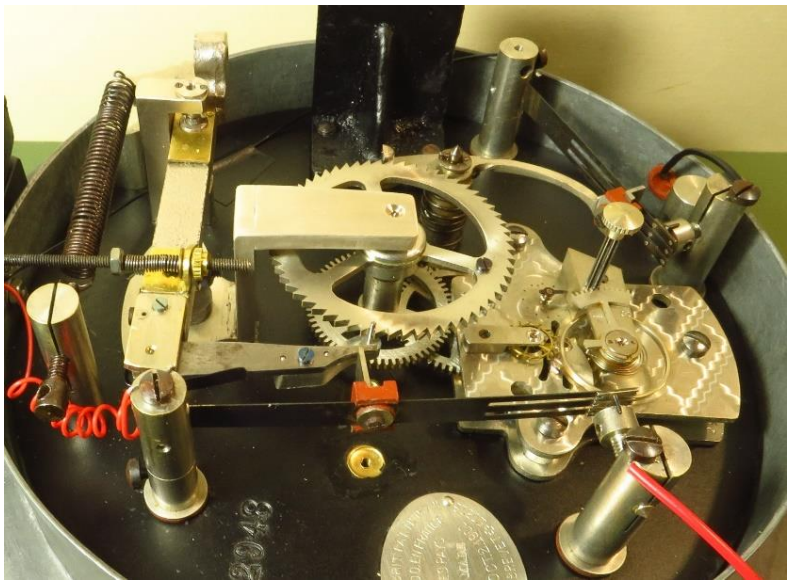
The restoration of David Perret Wall Clock Serial No 2948

By Brian Scott brian@hectic.name January 2023



Introduction

This article describes some of the history of David Perret clocks and the restoration by the Author of a wall clock by David Perret made around 1905.

David Perret the Man

David Perrett was a Swiss National born around 1848 at Le Locle. His father started a Watch Manufacturing company in 1854 at Neuchatel. David was well qualified - obtaining a degree in Mechanical Engineering from Zurich and was then part of the Family watchmaking Company. By 1883 the company employed not less than 300 workers and produced more than 50,000 watches per year David was very well respected and served as a Judge at numerous watchmaking exhibitions and was a prominent member of various horological industry associations. He had a very inventive mind and held numerous watchmaking patents. In 1900 he was granted a US patent for an electric clock. (ref 1)

In 1900 he started a factory making electric clocks and devoted the remaining years of his life to that pursuit. He died in 1908 His electric clocks were very successful and received high awards in Marseille (1908) and Turin (1911). His electric pendulum regulators were used by the Neuchatel observatory to transmit time throughout Switzerland. Accuracy was stated to be, at normal temperatures and pressures, a daily variation not exceeding three or four hundredths of a second. (refs 1 and 2)

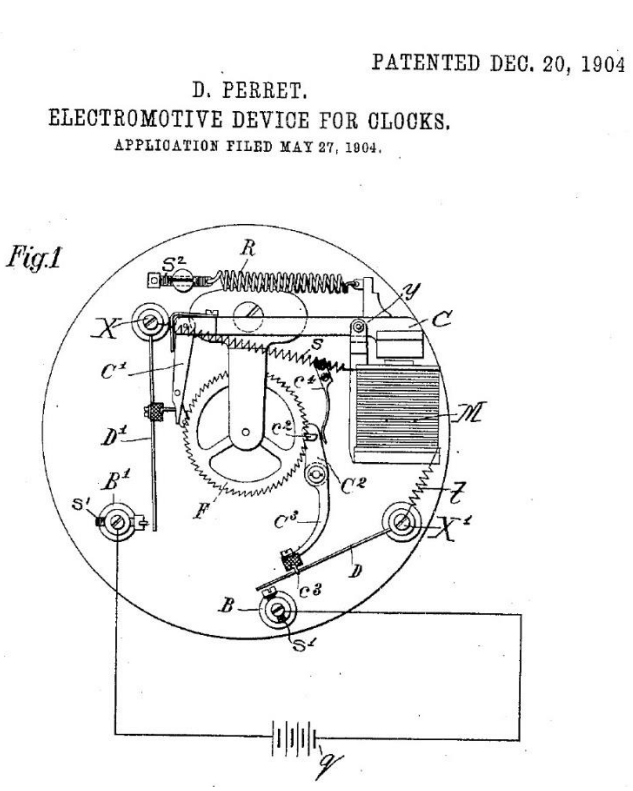
The clocks

All David Perret clocks use his patented twin contact system, solenoid and one minute spring remontoire. Clocks with this arrangement powering 1 ,3/4 and half second pendulums, and balance wheels were made. The majority of clocks produced had the balance wheel design and were mainly the wall clock design with some later decorative mantle clock designs. The Pendulum based Regulators and Master clocks had lower serial numbers and looked to be more limited production quantities. Based on serial numbers about 5000

clocks were made. The patents and scientific American drawing and photograph show the balance wall clock design so this also indicates this was the main production design. Unfortunately a lot of these balance wheel wall clocks had parts that contained metallic impurities in the zinc alloy that was used to cast the die cast parts. This is a common problem in early zinc die casting and is known by the term “Zinc Pest”. Over many years this causes these parts to expand and become brittle. The main parts effected were the main arm that the solenoid acts upon and the bracket that supports one end of the minute wheel. Many clocks with serial numbers below 3000 had this problem.(ref3). The defective clock were probably thrown out as being too difficult to repair so the number of these clocks still in existence would be considerably less than 5000.

