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# Horologix

*Early Battery Clock Parts & Restoration*

## *Restoration of Bulle Clock Serial Number 26561.*

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## **Bulle Clock Serial Number 26561.** *(By kind permission of the owner)*

This Bulle's a tall movement on a square mahogany base. Most of the clock looks as though it is there with the exception of the Pendulum bob and coil, which was found later. The clock as found can be seen in the photo below.



*The column on first inspection looks as though it has had battery acid burns (not unusual for a Bulle) and has had some soldering done at some time. It looks as though this was to attach a wire rather than trying to fill any holes.*

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This photo shows the damage in more detail. The acid burns look bad but they have not caused any major holes although they will leave some tell tale marks or stains when polished. Hopefully not too bad though. The solder is shown to be purely where a past repairer has tried to connect a wire.



The coil looks to be in good condition but in fact proved to be dead. There should be a resistance of between 1100 and 1300 Ohms. I hope that the damage is in the joint at the end where the small 6500 turns of 42 gauge enamelled wire is soldered to the large multi strand copper wire. The original winder of the coil has added his name to the paper covering the joint. He never thought that in Eighty years time his signature would be seen on a computer screen available for all the world to see.

I have unwound the coil for about 30 turns but it is still dead. There are no obvious cuts or marks on the coils so it looks as though the break must be at the other end where the joint is under the 6500 turns and impossible to fix. I will use another coil that I have wound ready for such an occasion. This one will then be rewound and put away ready for another dead one. The new one is wound on a wooden bobbin in exactly the same way as this one.

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*The clock after disassembly and initial cleaning in the Ultrasonic tank,. Note that the steel and fibre parts are kept separate in plastic bags. They will be cleaned and used as required. Note also the paper washer that is found on the inside of the pendulum bob. Make sure it is put back when reassembling. The cord around the bob was in a terrible state and was heavily glued in place. I normally like to keep the original where possible but this was too badly corroded. I will rewind with new green cord as original. Note Also the textured paper that is usually wrapped around the coil. This should also be carefully put aside for rewinding once a coil has been repaired..*

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*The column after initial cleaning in Horolene and then White Malt vinegar. The corrosion has been removed leaving clean bare metal. The colour is the copper that has been left, I guess, after some of the Zinc has been eaten away by the battery acid. There is some discolouration on the outside as well but most will be polished away. There are no large burn through areas.*

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*The fork is pretty well worn and will need some work. The fibre is all but gone and just leaves the brass rivet. The silver has worn down the the fork. A new silver contact will be made from silver flat. The new fibre will be cut from the solid.. Two new 1mm rivets will be turned on the lathe.*

*The silver end of the fork arbour is still in good condition and will last another 80 years. There is some rust on the steel fork but this will be cleaned and will cause no further problems.*



*This photo shows that the steel pendulum rod is in a pretty rusty state but has no serious damage. The threads at both ends are still in good condition and will clean up well.*



The components of the pendulum Isochron attachment are also rusty but otherwise in good condition.

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*The column after a final polish and lacquer. Most of the marks have come out and the overall feel is one of aged lustre. Interestingly there are some old turning marks that have shown up in the brass. They show up as a very light screw thread pattern running down the tube. You'd have to look closely to spot them. It may be marks left by the turner as he polished the tube.*



*The bottom cover was also missing from this clock so a replacement has been supplied that was recovered from an original scrap movement. Most of the clock was missing except for the base fittings.*

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*Some parts ready for reassembly. Although a good ultrasonic tank will remove all the dirt and tarnish from brass it will not impart a polished finish. Therefore each individual part of the Bulle including all the screws and washer need to be polished by hand. This is a laborious and painful task. The only method I have found acceptable by being kind to the parts, is unfortunately painful to the hands. I use a Dremel fitted with a mini soft wire rotary brush. It imparts a nice polish quickly to the part but leaves your fingers aching and rubbed raw. I have tried all sorts of alternatives including barrelling machines, but none come close to the Dremel. The parts are so small and easily lost.*

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*The main movement plate before polishing showing the serial number 26561. Be careful when recording Bulle clock serial numbers. As can be seen from this photo the number is very close to the mounting hole. A fibre washer and nut are fitted here and normally cover the first digit. If this clock was all together then the serial number would read 6561 as the 2 would be hidden under the washer.*

