



Bulle Clock Serial Number 180859. *(By kind permission of the owner)*

Restoration of Bulle Clock Serial Number 180859.

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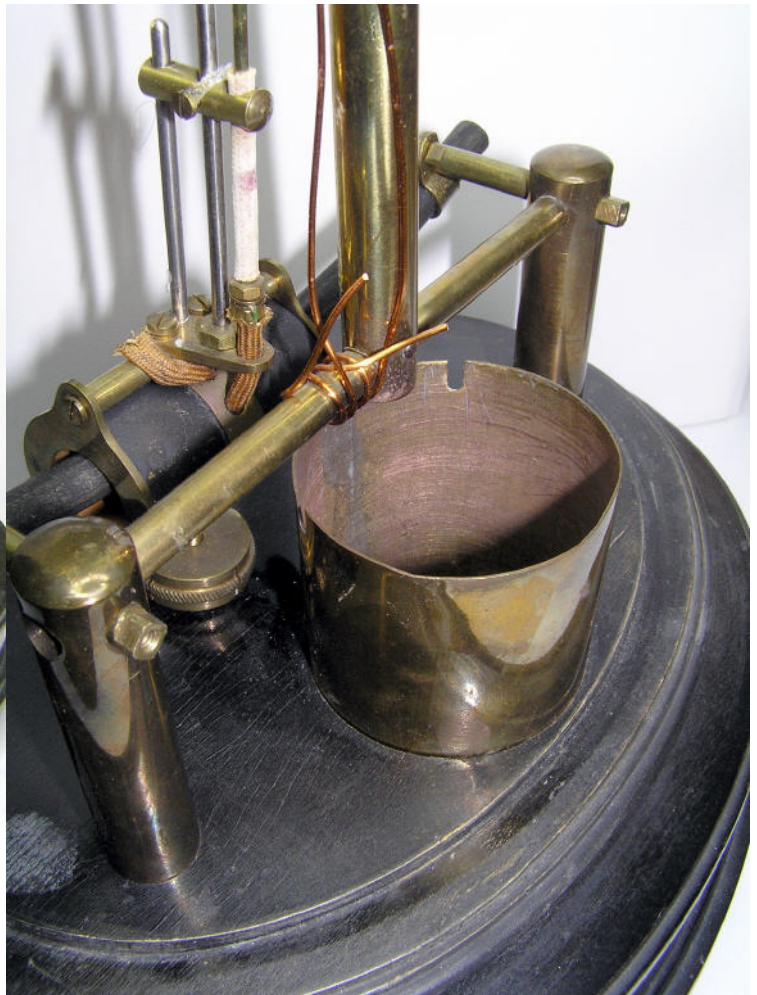
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—Early Battery Clock Parts & Restoration

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This clock is of the tall type on an ebonised wood base. It sits under a Crystal Glass dome which has not been supplied. The restoration is shown on this web site with kind permission of the owner.



The most obvious problem at first glance is the cap of the battery tube is missing. This will need to be manufactured. Note also the copper enamelled wire used to connect the battery to the movement. This will be discarded and replaced by new cloth covered wire

