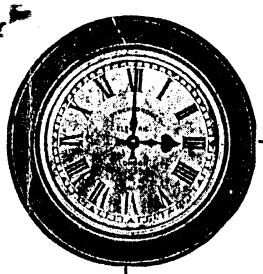
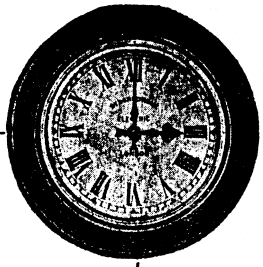


TO BE KEPT FOR REFERENCE.



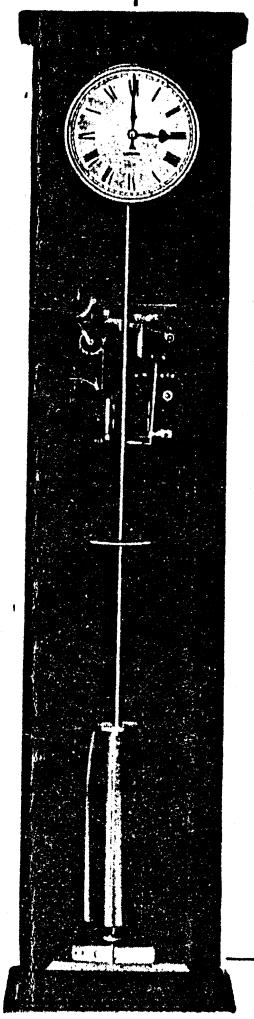
INSTRUCTIONS

for

ERECTION and MANAGEMENT

OF

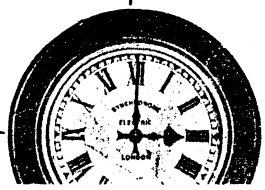
Synchronome ELECTRIC Time-Circuits



In Great Britain our prices generally include a visit of inspection to make sure that all the clocks are properly erected and in good order and adjustment. If erected by our staff we accept full responsibility for their safe-going and time-keeping, but we ask that they be put in the hands of a competent assistant provided with a copy of these instructions

THE SYNCHRONOME CO., Ltd.,

ABBEY ELECTRIC CLOCK WORKS,
WOODSIDE PLACE,
ALPERTON, MIDDLX.



ERECTION

WIRING.—A single line to connect each dial to its nearest neighbour in simple series circuit, as shown in diagram on previous page. Electric light wire of 3/.036 (3/20) or 3/.029 (3/22) gauge is recommended on account of its mechanical strength.

BATTERY.—This may consist of any form of good primary cell, or accumulator battery trickle-charged from the mains can be used.

The consumption of current is negligible. Join up cells in series with clocks.

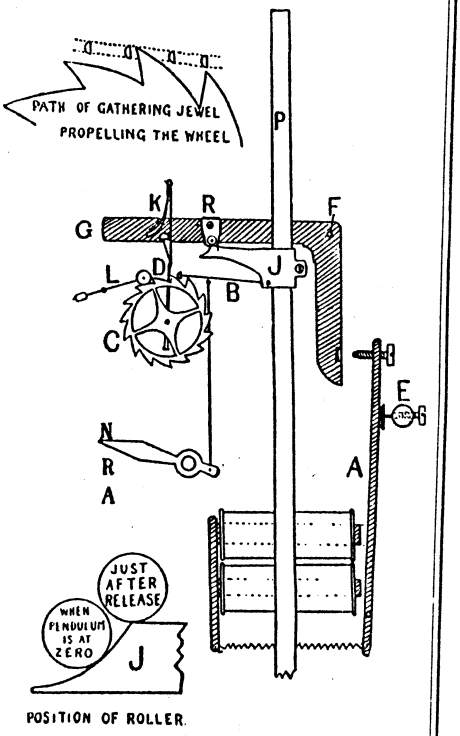
MASTER CLOCK.—Unpack carefully and hang **the pendulum case** on a substantial wall with its top no higher than 6 ft. 6 ins. from the floor.

