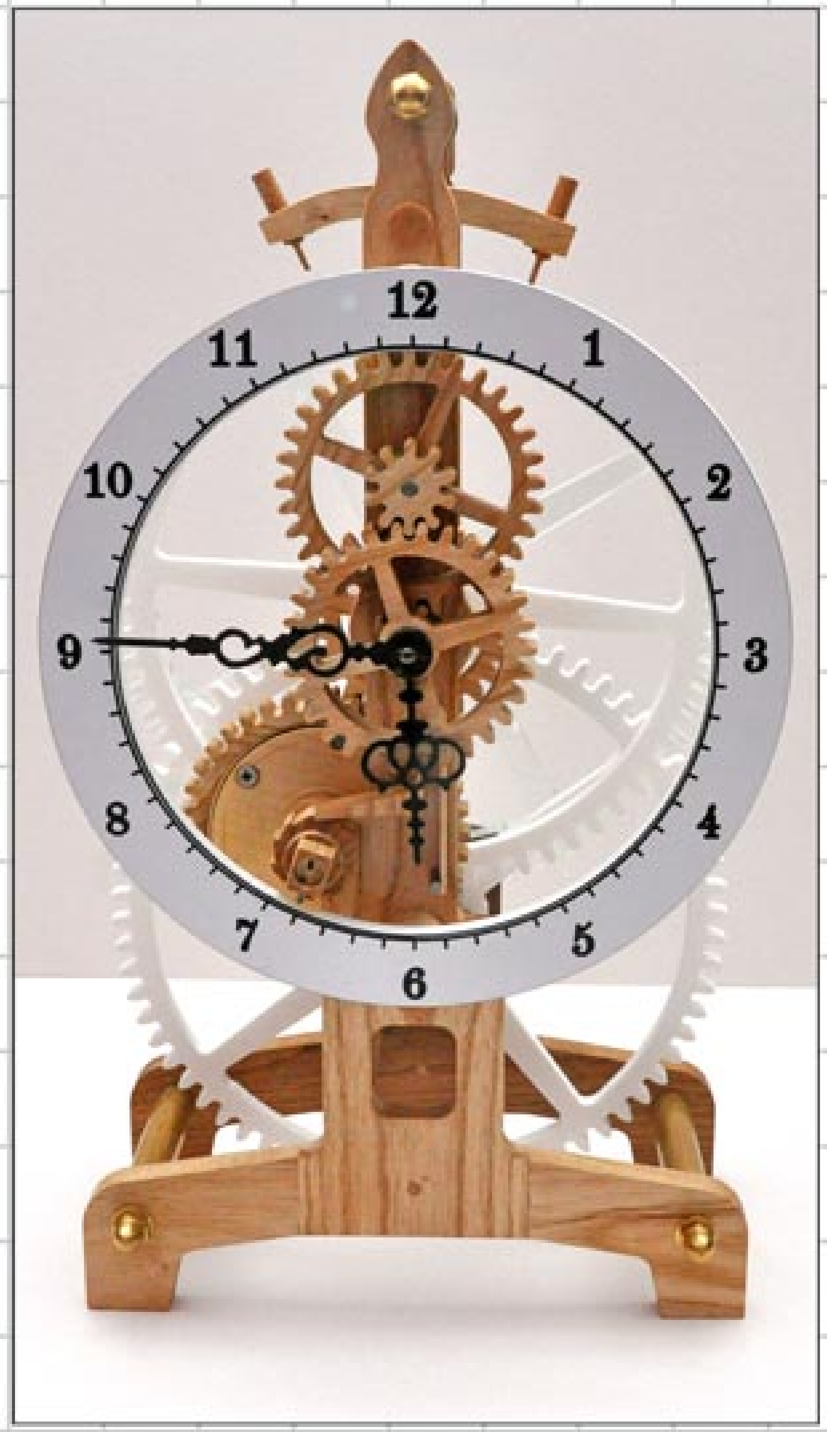
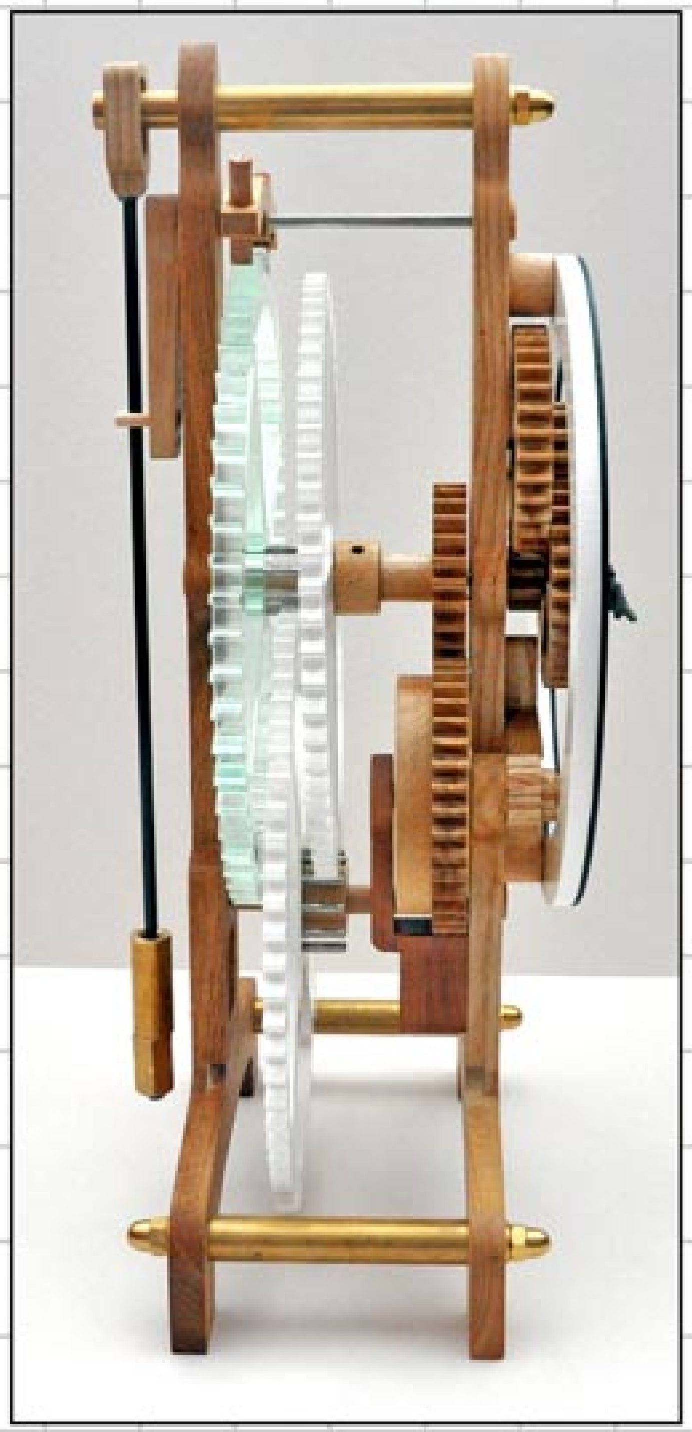
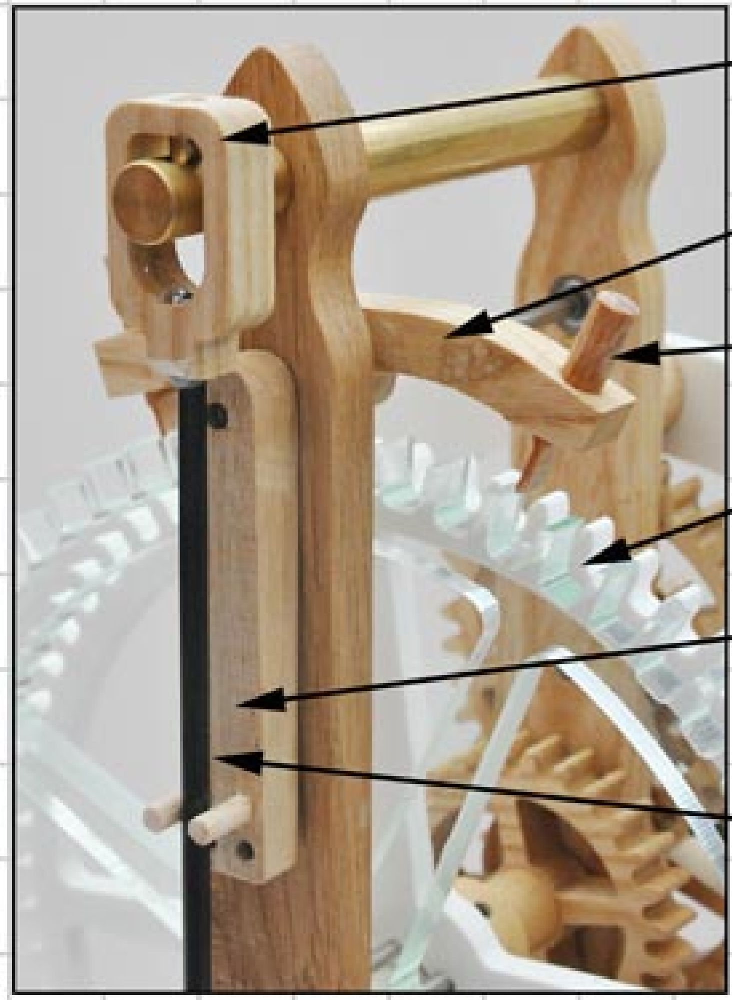
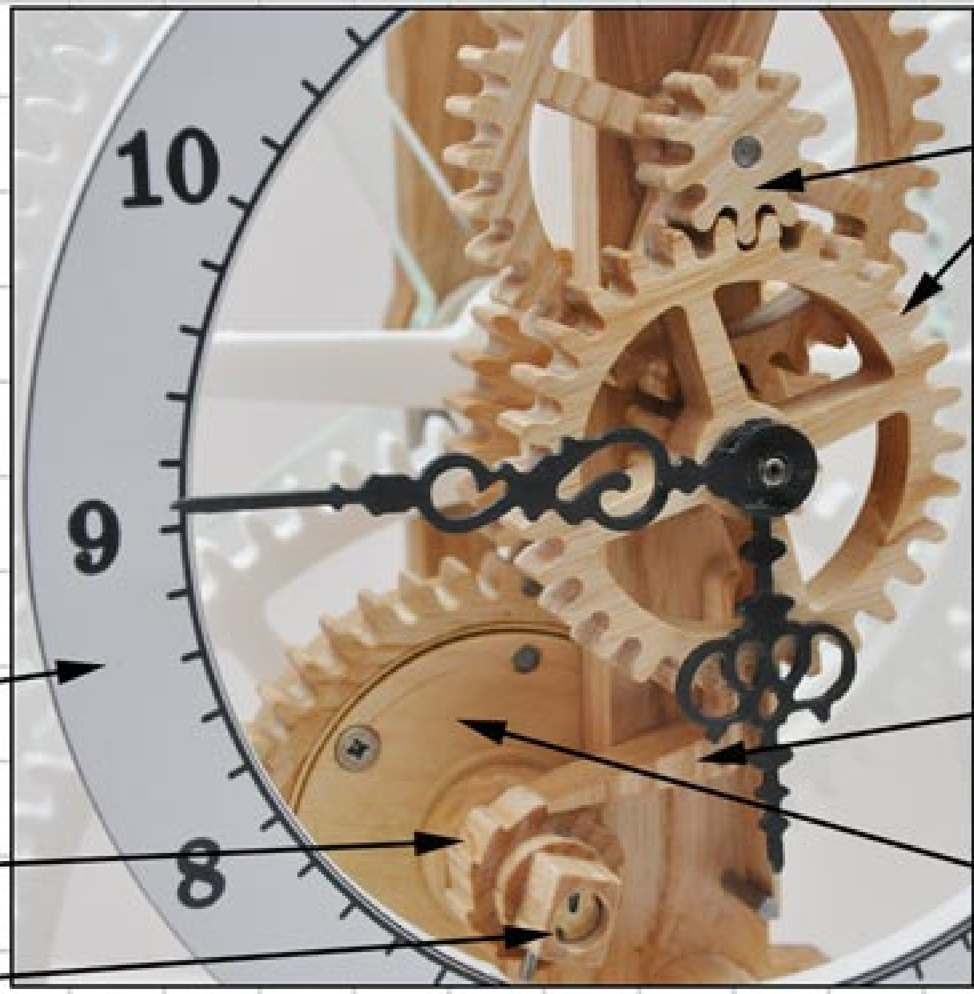