The Patents and principles of operation

David Perret had a number of patents for the remontoir design and solenoid designs. Two of these Patent sketches are shown below.

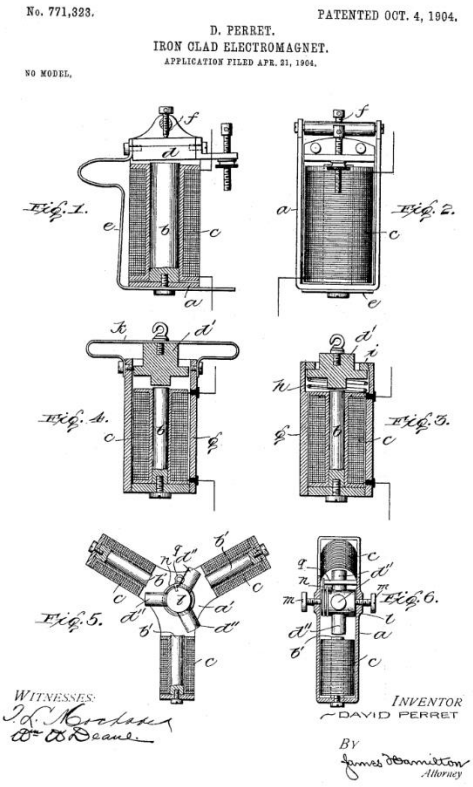

PATENTED DEC. 20, 1904

D. PERRET.

ELECTROMOTIVE DEVICE FOR CLOCKS.

APPLICATION FILED MAY 27, 1904.

Fig.1


No. 771,323. PATENTED OCT. 4, 1904.

D. PERRET.

IRON CLAD ELECTROMAGNET.

APPLICATION FILED APR. 21, 1904.

NO MODEL.

Fig. 1. Fig. 2. Fig. 3. Fig. 4. Fig. 5. Fig. 6.

WITNESSES: INVENTOR DAVID PERRET

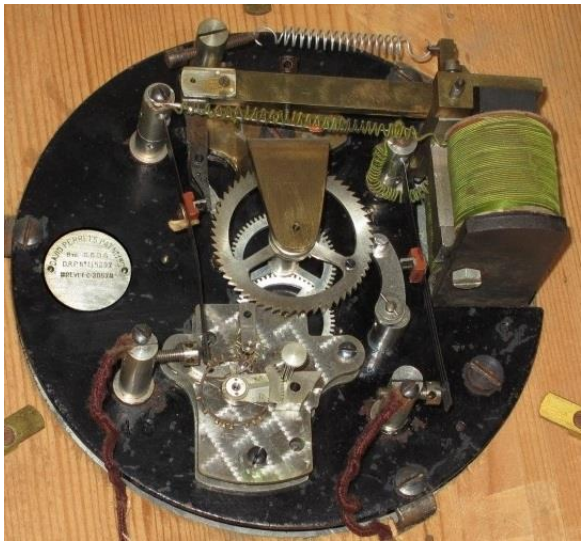
BY James Hamilton Attorney

Their characteristic is the double contact in series. One contact opens slowly and closes suddenly, the other opens suddenly and closes slowly. The idea was to limit the effects of the spark at a time when there was no not yet figured out how to absorb it by combining a resistor and a capacitor.

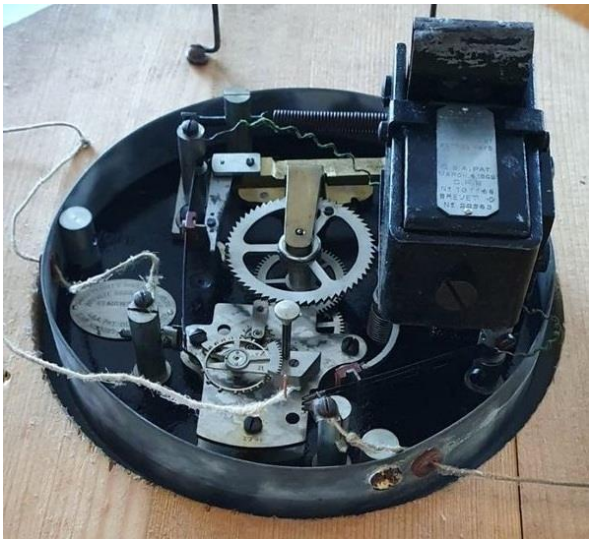
The advantage of the system is to allow the derivation of contacts (non-polarized) for secondary clocks on the winding circuit or on a parallel circuit. Strength is given by a coil spring acting by a pawl on a ratchet with 60 teeth on the minute axis, the spring being re-tensioned by an electromagnet. Ref 4

Examples of clocks

The following photos show two examples of similar clocks. The one on the left has an earlier design twin coil solenoid and the one on the right has the later Ironclad solenoid. The subject of this restoration had the iron clad solenoid but was missing the solenoid when the movement was purchased.