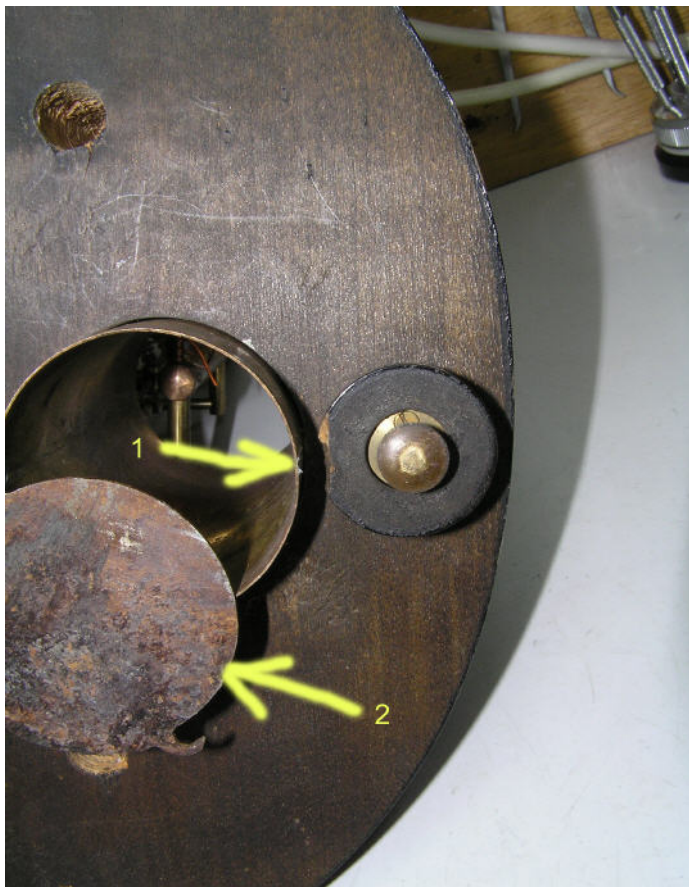
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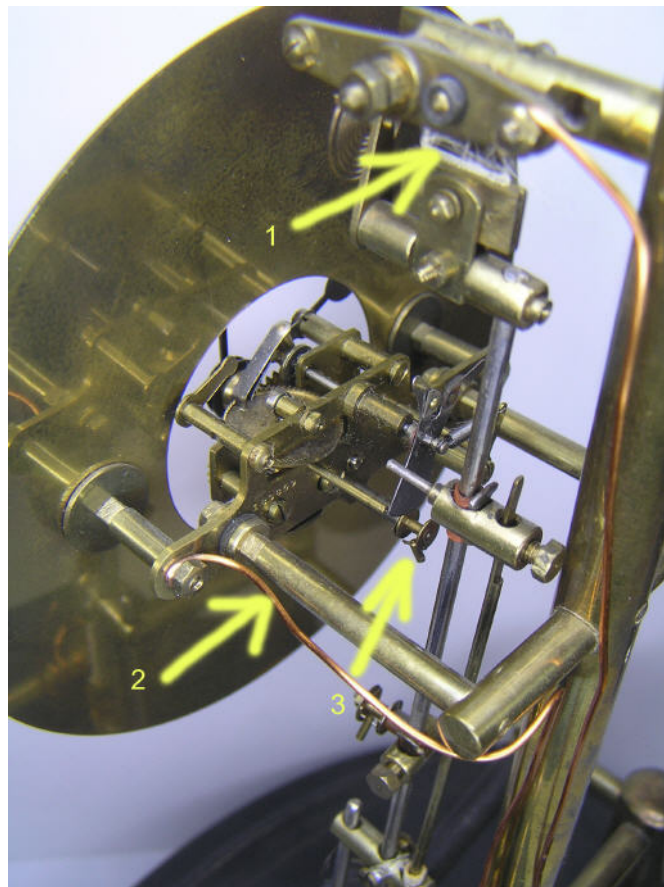
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This photo shows the badly rusted battery door (2) under the base. Hopefully there is enough metal left to restore. These clocks have the battery compartment made of a brass tube very similar to the tall movements under a dome except that the tube is actually pushed through and embedded in the black wooden base. The top carries a brass cap which we know is missing. The bottom protrudes by about a half inch and has two small brass threaded rounds soldered to the side to accept the door screws. One of these is missing on this clock (1).



The suspension can be seen to be broken in this photo (1). A new one will replace it. The copper enamelled wire mentioned earlier is shown at the terminal ends on the movement (2). There seems to be a problem here with the Isochron bracket attached to the movement. On closer inspection the threaded end of the arbour seems to have been snapped off (3) with the loss of the nut and first steel washer. This will need to be manufactured.

