

## INSTRUCTIONS

## FOR THE INSTALLATION, SETTING UP, STARTING AND ADJUSTMENT

## OF THE BRILLIE ELECTRIC REGULATOR (MASTER-CLOCK).

UNPACKING.

Open cardboard box (Fig. 3), remove contents with care, i.3 : pendulum B of the regulator, its battery P. Cut strings which secure these parts and remove them from Box. Hold the pendulum carefully by means only of its compensating sphere, without hurting the rod or the pawl fixed on the latter.

•1, 3 Unpack the fastening angle-bracket with its four screws (three steel and one brass screws).

CHOICE OF LOCATION.

Whenever possible, choose a thick wall which is not subjected to vibrations. The regulator should be placed so that it cannot be damaged by accidental shocks.

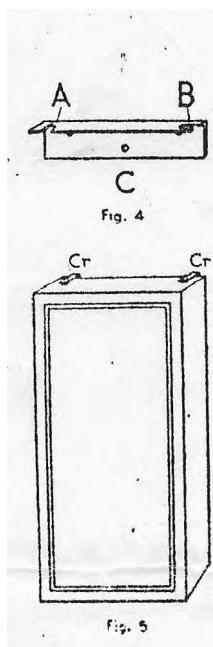
The regulator must, on no account, be installed in a damp place nor in any location where the air contains acid vapours, metal particles or any kind of dust. It must not suffer from severe temperature variations during the winter.

Avoid the proximity of metallic masses, particularly masses with magnetic properties. Iron girders, often embedded in the walls, will interfere with the accuracy of the unit.

In any case, moving metallic masses should be kept at a distance greater than three feet, since their action on the pendulum varies with their position (metallic doors, which naturally open or close, drawers, etc ...)

Set the angle-bracket at the selected spot (Fig. 4) the side with the slots a and b placed above the three holes. Mark on the wall the location of the three holes and drive in the wall three plugs. Then fasten the angle-bracket with the three steel screws.

Remove the box covering the pendulum by turning the two knobs Cr (Fig. 3) towards the outside of the box.



Hang the marble plate on bracket C. This is done by holding the middle parts of the marble plate with both hands, twisting it slightly to the right, and insert thoroughly rod b' inside slot b. Then lift up the marble and insert rod a\* inside slot a (fig. 6). The marble plate may now be left hanging by means of the nuts on rods a\* and b'.

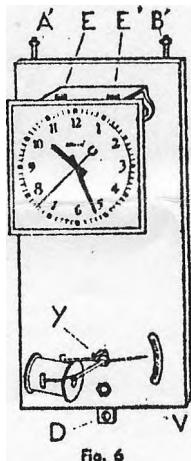


Fig. 6

Rotate the nuts using a spanner, so that the marble plate hangs as nearly perpendicular as possible.

Mark on the wall the location of hole D on the lower part of the marble plate. Remove marble plate in a manner opposed to that described above, i.e., removing rod a' first, then rod b'. Drive in the wall a plug front of the hole D.

Replace marble in perpendicular position as described above. Remove mechanism by using one hand to unscrew the milled edge bolts EE' (leave the small milled bolts F) (Fig. 7) while supporting the mechanism with the other hand.

When the master clock is intended to control some slave clocks, connect the lead as indicated by the connection diagram. Insert the wires through the holes drilled in the marble plate, inserting them from the back of the plate.

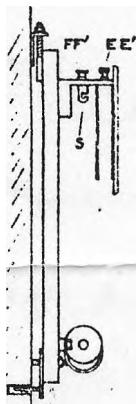
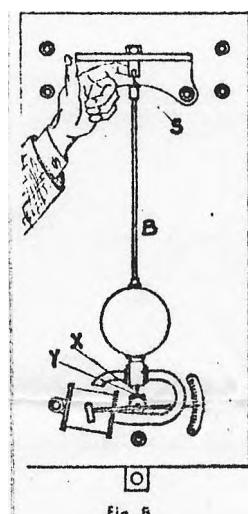


Fig. 7

Firstly the two wires of the supply battery through the hole at the lower left side of the plate to be connected to the two terminals placed on each side of the hole.

Secondly the two wires from the slave clocks line through the hole at the upper left side to be connected to the two terminals placed in the middle of the bronze support of the mechanism, F and F' (Fig. 7) and not to the milled heads E and E' fixing the mechanism on its bronze support. Take care that the wires do not come into contact with the support.

Place pendulum by proceeding as follows, in order to avoid damage to the suspension.



Having removed the cardboard label, use right hand to take pendulum, holding the sphere. Insert the lower branch of the magnet inside the coil piece at the bottom of the marble plate. Hang pendulum on suspension S lightly holding the latter with the left hand (Fig. 7). Let the pendulum rest lightly on the suspension.

Avoid any pressure or shock that might twist or break the suspension.

