REINSTATEMENT OF THE ELECTRIC SOLENOID REMONTOIRE SYSTEM OF A FRENCH, MASTER CLOCK

MADE BY VICTOR RECLUS, C.1875

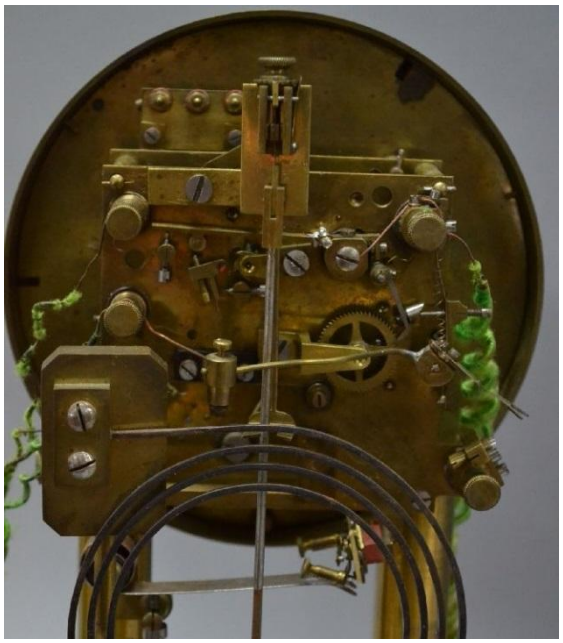
By Lindsay Bramall, Australia.

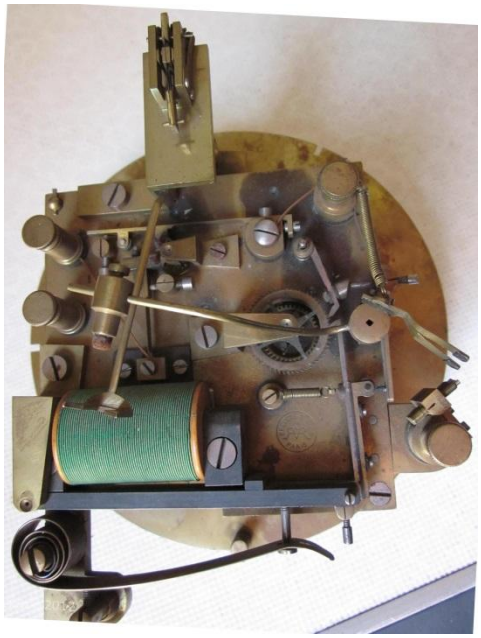
At a recent auction held in Sydney, Australia, I purchased a rare French electric remontoire master clock, certainly extremely rare in Australia.

The clock on offer was not identified by the auctioneer except to quote the dial " Regulateur Electrique".

Nor was the condition of the clock indicated in the description and only by visual examination could the problems by determined. With on-line research prior to the auction I was able to establish that the entire electric solenoid and the remontoire lever system were completely missing. The Clockdoc website (http://wp.clockdoc.org/) contained pictures of similar clocks by Reclus and from those I was informed enough to make a winning bid for the clock.

Close examination of the following pictures reveals the green wire wound coil, magnet core and end posts, the hinged armature, the vertical indexing hooked arm, the silver roller contact, and the indexing arm return spring, (which also forms part of the electric circuit !) were absent.

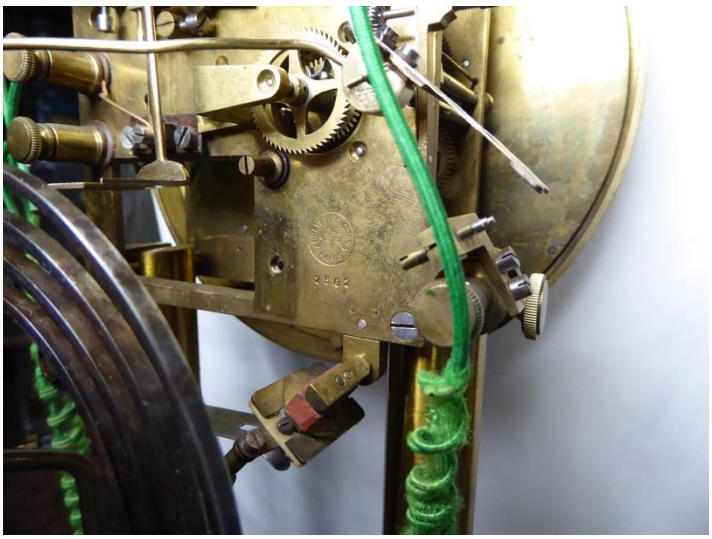




As a member of the Electric Horology Group in Sydney, Australia, I was familiar with basic electrical components and with consultation with an electronics friend I gradually built up a design and specification for the coil.