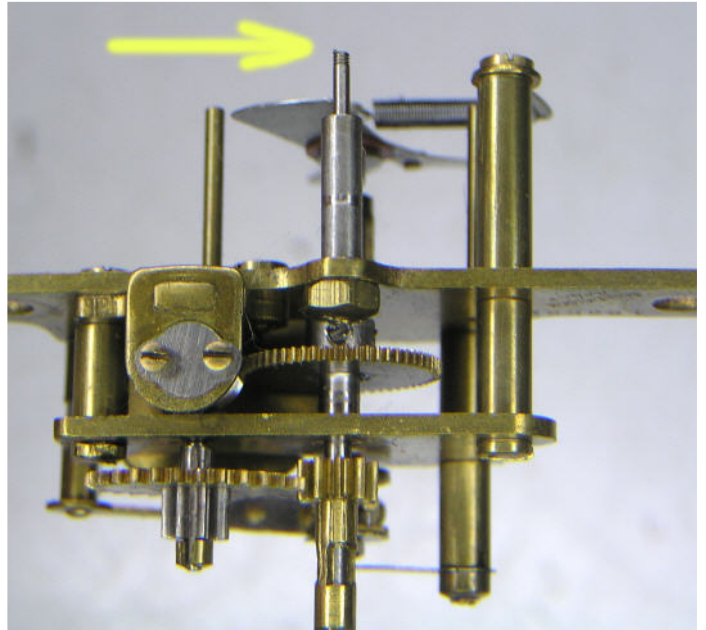
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The broken Isochron arbour can be seen more clearly in these two photos.



The silver fork contact looks to be a later replacement. Notice the domed rivet head. It contrasts with the normal flat head rivet. It also seems to have suffered from a blow with a hammer or stake. The fibre insulator seems as though it is impregnated with oil. Both will need to be checked carefully .

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The replacement cap poses a bit of a problem. The originals look as though they were spun rather than punched. After measurement they turn out to be made from 0.50mm brass plate with an internal diameter of 53.00mm. The first stage in manufacturing the replacement is to procure the material and roughly cut to shape. The lip extends for 4.00mm. Therefore allowing another 1.00mm for

trimming I cut a rough circle of 62.00mm from the sheet and placed it to one side while I decided what equipment would be needed to enhance the Myford lathe for spinning. After reading all that was available on spinning on the Internet, I decided I needed the following:-

1. A form of T rest with upright bars to use as levering points for the tool.
2. The forming tool itself.
3. A Pattern and what I call a Follower.



This photo shows the T rest with vertical levering bars. I already had a standard Myford T rest so I used the base of this as the starting point. All I needed to do was turn up a bar of steel to 19.00mm to fit into it. To this I added a cross piece of 3/4" mild steel to act as the tool rest with 1/2" silver steel uprights.

Some interesting sites on spinning are:-

<http://prl.stanford.edu/documents/pdf/spinning.pdf>

http://www.jamesriser.com/CD_Preview/Intro.html

<http://www.coe.ufrj.br/~acmq/spinning/>

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The forming tool I shaped from a 1/2" piece of Silver steel. The end was shaped and polished before fitting it to a wooden handle. The tool can be seen working the brass in this photo. It is being levered against the post while easing the brass into shape on the pattern..

The pattern I turned up from brass and secured it to a two morse taper arbour so that it may be fitted directly to the Myford head stock spindle. This ensured that no chuck jaws got in my way while manoeuvring the tool.. The traditional material used for patterns is wood. But I just happened to have a good bit of brass the right size in my scrap bin..



The follower is again formed from brass and sandwiches the cover between it and the pattern. The follower has an angled centre cut hole that accepts the nose of the revolving centre. The work is then nicely trapped for turning to size before shaping.

After forming, the cover was reversed in the setup for trimming .