Early twin coil solenoid model Serial No 448 (Clockdoc)



Later Ironclad solenoid (Ricardo Auction)

Condition of Perret Clock no 2948 on arrival in Australia

The clock movement was purchased from the UK and was shipped out in October 2021 and arrived in the 2nd week of November. The main issues were

1 There was light and heavy rust on some of the iron components – including some of the pivots.

2 The movement was dirty with flaking paint and general dirt.

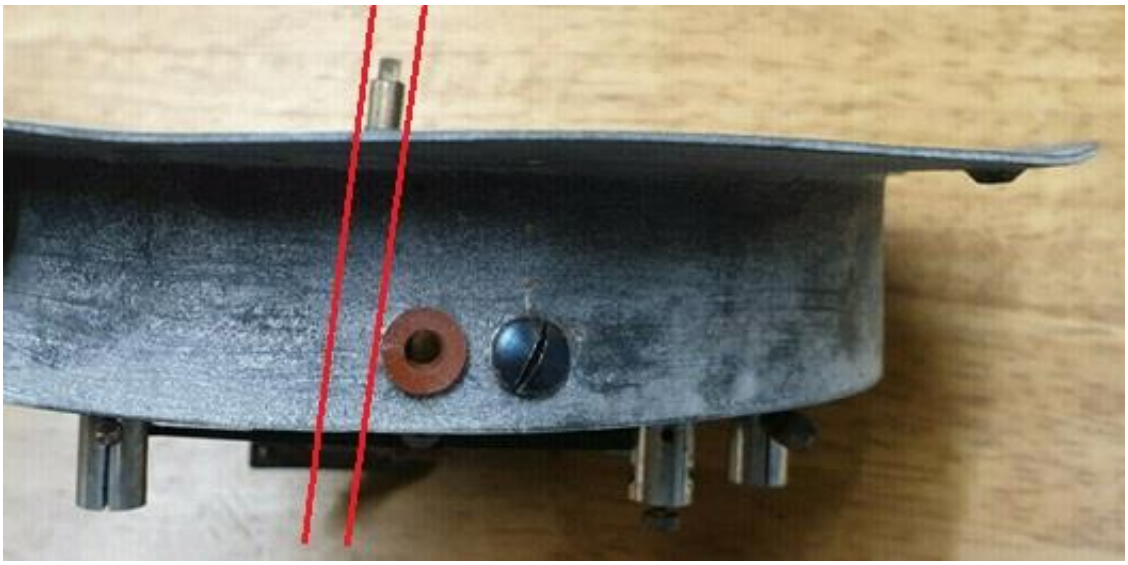
3 The solenoid was missing

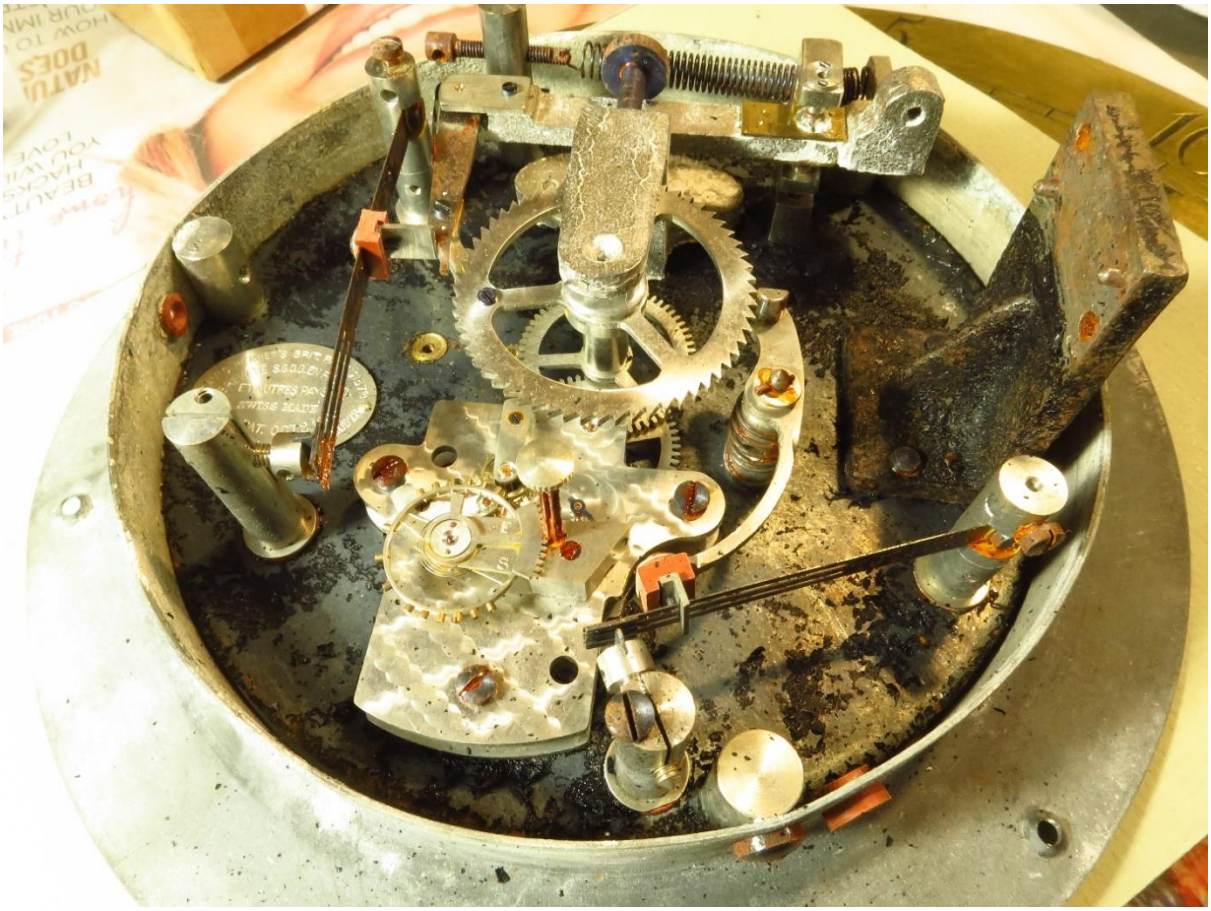
4 The main minute shaft was well out of alignment and it was thought to be bent