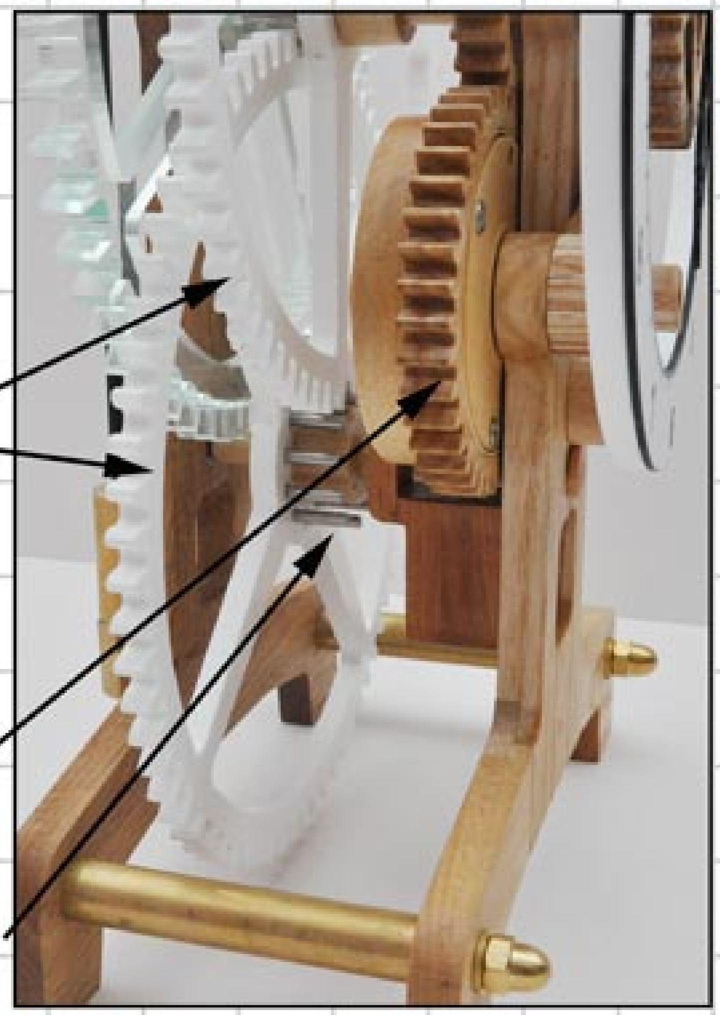
This clock is a departure from the normal design concept used in the previous clocks as it introduces a mainspring clock drive instead of the normal weight driven design. It was introduced here along with the shorter pendulum to allow the clock to sit directly onto a table or shelf.
A further departure is the use of a 60 tooth escapement wheel which allows me to use the simple gear train first used in Clock 11.
The mainspring is housed in a special gear mounted in the 7 o'clock position, it drives the main shaft through an intermediate gear at the front of the mainshaft. The winder is mounted to this mainspring gear and a Ratchet and Pawl arrangement fitted to maintain the tension in the spring.
To ensure the minimum of friction in the design Ball races are fitted to all the shaft pivots and a lightweight pendulum has been introduced to reduce impulse load necessary to keep the clock working to the minimum.



