Bulle Clock Serial Number 7446

Restoration of Bulle Clock Serial Number 7446.

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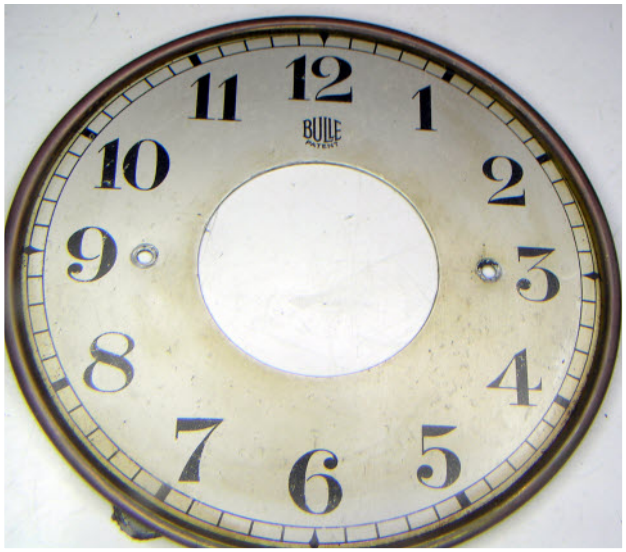
Early Battery Clock Parts & Restoration

Bulle Clock Serial Number 7446

Photos of this restoration with kind permission of the owner.

A tall ½ second movement in a round top glass fronted mahogany case. This clock is going to be one of the most interesting clocks to restore not because of it's rarity or unique features but because of the amount and variations in the damaged parts.



The photo left shows the clock as delivered. Some of the parts have already been disassembled and were in the jar shown. The dial looks OK but has some engrained dirt; probably nicotine stains.

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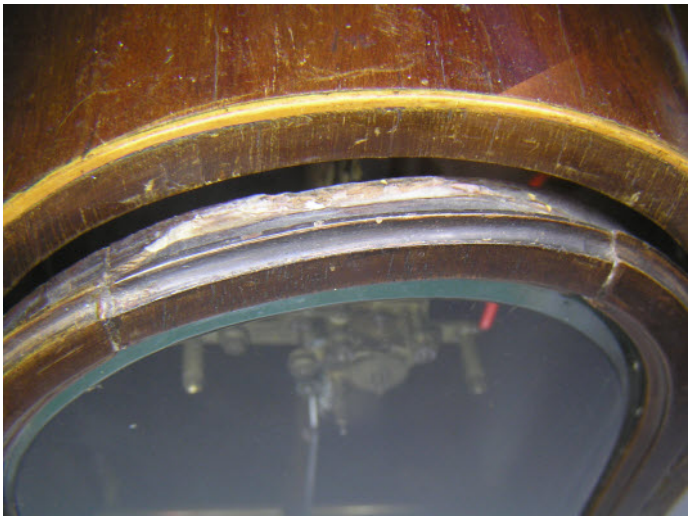
The door hinges are pulling the wood apart. To rectify the situation someone has tried using longer screws with the result that they have push completely through the case at just the right point to separate the stringing on the outside edge.



The door has faired no better with broken parts roughly stuck back together with modern glues. So there is a lot of work in just trying to get the case in good order after we have repaired the movement.

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The general condition of the case showing lots of dinks and scratch marks.

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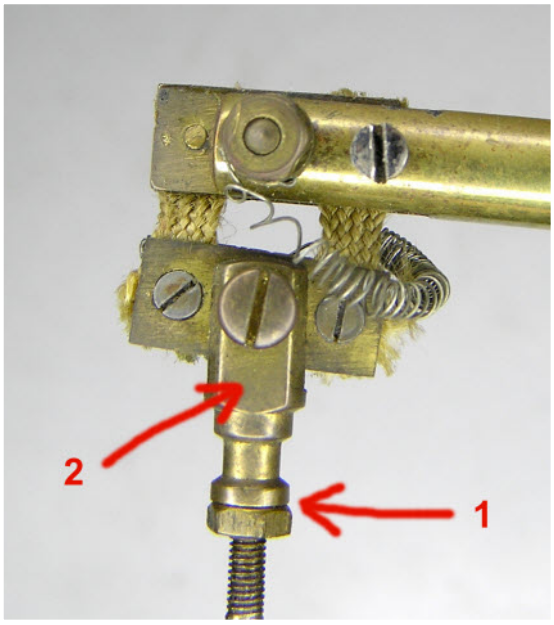
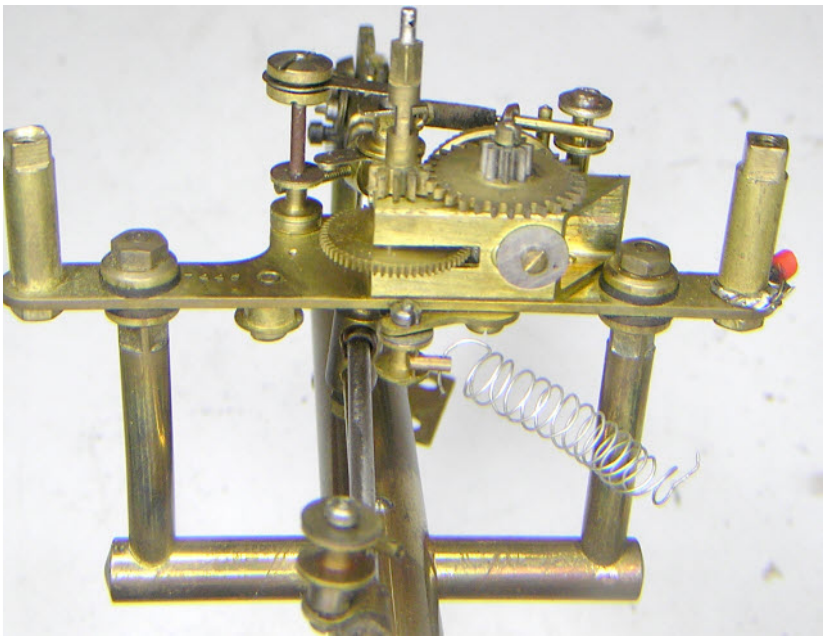
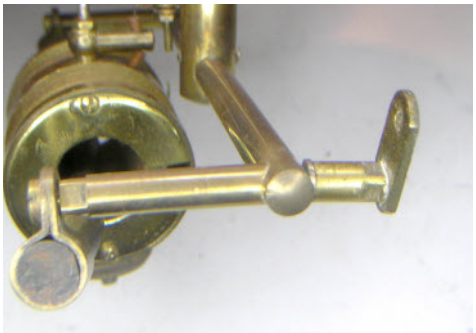
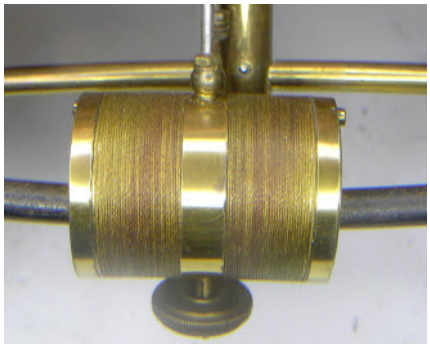