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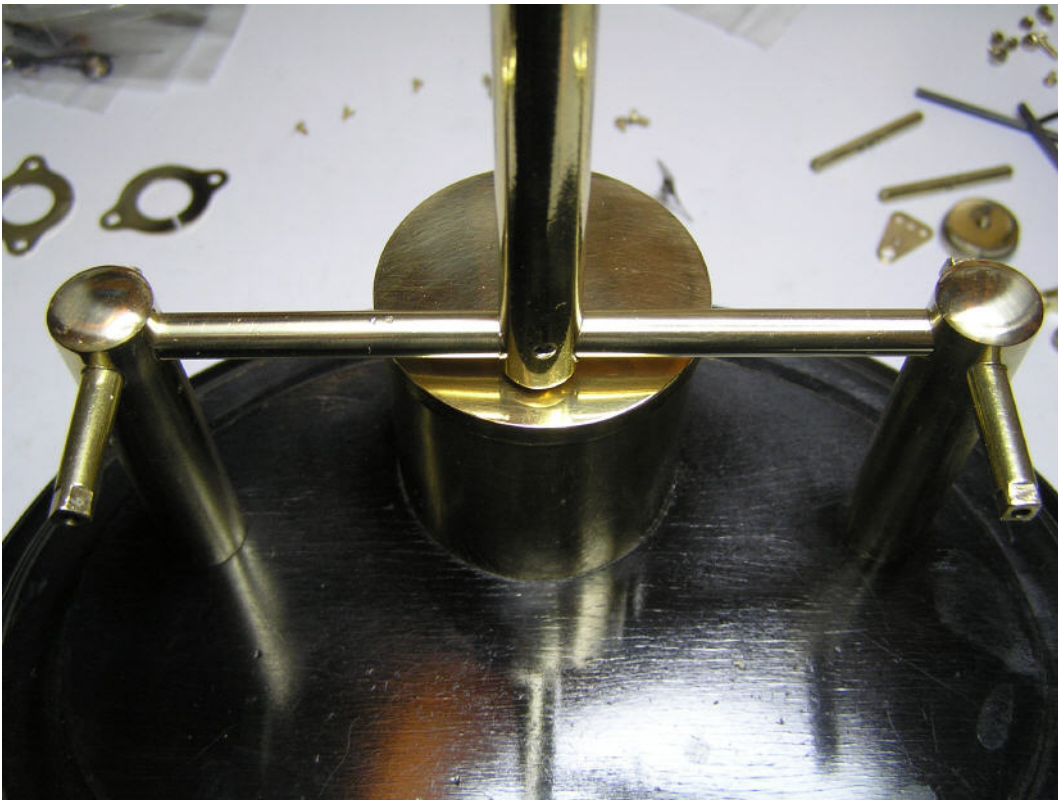
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The end result. An original lacquered cap is on the right. The only job left to do is a good polish and lacquer the new one. Perhaps I may distress it a little so as it doesn't stand out so much when it is fitted on the clock. Altogether a rewarding exercise and it fits perfectly. I am very pleased with the results.



The lower photo shows the cap back in place on The battery tube. The frame has been polished and lacquered. The base was in quite good condition and did not warrant re-polishing. It was given a good wax polish. And buff.

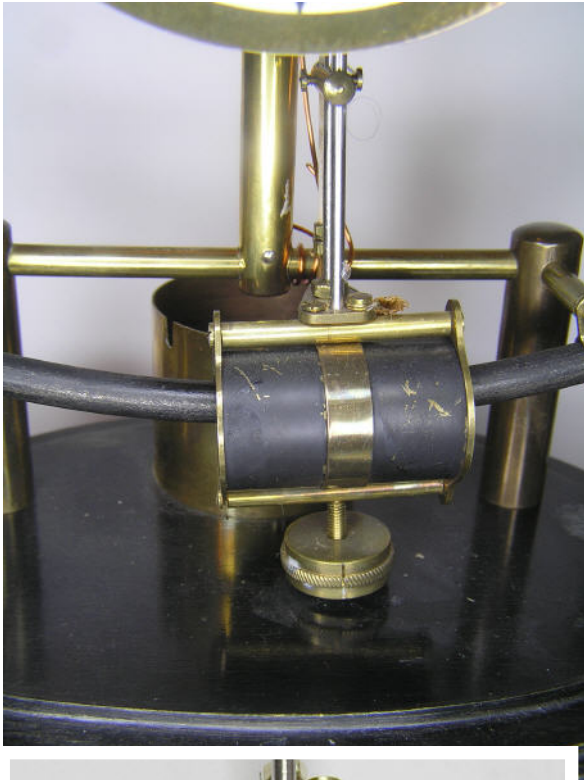
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The pendulum assembly before and after.

The bob was dismantled completely and the coil checked. It was still in good condition and showed 1190 Ohms.

The bob shell was in need of some attention as can be seen at the top left. It was cleaned and sprayed black. Only the brass parts of the pendulum bob itself were lacquered. .