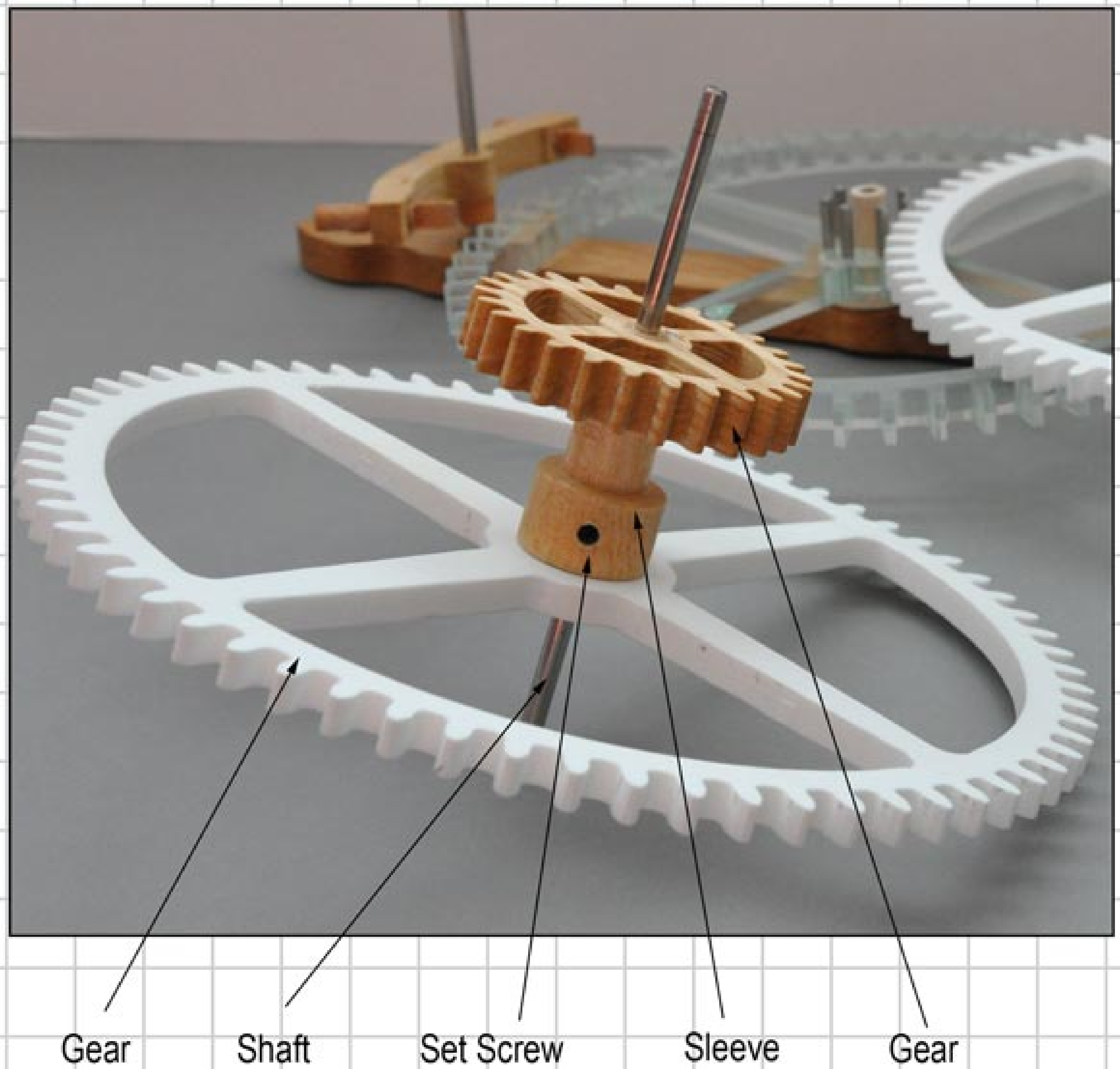
The escapement and the pendulum work together to control the clock. Without them the clock would spin freely and run down in in a couple of minutes.
The pendulum swings backward and forward at a rate of 1/2 second per swing, and with 60 teeth on the escape wheel and two pallets swing in and out to arrest the movement the escape wheel will rotate completely in 1 minute.
Adjusting the pallets so they engage equally with each pendulum motion is key to getting the clock to run continuously.



I have used a laser engraved dial stuck to a 6mm plastic base on this clock as it gives an excellent looking dial and relatvely inexpensive at $15.
The driving spring is contained within the spring gear case and is held onto the Arbor with a short hook. Turning the Arbor with the winding key winds the spring, the ratchet and pawl stop it unwinding. The gear on the outside of the spring case drives the next gear on the mainshaft to provide the main driving force for the clock.
The hour gears are a set of 4 gears driven by the mainshaft to reduce the rotation by 12 to 1 so driving the hour hand around.



To keep this clock simple to build there are only 2 gear trains with gear ratios of 66:11 and 70:7.
The two big gears are shown here in white plastic and the two small ones are not gears at all but pins or pinions, this helps simplify the construction.



The gear assembly shown here is typical for all the gear assemblies on the Main and 2nd shafts. The construction id in 4 steps :-
Make the parts The Gear, the Shaft and the Sleeve. The Sleeve is to be made with some material left on the dia where the gear is going to be mounted.

Tap and thread the sleeve to accept the Ø4 set screw and then fit the sleeve to the shaft and tighten it in place with the set screw.

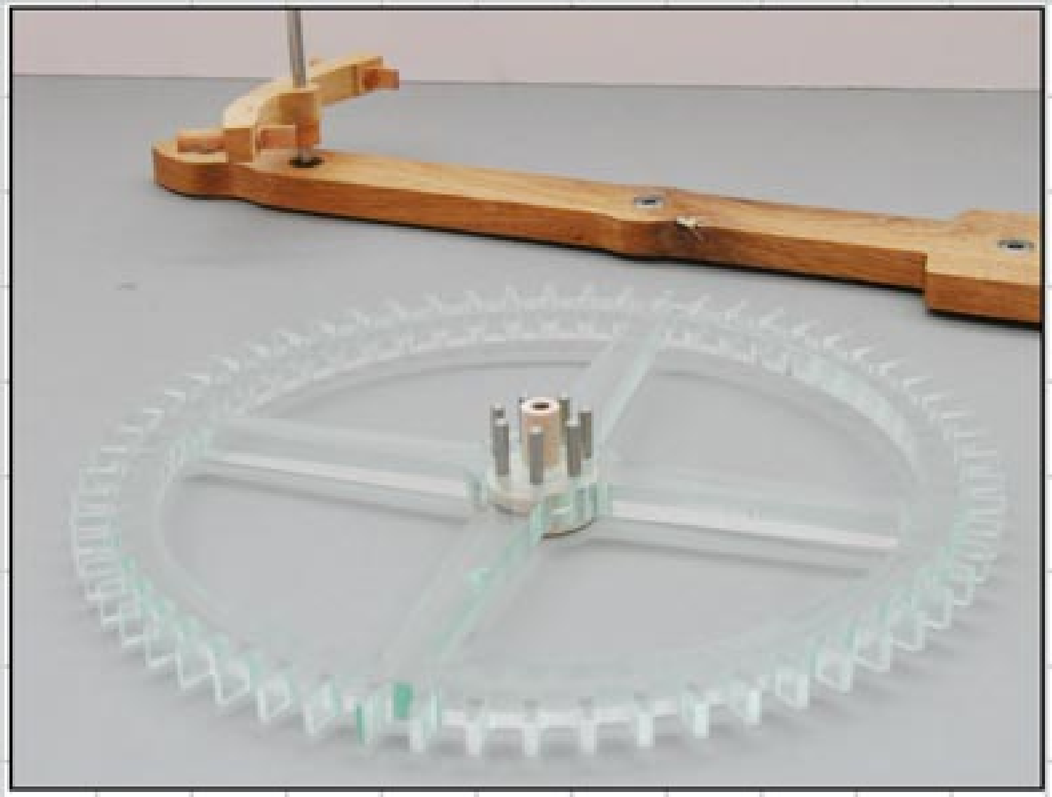
Mount the shaft in the headstock of the lathe and the other end support on a running centre, then turn the sleeve to the final diameter to ensure a tight fit with the gears. This process is not absolutely necessary, but does ensure that gear will run true on the shaft.