It is important to hang the case vertically both with regard to in and out and side to side planes, and it should be fixed firmly by means of screws through the back, one on each side of the pendulum suspension and one behind the bob, into Rawlplugs or ordinary wood plugs in the wall. The brass plate at the top of the case is to assist you to hang it temporarily whilst " marking off " for the plugs and screws.

Take the nut and washer off the lower end of the pendulum rod, put the bob on and replace washer and nut, screwing the latter up to such a position that the filed notch in front of the rod is just in sight above the pendulum bob. This will give approximate regulation. Now slip the click B into position. It will be found in a small envelope with the beat plate and the key of the case, tied to the pendulum rod.

The pendulum being now complete, proceed to hang it in position in the following manner. Observe the position of the trunnion and suspension spring on the top of the cast iron bracket, slacken the wing nuts and swing the clamps to one side, thus releasing it. Take out the small metal screw in the split brass head of the pendulum rod and place the lower end of the suspension spring carefully in the slit and fix it by replacing the screw. The complete pendulum may now be hung, the pallet J and click B being on the left and the small set screw on the trunnion being in front ; but before fixing it with the clamps and wing nuts it is necessary to see that the pendulum is in exactly the right position both with respect to in and out and side to side planes.

A Armature.
B Gathering click.
C Wheel.
D Vane.
E Stop screw.
F Pivot.
G Gravity arm.
J Impulse bracket.
K Catch.
L Backstop.
P Pendulum.



POSITION OF ROLLER.

To ascertain this, release the catch K allowing the lever G to fall. The steel roller R should then rest on the steepest part of the curve of the impulse pallet J. If not, the pendulum must be moved right or left along the trunnion and fixed by the set screw provided. The trunnion must be parallel with the back of the case and in such a position that the gathering jewel B lies squarely with its middle on the wheel C midway between the points of two teeth. This position can be adjusted by moving the trunnion inwards or outwards on the cast iron bracket, and when correct it should be clamped by the wing nuts.

The gathering jewel B should engage the wheel C with **just sufficient depth** to move one tooth at a time and no more. The steel wire which carries the jewel must not touch the N.R.A. wire when the indicator is at N (normal), and the upper surface of the pallet J should just not touch the roller R. Catch K being released the pendulum should be unable to reset lever G upon it when the current is off. The beat plate may now be placed in position and fixed if desired.

It is only when the pendulum is at or about zero and travelling (at its greatest speed) through a very small part of its excursion, that it is engaged in (1) turning the wheel, (2) releasing the gravity arm, and (3) receiving its impulse. Its entire freedom at all other times (particularly at the beginning and end of each swing when it is moving at its slowest) is the feature of overwhelming importance, and it is in this respect that it realises the ideal which horologists have been striving after for centuries.

THE DIALS may be hung like pictures on single screws or nails. The ends of the line wires must be carefully led into the back of the dial cases and securely gripped in the spring clip terminals.

THE BATTERY can be proved sufficient in the following manner. Having joined up the instruments in series circuit with all the cells and started the installation, reduce the battery one cell at a time until the magnet is incapable of resetting the gravity lever G without the assistance of the pendulum pushing roller R in its return excursion to the left. This is known as **battery warning.** Note the number of cells in circuit when this occurs and replace say 10% or 15% of that number.

MANAGEMENT

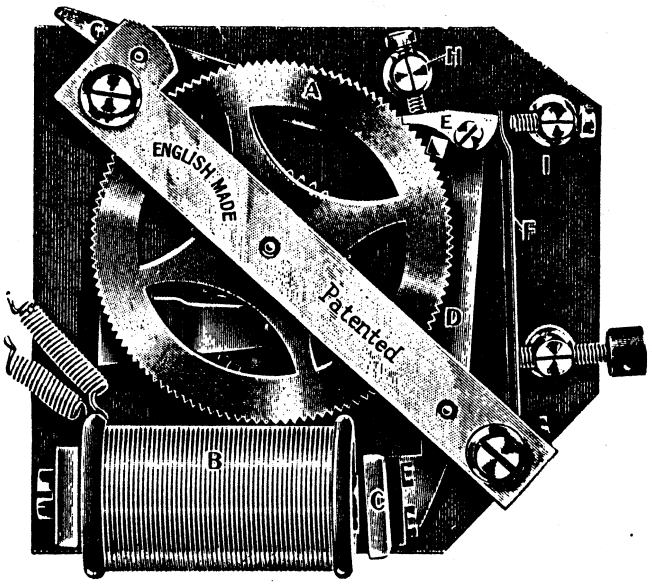
If a breakdown occurs you are earnestly requested to communicate at once with us, as the installation is guaranteed.