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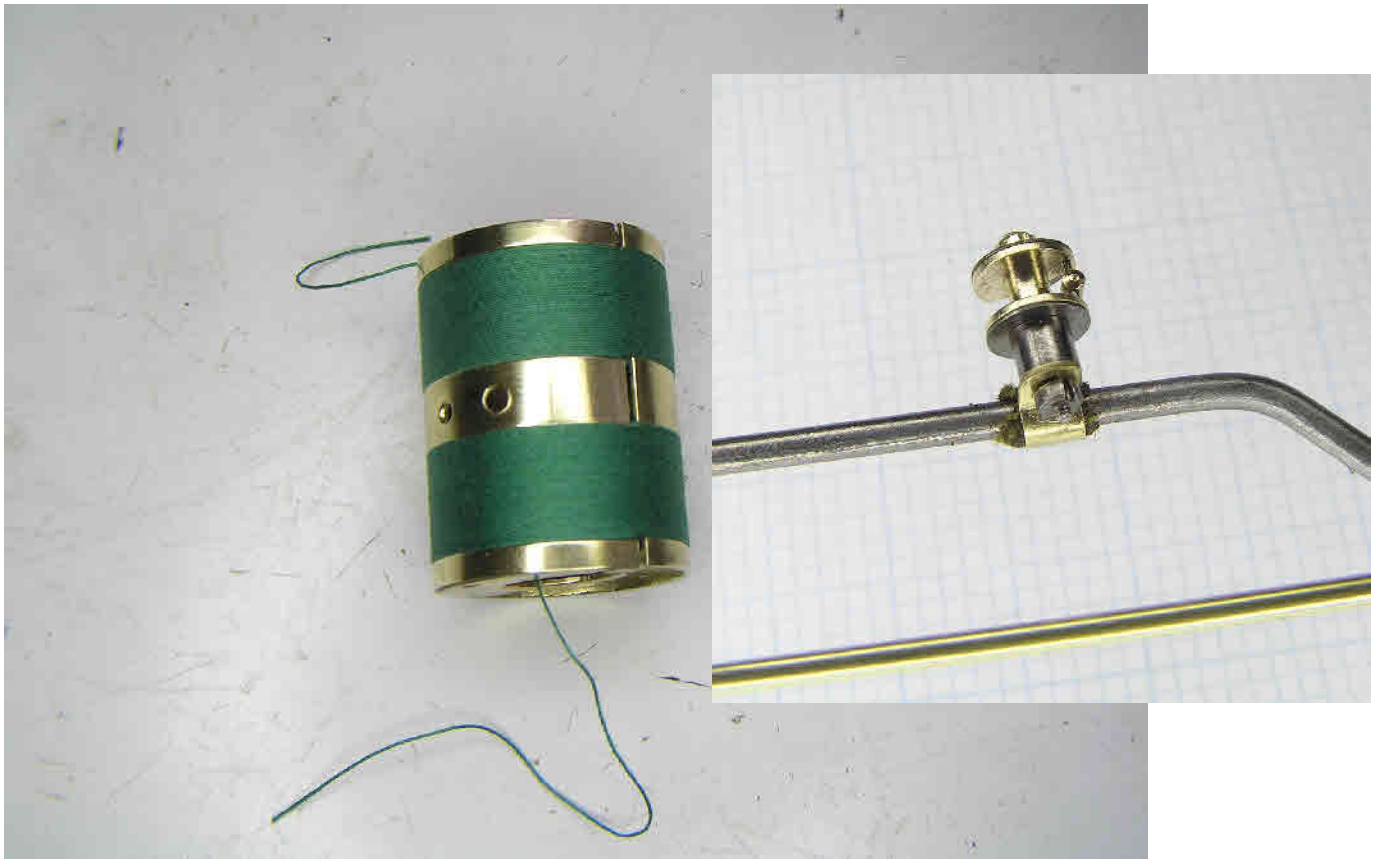
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*These photos show the pendulum bob after the new cord has been wound and before the coil cap is fitted. Note the paper washer ready to be inserted. This colour green is the closest match to the original colour that I have found so far. The brass has been polished and lacquered. I only lacquer the column, pendulum bob and case fittings on a Bulle clock. The rest is left in a polished condition. The movement needs to be free of all dirt and contamination to ensure good electrical contacts. The other photo below shows the cleaned Isochron attachment refitted and the pendulum rod after cleaning away the rust.*



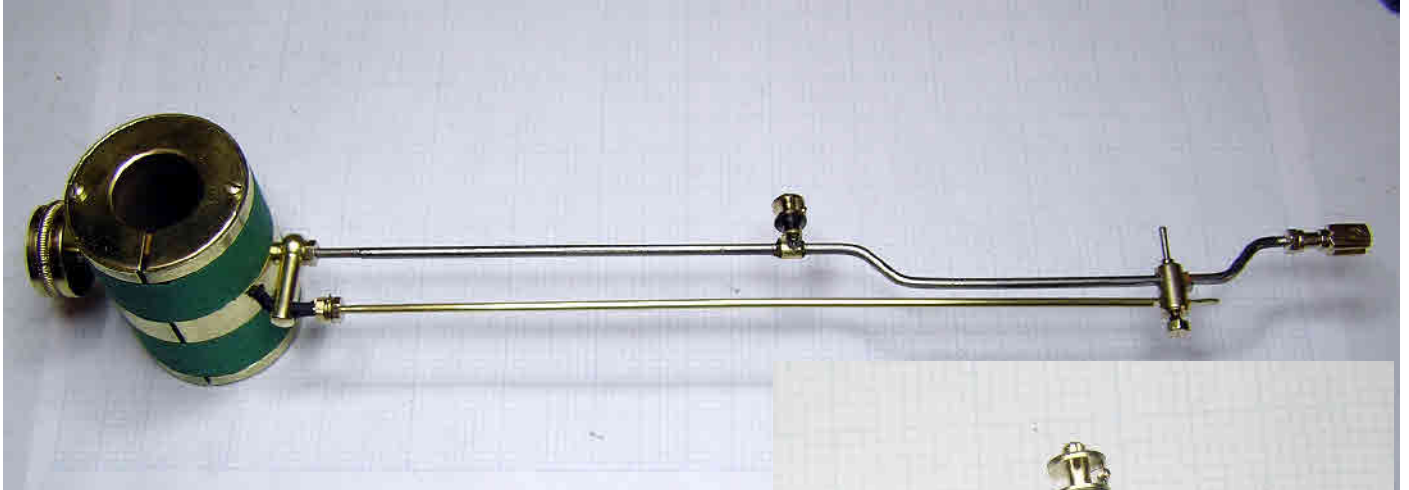
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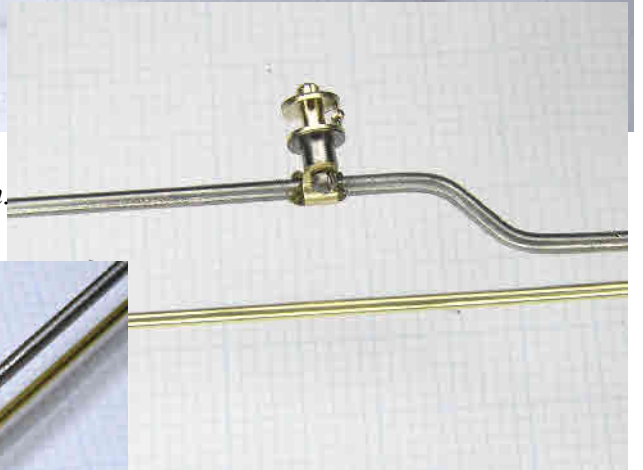
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*The completed pendulum ready for hanging on the column.*



