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Horologix

Early Battery Clock Parts & Restoration

Bulle Clock Serial Number 12199. (*By kind permission of the owner*)

Restoration of Bulle Clock Serial Number 12199.

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This clock is the subject of the restoration with kind permission of the owner.

The photo shows the clock as received. The door has been retained by the owner as their is no point in sending glass through the post especially as the case is in good condition and not in need of repair or polishing.

The pendulum has been secured for transit by the use of foam pipe lagging wrapped around the bar magnet. A small piece of foam has also been inserted between the coil and magnet to stop front to back movement. This method is very effective in stopping transit damage to the clock.

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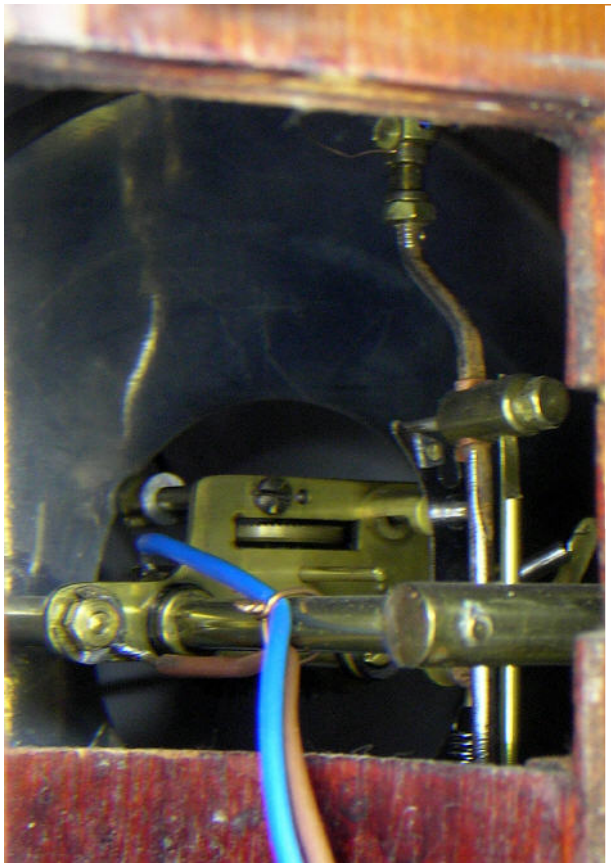
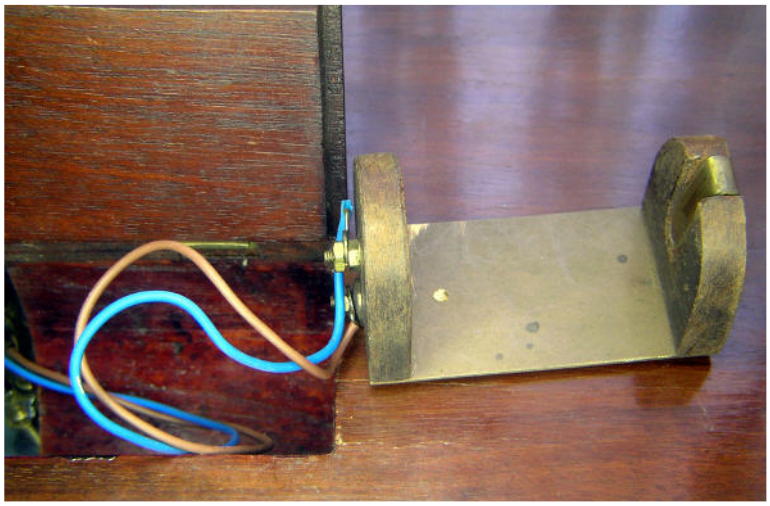
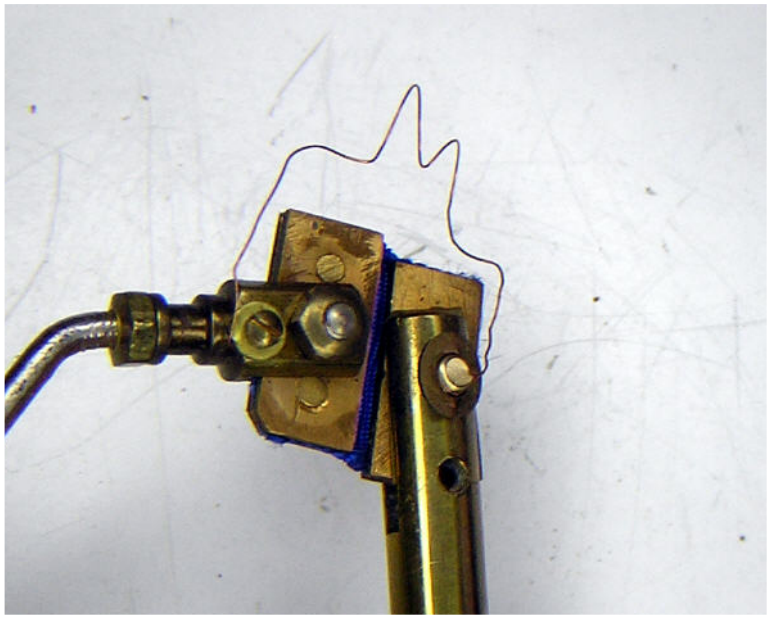


Peering through the battery door at the back, we can spot some interesting wiring techniques. The negative wire being connected to the movement plates.

The battery holder is a home made 1.5volt "D" cell holder.





The suspension is also home made probably using the original brass chops and a piece of what looks to be medal ribbon?