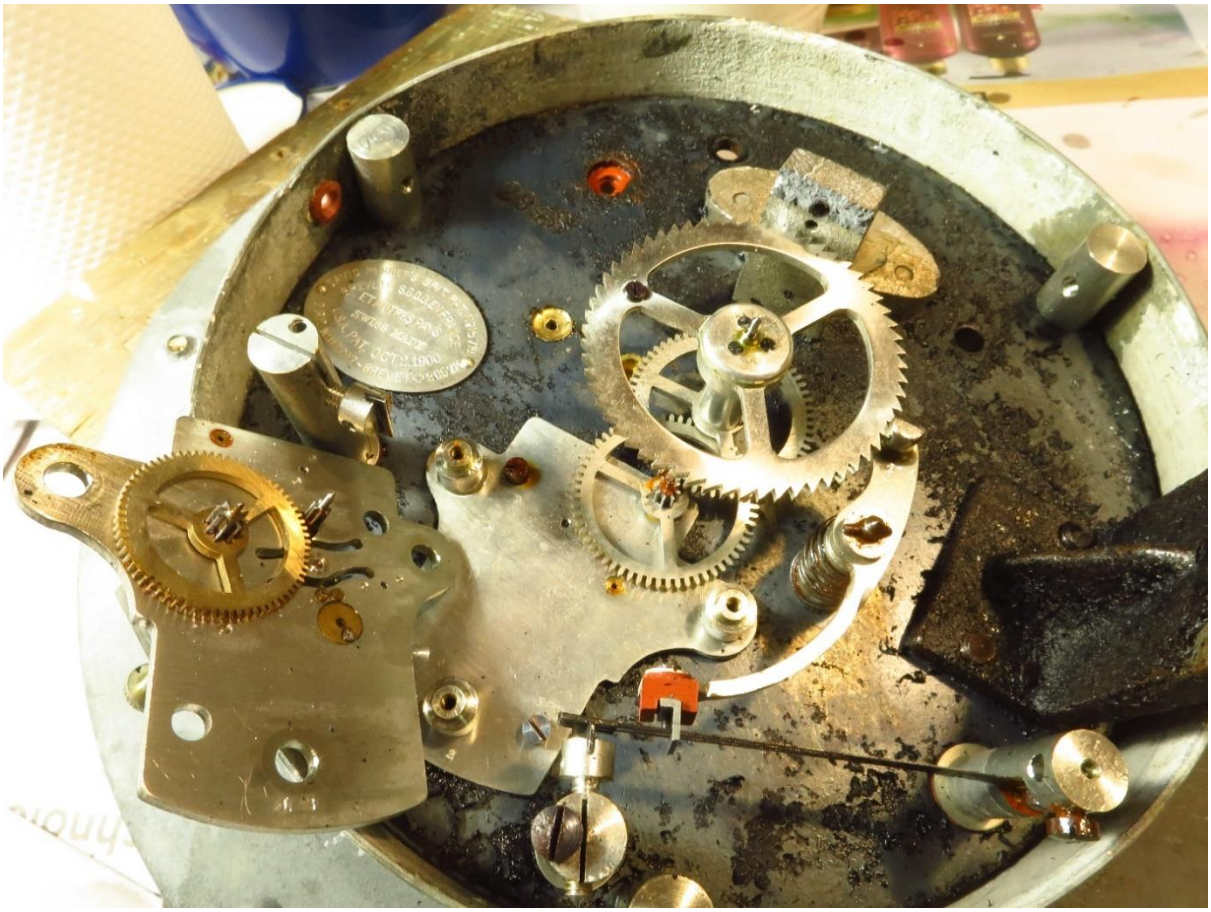
5 The die cast components exhibited growth in in their dimensions and showed cracks.

6 The main solenoid operating beam at the pivot point had been repaired in the past with brass re-enforcing plates.

7 The pin and short lever on the solenoid operating beam was distorted and would not engage the serrated teeth on the main minute shaft. The photographs show the condition on arrival.