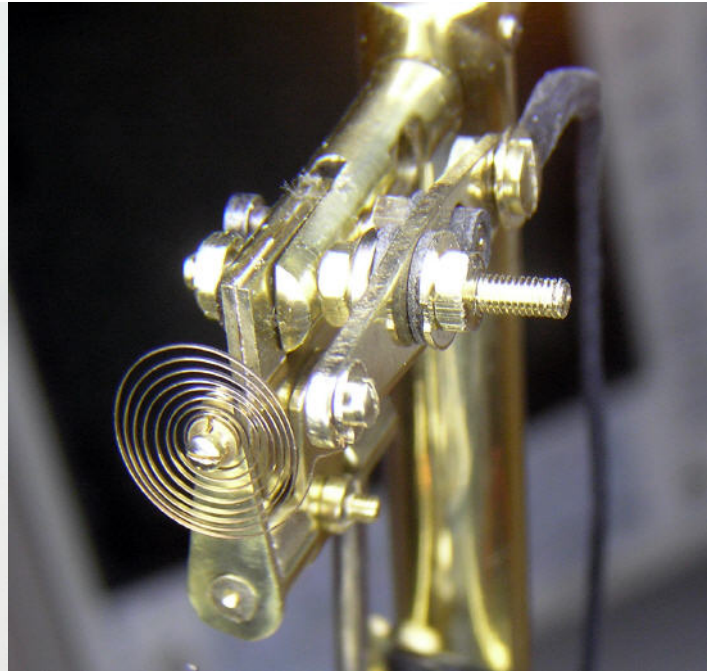
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The Hairspring and Negative contact assembly complete and in position.

The base, Column and pendulum assembly re-united and waiting for movement, dial and hands.

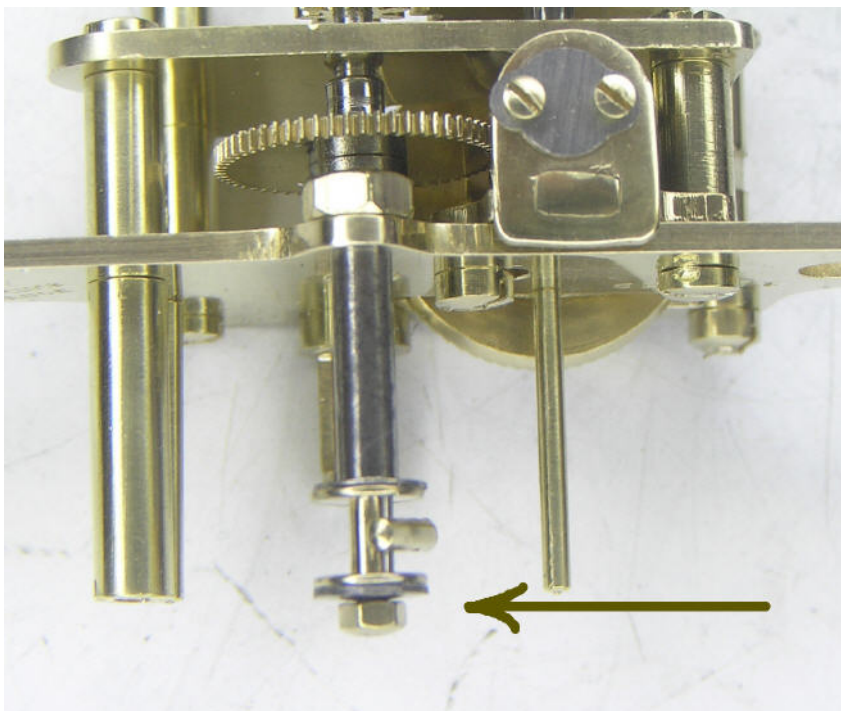
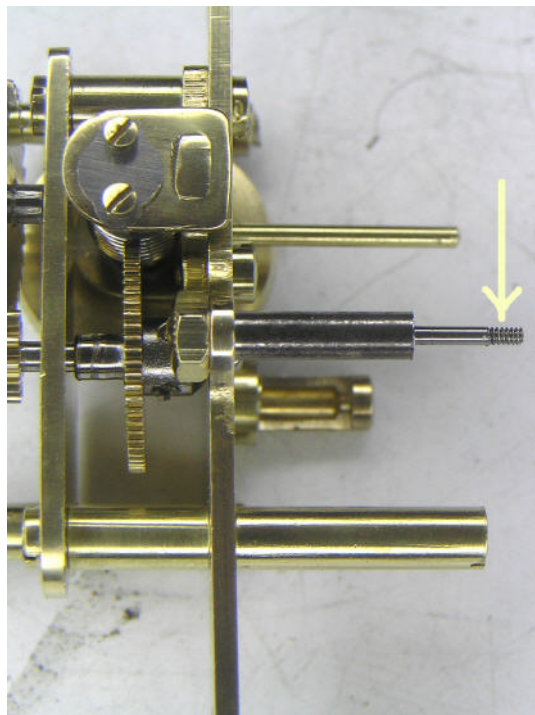
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The new Isochron bracket arbour in place.