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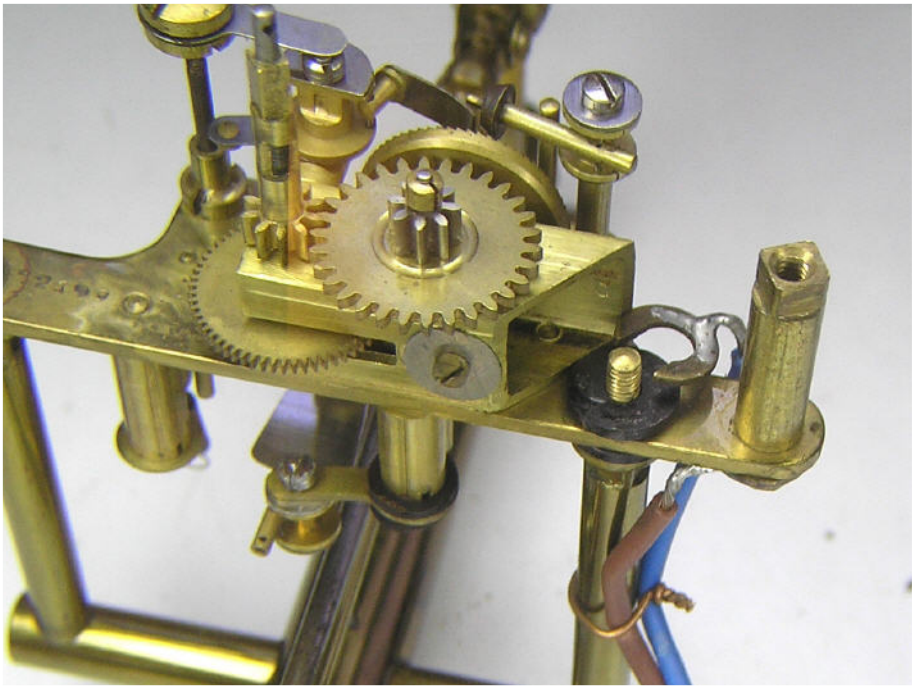
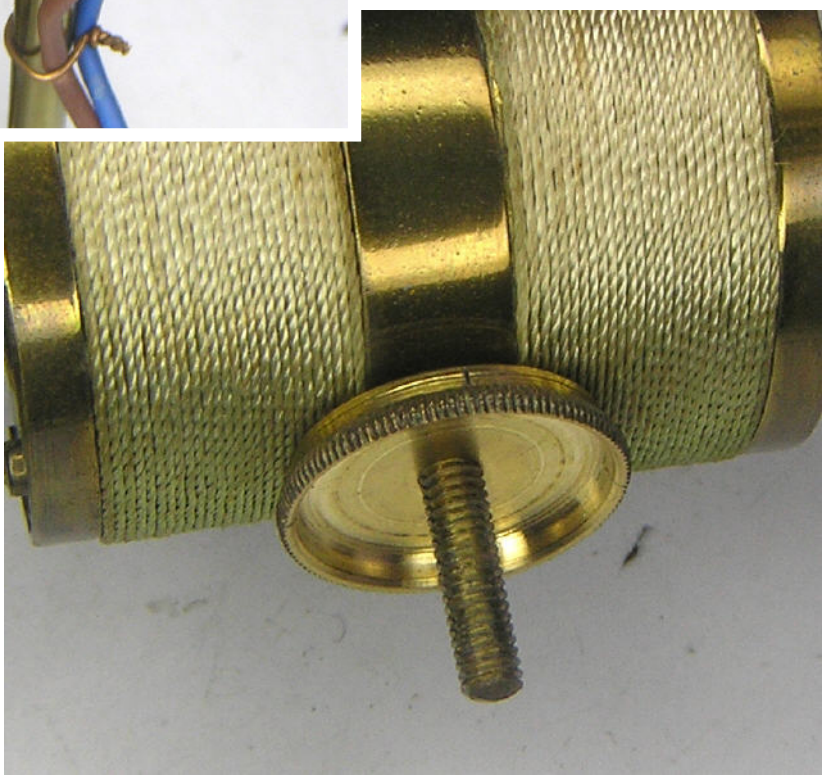


The photo at left shows how the negative lead from the battery was connected. Besides being incorrectly placed it also left little thread for the nut to engage with. One turn and it was off. This wire although theoretically correct in that it connected to the frame, left little thread left for the spacer and nut as well as potentially causing a short by touching the movement plates.

The observant amongst you might spot a problem with the rating nut on this pendulum!
Someone has decided that the clock was running to slow and when this could not be corrected by raising the rating nut, they decided to bore the middle out of it. I must admit it was done neatly so that it could not be seen when the clocks was standing in position in the case. But it's still a bodge and shows that the person who did it does not understand the principles involved in Bulle clocks.