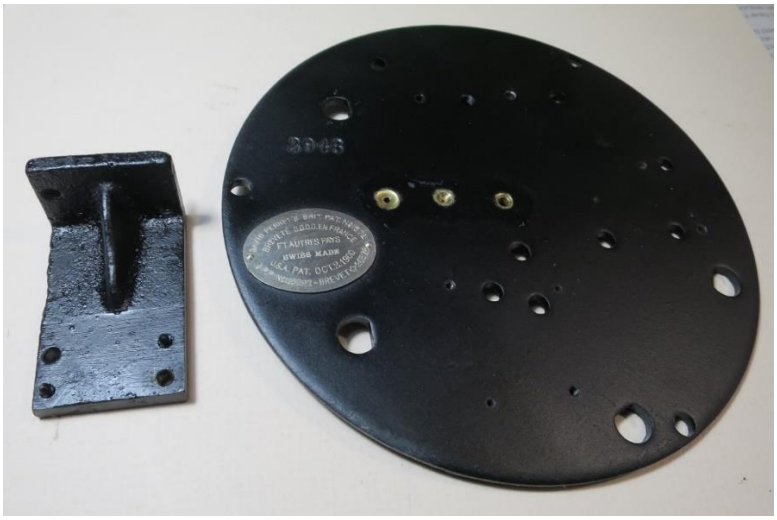




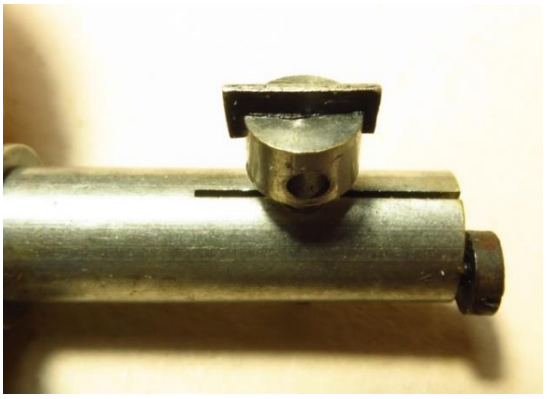
The main minute shaft was not bent as it appeared first but was angled because of growth of the die cast bracket supporting the pivot of the shaft. During disassembly the cast bracket broke due to the extensive cracks and embrittlement present.

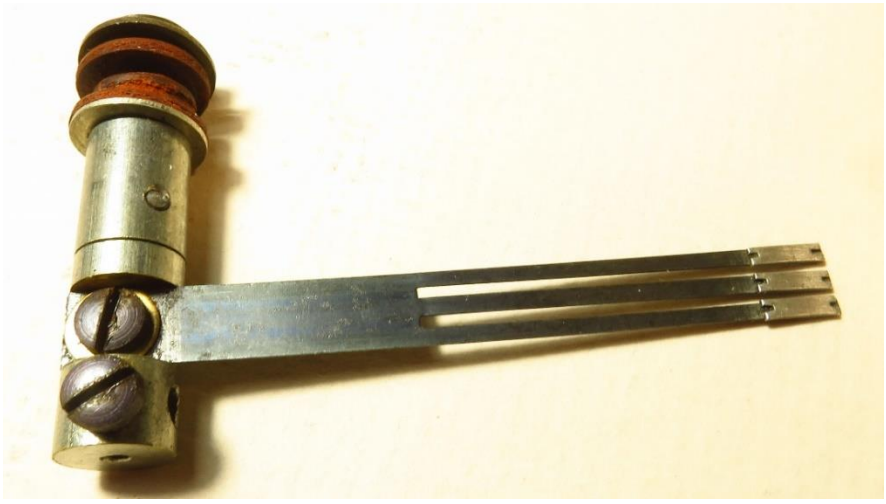
Cleaning and Repairs

The movement was completely stripped down and cleaned and examined under a microscope.