*Some close ups of the pendulum and the reassembly Isochron attachment. This attachment needs to be completely isolated from the pendulum and has a small Emery Cloth type insulator between it and the pendulum rod.*

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*Checking the resistance of the completed pendulum assembly. If all is well and the components properly insulated then we should have a reading of about 1100 Ohms between the end of the pendulum rod and the silver contact pin. This reading shows 1242 Ohms which is within the correct range.*



*This photo shows the finished column and pendulum assembly together with the base which is in the process of being French Polished. It has about eight coats so far and will need another ten before finally being cut back and gently buffed. It would look to garish and bright if left in this state. The surface is cut back after every three coats to flatten the surface and remove blemishes. We will be aiming for a subtle sheen commensurate with its age leaving some of the knocks and dents it has received over its life.*

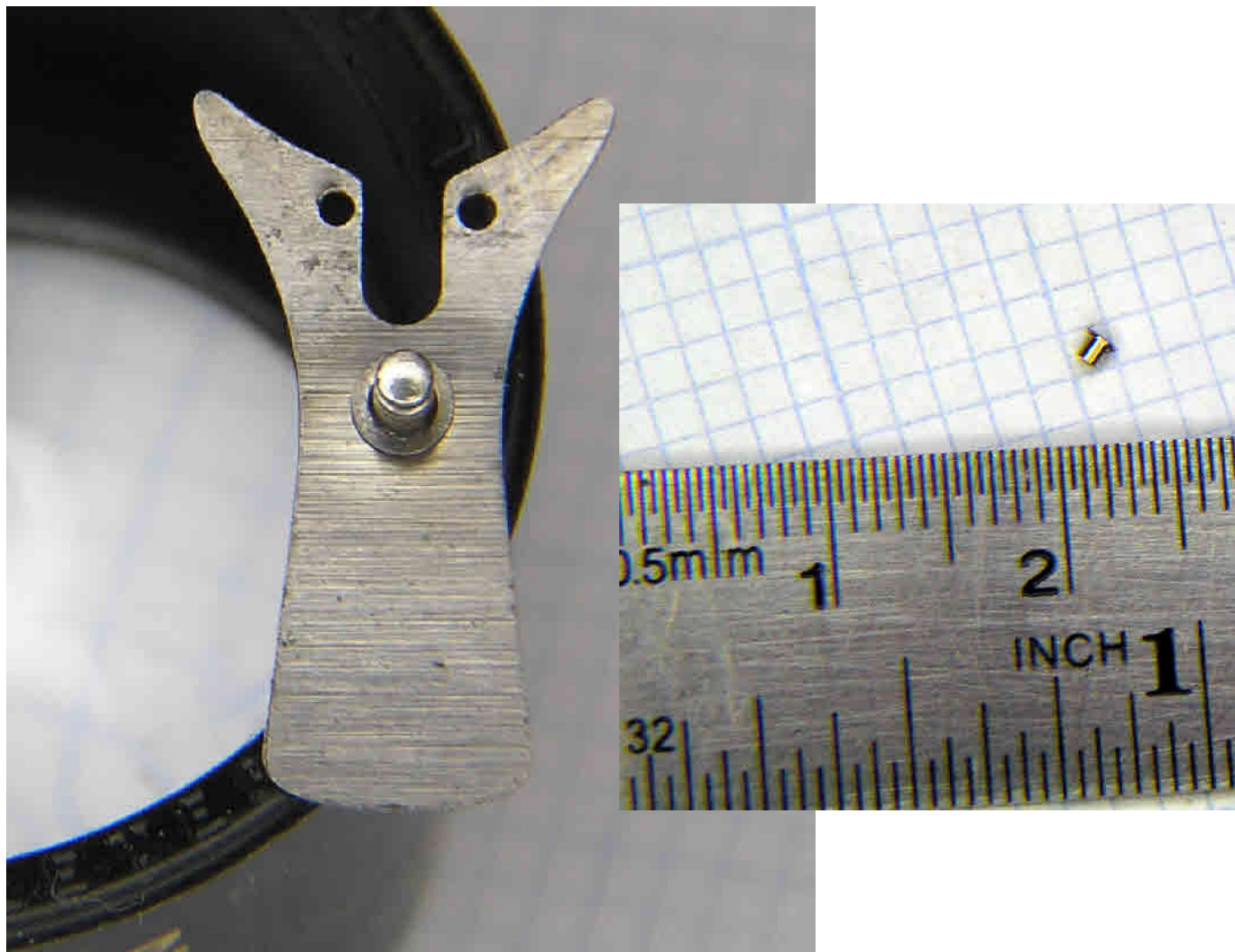
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*The fork after the old silver contact and fibre has been removed. The rivet holes are about 1.10mm in diameter. The fork has been cleaned up to remove the rust but some pitting will remain.*

*The New rivets have been turned on the lathe. The photo shows the size against a ruler. The have a 1.5mm head and a 1.00mm diameter body of 0.85mm length.*

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*The photo on the left shows the new rivets and the Pure silver strip from which the contact will be made. The fibre will be made in the same manner.*



*The finished fork. The gap has to be wide enough to accept the contact pin and should not be made too narrow. The fork should last another 80 years.*