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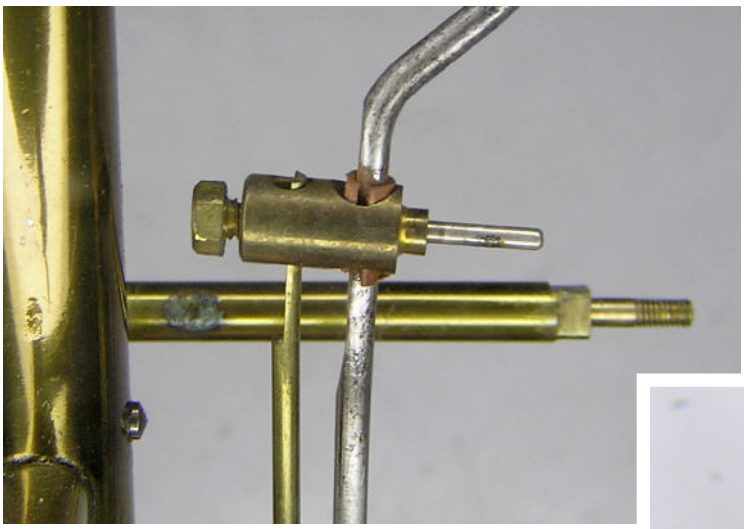
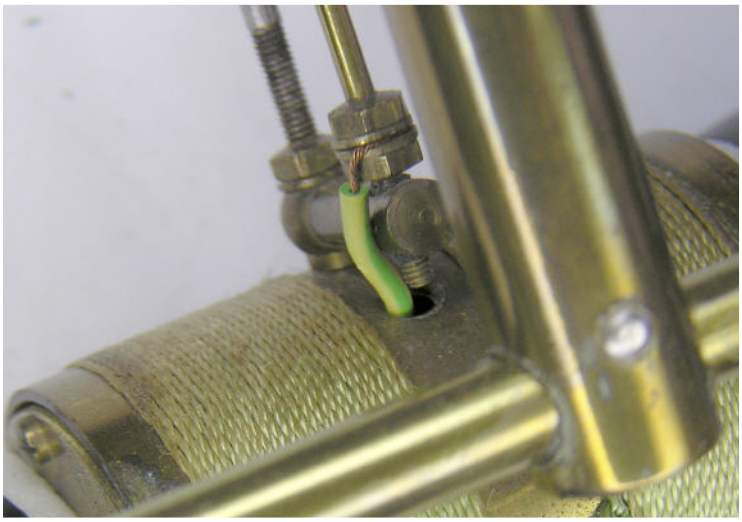
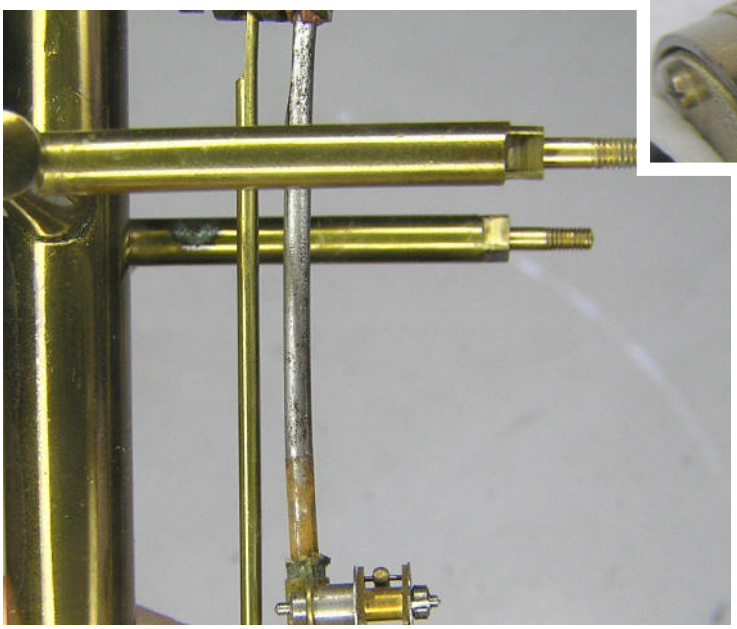


The contact assembly shown here is lacking the steel T piece that stops the screw from penetrating the fibre. This will have to be made.

The photo at right shows the modern earth wire used for one of the coil terminals. This probably means the coil has been damaged at some time and will need investigating.





The steel pendulum rod looks a little cock eyed here! It has been bent and will need straightening. Not also the rust .

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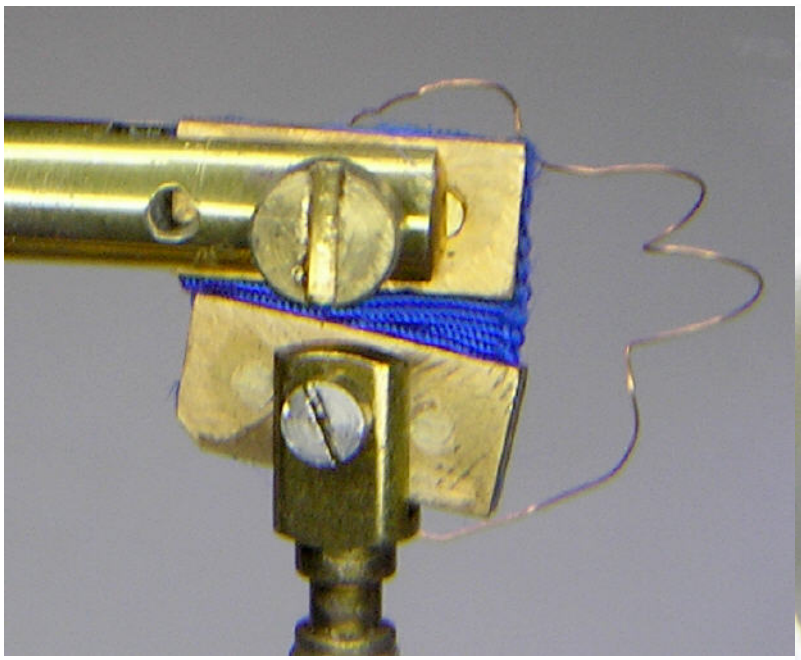