Further information and dimensioned diagrams came from Jan van Harten of ClockDoc. He dismantled his own clock, also by Victor Reclus, to measure and draw the various parts. This level of assistance ensured that I was able to reconstruct the clock.

Existing screw holes and “shadows” on the clock back plate helped to determine the true dimensions of the coil core end blocks and the coil wooden former dimensions.



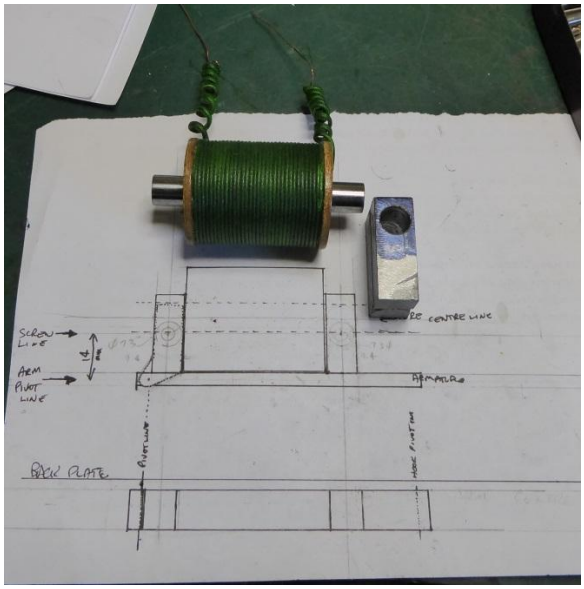
Based on information from Jan van Harten and from my own experience with Paul Garnier electric master and slave clocks, the specification for the coil wire, and coil electrical resistance was derived and a coil made.

A wooden spool was turned on the lathe using a fine grained wood, New Zealand Beech, 42mm long with ends 25mm in diameter, 2.00mm thick. The centre coil section was 14mm in diameter. A hole through the centre of the spool was drill out to 9.5mm for a steel magnet core.

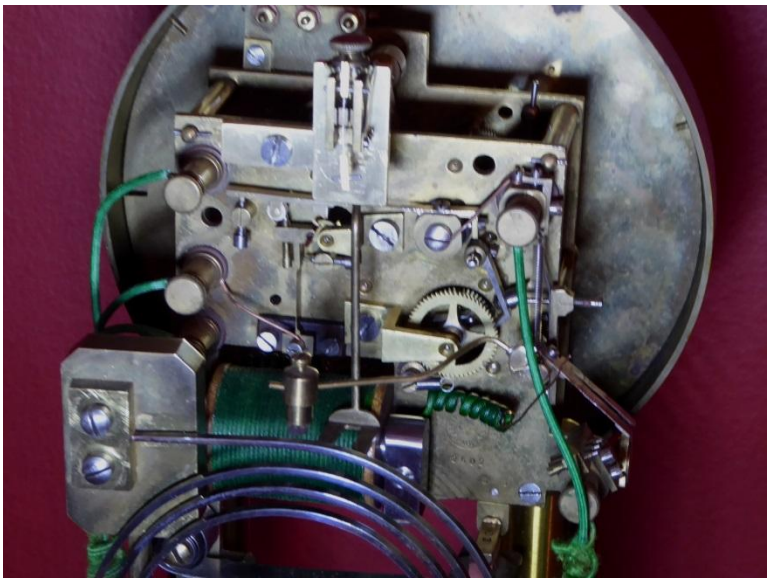
Enamelled 0.5mm copper wire was wound onto the spool with a full spool electrical resistance of 6.2 ohms. This resistance value was consistent with that of a similar clock in The Netherlands and with contemporary

Paul Garnier electric clocks. When 4.5Vdc were applied to the coil a powerful magnet was created at the ends of the core.

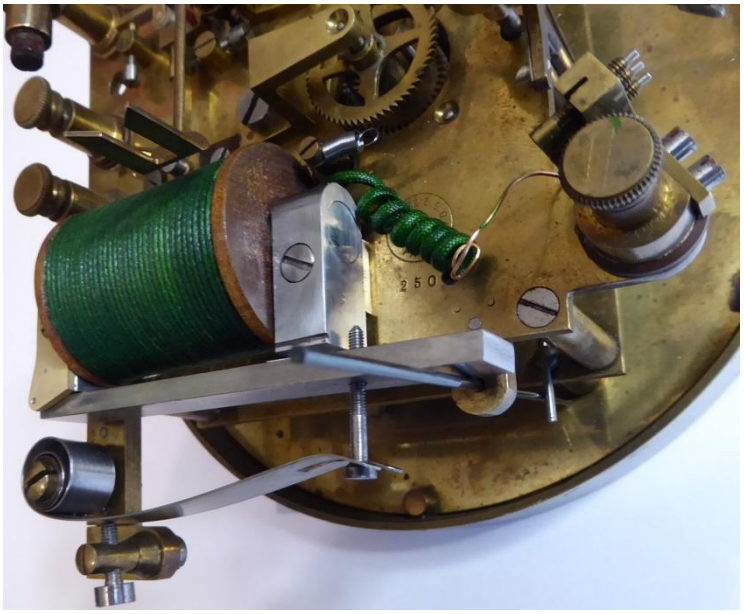
Two steel end posts were hand made to complete the electromagnet. These must be a very fine fit to the core so as to transfer the magnetic flux to the bottom of the post in order to draw in the armature.



