APPENDIX NO. 3

THE MAGNETISING OF ROTORS

It is obviously to the advantage of the repairer to have available the apparatus that will enable him not only to check the rotor strength, but also to re-magnetise the rotor, if necessary.

Detailed below are the particulars of suitable apparatus, that should not be beyond the scope of those who have access to simple machine shop facilities. It will be appreciated that this apparatus will not work to the high standards set by the Company on their new production lines; nevertheless, the results obtained should prove satisfactory.

There are three stages in the rotor magnetising process:

MAGNETISING

1. The drawing (Plate 14) gives details of a magnetiser, for 100/125V and 200/250V 50 and 60 cycle rotors, for the Bijou and Autolarm types. It will be noticed that a circular steel baseplate holds six steel cored bobbins. These bobbins have elongated pole pieces which locate in slots milled into a phosphor bronze centre core, on which the rotor locates. Three further slots on the core afford clearance for the rotor self-start star, and a pin ensures correct location. The bobbin windings are connected in series and arranged so that the polarity of the poles alternate, *i.e.* N.S.N.S.N.S. Two sets of coil windings are given as for a 100V. D.C. supply, and also for a 24V. D.C. supply The magnetiser is connected to the supply with a push button type of switch in the positive lead. (It is important that the switch should be of a design that cannot be left "on," and should be capable of carrying an inductive load of 10 amperes. If possible, use a mercury switch, balanced in such a manner that it immediately falls to "off" when finger pressure is released.) To use the magnetiser, locate the rotor on the positioning pin, and switch the power supply on for at least one second's duration. The rotor should now be fully magnetised, or, to use the correct term, saturated.

For rotors fitted to 25 cycle type clocks, a four pole magnetiser is required. This should be built up in a form similar to the six pole magnetiser, but with four bobbins only. Modification of phosphor-bronze centre piece is also necessary. For 24V. D.C. each bobbin should be wound with approximately 148 yards (135 metres) of 26 S.W.G. enamelled copper wire.

STABILISATION OF ROTOR

2. This operation insures that fluctuation of the rotor magnetic strength will not occur. The stabiliser is adapted from a standard stator as used normally with the rotor. The stator bobbin winding is removed and replaced with a winding of 7,000 turns of 43 S.W.G. enamelled copper wire for a 200/250V. 50 cycle supply

For a 100/125V. 50 cycle supply use 7,600 turns of 43 S.W.G.

On a 100/125V. 60 cycle supply use 6,500 turns of 43 S.W.G.

The schematic sketch shows that this stator coil has a variable resistance and press button switch incorporated in its circuit. The milliammeter shown is not essential, but provides an excellent method of keeping

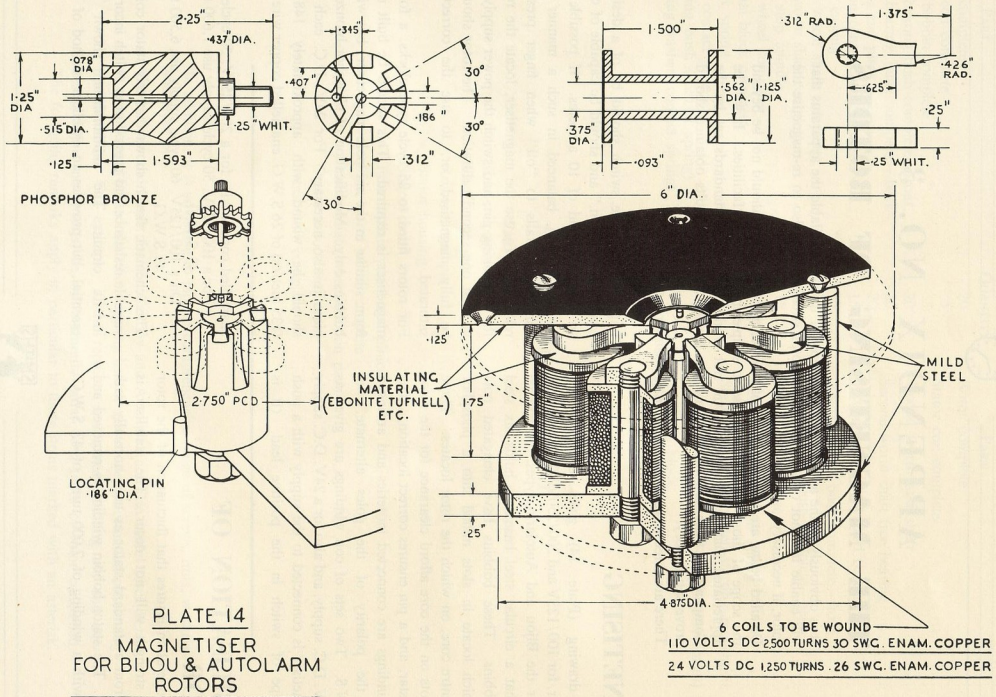
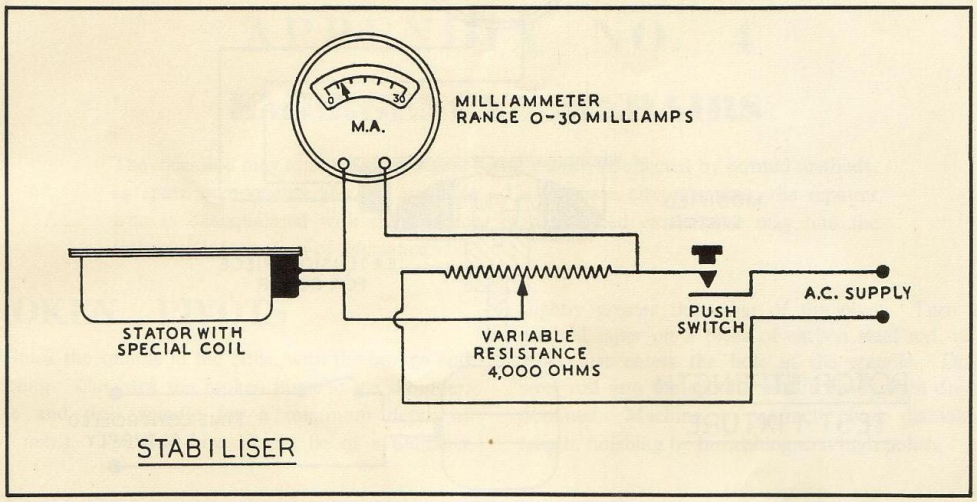