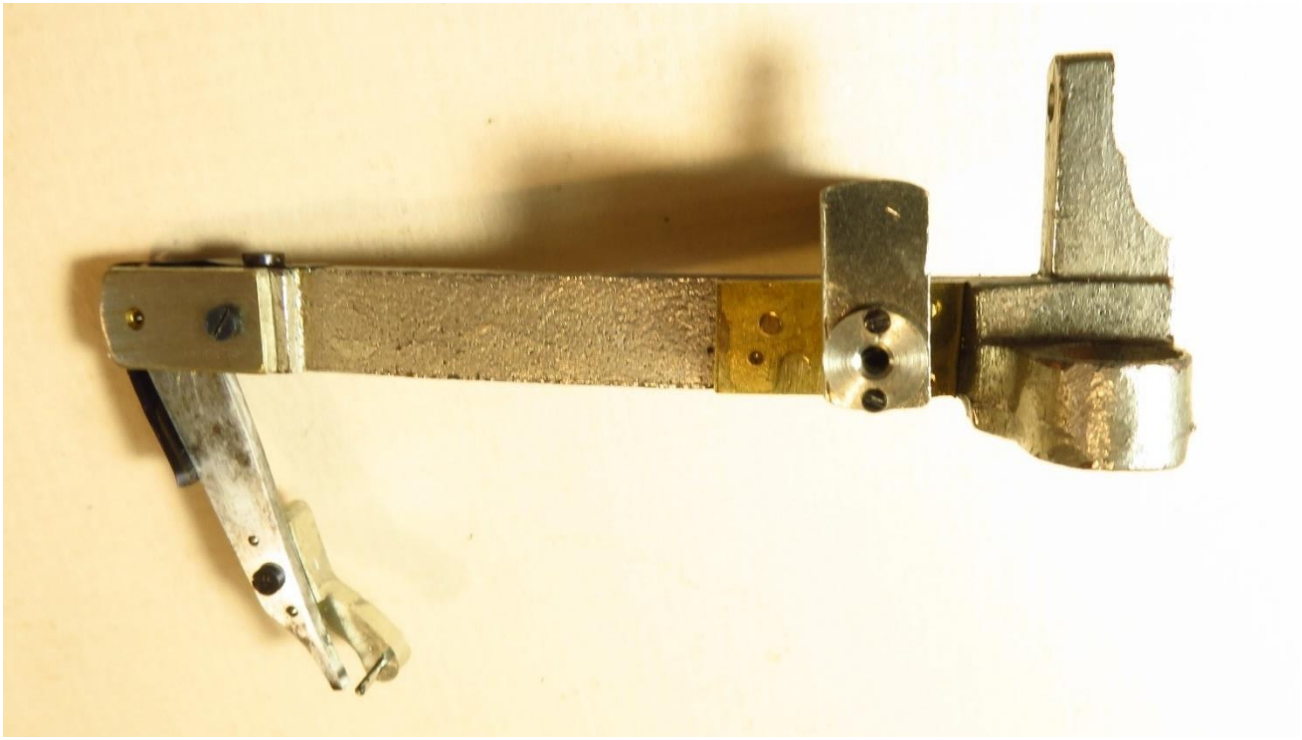


The main plate was cleaned and repainted



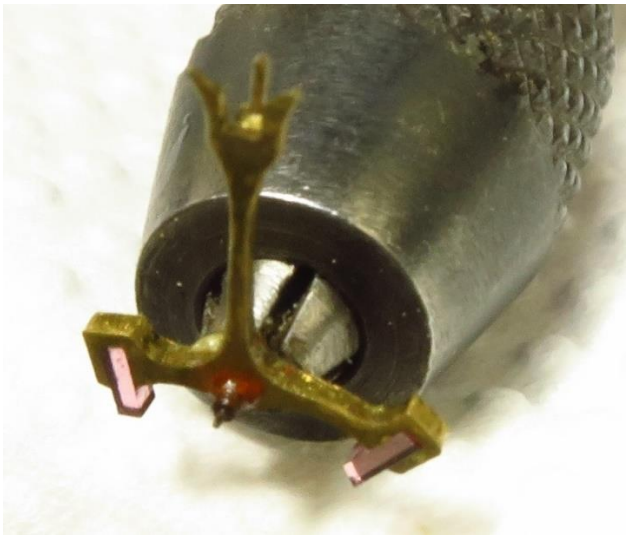


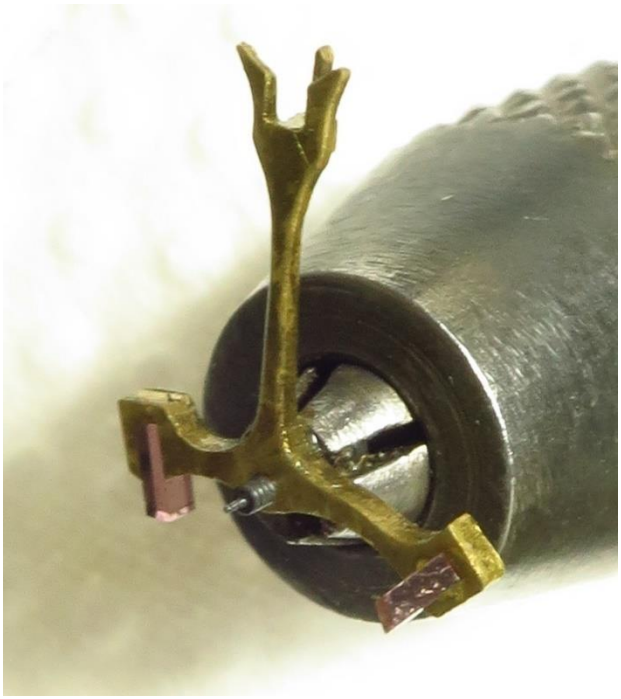
The two main sets of electrical contacts had their silver pads restored with light abrasion.



The main solenoid operating beam was cleaned and inspected for cracks. Some cracking was present

Most rust was relatively superficial and with light pivot polishing bearing surfaces were rendered smooth.