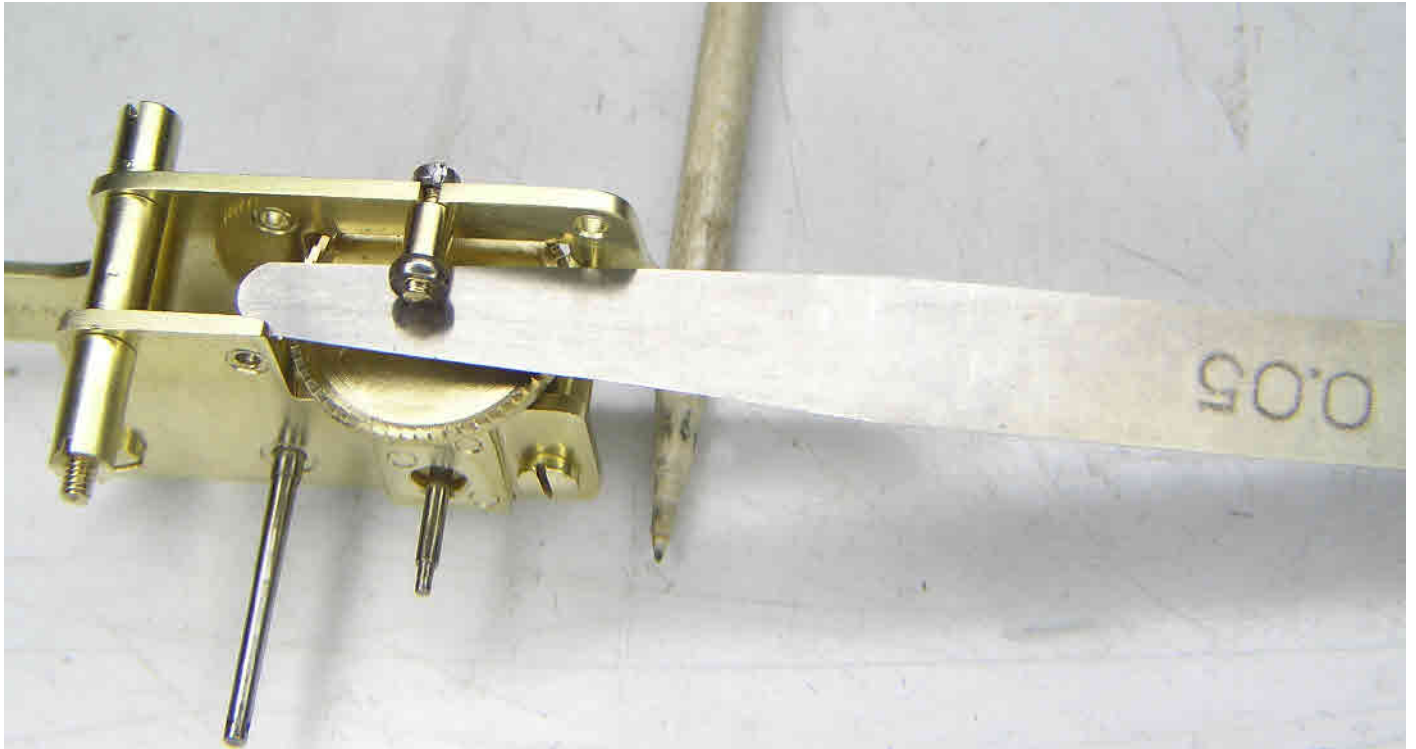
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*This photo shows setting the end shake on the count wheel. I usually set this to about 0.05mm (0.002") which allows the wheel to run friction free and yet not allow the minute hand to be too loose.*

*The arbour runs in two pivot holes and rests on a hardened steel plate at the bottom. The motion is transferred through the worm, that is attached directly to this arbour, to the wheel on the minute arbour. The weight of the minute hand when it is being lifted past the half hour position, would likewise lift the count wheel. The result would be that the minute hand would lag behind and misrepresent the time by several minutes. The reverse would happen past the twelve o'clock position. It would seem that the timekeeping was very erratic. So this gap needs to be as small as possible conducive with free movement of the count wheel and driving pawl.*

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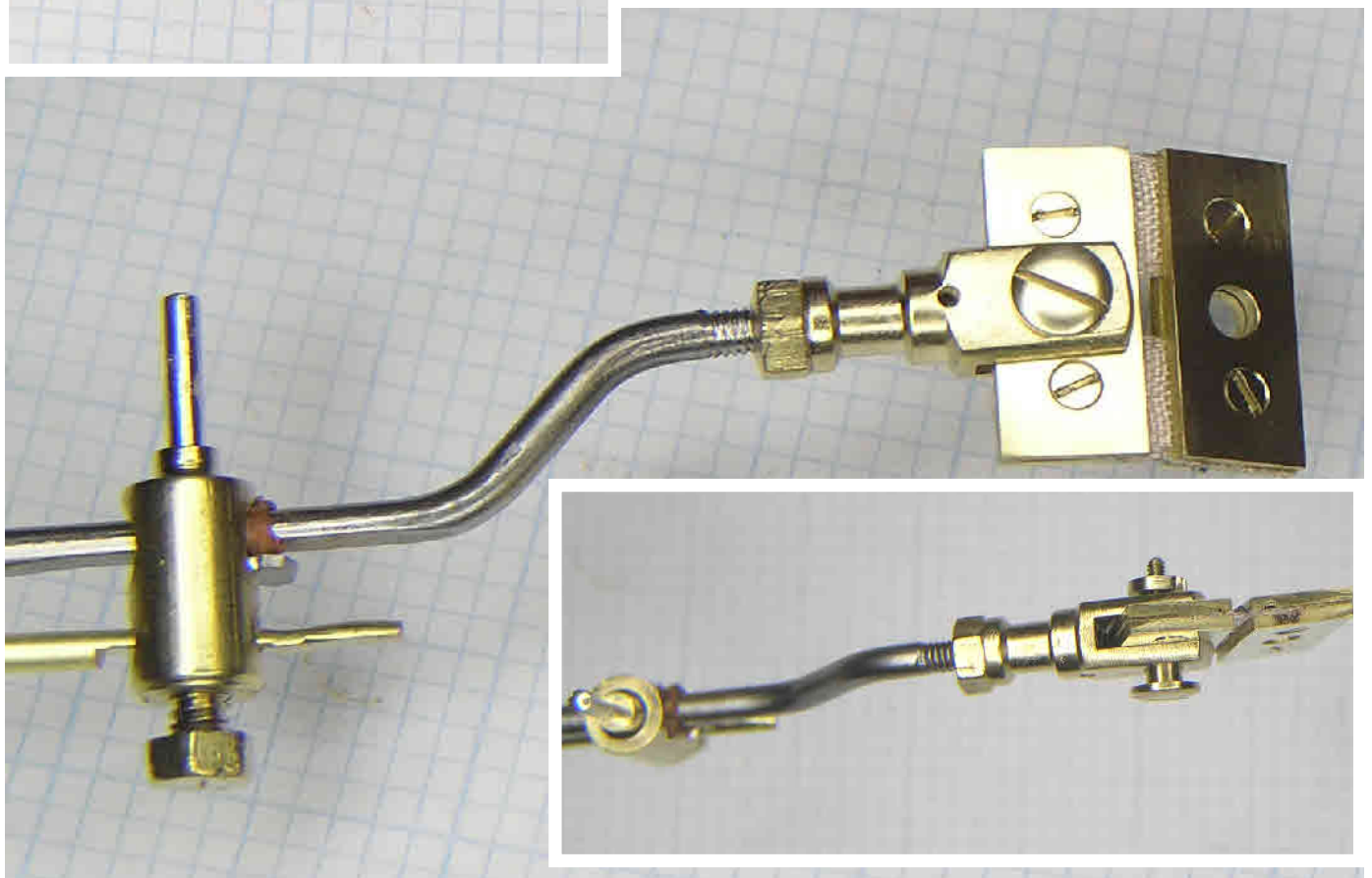
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*These photos show the new pendulum suspension bolt and nut that was turned up from brass. This bolt needs to have a shaft that is not only a loose fit in the suspension unit, but also is slightly longer than the total width of the suspension and the pendulum block in which it sits. This enables the pendulum to swing freely forwards and back so that it finds its own level regardless of how much the clock is leaning front to back (within the limitations imposed by the bar magnet). The top of the suspension will be held firmly at its other end mounted in the column, with no allowance for movement other than initial setting up.*