If the pendulum has stopped and it is desired to ascertain the cause, note whether **lever G is** supported **on** catch K or is **down,** resting against the pendulum. If the latter, start it swinging again gently with a sufficient arc to enable the contact surfaces to meet. If no current passes, then there is a disconnection at one of the terminals or a break in the line. On the other hand, if the magnet attempts to throw up the weighted lever but is unsuccessful, then either the current is insufficient, the automatic warning of impending failure having been neglected, or there is something preventing the spring catch K from holding the lever G.

If when the pendulum is stopped, lever G is found to be **resting on catch K** and the pendulum only requires to be restarted, the battery and wiring being all right, then the stoppage has been due to something impeding the motion of the pendulum, such as undue friction in the movement of the wheel or its releasing of the catch.

In the event of any one Dial stopping or dropping behind time, take it out of circuit, twist the wires together quickly between successive impulses, noting the precise instant of their occurrence by means of the seconds hand of your watch.

A Main wheel
B Electro-magnet
C Armature
D Armature lever
E Driving click
F Driving spring
G Backstop lever
H Momentum stop
I Stroke limit stop

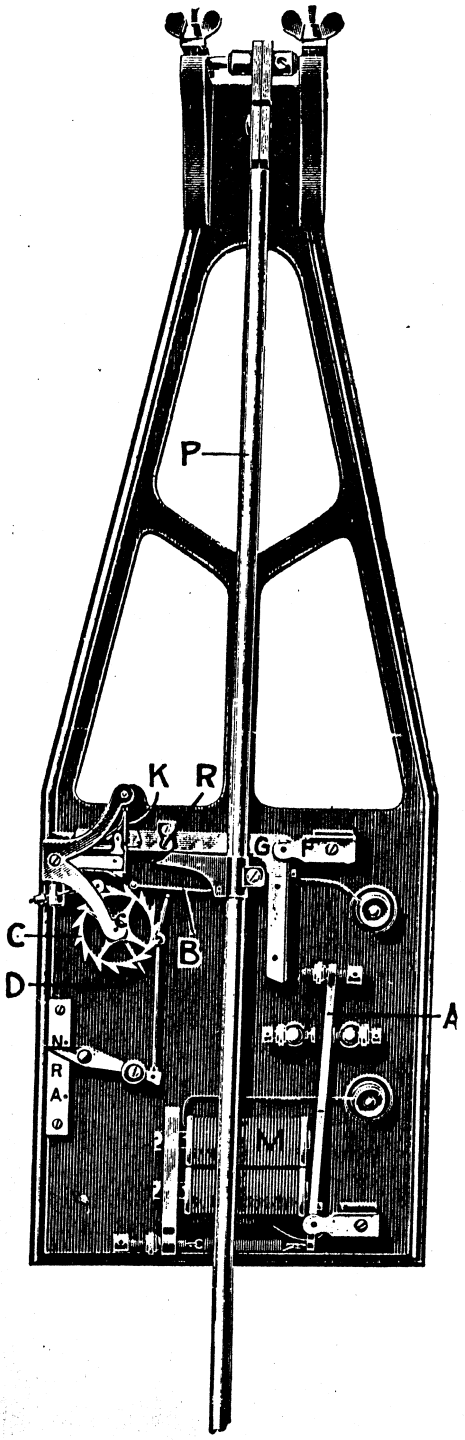


If it is desired to ascertain and correct the fault, open the back and lift the backstop lever G, which will hold the driving click E out of engagement with the wheel A, and spin the wheel A to find undue friction. If the wheel and hands revolve quite freely, there is only one thing more to look at, viz.: the flat steel spring F, which must be just strong enough to propel the hands, but not too strong for the electro-magnet B to pull it over. It may be easily adjusted by the capstan screw.