Glue or screw the gears to the Sleeve.

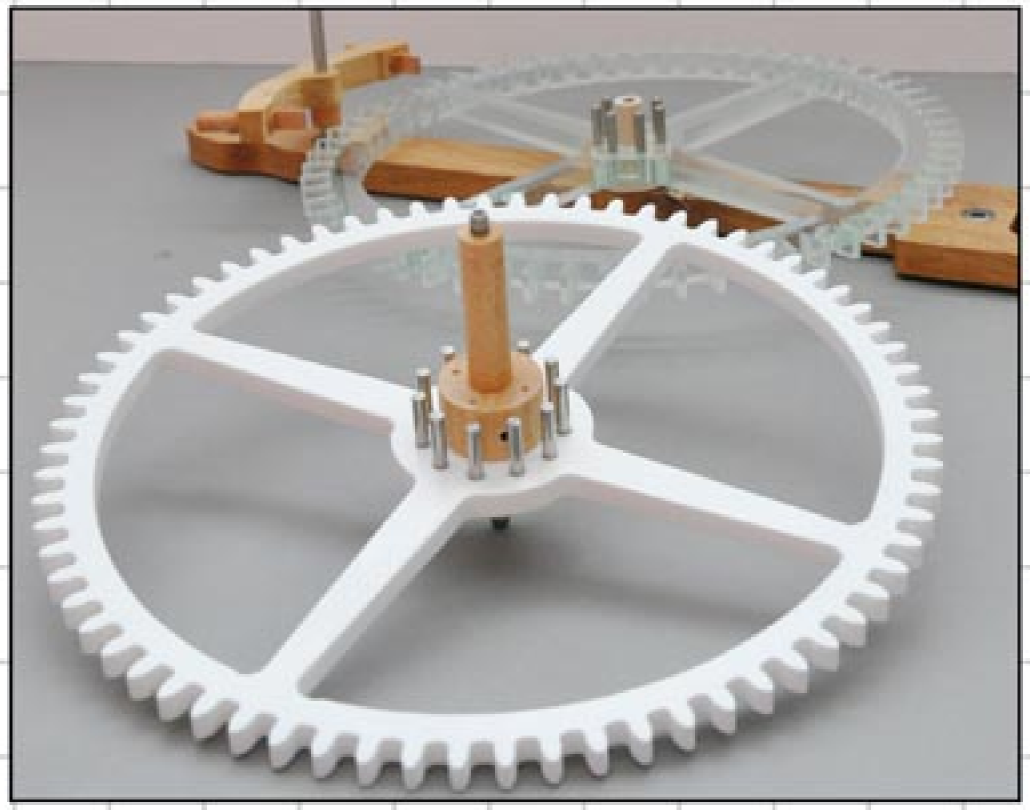
Now you can mount the gear trains into the clock.

Fit bearings into front and back panels

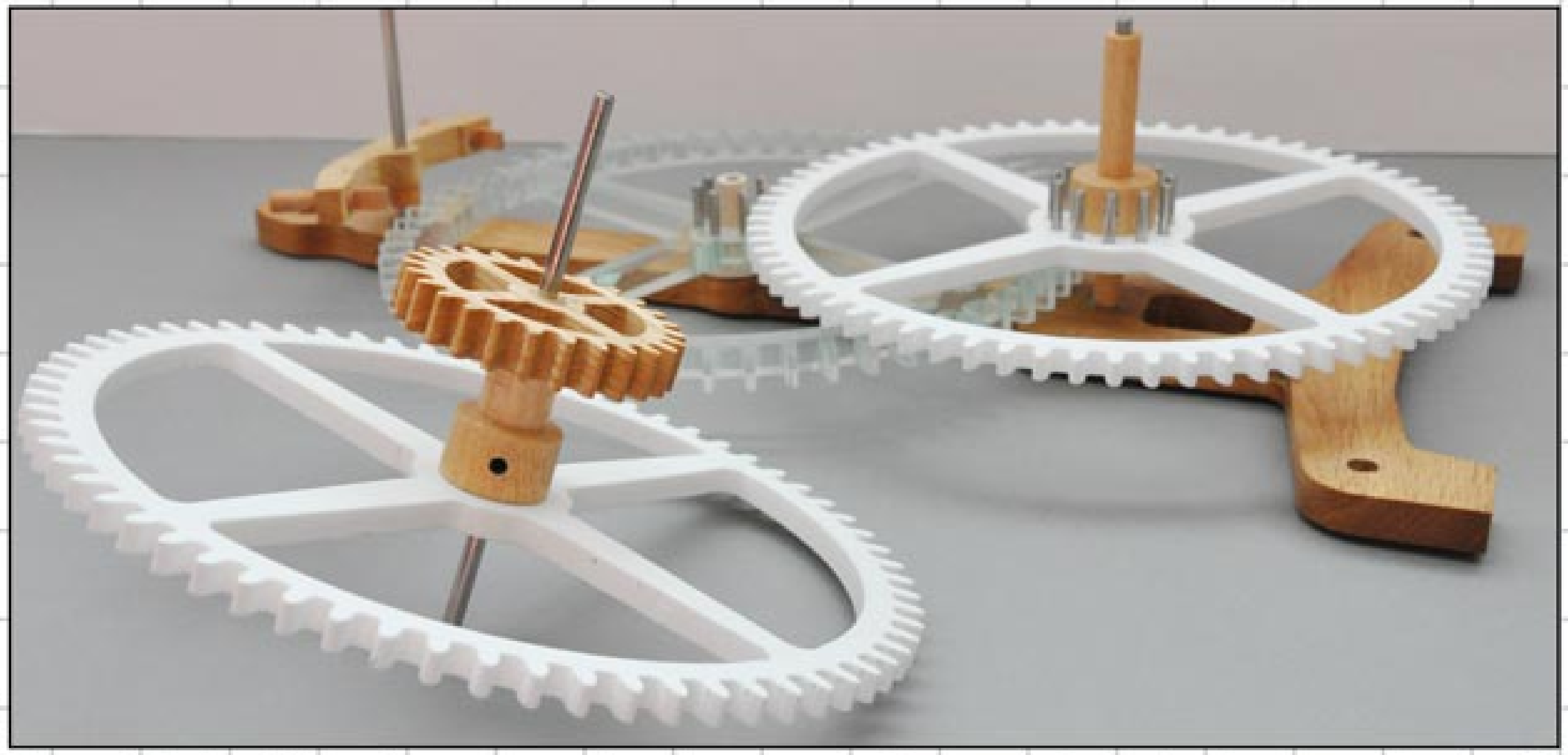
Assemble the Escapement and pallets to its shaft and initially set the protrusion of the pallets to the dimensions on the drawing, then fit to back panel.