The suspension assembly looks to be all there bar the suspension itself which in this case is a made up unit. The coiled contact wire would of been OK were it not for the fact that it is connected to the top of the pendulum rod via the singe nut and bolt which is intended to be a loose fit allowing free movement of the pendulum in a forward and back direction. Therefore the contact would inevitably be intermittent at best. In this design of clock there are only two attachment points. The first is to the pendulum rod at the point where the nut secures the lower part of the suspension assembly (arrowed 1). Or via a small screw which if present would be on the small flat area of the assembly (arrowed 2). The second photo shows the underside of the movement which generally seems to be in good condition. The Isochron spring is a replacement which doesn't seem to be up to the job being a little to soft and has been stretched..



This photo shows one of the three the short supporting legs at the rear of the clock which has been bent. The last photo shows the bob cord which has been rewound at some point showing a now twisted pattern. This will be replaced.



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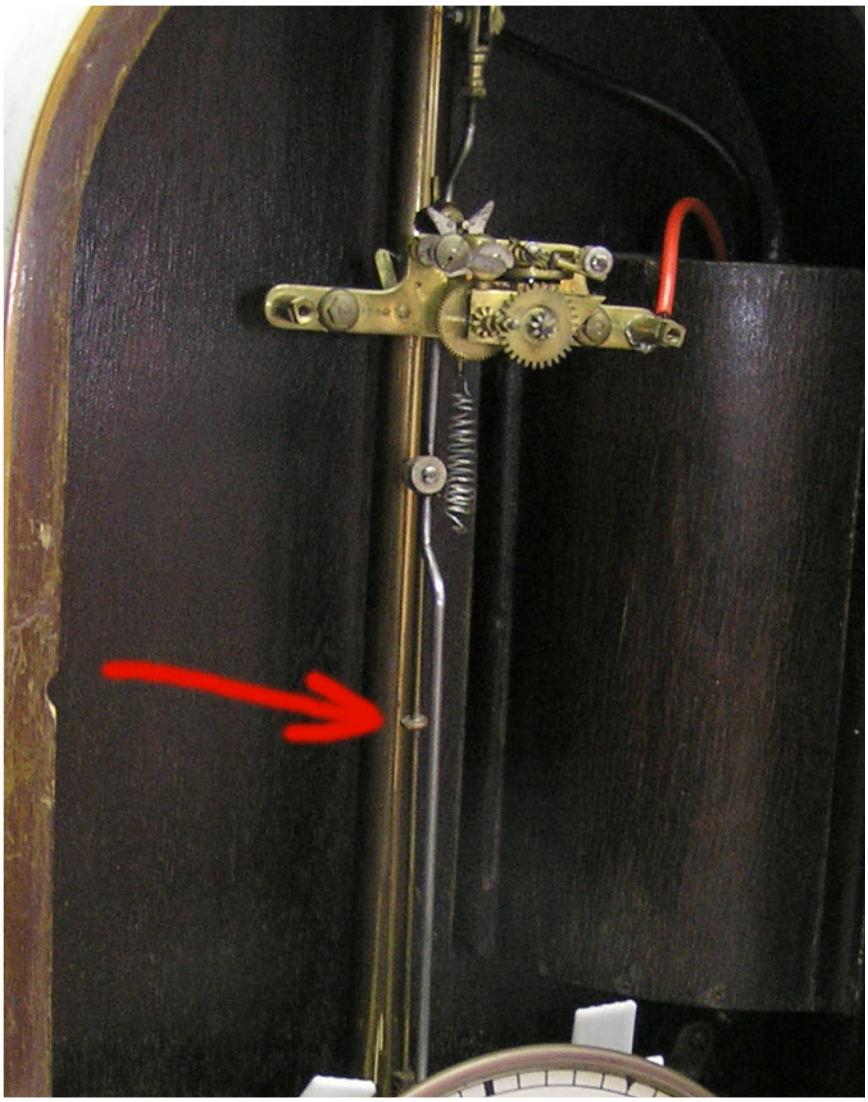

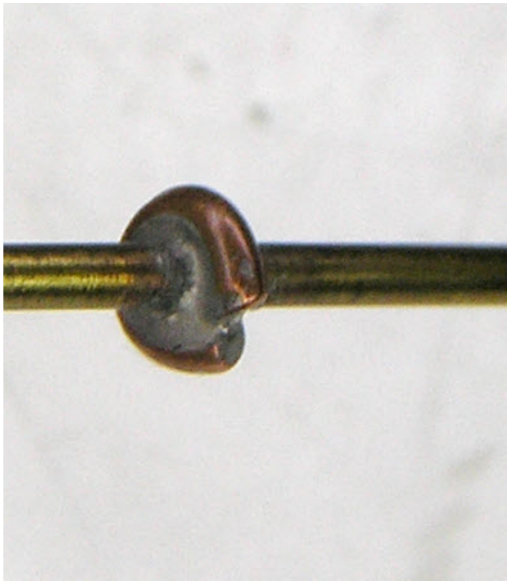

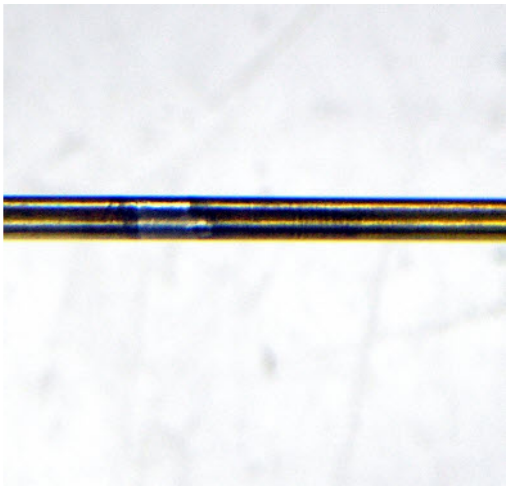

If you look at the large photo of the movement still in the case you will see a "Pimple" on the brass rod at the rear of the pendulum. This carries the 1.5 volts down the one side of the coil. Closer inspection showed this to be a small copper wire wrapped around and soldered to the rod. The only reason for doing this is to try and affect the time keeping of the clock by adding weight to pendulum in a similar way to the pennies that are added to the pendulum of the clock in Westminster (Big Ben). So that probably means there are problems lurking elsewhere. The last photo shows it removed before cleaning.