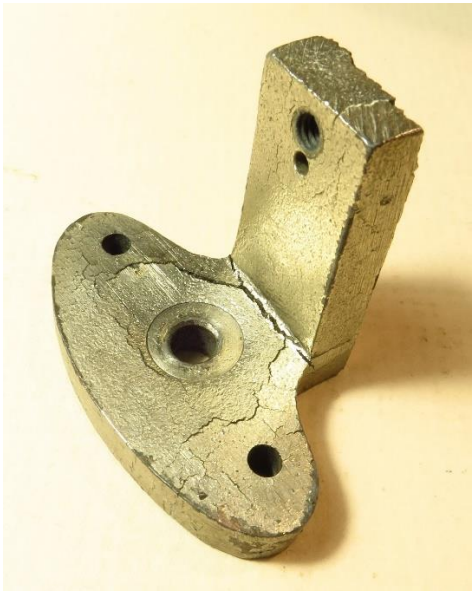


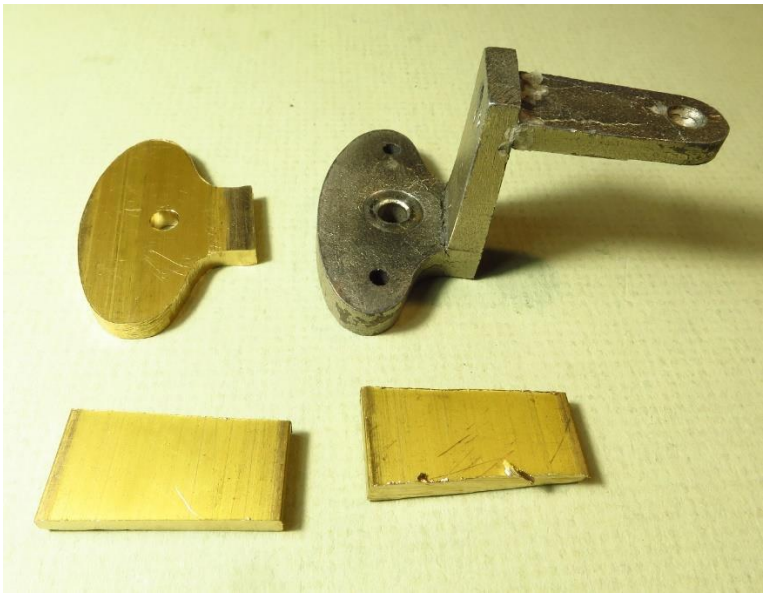


Pivots were fairly corroded on the pallet fork

Completed balance wheel movement

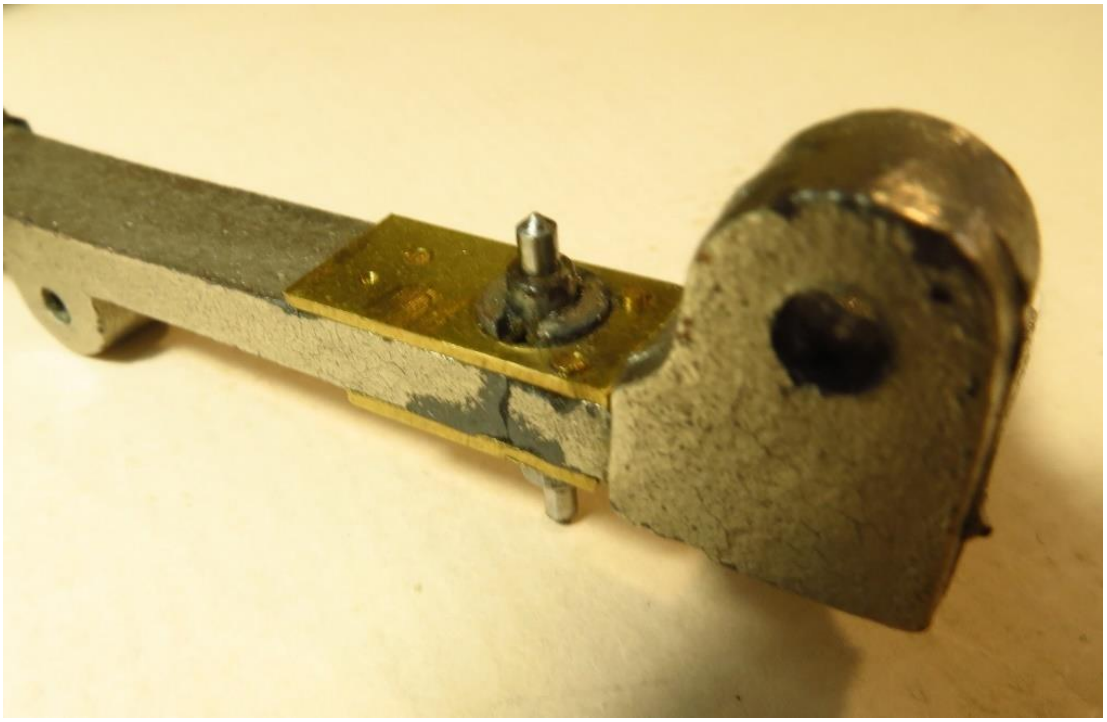
The damage to the 1 minute shaft support bracket , due to the “zinc pest” degradation problem, meant that a new support bracket had to be fabricated. The steps are shown in the pictures below.

