

Maintenance, 1/2 Minute Mechanism.

The information, so far has dealt with the setting up of the clock and the performance which may be expected from it. There will come a time, however, when the clock needs attention, due to infiltration of dirt into the pivot holes and other parts, drying up of the lubricating oil, or wear or breakage of some part or parts.

The clock should work for about one to two years without need of oiling or adjustment, during which time the arc of the pendulum should have remained, within a little, quite steady. Whilst the arc does remain steady and the clock is giving a satisfactory performance it should be left alone.

If the arc appreciably decreases or keeps varying it is generally a sign of increasing or fluctuating friction and the clock may soon stop.

Oiling all the pivots and the working surface of the catch may get over the trouble, but if it does not, the clock will have to be stripped down.

It is not usual to get trouble with the switch contacts which are made of platinum unless they are being overloaded without adequate spark suppression.

In a normal Synchronome Master Clock system operating a number of dials, all the coils in the system are individually bridged with a non-inductive shunt resistance which reduces sparking at the Master Clock contacts to a point which is negligible, and no other precaution is necessary. When the Master Clock is operating several hundred dials in a number of paralleled series circuits, a special spark suppressor is used in addition to the normal shunting, this ensures complete protection of the contacts.

If the Master Clock should stop, the stoppage will either be caused by friction in the mechanism or a break in the electrical circuit either of which may be ascertained as follows:-

If the gravity lever is resting on its catch then friction in the mechanism is the cause of the stoppage. If the gravity lever is not resting on its catch, but its roller is on the pallet on the pendulum then a break in the electrical circuit is indicated, the break may be within the Master Clock but usually it is in the wiring of the external dials. Assuming the clock has stopped through friction in the mechanism, and oiling the pivots and catch, as previously mentioned, does not get over the trouble, it will be necessary to dismantle the mechanism for cleaning and oiling.

To do this it is not necessary to remove the pendulum from its set position. The electrical circuit should be opened by removing the wire from the gravity lever terminal or break the circuit at any other convenient point.

Release the gravity lever from its catch and let its roller rest on the curve of the impulse pallet. Now remove the two screws holding the bridge and take out the 15 toothed wheel, the backstop and the catch, being careful when removing the bridge that these parts do not fall out. Clean the parts, if possible, by washing them in benzine, petrol or tetro, drying and wiping perfectly clean with clean dust-free rag.

If it is not possible to wash the parts, clean them off well with clean dust free rag. Clean the bridge plate and the back plate, and clean the pivot holes out with a tapered pegwood twisted in the holes, and scraped clean several times for each pivot hole, until the pegwood comes out clean.

Having cleaned the 15 toothed wheel, see that the pivots are perfectly clean and polish the long surfaces of the teeth of the wheel, they have already been burnished but may now be tarnished. It is best to clean the teeth with a metal polish, such as Bluebell, do not touch the short upright parts of the teeth beyond wiping them clean.

When the backstop and catch have been wiped clean, this assembly is ready to be re-assembled. Before placing the back pivots in the pivot holes in the back plate, oil them with good quality clock oil. Be careful not to bend any of the pivots and that the light catch spring is resting in the little nick on the right hand side of the catch. Replace the bridge carefully, guiding the pivots into the holes and screw the plate down firmly. The catch must be on the right of the catch piece (U catch) on the gravity lever. Next the gravity lever should be taken out for cleaning, first remove the flex from the terminal, take out the screws securing the top pivot plate, take the plate off and remove the gravity lever. Unscrew the top plate holding the steel roller and take out the roller. Wipe the gravity lever clean, clean all old oil off the U catch, clean out the roller pivot hole with peg wood, wipe the gravity lever pivots thoroughly clean and if the platinum contact plate is pitted, clean it with very fine glass paper until the pitting is removed. Clean the steel roller and its top plate and replace them on the gravity lever seeing that the roller is the right way round, i.e. the body of the roller is nearest the top plate, oil the roller pivots.

Before replacing the gravity lever attention should be given to the impulse pallet and gathering click on the pendulum. Remove the gathering click from its bearing screw by lifting the jewelled end of the click and sliding its pivot end out of the hole, backwards. Wipe off the jewel and the pivot end of the click and clean the bearing screw hole with pegwood.

Wipe the pallet clean, particularly the top surface and the impulse curve, if these surfaces still appear to be dirty or stained, rub them carefully with a little metal polish on a rag and clean off, when clean replace the click but do not oil its pivot.

Now the gravity lever can be replaced, first clean the back bearing plate and the top bearing plate, pegging out the pivot holes, replace the gravity lever, first oiling the back pivot. See that the U catch is on the left of the catch, which must be pushed well to the right against its return spring, to do this, re-connect the gravity lever flexible lead to its terminal.