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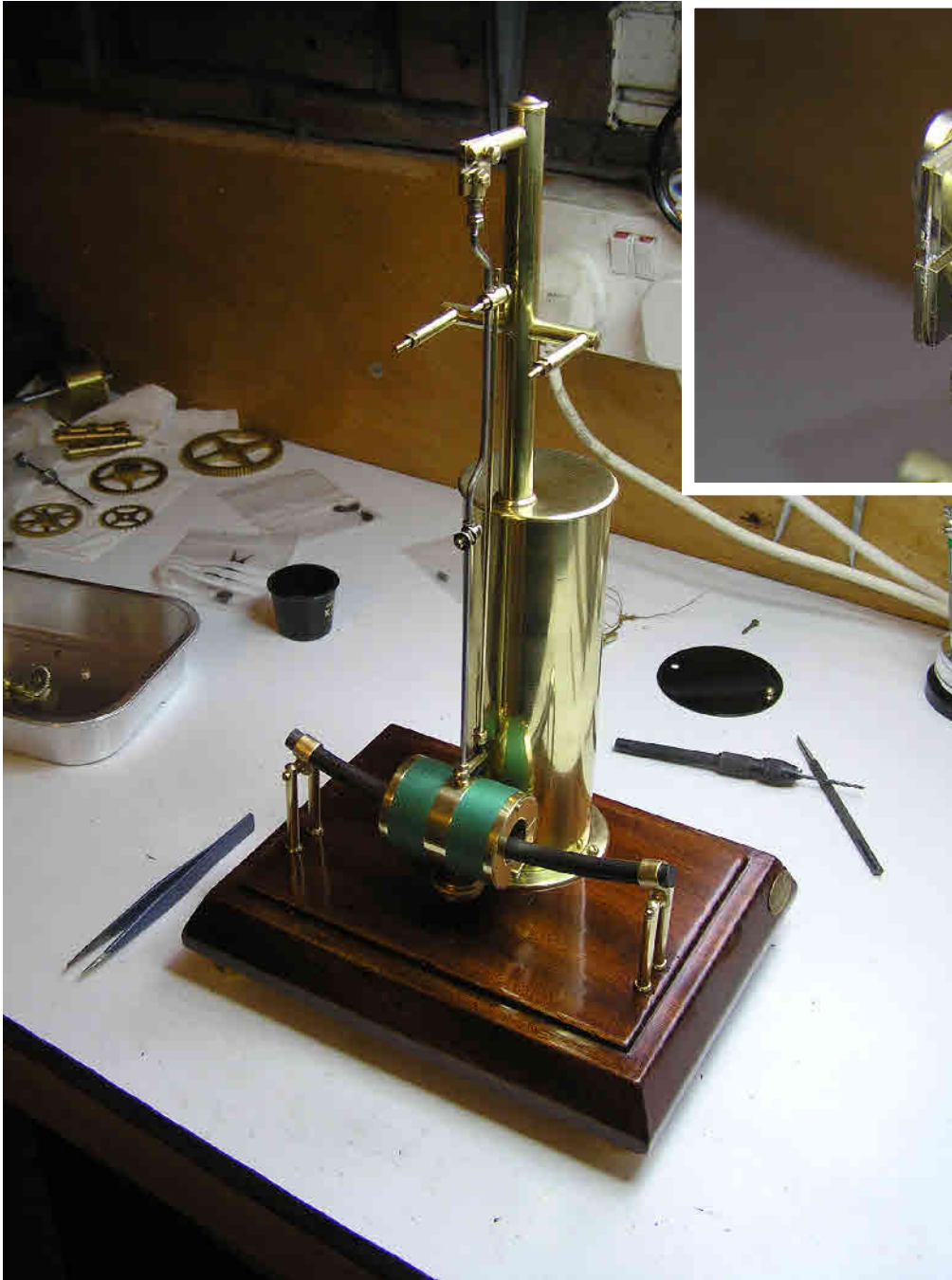


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The photo on the left shows the column, base and pendulum in place ready for the movement. The Isochron attachment is low down on the pendulum rod just to keep it out of the way for the time being. It will be raised into place when the spring is ready to be fitted. The insert photo shows the suspension mounting on the main column. There are two washer behind the nut ready to take the contact wire. This wire will connect the pendulum rod to the main column because the contact is broken by the non conductive silk suspension.