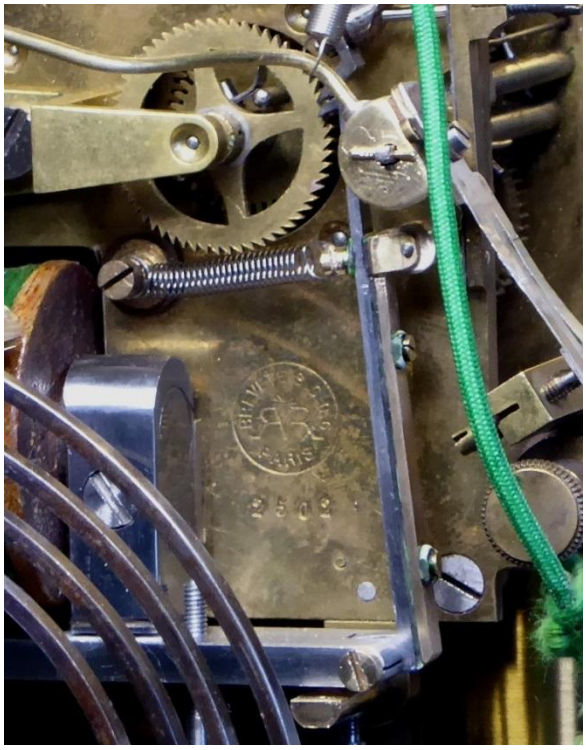
Custom made screws secured the coil to the clock back plate.

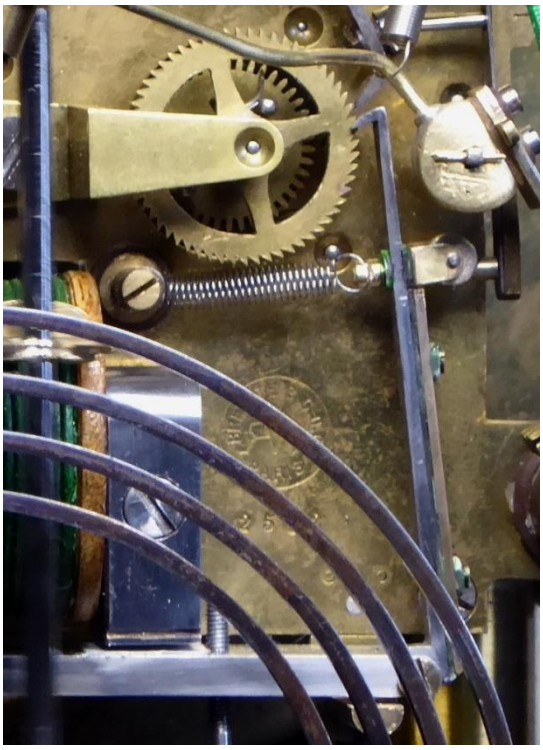


When the coil is activated it immediately pulls in the armature. Using the clock back plate dimensions, electromagnet position and information from Jan van Harten, an armature was made from mild steel and fitted to the clock.



Note in the picture above, the leaf spring mounted bellow the armature which acts as the power source to drive the clock. The activated electromagnet pulls the armature up when the electric circuit is closed and the leaf spring then applies downward force.





The upward movement of the armature, drawn up by the electromagnet, raises the vertical arm attached to the end of the armature. A hook at the top end jumps up one tooth on the indexing wheel and the leaf spring below the armature applies downward force on the indexing wheel thus maintaining the power to the mechanical clock mechanism.

The roller contact mounted on the vertical arm meets its companion contact, it being mounted on a spring-loaded arm which responds to the lifting of the anti-reversing pawl. The instant the anti-reversing pawl falls off the tip of an indexing wheel tooth the spring loaded contact hits the roller contact thus closing the circuit and activating the solenoid.

This remontoire (rewind) process is activated every 30 seconds.