The fork contacts proved to be oil soaked and unreliable so the opportunity was taken to replace them. This procedure has been shown already in previous restorations so I won't go into detail here. The other problem with this particular fork was that the silver stub at the end of the arbour was also loose. It was removed, cleaned and reshaped slightly to be a much tighter fit so that good contact was made between it and the arbour. This silver stub holds the loop of the Silver Contact spring.

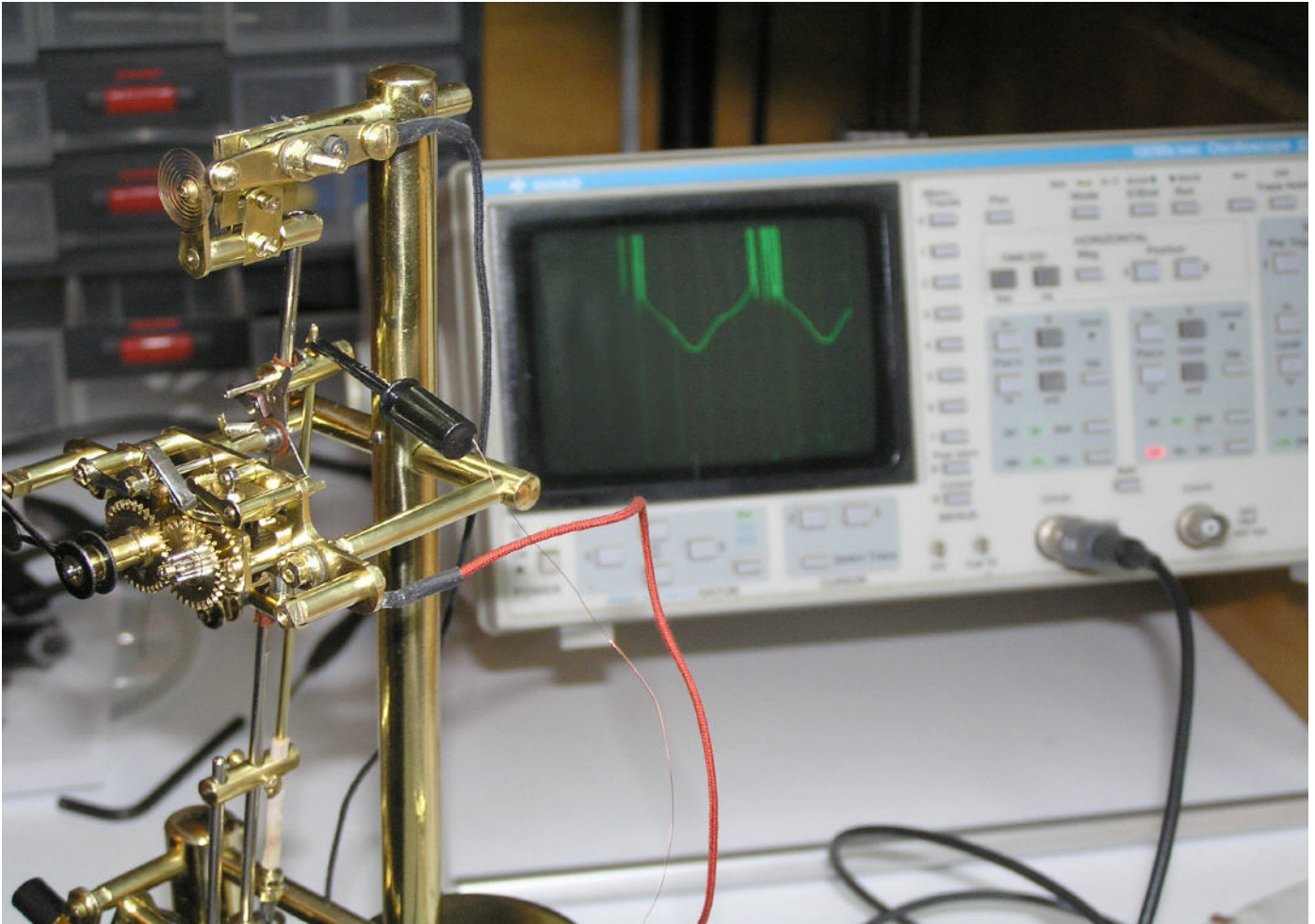
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Testing the Bulle for timing , continuity and cleanliness.