The armature should next be taken out, first unhook the tailspring and unscrew the continuity flexible lead from the baseplate, unscrew the top plate, remove it and the armature. Wipe the armature clean and clean the platinum tip of the screw with a very fine glasspaper keeping it flat on the surface. Clean the top plate and back plate and the pivot holes.

Wipe the two magnet poles clean and replace the armature, first oiling the back pivot, re-connect the continuity flex to the baseplate and hook up the spring.

Oil all front pivots, i.e. the front pivots of the 15 toothed wheel, the backstop, the catch, the gravity lever and the armature. Do not oil the teeth of the wheel or the clock jewel or its pivot bearing. Oil the catch step, i.e. the part of it which supports the gravity lever U catch. Re-connect the electrical circuit when the clock is now ready to be set going again but before doing this check over the various settings as given in the ERECTION section and check and re-set the gaps at the contacts if necessary.

To re-set the gaps, first, with the gravity lever on its catch, push the armature against its left hand buffer when the air gap between the armature and the top magnet pole end should be .01 inches adjust the left hand buffer until this is so. Next, with the armature still held against the left hand buffer and the gravity lever on its catch measure the air gap between the contacts, it should be set at .070 inches (1.8 millimetres) to set this gap adjust the contact screws at the top of the armature. Finally, allow the armature to fall back on its right hand buffer and with the gravity lever still on its catch the air gap between the contacts should be set at .212 inches (5.4 millimetres). When these adjustments are completed see that all screws are held tight with their lock nuts.

Give a final check over to see that the wheel spins freely and all pivots are quite free in the bearing holes, the catch return spring has a moderate pressure and the electrical circuit is re-connected.

The Master Clock dial will probably need no attention, but if it should, the procedure to be carried out is dealt with in the instructions on Maintenance of Dial Movements.

The Master Clock is now ready to be set working. Swing the pendulum just sufficiently to see the 15 toothed wheel is being gathered and the gravity lever is being released and operating every 30 seconds. This Master Clock switch has been designed to operate itself and a circuit of series connected dials at a working current of .33 amp., excessive current will make the switch operate with some violence but the switch and the clocks in circuit will continue to operate correctly providing the current does not exceed about .4 amp. Indeed, it will operate correctly with a reduction of current down to .26 amp. at which point the contact duration which is normally .06 to .08 second, suddenly increases to approximately .3 second. This increase is most noticeable visually at the Master Clock and audibly at the Master Clock and at every dial in the circuit. This is usually a warning that the battery needs attention. However, if the battery is found to be in good order, it could be that there is excessive resistance in the circuit. The weight of the gravity lever, the distance the contacts are apart, the strength of the armature tailspring and the coil winding are all arranged to bring about the above conditions.

(1) The half minute impulse dial movement.

This movement maybe fitted onto the dial on the door of the Master Clock case, or fitted to a complete dial unit which is connected in the half minute impulse circuit.

Operation.

The propelling of the dial wheel work is by means of a reciprocating brass lever having the armature plate at its bottom and which is attracted at each impulse passed through the coil. At the top end of the reciprocating lever is fitted a driving click which engages and drives the main centre wheel. The wheel is held steady and prevented from moving by the backstop lever, the steel squared end of which will be seen resting on a tooth of the wheel immediately below the driving click.

To set to time.

To set the hands to time, press with the finger on the left hand end of the backstop lever which will be seen projecting from the top left hand corner of the movement. This will disengage the wheel work from the click and backstop square and leaves the large wheel free to revolve by hand. Set to time and release backstop.

(2) The one second impulse, full centre seconds movement.

This movement may be fitted onto the dial on the door of the Master Clock case or fitted to a complete dial unit, which is connected in the one seconds impulse circuit. The movement consists of a full set of wheelwork suitable for carrying the three hands, hours, minutes and seconds.

Operation.