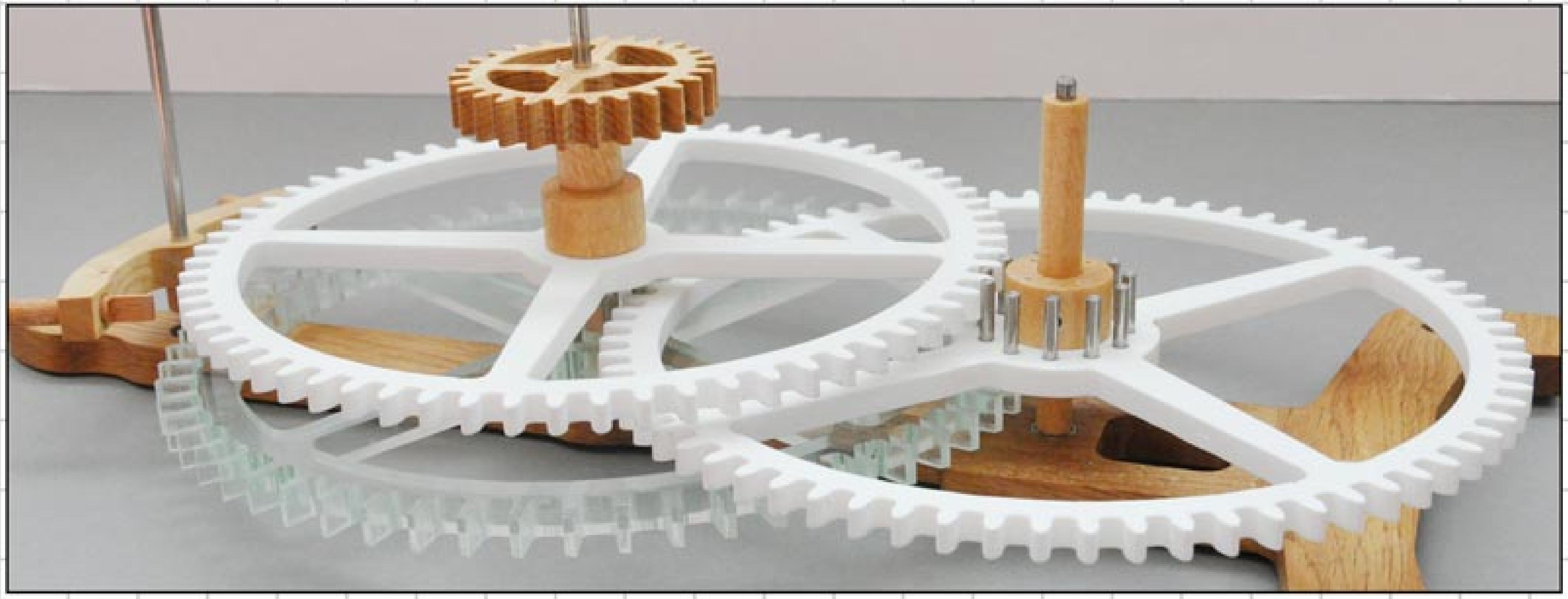
Assemble the pinions and sleeve to escapement wheel and then place it over the main shaft bearing in the back panel.



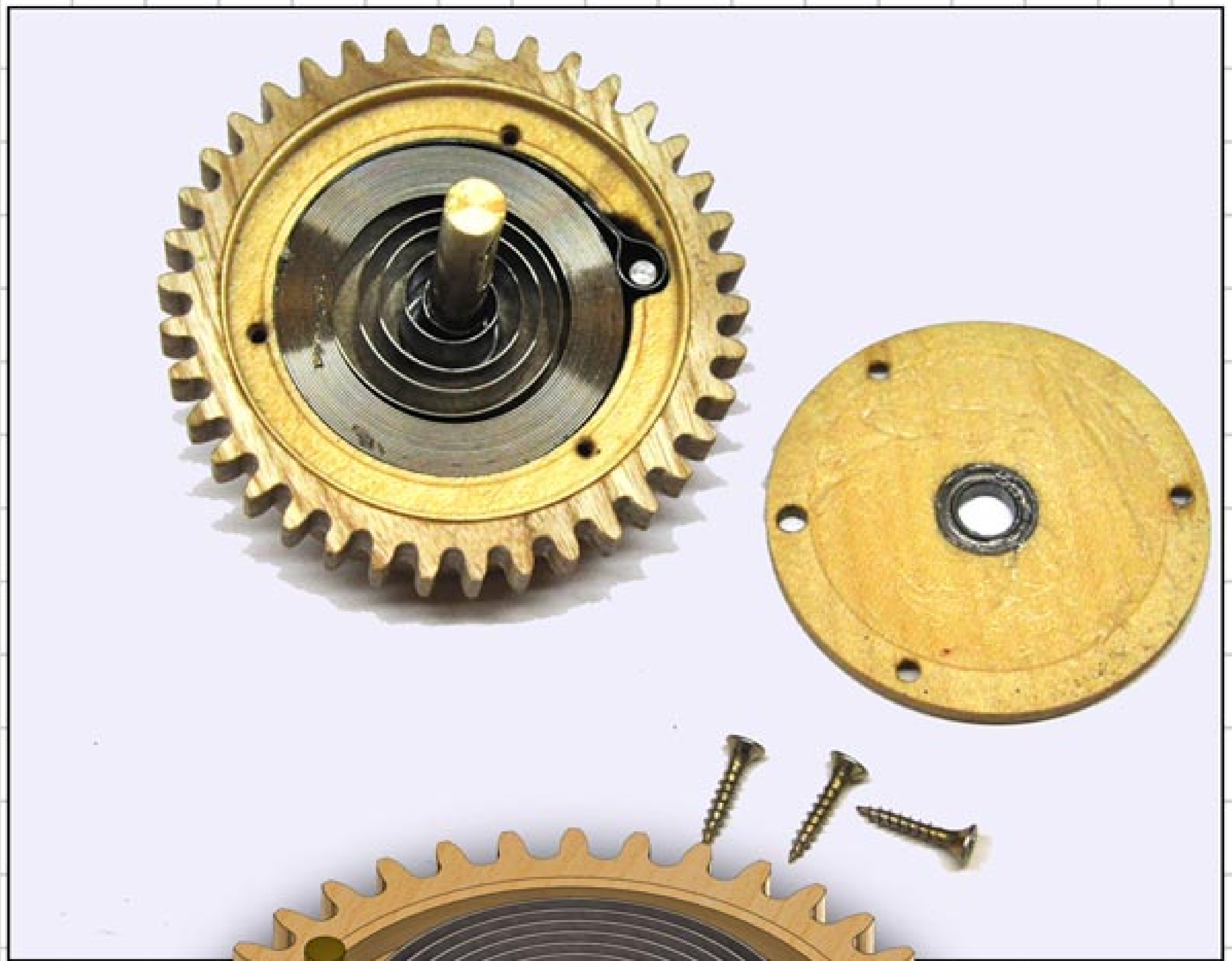
Assemble the pinions and sleeve to 70 tooth gear and then place it into the 2nd shaft shaft bearing in the back panel.