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*Left shows the movement now fitted and the contact pin set to enter the fork at the right height (about halfway in). The full movement of the fork left to right should only move the pawls far enough to move the count wheel one tooth at a time.*

*The inset shows the contact wire now attached and passing across the silk suspension. There are many ways that this contact can be achieved on the later models of the Bulle. This method uses a small screw and washers for the pendulum side.*

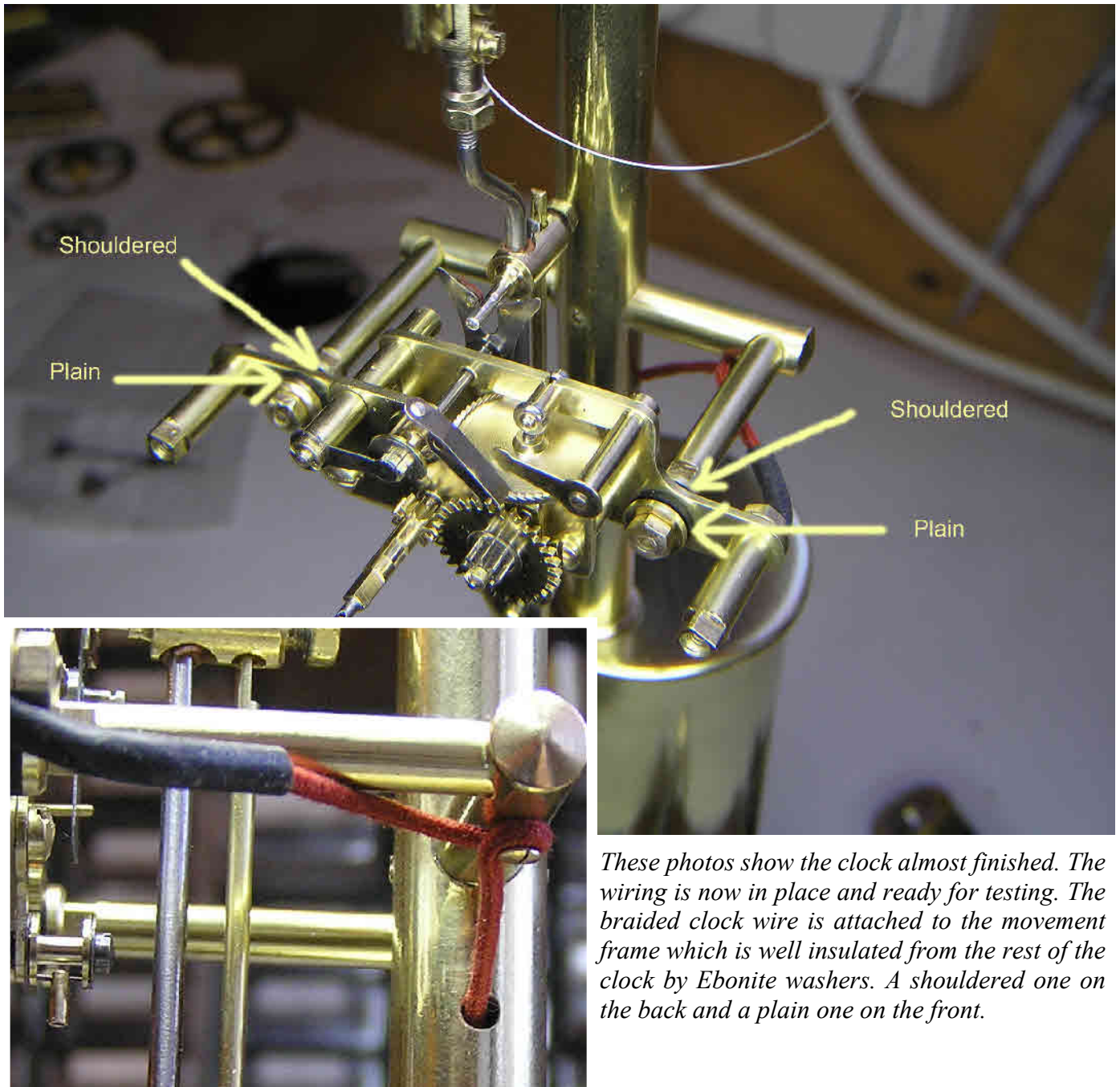
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*These photos show the clock almost finished. The wiring is now in place and ready for testing. The braided clock wire is attached to the movement frame which is well insulated from the rest of the clock by Ebonite washers. A shouldered one on the back and a plain one on the front.*