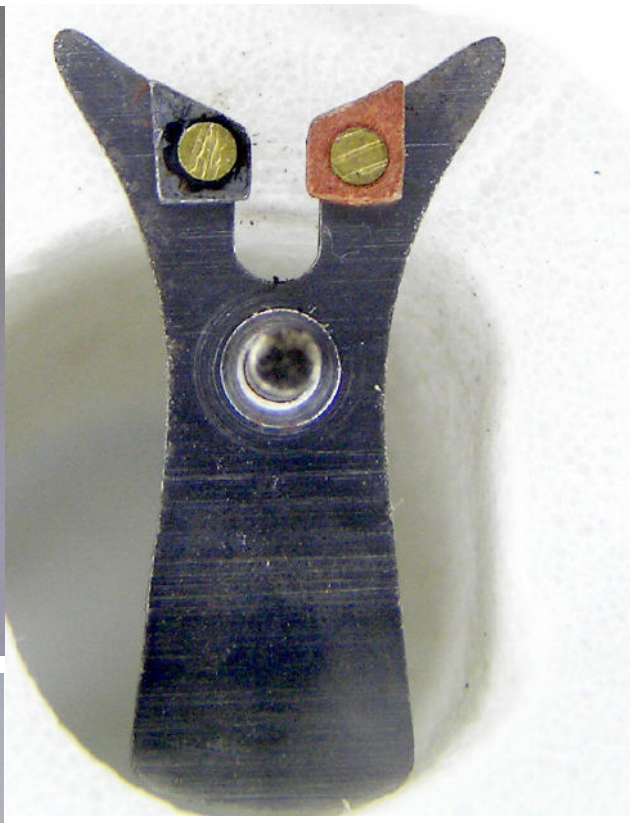

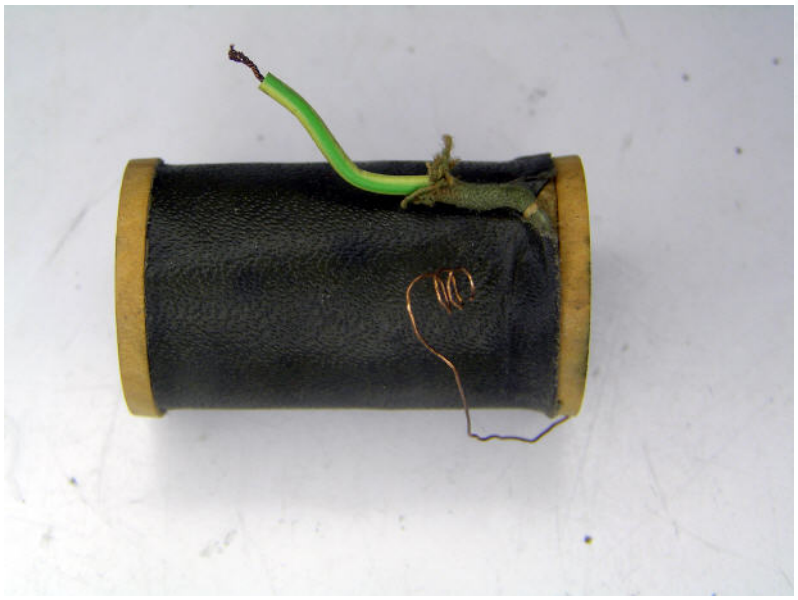

The top left shows the suspension. This assembly has none of the right screws, washers or nuts. All will need to be made from scratch. The fork is in good condition if a little dirty. The contacts still have 50,000 miles left on them!. A good clean up should suffice here.
The photo at lower left shows the coil. It stiil has its original wrapping but we'll need to carefully peel that back to look at and replace the wire. The good news though is that it shows a good resistance of 1150 ohms. Spot on for this clock.

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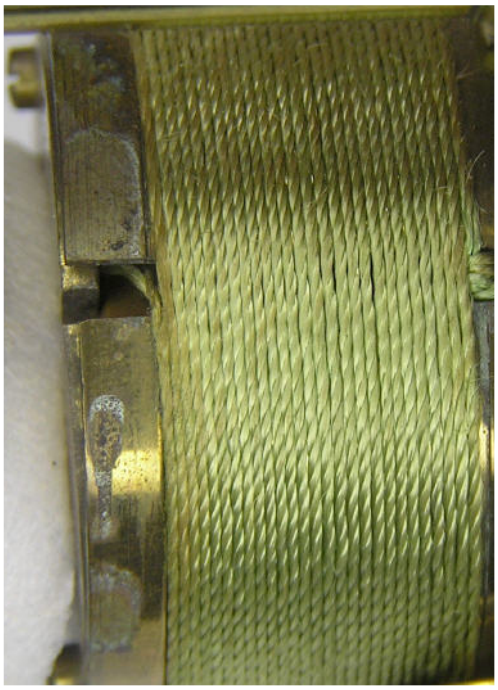
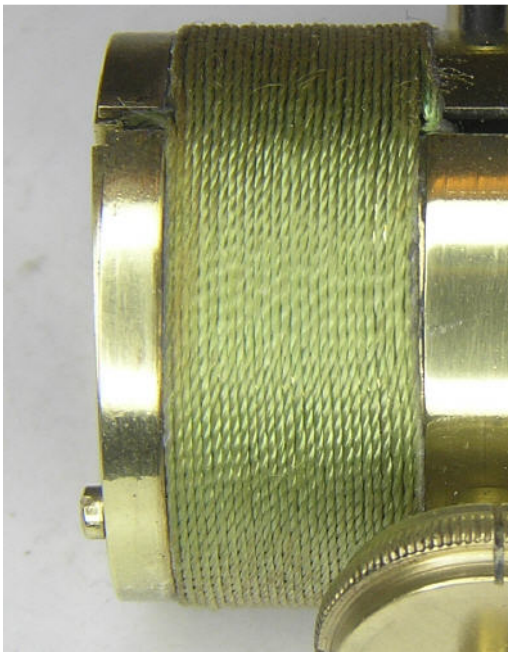


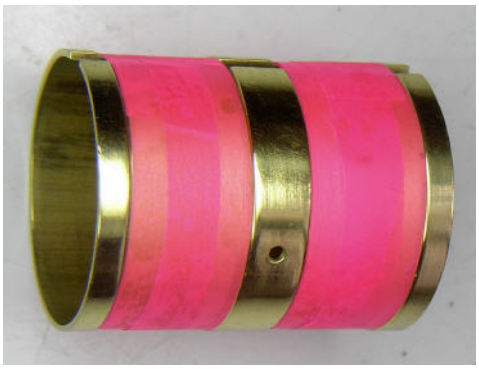


This type of Bulle is of course encased on three sides with wood and has much less sunlight falling on the back of the pendulum which has, in this case, resulted in a hint of the original colour being evident in the cord. It has still faded but not to the same extent as the front. Though the only part that is closest to original is that that is usually found knotted up inside the coil.

The photo also shows some damage to the brass coil casing which will need to be polished out.

There is always a conflict of interest when presented with a coil that has much of the cord intact (especially when it is in reasonable condition such as here) yet the brass cover needs repairing or cleaning.. To really get at the brass it is preferable to remove the cord so as to effect a good job. But it is then impossible to rewind the cord without it twisting and presenting a Zebra pattern when finished. Besides, the cord is usually so fragile after 80 years that it falls apart at the slightest touch..

In these cases I wrap some light duty masking tape around the cord only and try and clean the brass with 0000 grade wire wool. The tape I use is not as sticky as the normal white variety and does not tug so hard on the cord when it is removed.. I admit you still have to be very careful and it does take much longer but you are preserving a s much as possible of the original clock. There may also be some discolouration of the outside coil of the cord due to dirt migrating under the masking tape when cleaning. But it should be hardly noticeable if you're careful.