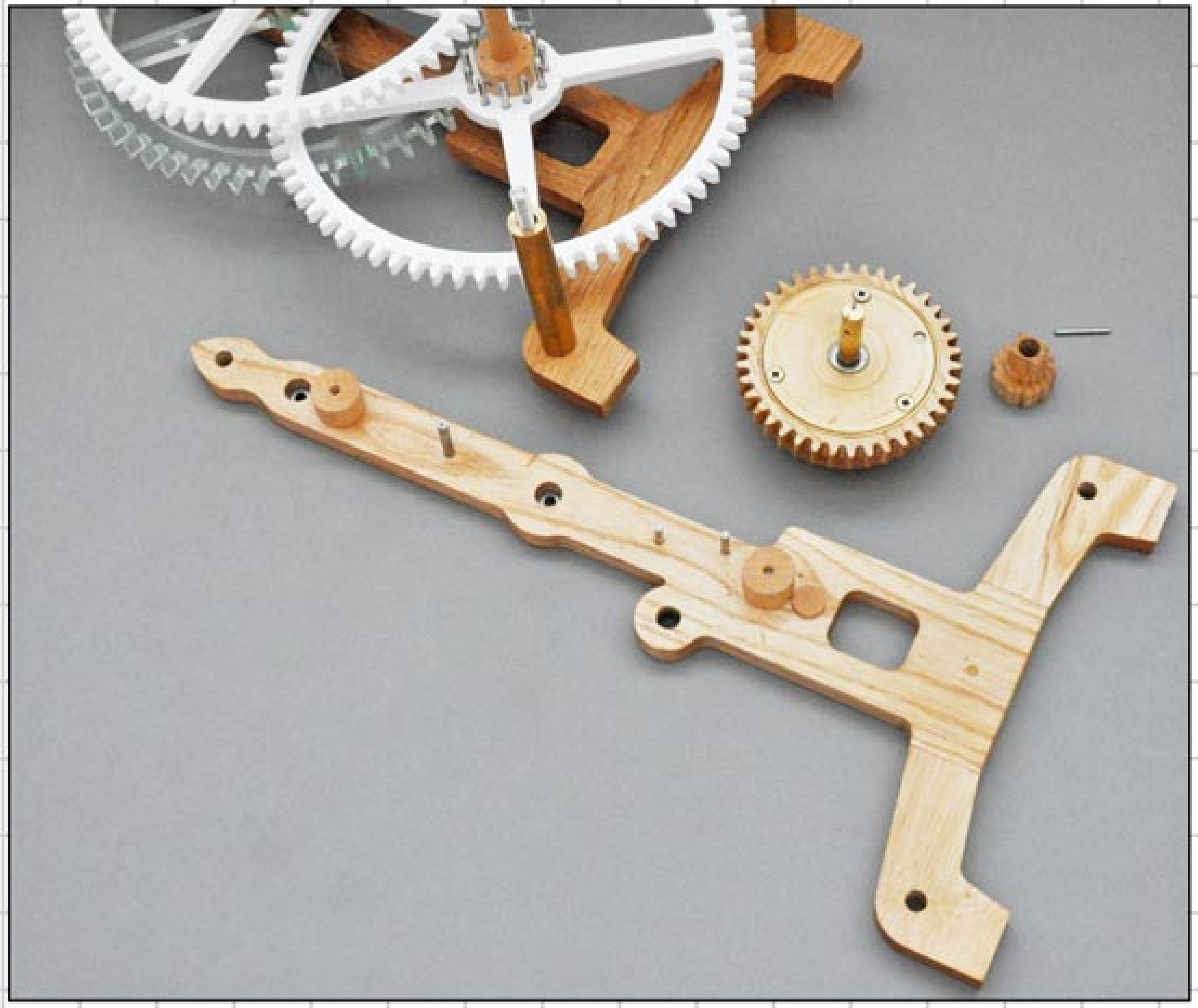


Assemble the 26 tooth gear onto its sleeve and glue and pin it, do the same for the 66 tooth gear, and then slide onto the shaft and screw in position. Finally place the shaft through the escapement gear intp its bearing on the back panel



All the gear and escapement parts are now fitted to the back panel, and we need to fit the brass spacers and threaded rod into position on the back panel before proceeding to the fitting the spring into the spring case and assemnling it onto the front panel