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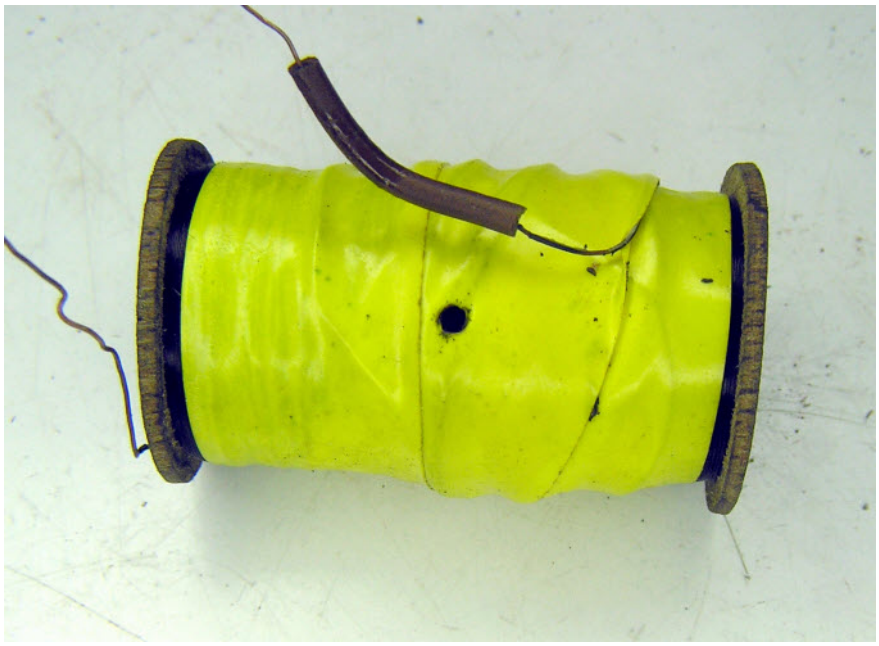

Not only are both the silver and fibre contacts worn and need replacing, but the silver side is so worn that the rivet that holds it in place has also been affected. When I removed the silver I found that the wear was so bad that the hardened steel fork had been worn down to the hole. So I will have to remove and replace the fork as well.

Now for the worst part. The photo of the coil shows that it has been bound in modern pvc tape at some point. Which of course means that it has been meddled with. Then you cannot help but notice the nice little hole in the tape. The photos on the following page shows what has happened to the coil windings underneath the tape. When the coil was re-assembled with the pendulum, the steel pendulum rod has been screwed right the way through the brass shell and into the coil windings. There is no need to add that the resistance reading was non existent when measured. That means the coil will need to be completely rewound with 6500 turns of 42 swg enamelled wire. Good fun if you've got nothing to do on a wet afternoon.

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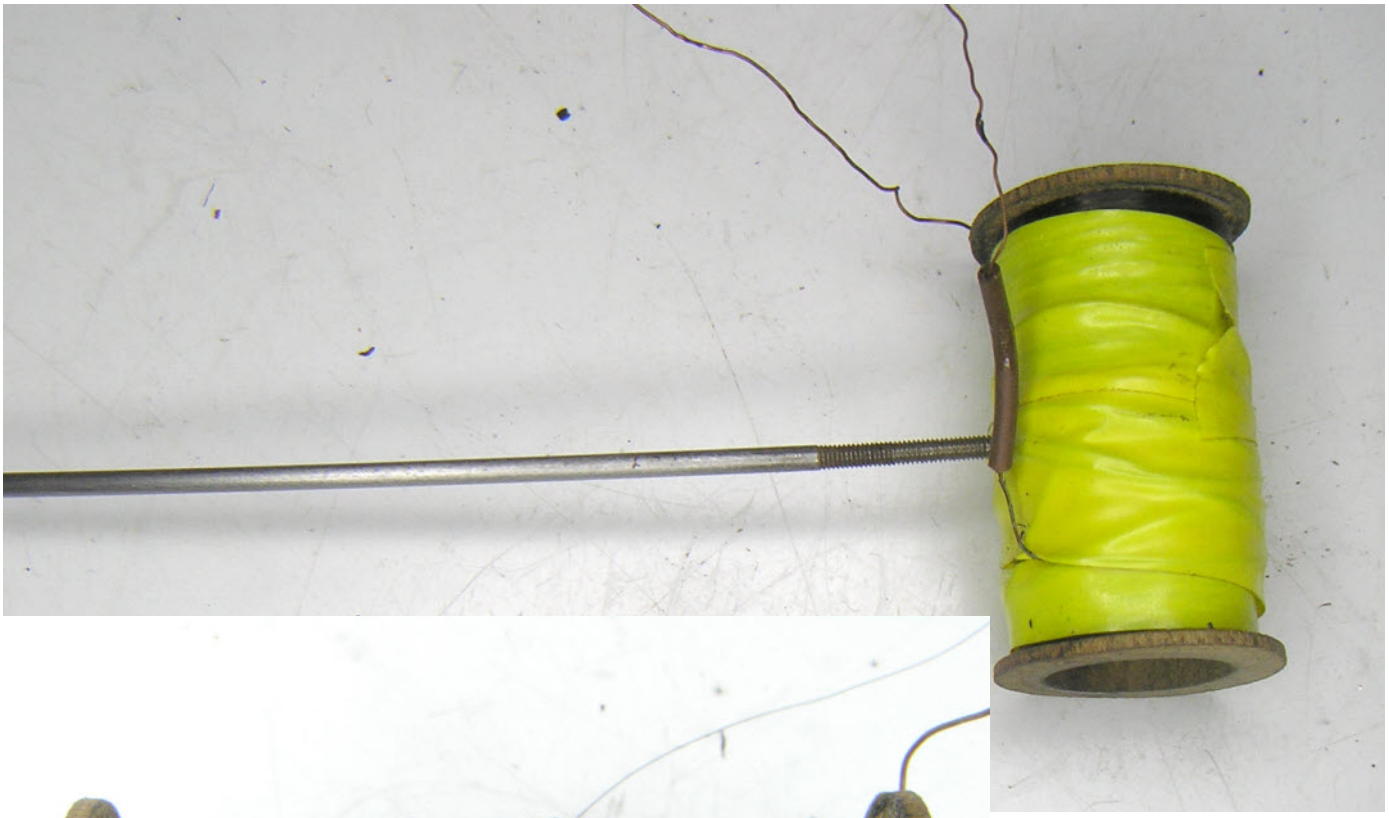