I use an oscilloscope to show me the what's going on with each swing. It needs to be connected in the right places. One point is directly behind the contact pin. But this is on the pendulum which is swinging away so it's no good trying to touch it with a probe. I use a lightweight plastic gripping probe with 42swg enamelled wire attached which being extremely light does not influence the pendulum at all. It's the same wire used to wind the core of the coil. When connected at this point the oscilloscope not only shows the reliability of the contact, it also shows the voltage induced by the coil moving over the magnet when the pin is not in contact with the conducting side of the fork. You can just see this "wave" on the screen. This is another way of checking the effectiveness of the magnet.

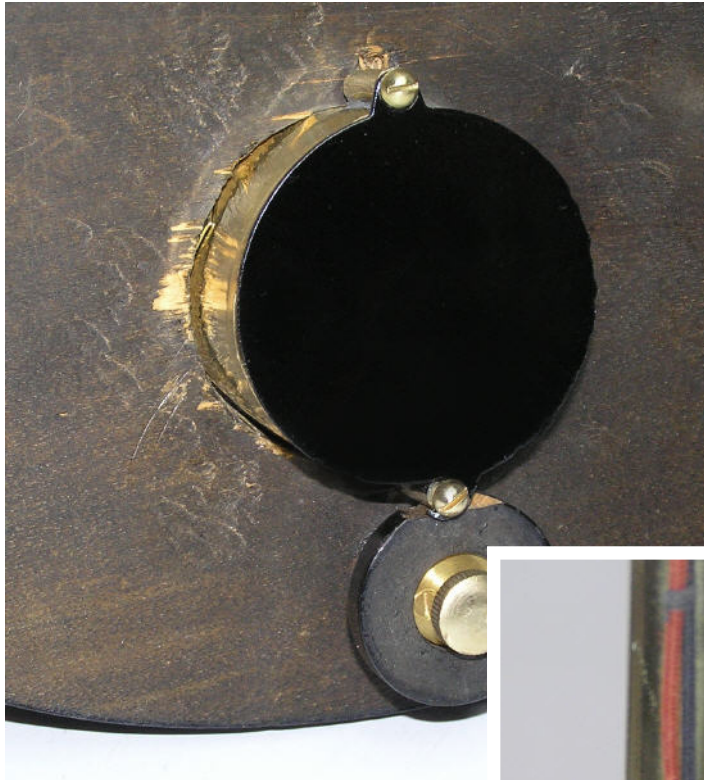
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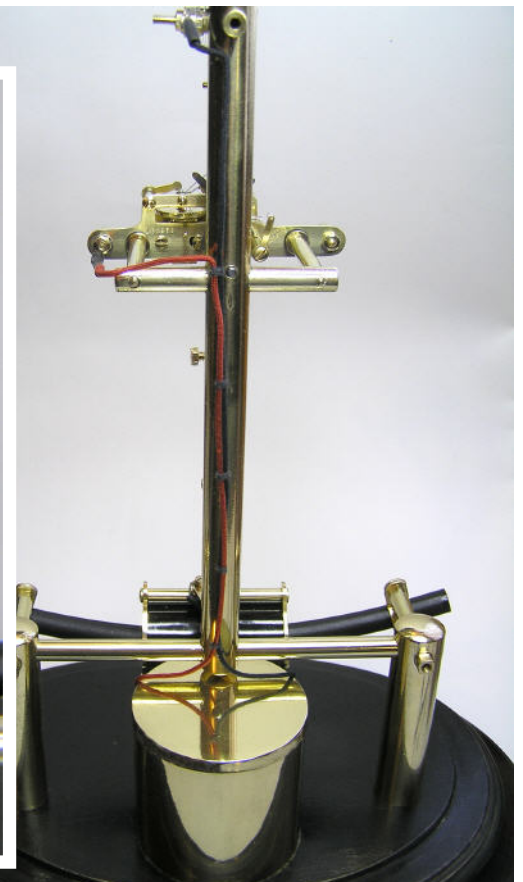
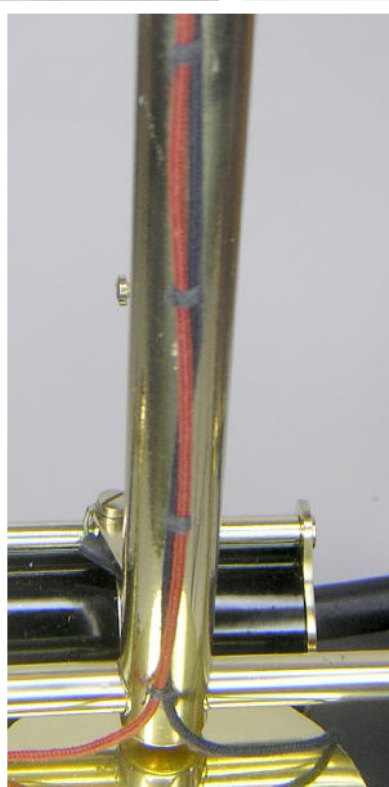
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The steel battery cover has been cleaned of all rust and sprayed black. The cover is heavily pitted but still usable. The new threaded tube can be seen in place with matching dome head screw. You may just notice that sometime in the past a couple of pieces of brass shim have been forced between the battery tube and the wood. This was probably to stop the tube from falling out of the wood base. The tubes are only held by friction and so must be a good tight fit in the hole. There was also some fracturing of the end of the tube.