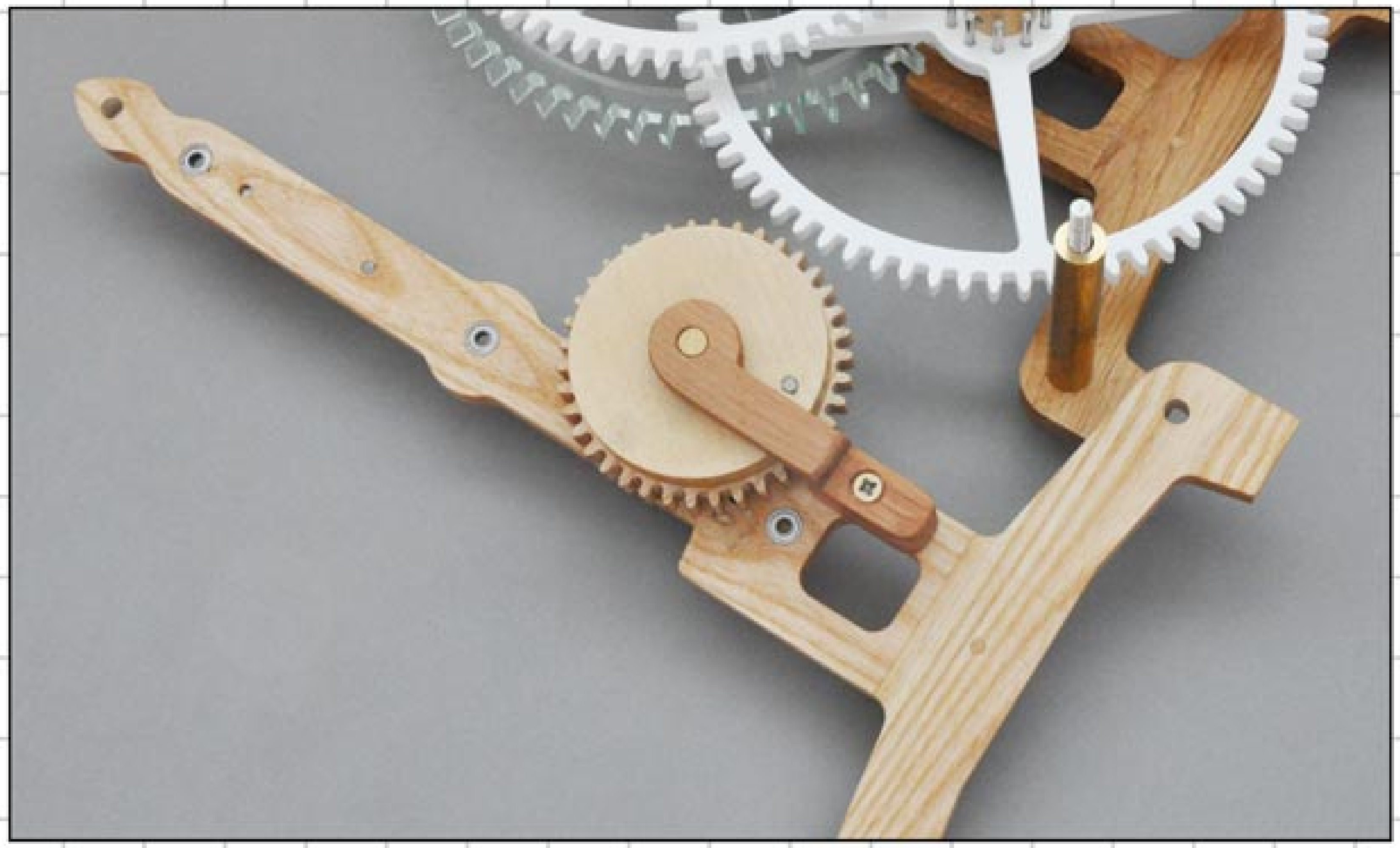


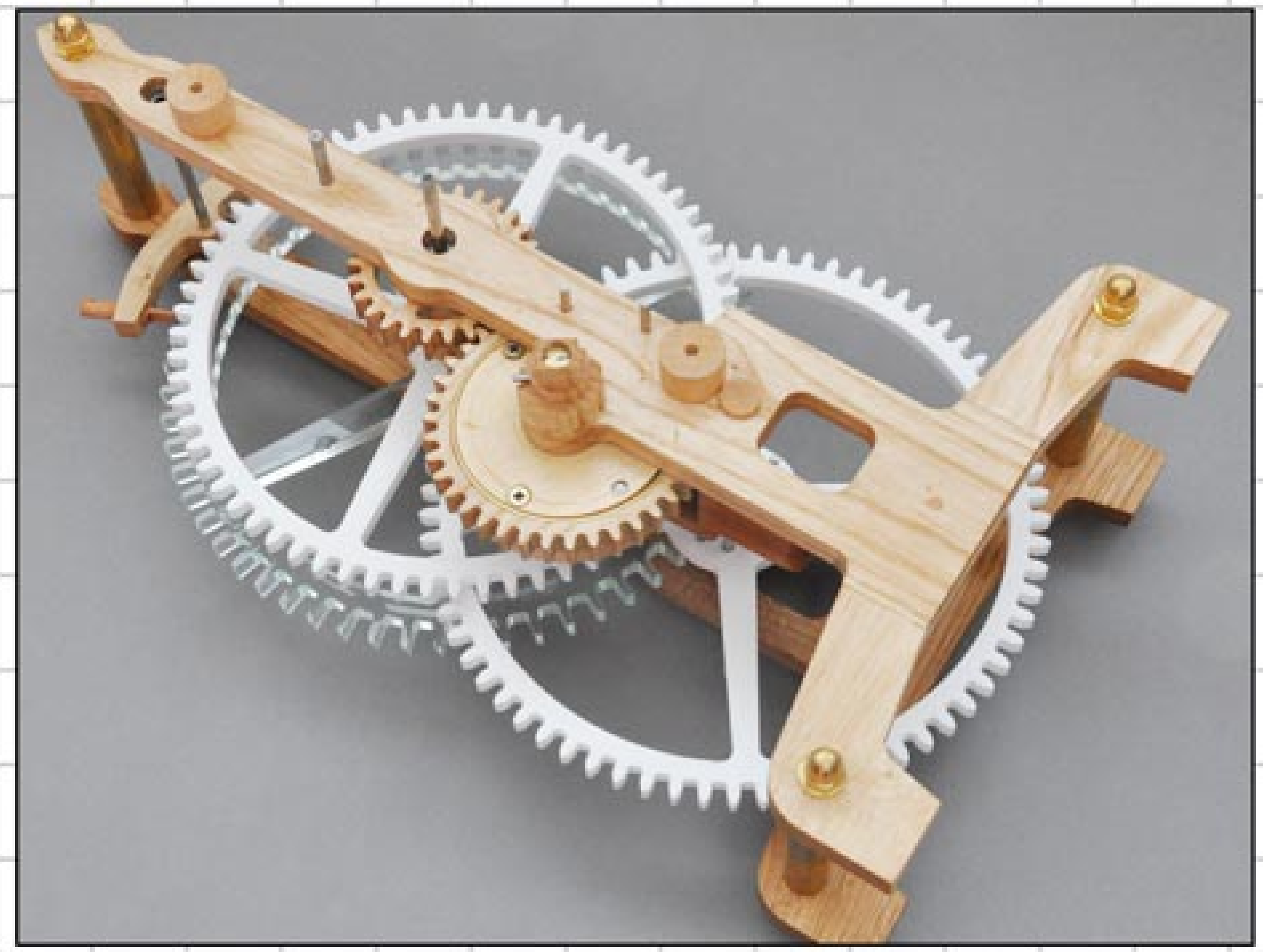
The spring used here is an Ansconia AN1242 and it comes wrapped in wire and has a loop at one end. To fit the spring lay it in the Spring Case as shown with the wire supporting it and the loop over the pin. Now push down steadily untill the spring pops through the wire and expands into its socket. Remove the spring and then push fully home.

Now fit the Arbor by pushing it into the central hole of the spring and twisting anti-clockwise at the same time untill the small hook on the arbor engages into the short central slot in the center of the spring. Once that is secure, fit the cover with the 3 screws,

The sub assembly is now ready to be fitted to the front panel.

Having assembled the spring sub assembly it can be fitted to the back
of the front panel.
Turn over the front panel and fit the ratchet to the arbor using the short pin