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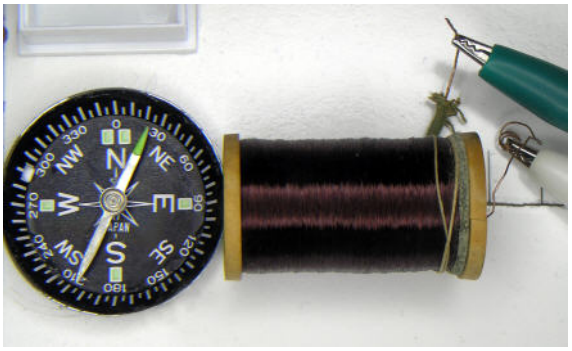
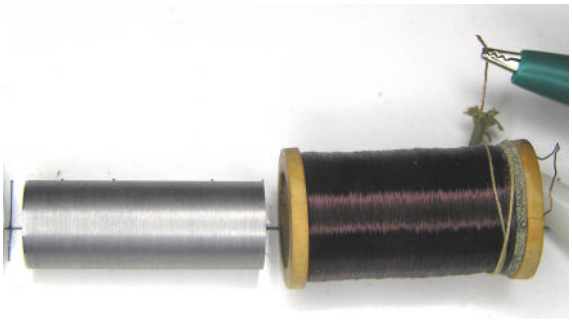
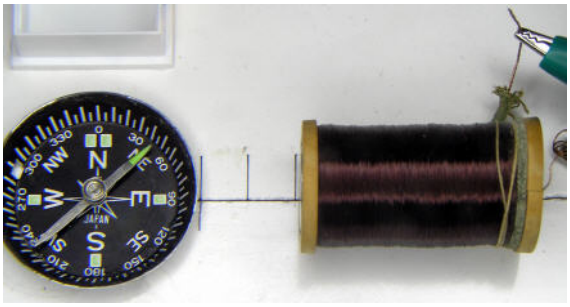


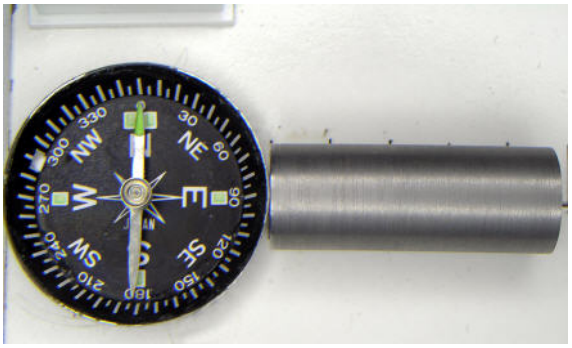
This sequence of photos shows another way of testing the coil. Well, OK, it's just me playing with Electromagnetism. But it does show the principles involved in Electromagnetism and the strength of the field introduced by the Bulle Coil.
The first photo shows the effect on the compass of 1.5 volts being passed through the coil. The magnetic field induced is quite weak and is just enough to deflect the compass 20 degrees if it is pushed right up against it.



Now, if we introduce a soft iron bar into the coil so that it will be magnetised by the coil it should dramatically increase the effect and act like a solenoid. This iron is very low carbon and will release most of the magnetic flux as soon as the 1.5 volts is removed.



This photo shows the effect on the compass with the soft iron bar introduced into the core of the coil. The magnetic flux was so strong that it pulled the compass needle to horizontal (East) so I moved the coil 20mm down the scale to get a 45 degree reading.



The soft iron once removed from the influence of the coil reverts back to a non magnetised state as seen in this photo. It has a negligible affect on the compass.

This material can be used to make the core of the Eureka clock coil.

Bulle Clock Serial Number 12199. (*By kind permission of the owner*)

The bar magnet after regenerating and buffing with Grate Black.

The old green and yellow earth wire was removed and a new piece of copper stranded wire added to lengthen the end. I have made a tight twist here instead of soldering which would have made the joint too hard to bend easily when the wire has to be fed through the coil casing and attached to the brass pendulum rod. Both ends of the wire were cleaned before jointing. The whole coil was then tested for strength and continuity.

The bare copper is then insulated with thick rubber tube and left long for trimming after refitting into the brass cover. This end of the coil need s to be well insulated so that it does not com into contact with any part of the pendulum cover or iron pendulum rod. The other end though is left bare and twisted around the rods that the brass casing caps are screwed to.

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All the parts cleaned and ready for reassembly. Only the frame, magnet retaining parts and the pendulum bob casing parts are lacquered. Everything else is left clean to ensure good electrical contact.

Even though the parts have been cleaned in an ultra-sonic tank the parts are quite dull and need to be polished. So each individual part right down to the smallest nut and screw are given the once over with a soft iron rotating brush in the Dremel. This imparts a nice polish to the brass .

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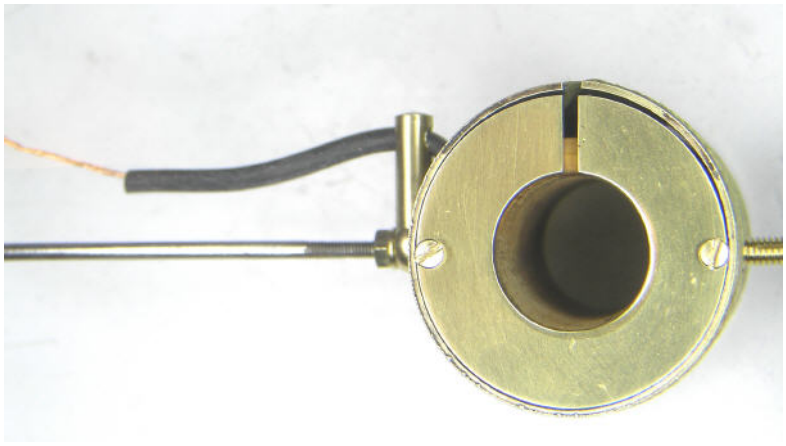
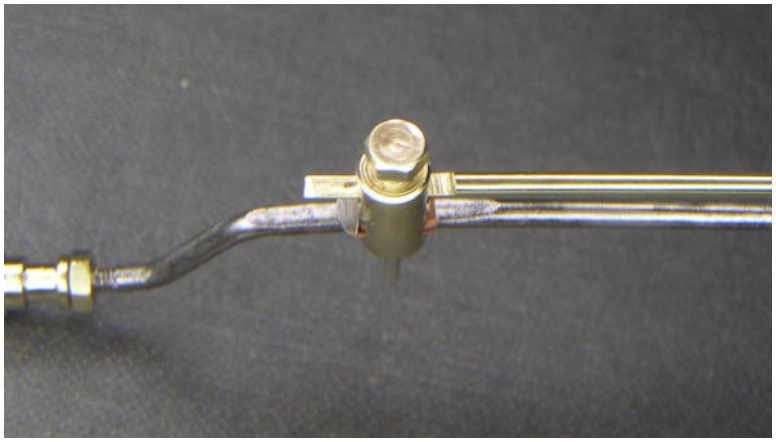


The coil back in the bob with the caps in place. Note the insulated end of the coil in place ready for trimming and fitting to the brass pendulum rod.