Place the pendulum dead perpendicular by bringing reference mark X (Fig. 8) fixed on the lower portion of the pendulum and mark Y on the brass bracket at bottom of marble to face each other. This is achieved by means of the nuts A\* and B\* of the rods holding the marble plate. Once the two marks face each other exactly, adjust to perfect coincidence by means of screw V

Fig. 8

(Fig. 6) placed at the bottom of the marble plate, bearing against the wall. Use a spanner to free the locking nut and rotate screw by means of a screwdriver, moving the marble plate closer or further away from the wall. When the two marks coincide exactly, block the adjusting screw and screw the brass screw into the plug through the hole D. Do not tighten the bolt but bring it to bear on the lower brass bracket, being careful not to move the marble plate so that the marble plate hangs freely on the two nuts a' and b\*. The bolt at D is used only to maintain the plate when the box is removed.

Replace the mechanism carefully by first introducing the fixing rods in the corresponding holes on the bronze support. Screw the two milled heads and tighten.

Place supply battery P (Fig. 9) in position. First, dislodge the small cork plug used to keep the battery sealed during transport, by pushing it with a matchstick, then fit a small plug of cotton smeared with vaseline. Place the battery on its support placed at the right of the marble plate, behind the dial. To do this, slide the copper plate fitted to top of battery into the grooves on the two brass rods G and G'. Push well in and see that top of battery O fits snugly in cavity T of spring R therefore ensuring good electrical contact (Fig. 9).

#### STARTING AND SETTING CORRECT TIME,

Hold lightly the U of the magnet and pull pendulum to the right, some two centimetres from the vertical. Release pendulum lightly. The movement of the pendulum should now maintain itself until the battery supply gives out. Wearing out of the battery will be indicated by stoppage of the pendulum or by a quickening of the rate of swinging together with a decreasing of the amplitude of the pendulum swing. This amplitude is normally 40 mm., measured at the curved tip of the magnet.

Set the second hand by advancing it by hand, in its normal direction taking care not to stop it nor pushing it back. This would result in damaging the hand or the pendulum pawl.

Set the minute hand by advancing it in its normal direction, be careful to leave the hand in a position corresponding with the direction of the second hand, i.e : on a minute graduation when the second hand coincide with 0.

To stop the master-clock, for instance when it is too fast, . lightly catch the magnet when the pendulum is at the top of its swing and bring it back carefully to vertical position where it hangs left. To re-start, proceed as described above.

If the time indicated by the slave clocks is in retard by comparison with the time indicated by the regulator, proceed as follows • advance manually the second hand of the regulator between seconds 5 and 27, then between seconds 33 and 57, lifting the second hand advance by the pendulum impulse between seconds 57 and 3 and between seconds 27 and 33. If the slave clocks are in advance, in order to retard same stop the pendulum as described here above.

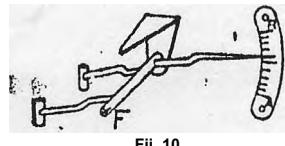


Fig. 10

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P.485O.

Once the correct time has been set, replace cover, securing it to the marble plate by means of hooks Cr placed at the top of the cover (Fig. 5)»

#### ADJUSTMENT

The master-clock is adjusted before leaving the factory and normal working variations should not exceed three or four seconds per day; however, components may be displaced during transport and errors of a greater magnitude may be observed after a few days of normal working conditions.

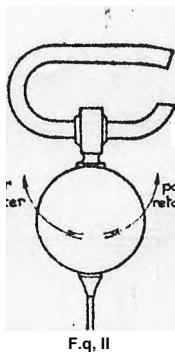
Errors can be easily corrected and the master-clock is adjusted as follows:

In order to make absolutely certain that the regulator actually advances or retards, comparative checks should be carried out between the hour indicated by the regulator and the hour listened by phone from a local observatory or from a speaking clock.

Adjustments must not be carried out until the above comparative checks have been made over a long enough period, so that the difference between BRILLIE master-clock readings and those of the reference can be appreciated with some precision.

Once the difference is appreciated with precision, the period during which the difference was observed being carefully noted, the average error should be derived by simple division and expressed in seconds per 24 hours.

Adjustment can now be carried out.



If the average variation remains at only some seconds per 24 hours, the following procedure is adopted: insert a small screwdriver inside the slit of red F of the magnetic adjustment (Fig. 10) and rotate the rod slightly, thus moving index I over a scale fixed on the marble plate. The scale shows, by means of letters A and R, the direction of the required correction. Each graduation corresponds approximatively to a correction of one second per 24 hours.

Should daily variation exceed 2 seconds per 24 hours, the magnetic adjustment is not used. Use is made of the compensating sphere, as follows:

Remove mechanism from its support, as described earlier. Carefully remove pendulum from its support. Maintain pendulum upside down by holding the magnet piece with one hand and rotate sphere clockwise or anti-clockwise, according to whether one wants to advance or retard the regulator (Fig. 11).

Small graduations on the lower side of the sphere move in front of the reference mark engraved on the support of the magnet. They correspond approximatively to variations of 2 seconds per 24 hours. The pendulum will now be replaced as indicated earlier.