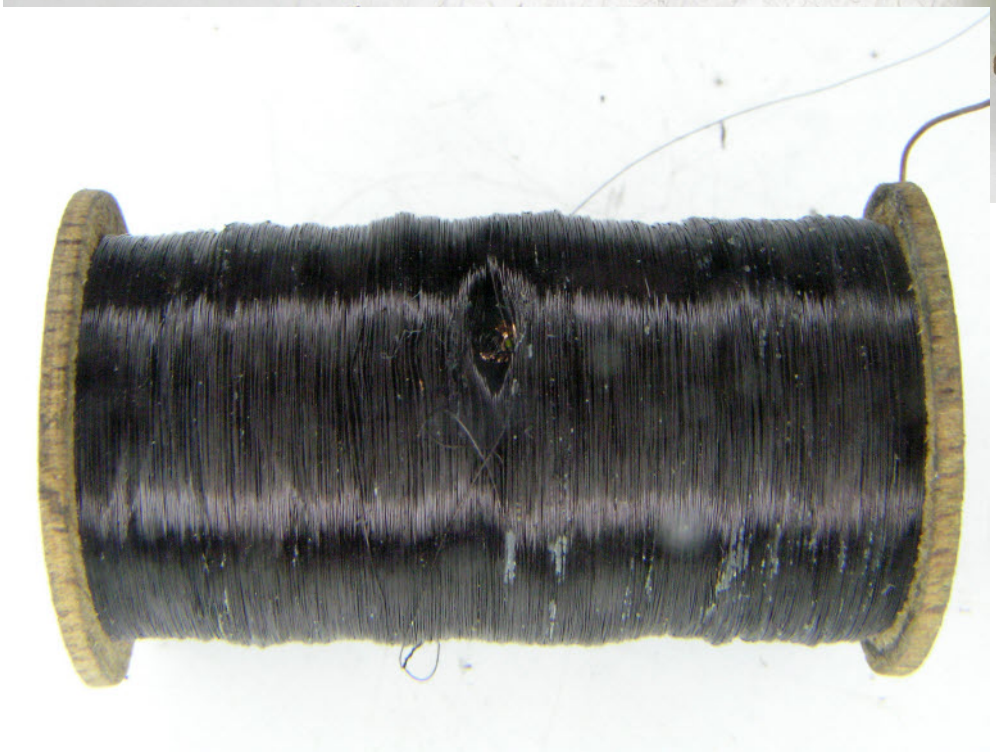

The top photos shows how the hole was formed while the second photo shows the resulting damage to the coil itself. The hole cuts into the wire for a distance of 1/8". It stood no chance of survival.

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Whilst cutting out the old wire I started to notice the green tint seen in the top photo. This proved to be corrosion of the heavier swg copper lead wire that was soldered to the coil at the start of the coiling process. Wire exits the coil and runs up the pendulum rod. This lead wire of copper was not enamelled as the 42 gauge fine coil wire and consequently has started to corrode. This would have damaged the coil wire at some time probably affecting the soldered joint which was wrapped in paper as can be seen at the bottom of the photo. The bobbin can be seen laid bare below where the green stain is obvious. So the coil would have failed at some point anyway and may have indeed been the reason why it was later taken apart and "Repaired" with the yellow pvc tape. The bobbin itself is in good condition although by necessity they tend to be very thin and quite fragile.

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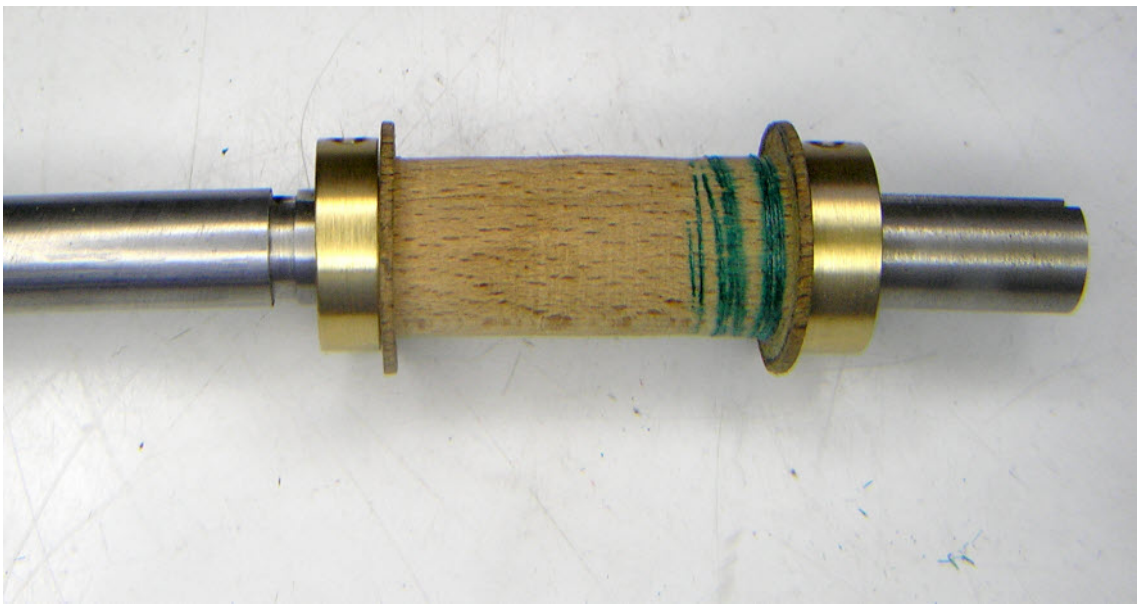

The start of the winding process. I have made an arbour to take the bobbins. The arbour is a one size affair that has been turned to accept a range of brass collets that can be turned up quickly to any size required to fit different bobbin dimensions. The collet can then be allowed to spin freely on the arbour to unwind a coil or pinned tight between the collars so that the bobbin can be rewound in the spindle of the lathe. A pair of these arbours can then be used in the lathe , one to take the bobbin and one to take the new real of enamelled wire to be unwound.