The silver contact pin cleaned and ready to be screwed back into the brass housing..



The contact pin assembly with the new steel "T" piece back in place. The "T" piece was cut from mild steel strip 0.5mm thick. I held it in a small hand vice while cutting and shaping..

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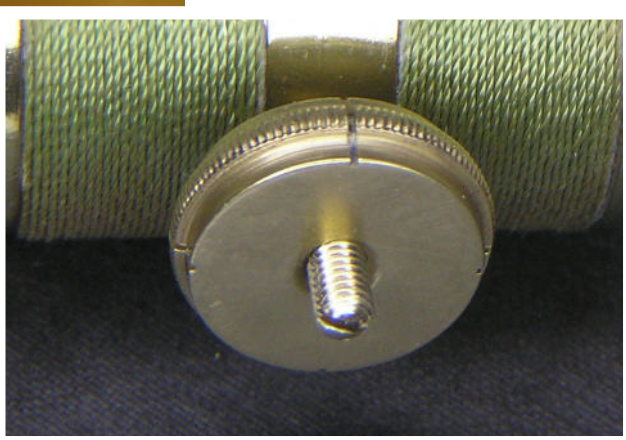
The frame cleaned and lacquered waiting for the pendulum assembly. The stand is a home made one that allows full access to all areas of the mechanism.
The case would be too restrictive too allow reassembly and testing of the mechanism.



The photo above shows the replacement rating nut. The original having been hollowed out to try and lighten it.

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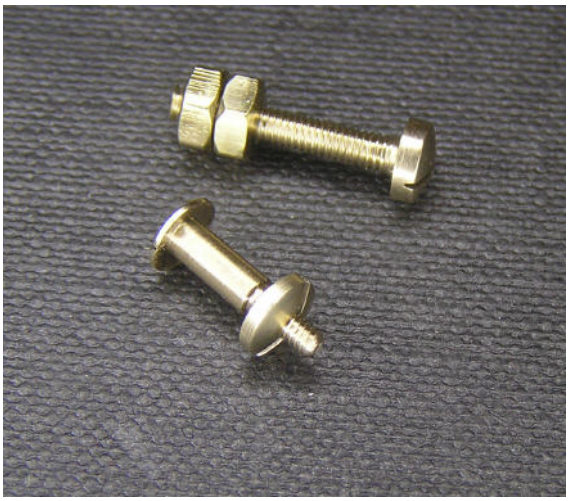
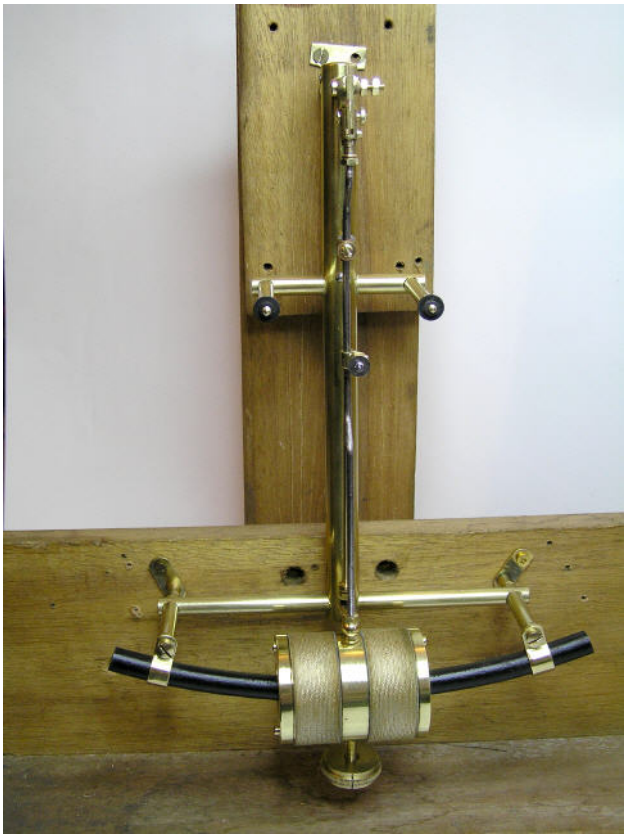


The new pendulum suspension parts that were turned up to replace the mish mash of screws and nuts that were on the clocks when received. The photo at right shows them in place. The top screw will also have a couple of washers between the nuts where one end of the silver contact wire will terminate. The other end will be secured

by the small screw and washers seen just below the lower suspension screw and nut.



The finished pendulum assembly in place on the test frame.