The wiring at the back of the clock has been bound with black cotton to try and lead and keep it behind the column so it won't be seen from the front. These later column clocks had nowhere for a "Run" of wire. The tall earlier clocks at least had the hollow tube and column that hid the wiring from the base to three quarters up the height of the clock only to emerge at the height of the movement support arms.



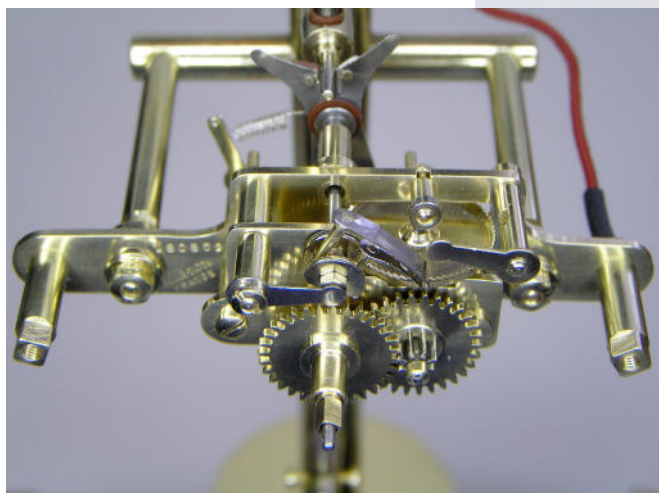
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These photos show the movement fitted to the clock and the finished clock with dial. The dial on this type of clock is one of the better types as the numbers and lettering are engraved and filled. The silvered chapter ring is matted and sits slightly lower than the surrounding brass. This one is in good condition and only needed a polish to the brass surround..

The clock is now on test and has so far kept good time to within a minute a week. This will no doubt be improved upon when settled back home with the owner.



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