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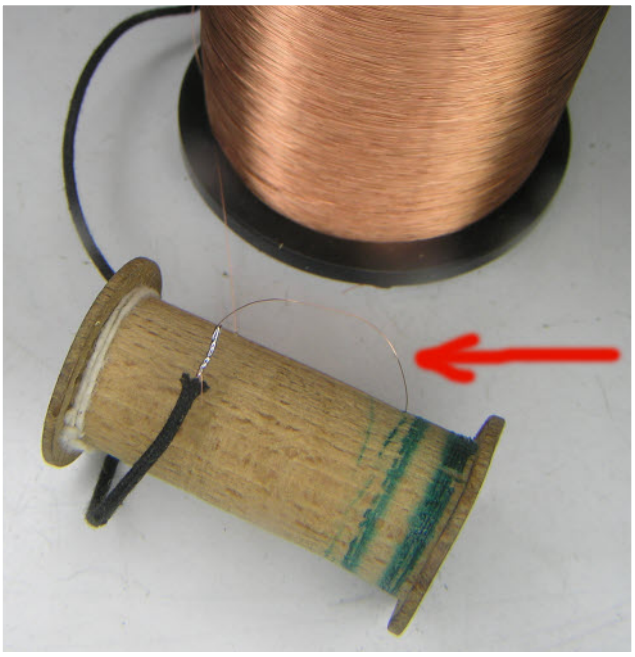

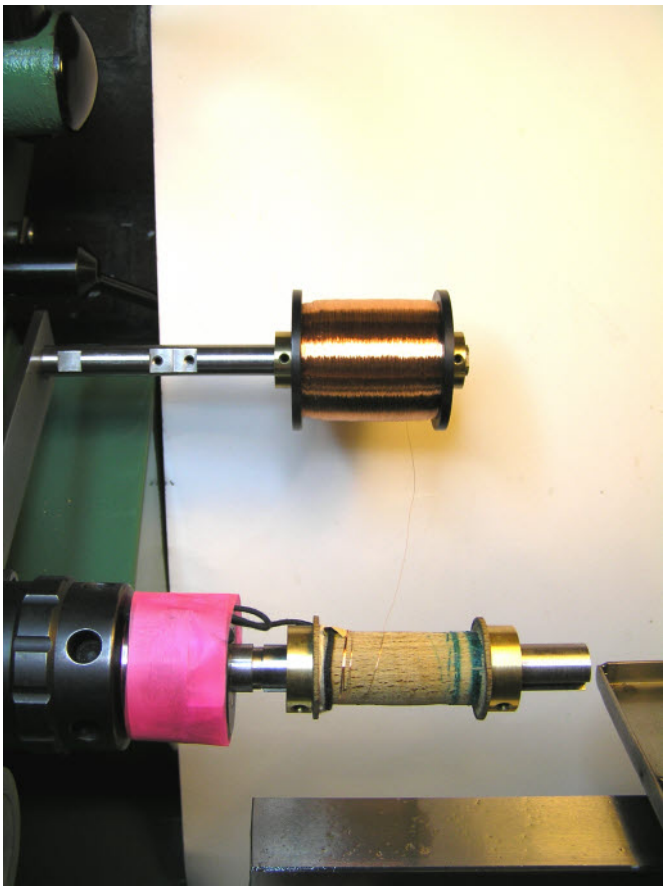

The winding is started by passing the first lead wire through the hold provided in the bobbin and securing tightly with string so that it will not pull through. This would be disastrous once the coil is fully wound as there would be no chance of reconnecting the end which would be under 6500 turns of wire. The second photo shows the 42 gauge wire soldered to the lead. Clean back the covering about an inch back from the joint and check with a meter (arrowed). Thus ensuring that you have made a good soldered for the same reason above. The bobbin on its arbour is then chucked in the lathe. Use a collet chuck so that there is no danger of your hands being caught by the jaws of a three or four jaw chuck. Notice that I have already wound a few turns on the bobbin already so as to capture the the paper I have placed around the soldered joint to insulate it. The feed bobbin is on its own arbour about 10 inches to the rear of the lathe. It must be free to revolve without sticking or jumping.

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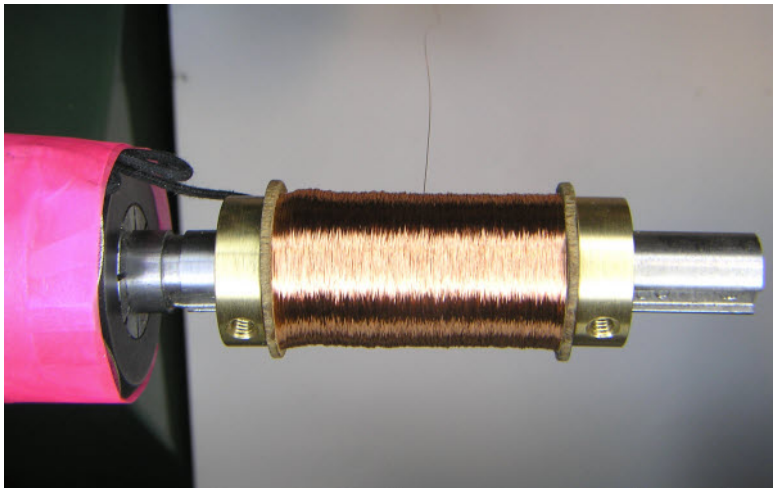
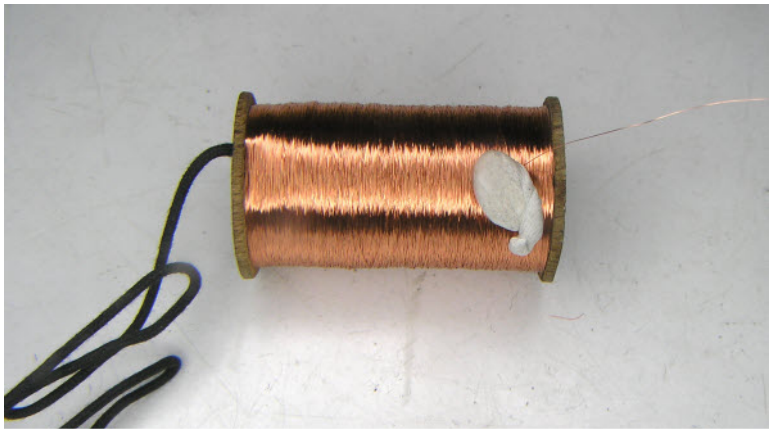
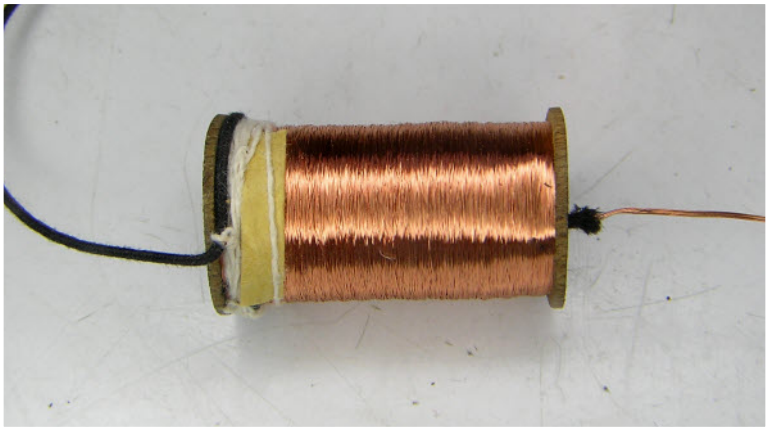


The coil fully wound. Note the masking tape keeping the lead wire out of the way while winding.