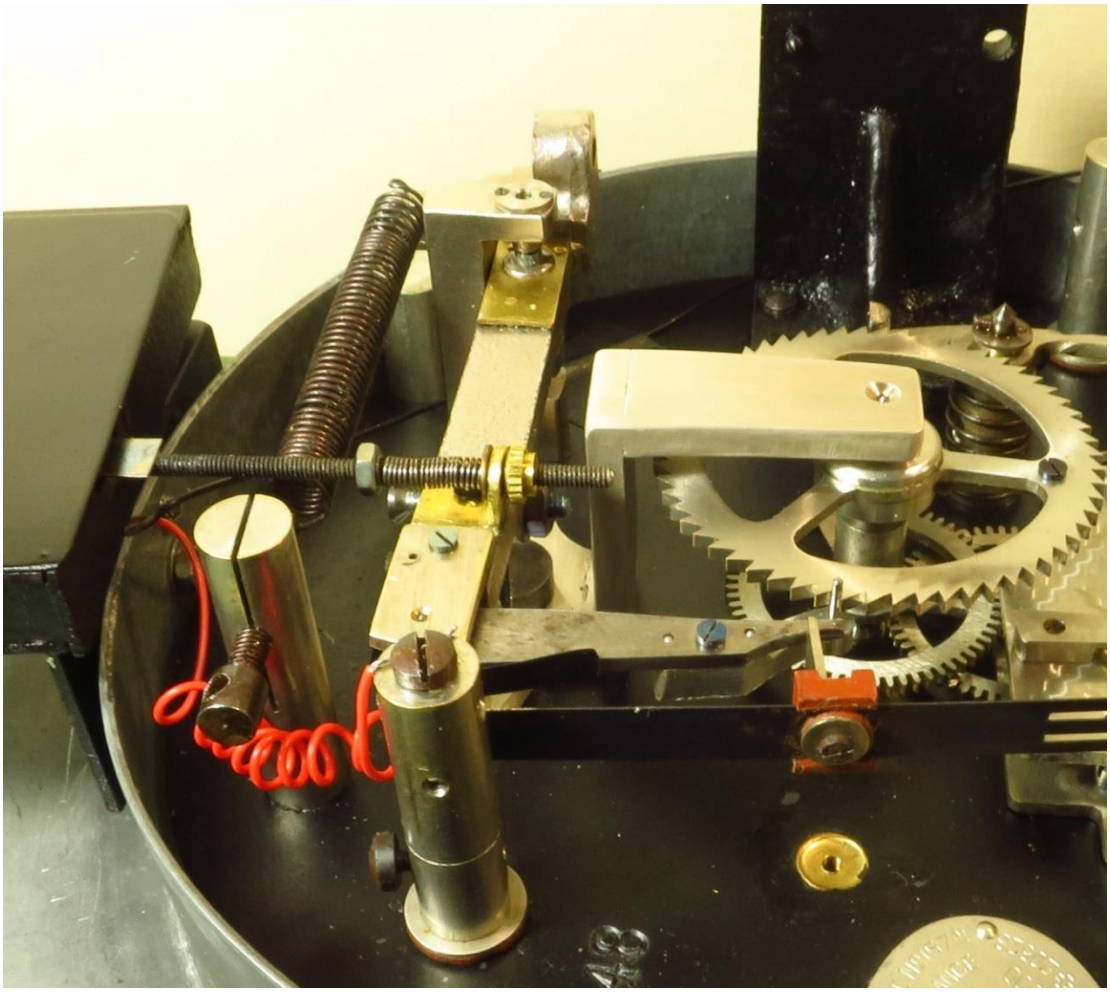




Solenoid Construction

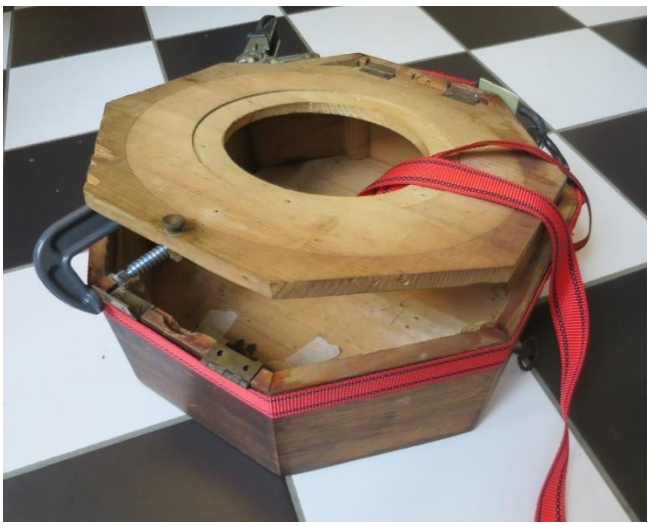
Initially the plan was to construct a new solenoid as it was thought that the solenoid would be of the twin coil type shown in the Patent sketches. However on closer examination it was found that the original solenoid had been the Iron Clad type (shown in the 2nd patent drawing) which would be a much more difficult task to construct. Additionally the repairs to the main solenoid operating beam, while quite well executed, were still a weak point with some serious cracks present. Given the ease with which the main support broke it was decided to utilise a more modern solenoid that would act on the opposite end of the beam – virtually eliminating the bending stresses at the main pivot point. While not ideal this solution eliminates the need to construct a new main solenoid operating beam and a new Iron clad solenoid. The new solenoid arrangement makes minimal alterations to the original components or the operating mode of the original clock.





Clock Case and Performance

The original purchase did not include the clock case and it was expected that a reproduction case would have to be made. Miraculously a friend in France had a David Perret case which was fitted with a mechanical movement and he kindly donated the case. Presumably the original Perret movement failed and was discarded. The case was picked up from France in 2022. The case was a perfect fit for the movement and required no modifications. Some minor damage to the case occurred during transport to Australia. The case was repaired and restored, the movement fitted, the dial paintwork touched up and hands fitted. The winding hole made for the mechanical movement fitted when the original Perret electric movement failed was retained as a reminder of the clocks previous history The clock has been running for over 170 days and apart from a small problem with a screw coming loose in the solenoid it has run well and keeps time to within a minute or two per month.



References

Ref 1 David Perret Obituary Journal suisse d'horlogerie octobre 1908

Ref 2 "The David Perret Electric clock" Scientific American May 30 1903

Ref 3 "Report on the restoration of a David Perret wall clock in original condition" by Dunkel, Frank – "Bericht über die Restauration einer David Perret Wanduhr in originalem Zustand" document on Clockdoc

Ref 4 "David Perret" by Michael Viredaz Pdf on Clockdoc

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Ref 5"The electric Remontoire" by David Read. Antiquarian Horology, December 2011

Ref 6 "Early Electric Clocks -2" by Geoffrey Crabtree Horological Journal July 2013 P301

Ref 7 "An Introduction to Electric Clocks by Michel Viredaz" translated by David Read NAWCC Bulletin April 2003