In the event of its being necessary to attend to any individual dial to turn the hands to time, **never touch the hands themselves,** but open the back and touch the armature with the finger, or lift the backstop lever and spin the wheel.

Notice to those who erect their own installations.

All adjustments are carefully made in these works before the instruments are sent out, and are securely locked. In order to prove that these adjustments have not been altered and to satisfy yourself and us that the Controlling Pendulum has been properly erected you are asked to fill in the following form by answering the questions. If this is done the Synchronome Co., Ltd., will accept it as a substitute for erection by their own staff, and will be responsible for the safe-going and time-keeping of the installation.


P
K
R
G
C
B
D
A
N
R
A
M

REGULATION

REGULATION.—Take hold of the pendulum rod firmly, just above the bob, in order to prevent its twisting and damaging the suspension spring or click B, and if the clock is slow, turn the rating nut so that the front edge moves from left to right, and the bob is raised : if fast, turn it in the opposite direction. **One complete revolution of the rating nut will make a difference of half-a-minute in 24 hours,** the figures 10, 20 and 30 on the rating nut representing **seconds** in 24 hours.

For accurate regulation, prove a small but definite losing rate by two or three observations, then turn the nut upwards accordingly, taking great care not to overshoot.

If an adjustable platform is provided at the middle of the pendulum rod, the addition of 0.6 gram weight will cause the clock to gain 1 second in 24 hours.

DIAL SETTING FROM MASTER CLOCK.

To set all the dials forward if slow :—

A Few Seconds.—After the release occurs, move the wheel forward, each tooth passed representing two seconds.

A Few Half-Minutes.—When the pendulum swings to the **left** release the catch K with your finger. **On no account must lever G be released unless the pallet J is underneath it to prevent its falling on to the armature contact, which might cause trouble.**

Longer Periods.—Depress the lever to A (accelerate). The switch will then work every two seconds instead of every half-minute. By this means the Summer Time advance of one hour will be accomplished in 4 minutes and 16 seconds.

To set all the dials back if fast :—

A Few Seconds.—Before the release takes place depress the tail of the backstop glass roller L and turn the wheel backwards, each tooth representing two seconds.

A Few Half-Minutes.—Hold a piece of paper between the contact surfaces before the gravity lever is released, and then reset it by hand.

Longer Periods.—Move the setting lever from N (normal) to R (retard) for as long as may be necessary. After one hour's stoppage to revert to G.M.T. in the Autumn, it will be necessary to start the pendulum again.

The Church Army Press, Cowley, Oxford, England. 14488

CONTROLLING PENDULUM ERECTOR'S CERTIFICATE.

Movement No.....erected by.....
(See bottom of N.R.A. plate).

at..... Date.....

address .....

What is the space between the poles of the magnet and armature? It should be one-hundredth of an inch. Insert a piece of thin notepaper and see that you cannot grip it. .....

What is stroke of the armature and gravity lever? It should be $\frac{3}{4}$ **travel in company** with $\frac{1}{4}$ **kick.** .....

What is the minimum arc of the pendulum on which the jewel will gather? It should be 1° + 1° or 20 m.m. + 20 m.m. .....

What is position of impulse roller when pendulum is at zero? Sketch the curve and the roller. .....

What is the minimum contacting arc? *i.e.*, minimum arc at which contact can be made and gravity lever reset. .....

What switch air gap results? *i.e.*, space between contacts when lever is on catch and armature is pushed against the poles of magnet. .....

Is the gathering click no deeper in engagement than sufficient to allow backstop roller to drop into next tooth? .....

Is N.R.A. adjusted? The lifting wire should be altogether clear of B when indicator is at N; should raise B clear of the wheel at R; and should raise the jewel to engage the accelerating arm of catch when the indicator is at A. .....

How many cells were taken off before battery warning? .....

How many cells were taken off further before dying kick? (battery too weak to replace lever). .....

How many cells were left operating the circuit? .....

In which room is battery situated? .....

Is pendulum case rigidly fixed to a substantial wall? .....

How many screws, and is wall plugged? .....

Who did the wiring? .....

Who keeps series order list, and/or wiring plan? .....

Fill in spare form and return to—
THE SYNCHRONOME CO., LTD.,