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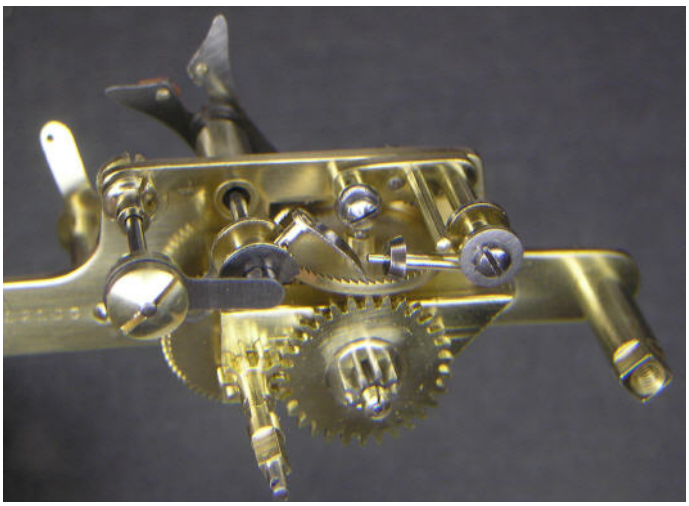
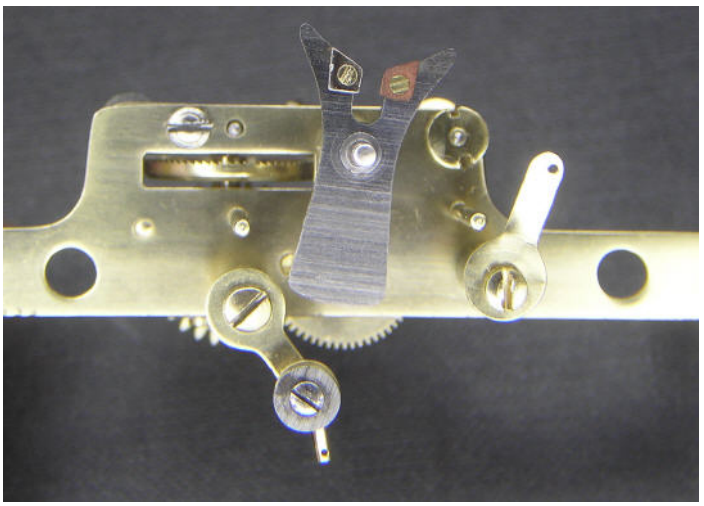
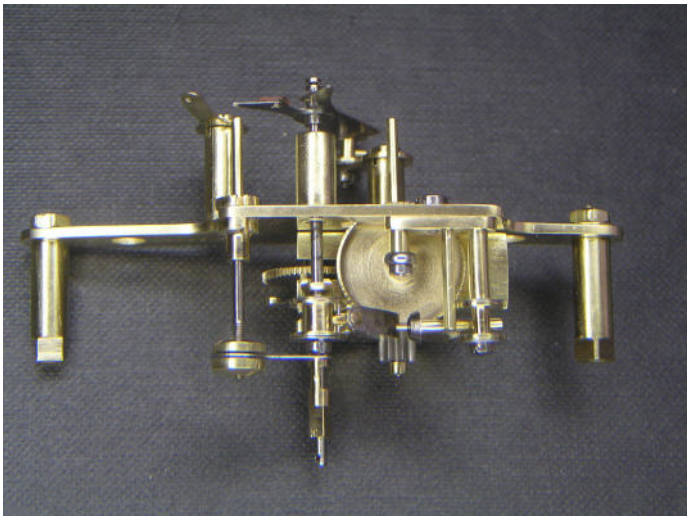
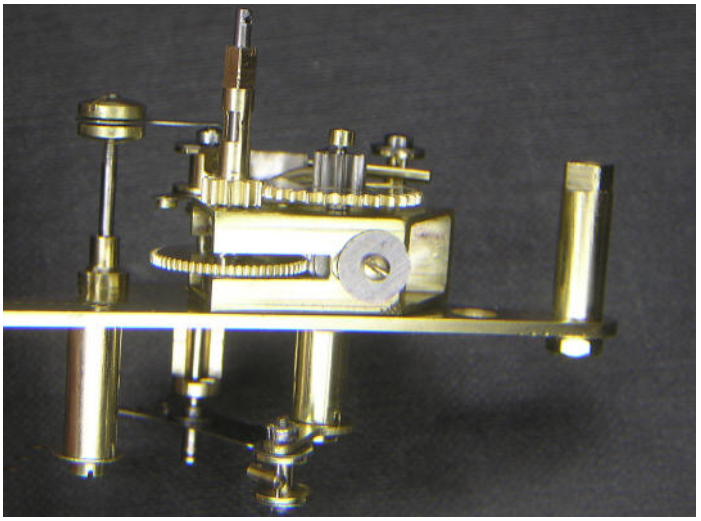

The movement assembled and finished. The silver contact spring will now be fitted and the the assembly mounted on the frame with the pendulum. Note that on this movement there is no provision for a damper assembly. The arbour is still there but only supports the stop assembly for the fork arbour.

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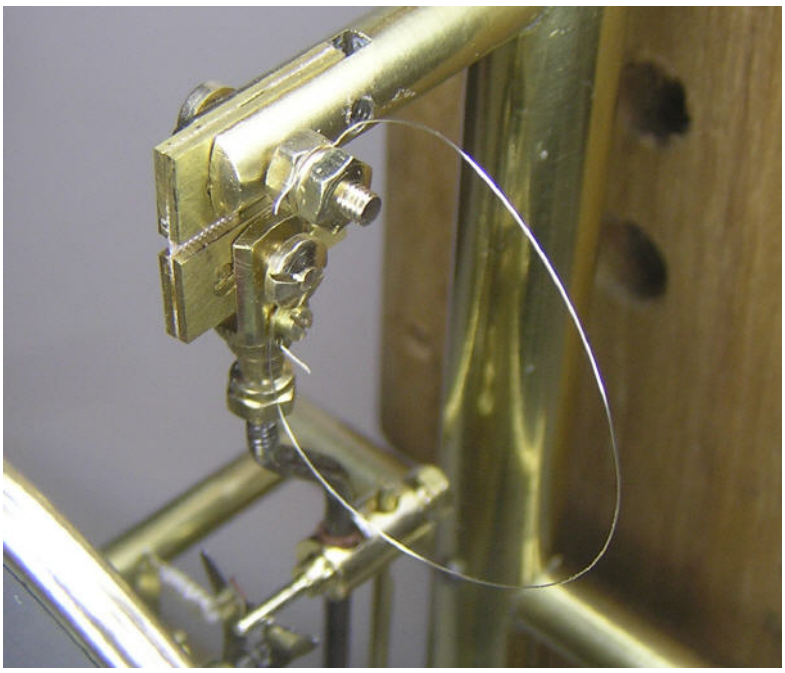