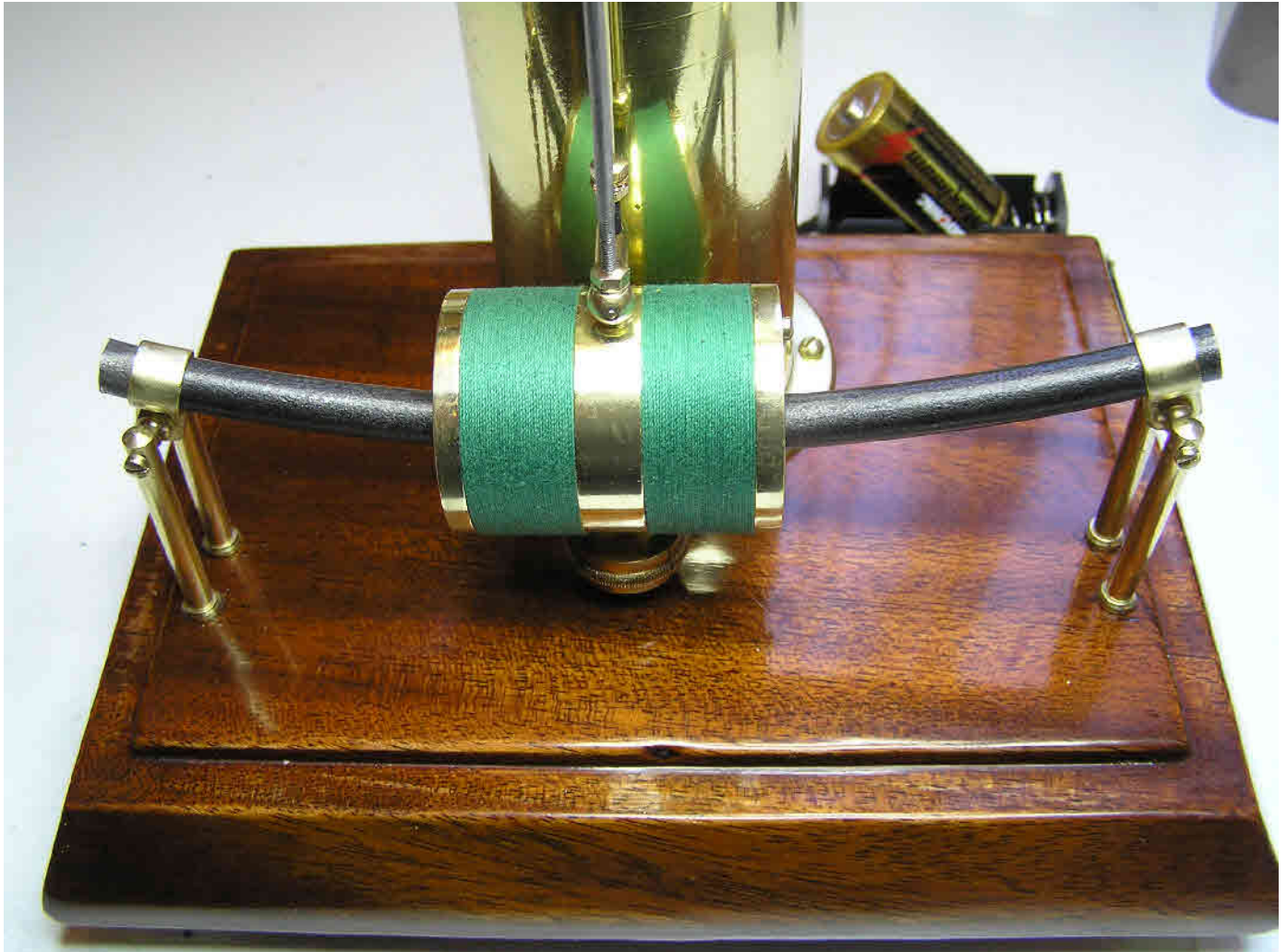
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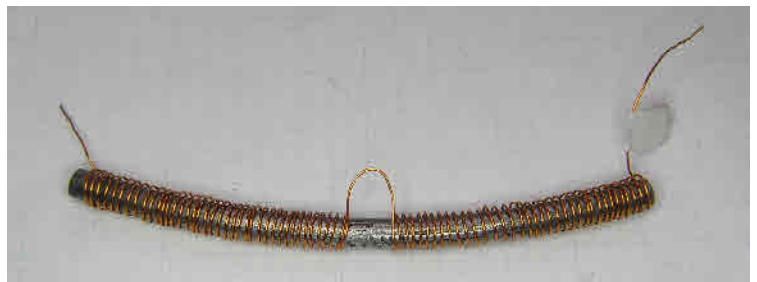
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*The finished base and bar magnet. The base has had about 20 coats of Polish with cut backs every 3 coats. I have left all the old "Lumps & Bumps" in the wood so as to retain its age. The magnet was a little weak and has been re energised. Note that the enamelled wire has a "Loop Back" in the middle to induce the North-South-North poles.*



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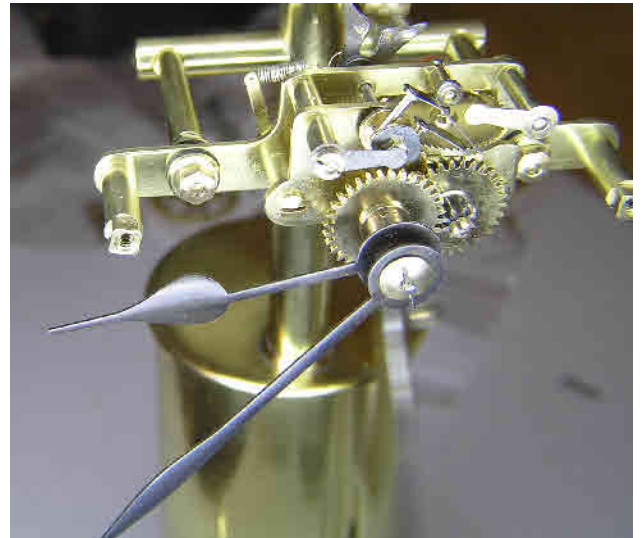
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*The bottom of the base with it's four brass feet/ The two at the rear are shorter than the front pair to allow the screw foot to have a greater distance of effective adjustment. The replacement door is also in place.*



*Testing the cleaned and blued hands for size and alignment before the dial is cleaned and refitted. The minute hand was badly rusted.*



*This photo shows clearly what happens when the movement is mounted on the column with the fibre and brass washers in place. The first digit of the serial number disappears.*

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*This photo shows the new silver contact spring in place. The large loop rolls around the silver contact at the back of the Fork.*