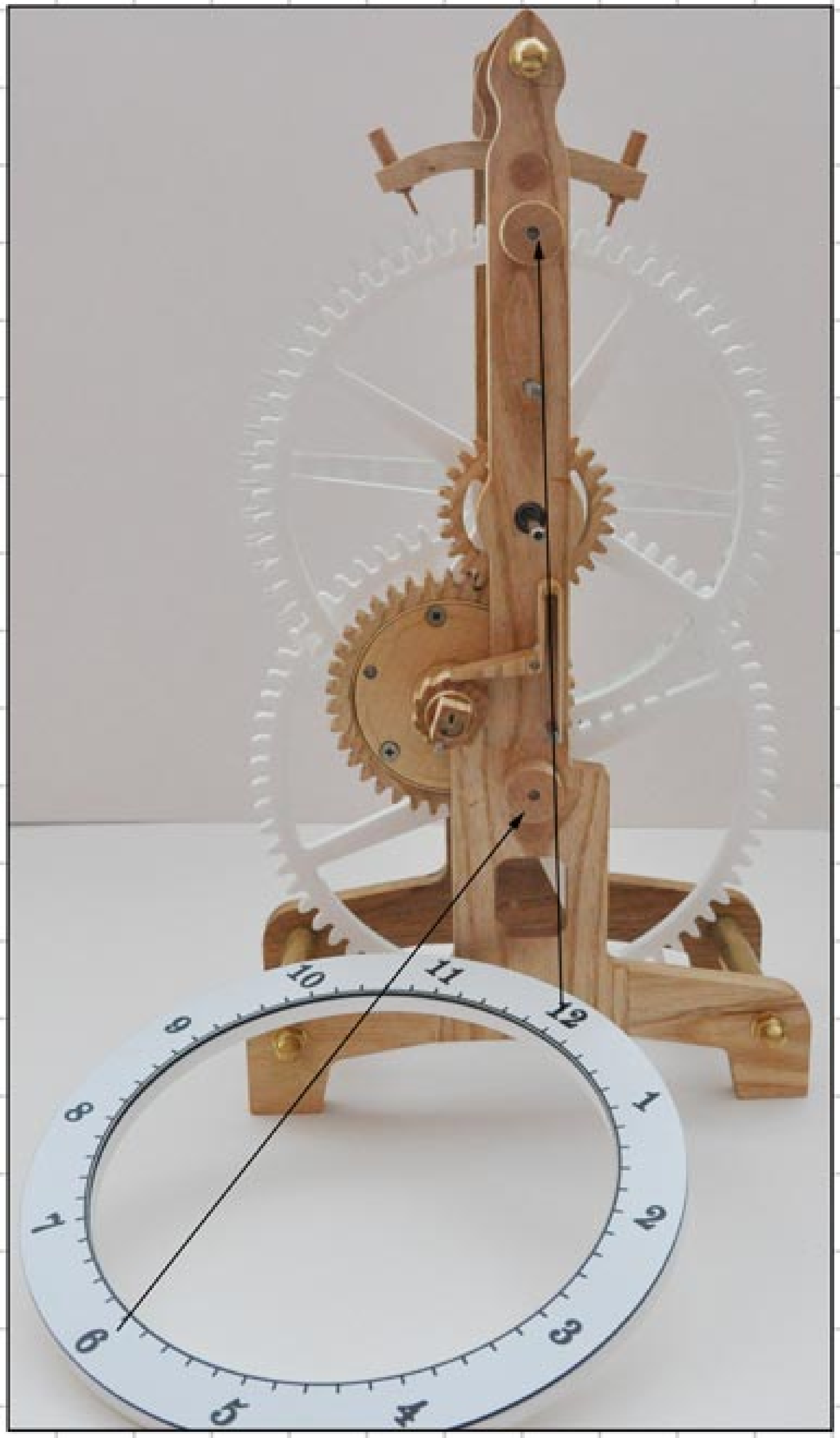




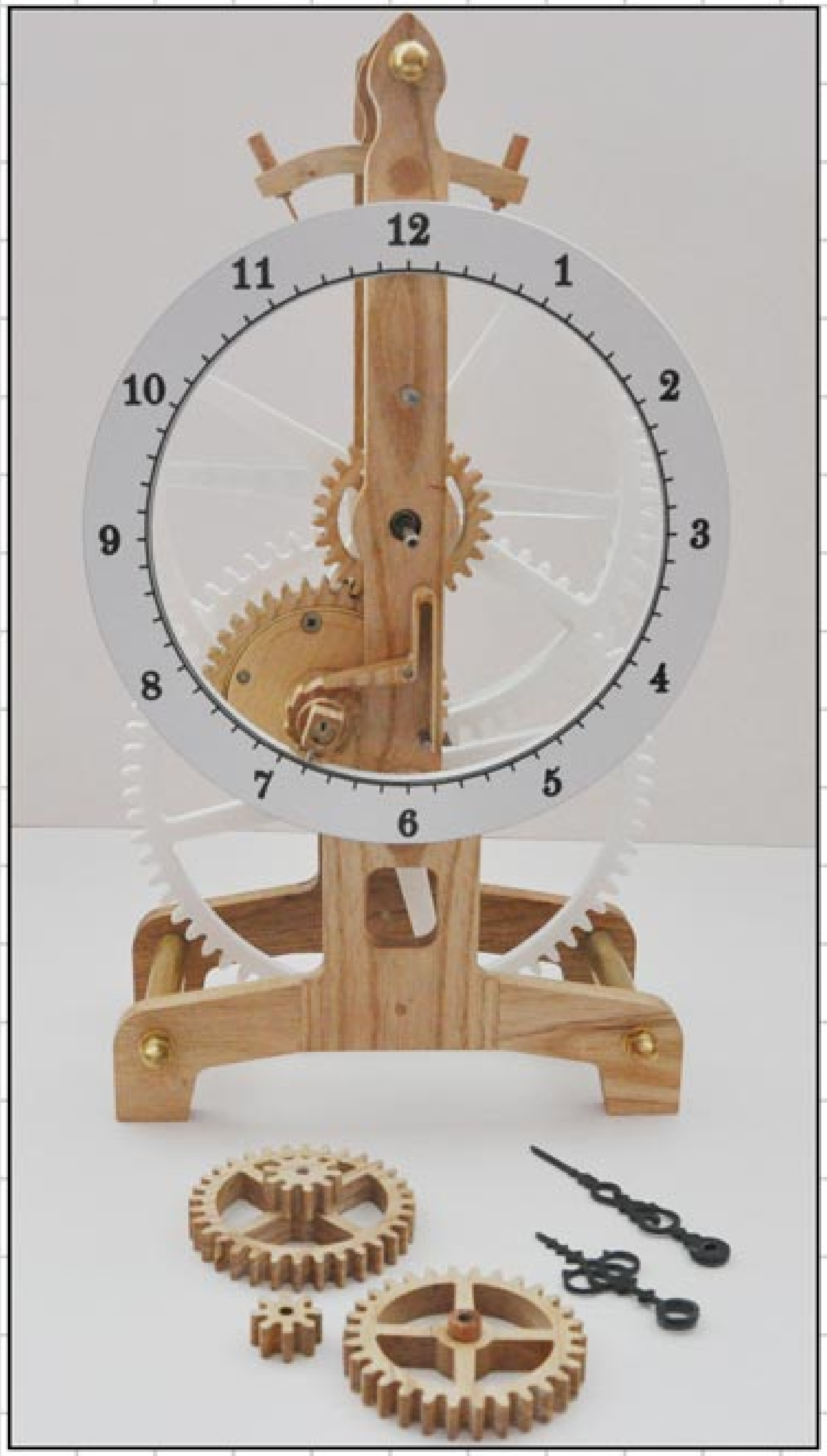
Fit dome nuts and washers to secure the front panel

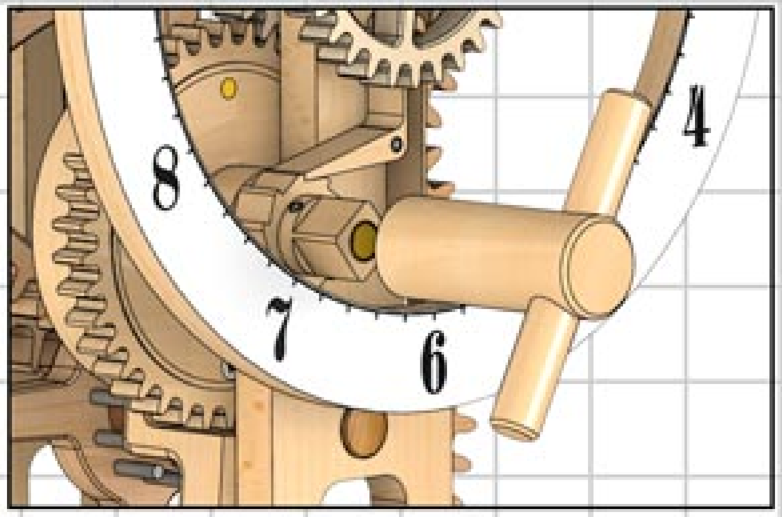
Fit the Yoke and the yoke support to the back Frame and then hang the pendulum in the groove on the support and engage the pendulum rod between the two pins on the yoke.

Fit the Pawl to the pins on the front plate so that it engages with the ratchet.



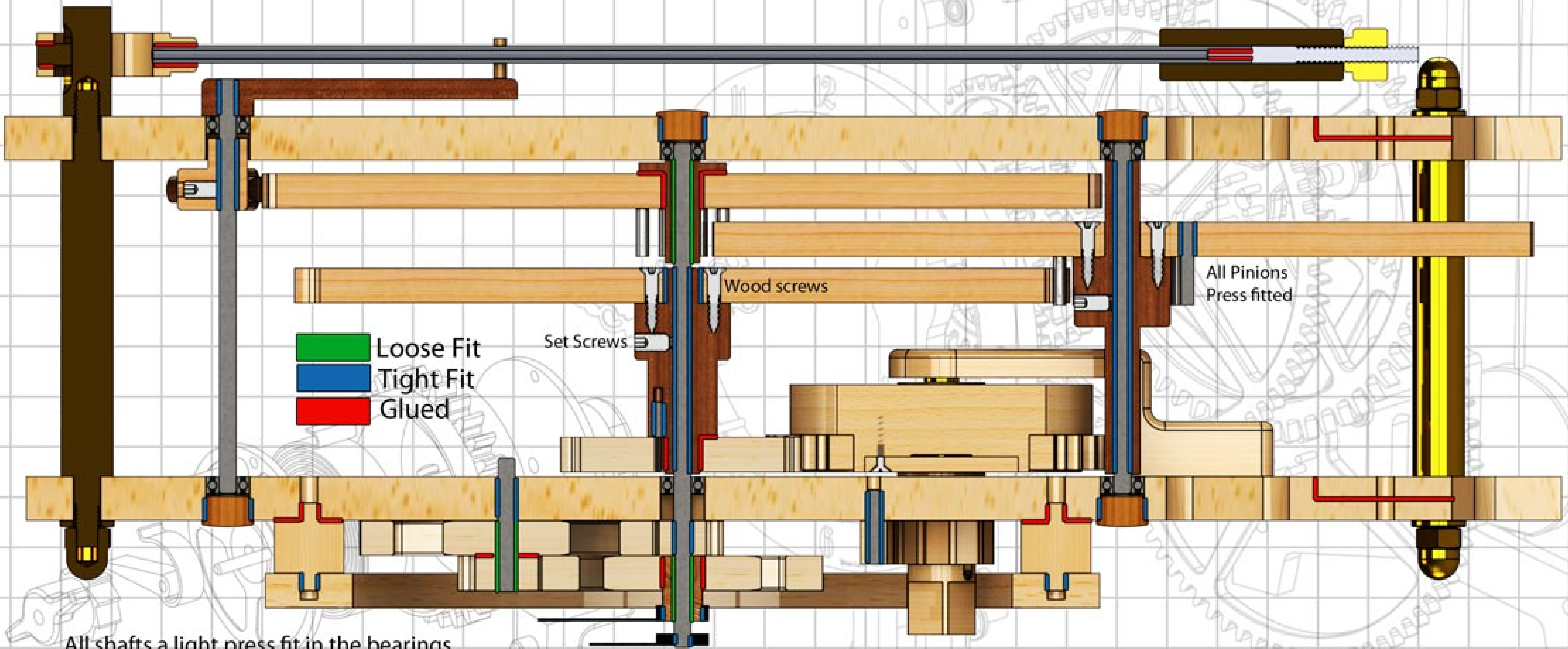
Fit the Dial onto the two Dial off set pegs





Fit the remaining gears that create the 12:1 ratio for the hour hand and finally fit the hands. It only remains for you to wind the clock and set it going, and do the final adjustments to the pallets and the escapement to get the clock ticking correctly.

This diagram is intended as a guide to the types of fits required to ensure the clock will run correctly.



All shafts a light press fit in the bearings

NB! The ball races may be substituted with plain bearings if required.
The bearings and the domed headed nuts are proprietary items and can be obtained from the internet.