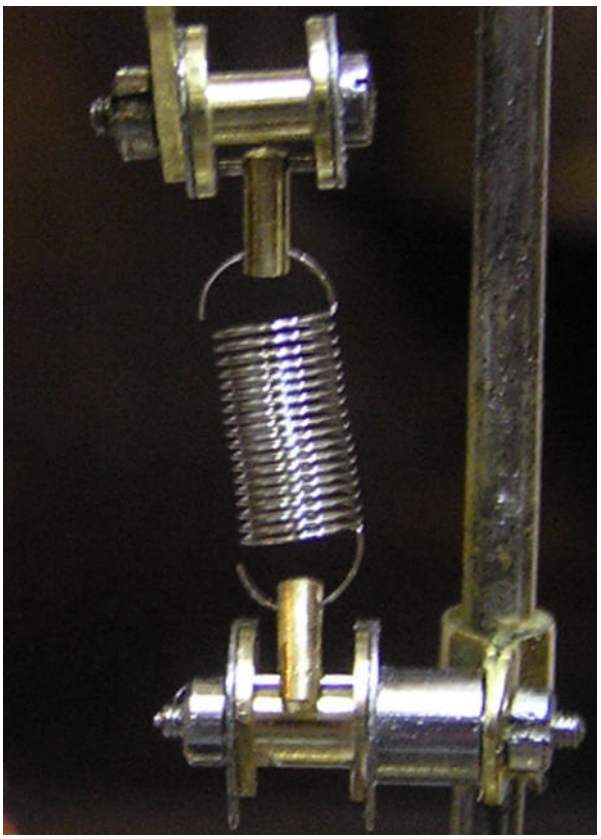

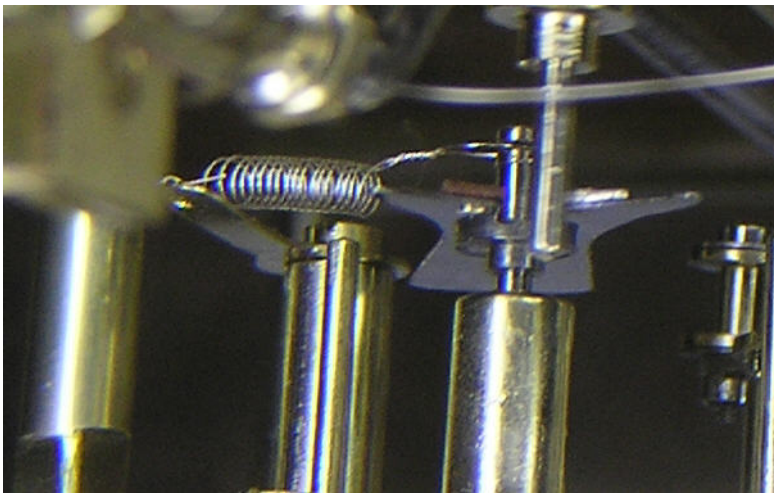

The photo top left shows the Silver contact wire that jumps the gap created by the silk suspension. It must have a large loop so that it is not stressed into breaking by the continuous rocking of the pendulum. The photo above shows the Isochron spring in postion. It should be under no tension when at rest. In fact for the first test run it should not e

be under any tension even when at full amplitude. This will then allow the rating nut to be tested to check that the clock will run slow when fully lowered. Only then should it be brought under tension with the rating nut set at the midway point. The final photo shows the Silver Contact spring in place rolling in the silver groove at the back of the fork arbour, under just enough tension to keep it there.

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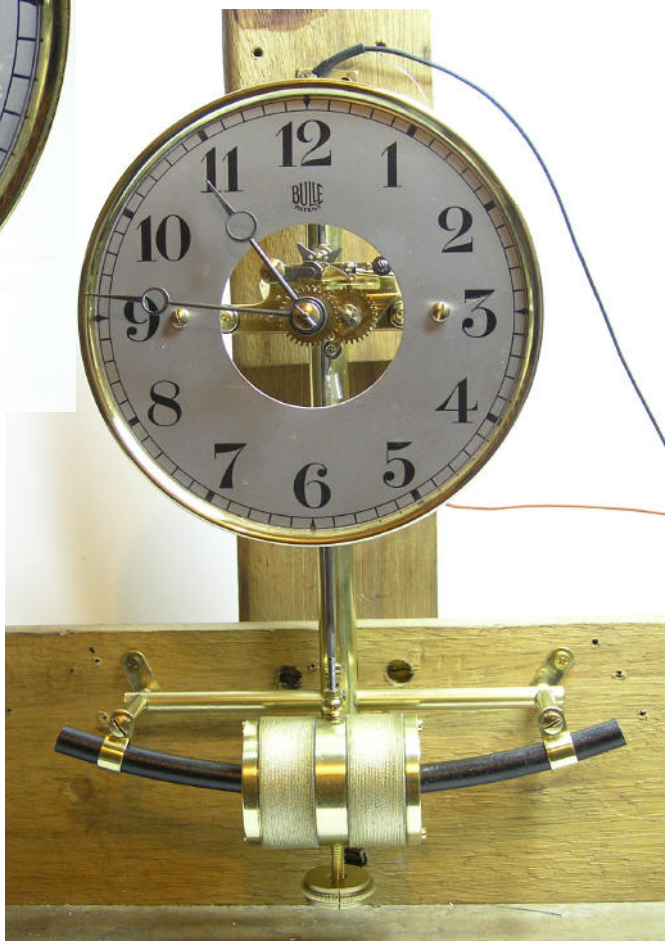
The face was cleaned with just soap and water whilst the brass surround was polished with '0000' gauge wire wool. Great care needs to be taken with this process as one slip and the dial is marked for good. I use two pieces of thin brass sheet; one cut to the outside diameter and once cut to the inside. This allows me to cover the face whilst working on the brass.

The photo at right shows the finished clock in place on the test stand. There now follows a week of testing. making sure that the pendulum has enough amplitude to drive the count wheel and checking that the pawls are not gathering more than one tooth at a time. Loss or gain in 24 hours should only be of the order of minutes. If it gains an hour or more then it is gathering two teeth at each swing. This is normally attributed to the contact pin being set too deep in the fork.



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The finished clock reunited with the case and door. Photos kindly supplied by the owner.

End