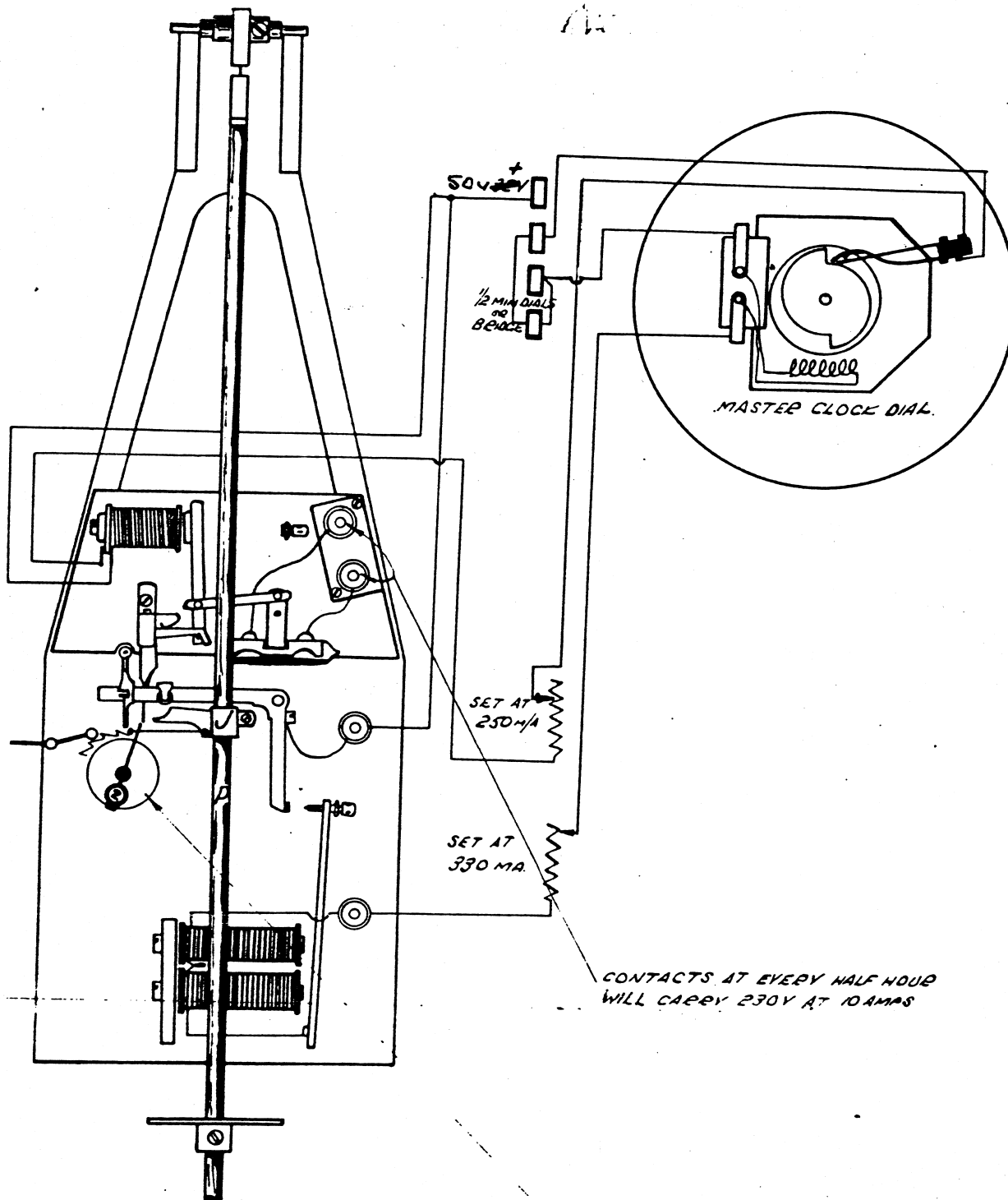
The movement is operated by one second impulses transmitted by the Master Clock, the magnet rocking a pivoted lever and a suitable driving click fitted at the top end of the lever pushing the centre wheel round one tooth for each seconds pulse. The seconds hand is fitted to the arbor on which this wheel is mounted and suitable gearing is arranged for rotating the minute and hour hands at the correct speeds.

To set to time.

To set to time, press down with the finger - the projecting tail of the backstop lever seen at the top left hand corner of the movement. This will free the wheelwork from the backstop and driving click.

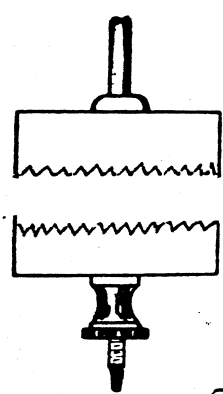
The Hands can now be spun round by turning the freed centre wheel.

When set to time, remove finger from the backstop tail when the driving click and backstop will fall back into position on the 60 toothed wheel.



CONTACTS AT EVERY HALF HOUR  
WILL CARRY 230V AT 10 AMPS

THE DURATION CONTACTS CAN BE ALTERED  
BY LIFTING LEVER & TURNING ROUND SO THAT  
INDEX READS THE SECONDS.



MASTER CLOCK MOVEMENT WITH DURATION  
REDUCER ADJUSTABLE FOR CLOSING CIRCUIT FROM  
2 TO 28 SECONDS, OPERATED EVERY HALF HOUR FROM  
MASTER CLOCK DIAL

DWG N°19443