The bobbin removed from the arbour with a bit of blue tack used to keep the 42 gauge wire in place whilst the other lead wire is attended to.



The other lead wire is then soldered to the coil in the same way as the first. The joint is then covered with a piece of brown paper which is folded lengthwise so that the joint sits comfortably inside. Again the lead wire is wrapped once around the bobbin and tied securely with a short length of string. This ensures that the lead cannot be separated from the coil when manipulating and fitting the coil later.

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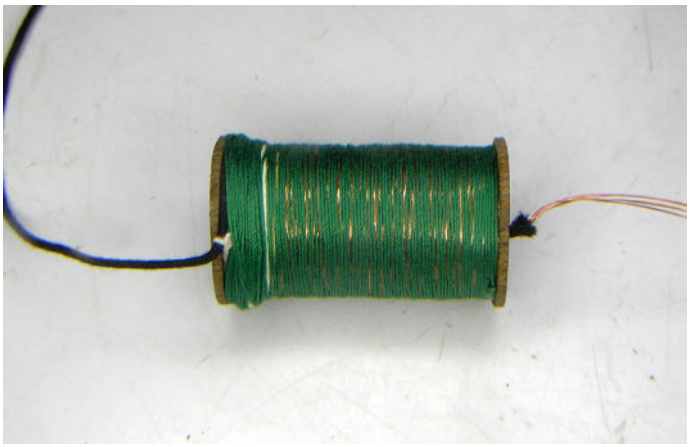
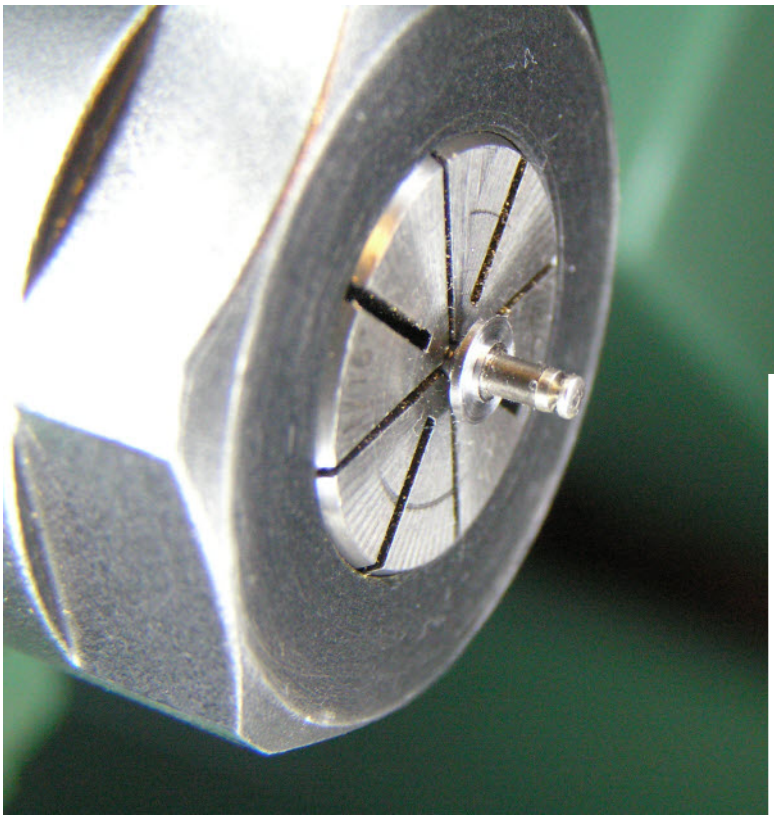


The coil is then tightly bound in a couple of layers of cord. In this case the photo shows the process after just one layer. The coil still shows though.. The originals were bound in all sorts of ways, the most common being in a black and patterned paper.
Finally the coil should be double checked for the right resistance. The reading should be anywhere between 1000 and 1350 Ohms. This one read 1086 Ohms which is perfect.



These last two photos show the fork arbour after removing the old and damaged fork. The seating for the new fork has just been turned down to 2.8mm to fit the new Horologix blank.

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The rating nut from this clock has been turned down at some point. Probably to reduce the weight because a previous owner could not adjust it high enough to increase the rate of the clock. So rather than investigate what the actual problem was they have resorted to lightening the nut. This will have to be replaced as the clock will be in perfect working order when restored and will need the full weigh of the nut to properly affect the rate.

These two photos show the wear in the contact pin. Fortunately the whole contact assembly can be used either way up so it is a simple matter to reverse the fitting and present a new face to the contact fork. The pin should be positioned so that any wear is facing upwards.