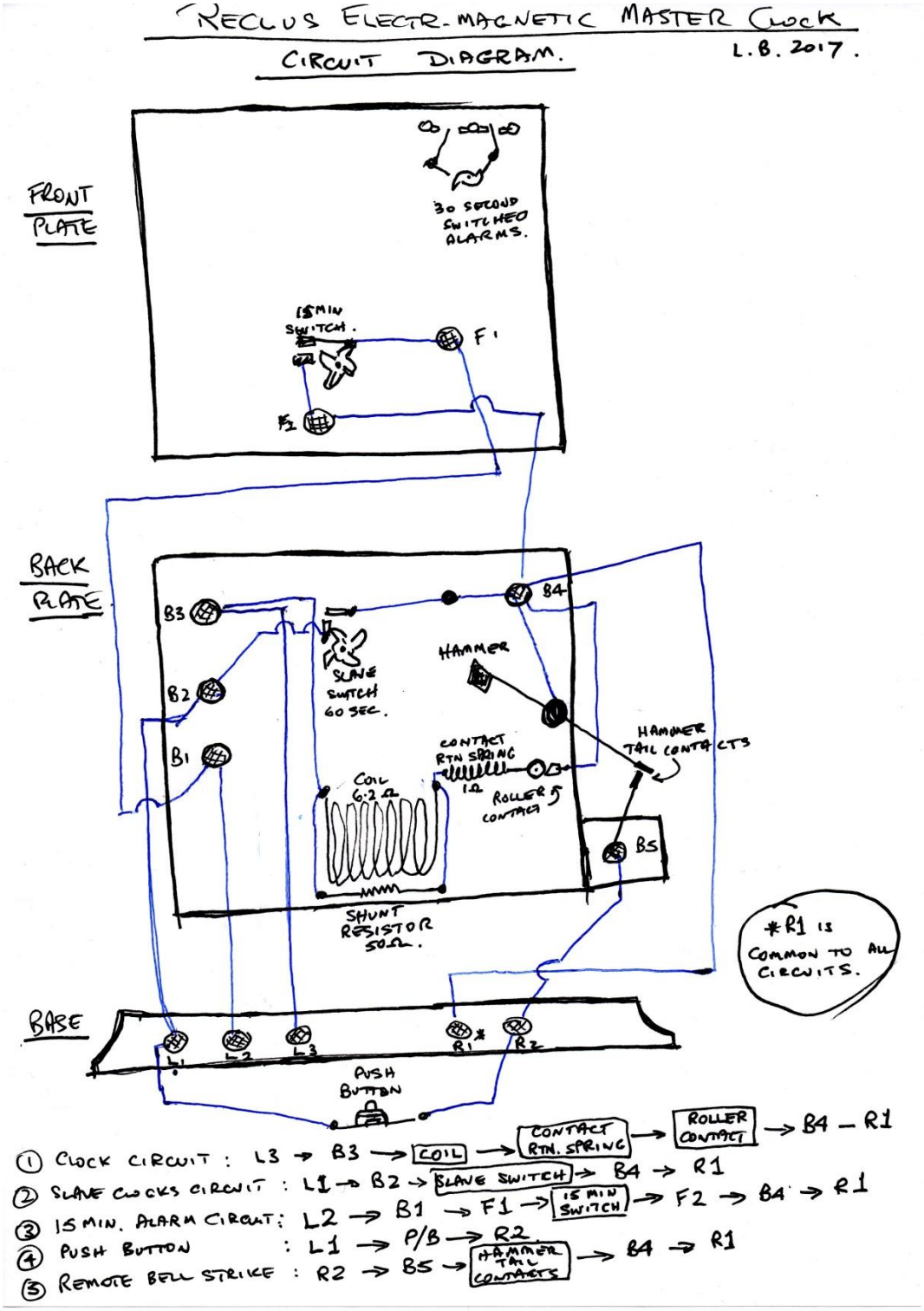
----------INSERT MOVIE OF THE OPERATING REMONTOIRE……

It would seem that these master clocks were made to order, to meet a customer's specific requirements, and my clock was obviously required to perform multiple timed switchings.

More than 10 contact pair exists throughout the mechanism;

1. Clock remontoire solenoid - 30 second intervals
2. Slave clock impulse – 60 second intervals
3. Alarm circuit – 15 minute intervals
4. Remote bell or horn – on the half hour and the hour.
5. Double pole alarm switch – 30 second intervals.
6. Push button – on demand to reset slave clocks.

The electric circuits for this clock are shown in the following diagram.



With a restored remontoire system the clock regained the ability to operate correctly and keep very accurate time. Originally fitted with a mercury double tube pendulum a period pendulum was sought and fitted to the clock. A contemporary equivalent temperature compensating pendulum was that invented by Ellicott. My personal choice, on aesthetic grounds, was for the Ellicott.