*The clock is left on test whilst the dial is cleaned.*



*The small selection of tools necessary to strip a Bulle. Mainly, Nut Spinners and Open Ended Spanners in the range 4mm to 5.5mm. The pliers are smooth faced so as not to damage the parts. Note the modified screwdriver.*

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*The finished clock. The dial has been cleaned but there are still some marks left on the dial which cannot be removed without damage to the surface and characters. The brass has been cleaned with "0000" gauge wire wool and Solvol Autosol. The face has been sponged with warm water with a very mild soap. No lacquer has been applied as this will prove difficult to remove in the future, especially around the rim of the face.*

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*The reverse of the dial cleaned pan and detail of the face showing the marks.. I've adjusted the lighting to show them off much worse than they actually appear.*

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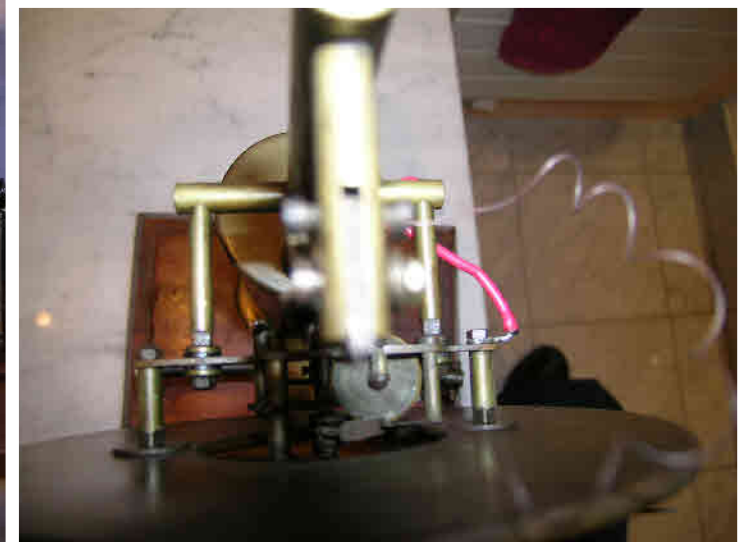
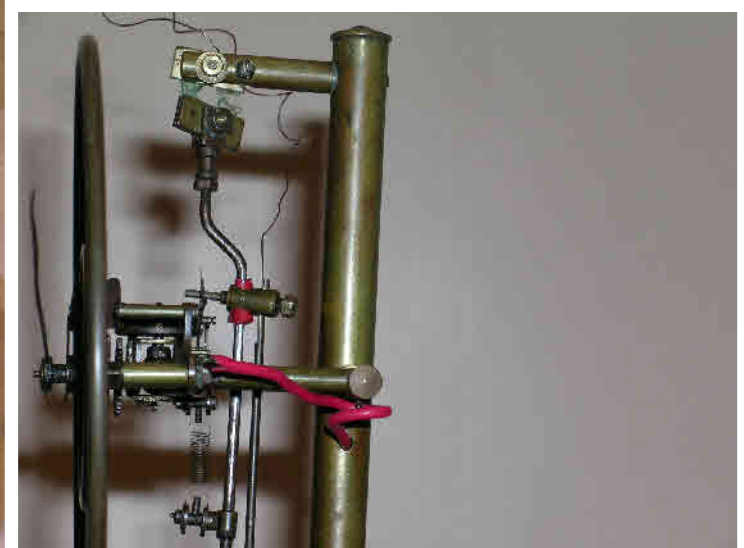
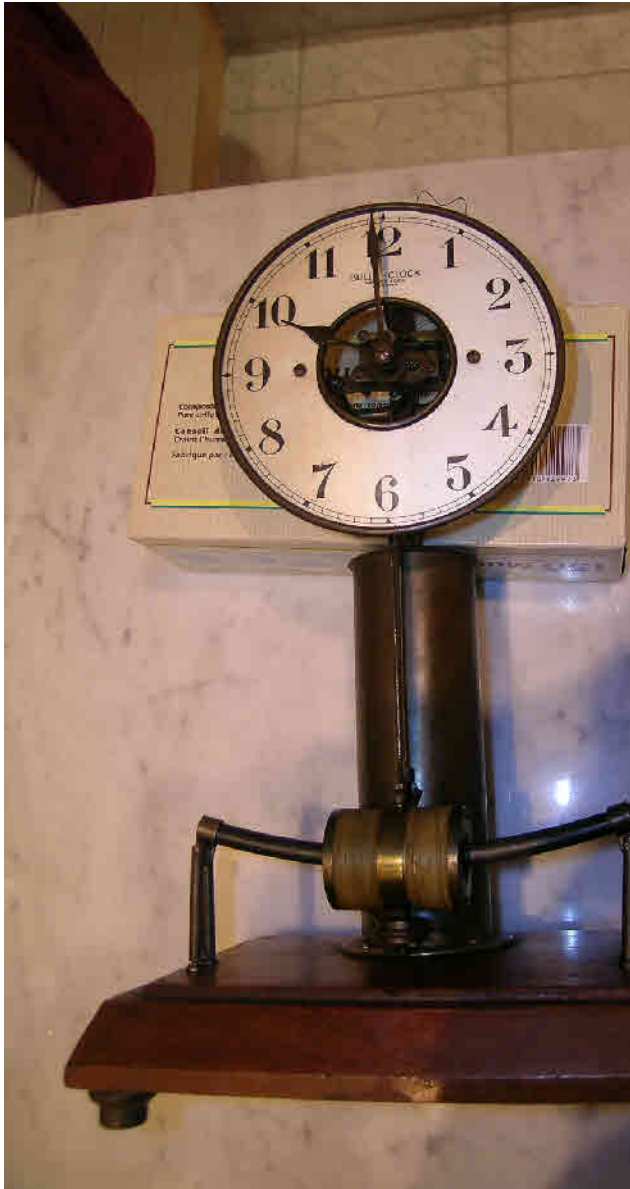


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Finally, on this and the next page, a few shots of the clock in its original condition for comparison..

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***END***

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