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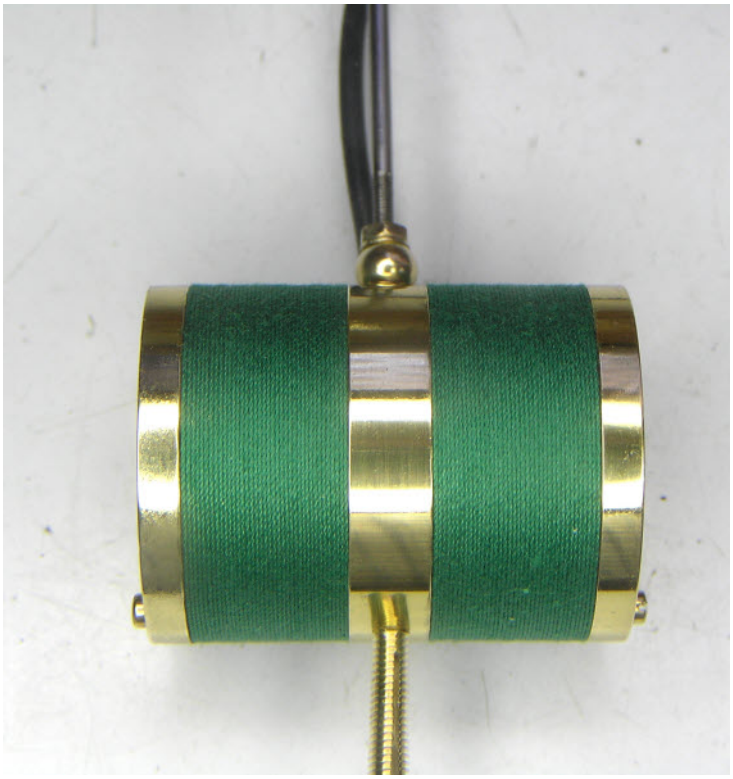
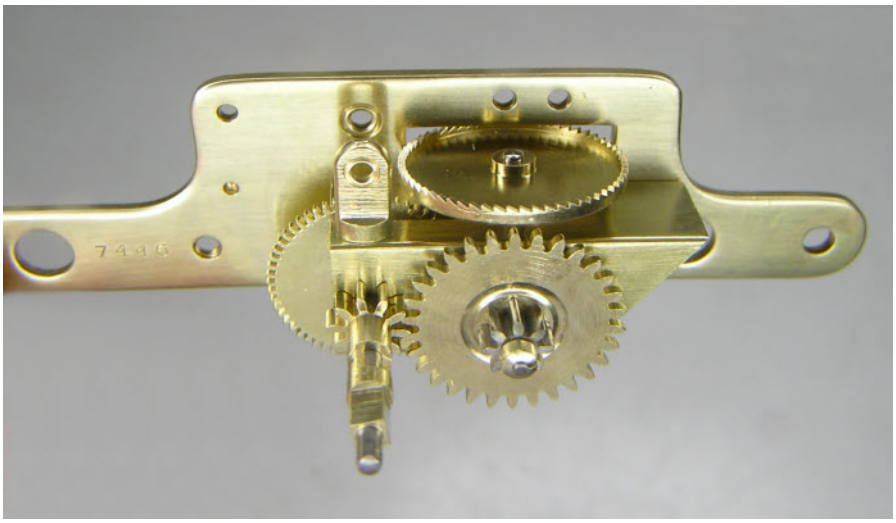


The pendulum bob after the coil has been refitted and the cord replaced.

The pendulum rod after reassembly with the new rating nut in place.



The partially rebuilt movement.

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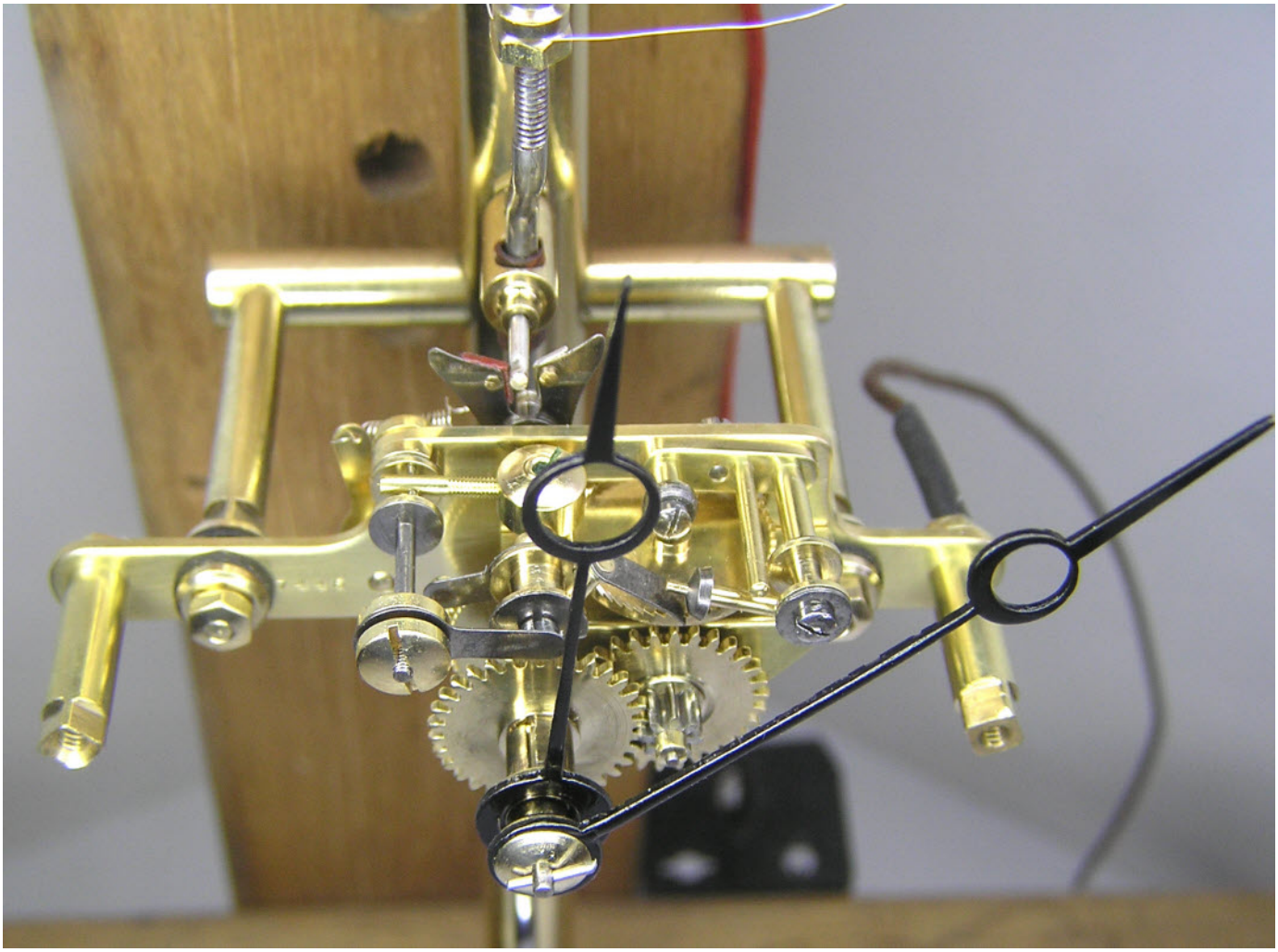

The rebuilt movement and restored hands are now back on the frame. Note the new fork in place with the silver and fibre contacts. The hands have been cleaned and sprayed black. The damper arm has been filled with cotton cord and oiled. The contact pin on the pendulum has been adjusted to sit in the fork with half of its diameter sitting in the "U" of the fork. The action of the pendulum, fork and pawls are now checked over the next 24 hours before leaving the clock for timing tests over the next week. This will also show up any anomalies they may present themselves in terms of high points on the contacts or high resistance loose joints etc.

