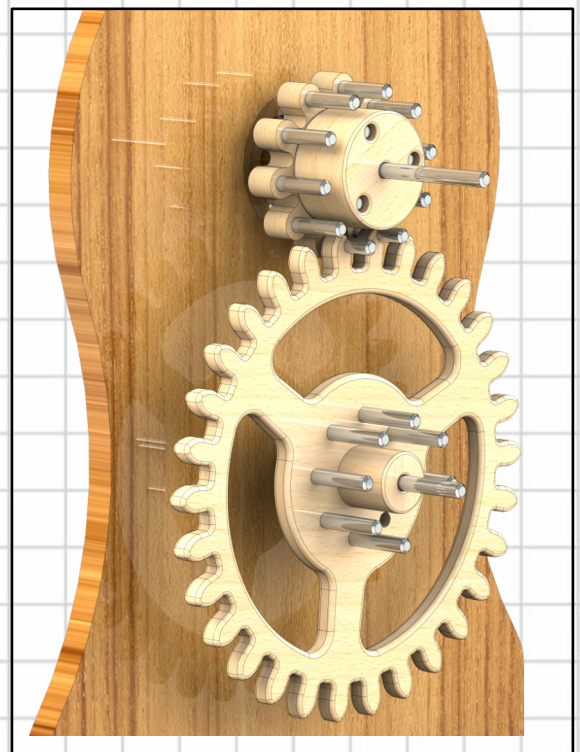
Step 4 Assembling the 10 toothed pinion gear



Magnified section view of the connection between Motor shaft and the 10 toothed gear



Glue the bush to the centre of the 30 toothed gear and press fit the $\varnothing 3\text{mm}$ dowel in 8 positions



Press fit the Bottom shaft into the back frame and then fit the 30 toothed gear onto it.

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Step 5 Fit the 32 toothed gear and the Dial.



Fit the the 32 toothed top gear onto its shaft

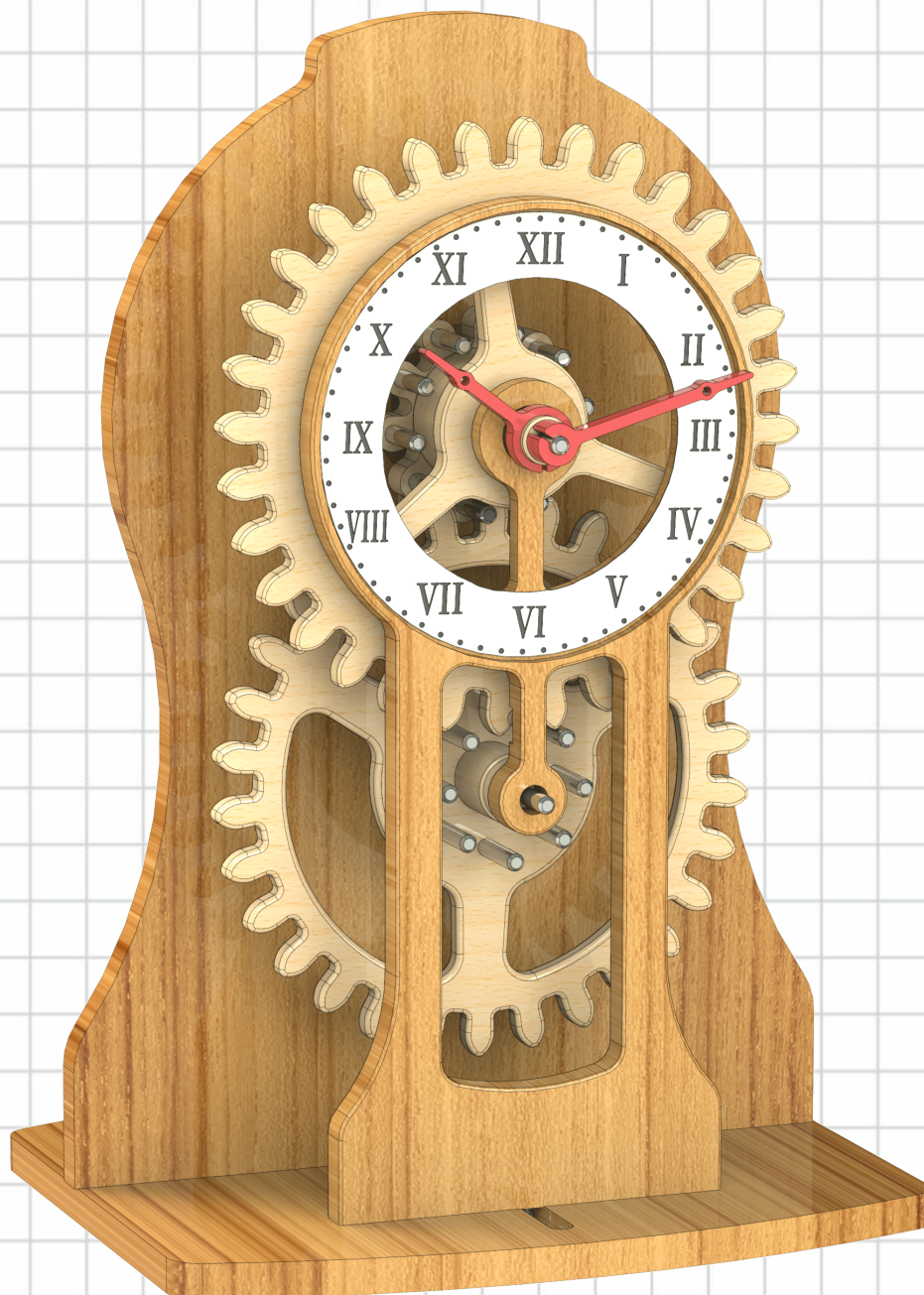


Now position the Dial onto the Base and slide back over the two shafts. Secure in position with a M4 screw through the base.

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Step 6 Fit the printed dial and hands



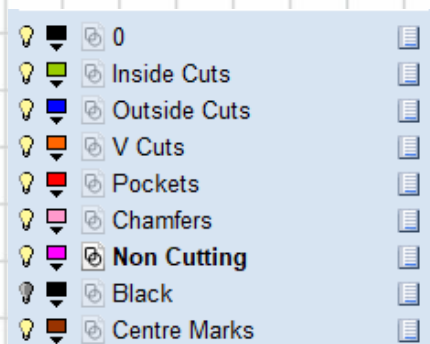
If you have not already done so cut out the dial and glue it to the inside of the dial frame. Attach the two hands and make sure to fit a AA battery into the Clock motor around the back of the clock.

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HINTS AND TIPS - continued

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- The DXF files supplied include all the parts that can be cut using the CNC router, they do not include any pins or nuts and bolts, information on these parts are included in the Detail drawings supplied in PDF format.
- The parts shown laid out in a single DXF files ready for you to extract and use in your CAM software. The profiles are shown on 6 separate layers , these being 'Outside Cuts' 'Inside Cuts' 'Pockets' 'Non Cutting Profiles' and 'V cuts' and 'Chambers'. The layers are colour coordinated as shown.



For more Hints and tips you could have a look at my Blog here
<https://brianlawswoodenclocks.blogspot.com/search?q=hints>