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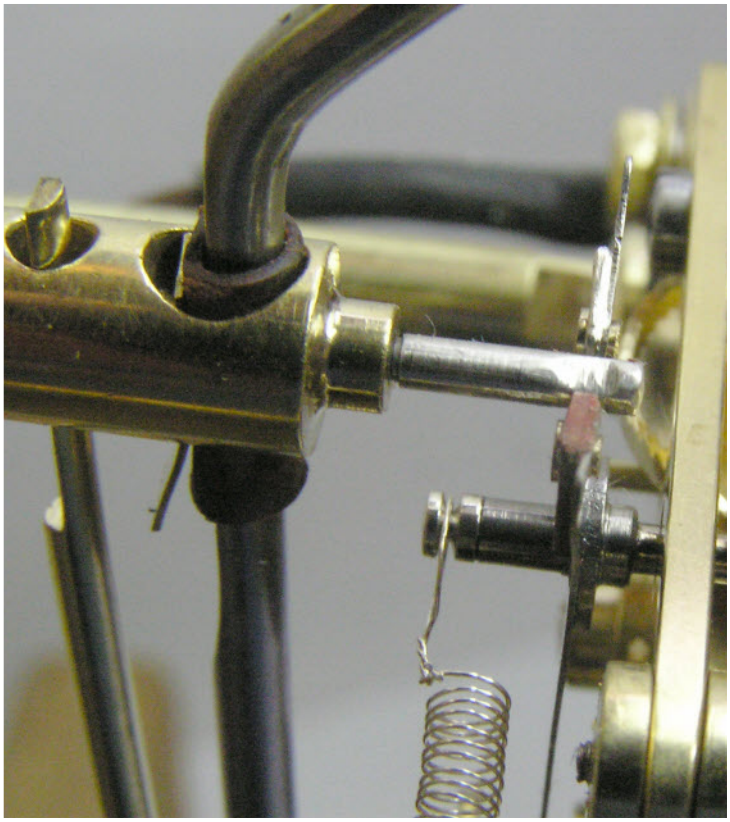

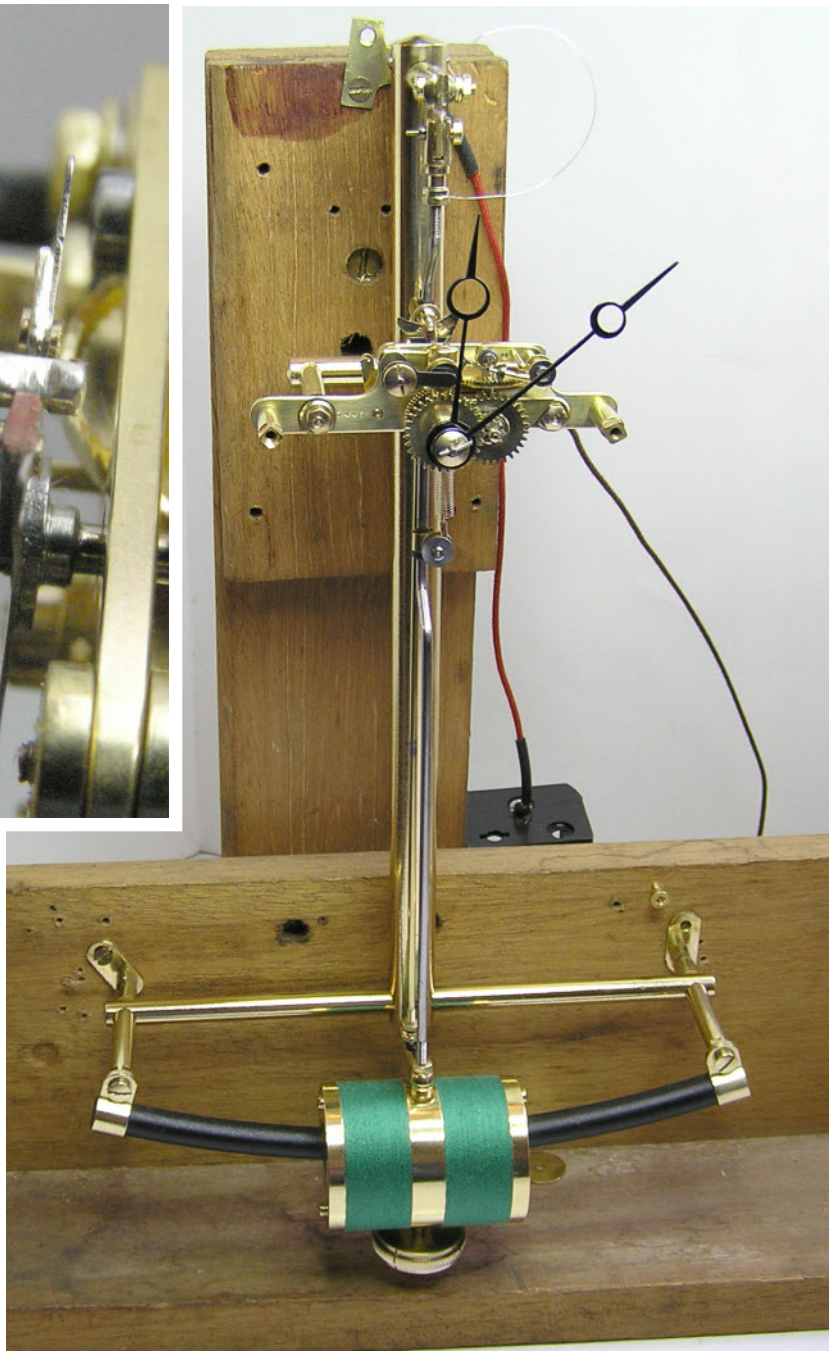

The photo above shows the contact pin in its new orientation that positions the old wear point at the top so that a new face is presented to the contacts on the fork. The second photo shows the clock on the test stand whilst timing and checking for problems. The movement has been fitted with new clocth covered wire and a standard 1.5 volt "D" cell battery holder.

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The movement now is now back in the case which has had some of the damage repaired. The splits were filled and glued as well as the over-large screw holes filled and re-drilled to size.

The dial is in relatively good condition and has been washed in warm soapy water to remove a lot of the nicotine stains. There is some mottling on the dial which does not detract from the overall appearance though.

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The completed clock.