PLATE 14

MAGNETISER
FOR BIJOU & AUTOLARM
ROTORS

the stabilising strength constant. Experiment will be necessary to obtain that setting of the variable resistance which gives correct stabilising figure strength. In use, place the magnetised rotor into the stator, set the variable resistance at a high value, depress switch momentarily, and check rotor strength on fixture 3. Repeat this operation as necessary, increasing or decreasing the variable resistance setting according to the rotor strength obtained. If the reading obtained is too low, it will be necessary to re-magnetise, before stabilising again.



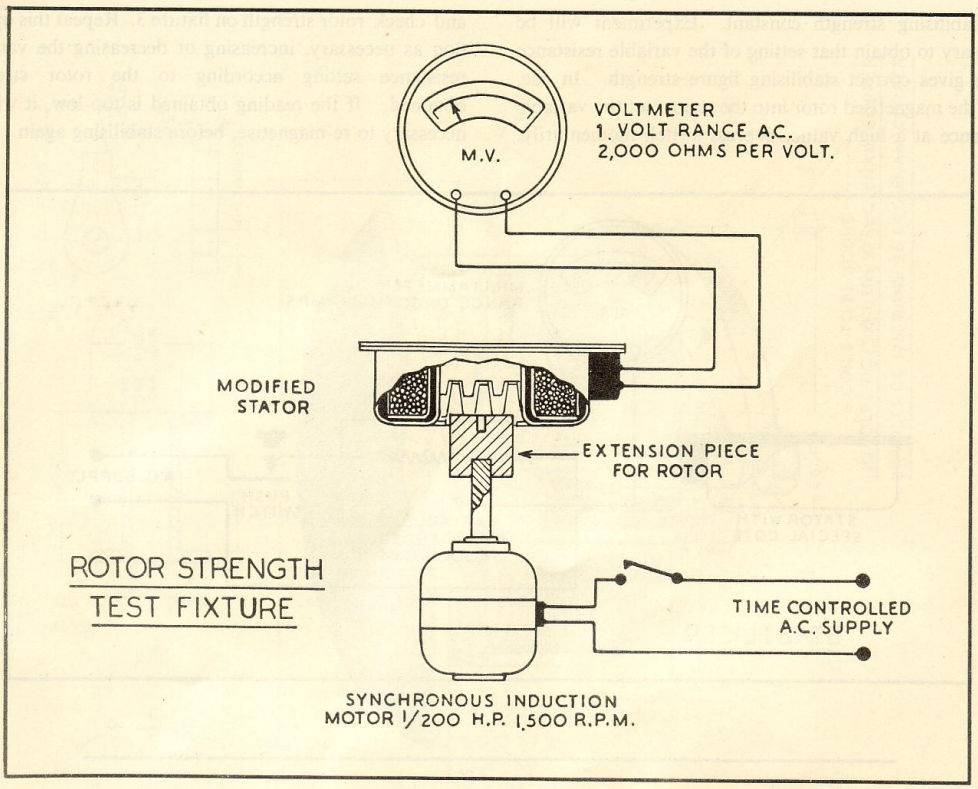
CHECKING ROTOR STRENGTH

3. To avoid the use of laboratory apparatus, the following method is recommended:

It will be appreciated that if the rotor is driven in the stator, an E.M.F. will be created in the stator windings. This E.M.F. can be read on a sensitive meter, and will prove a direct indication of the rotor strength.

To build the test apparatus, obtain a fractional horse power motor (not less than 1/200 H.P.) that is designed to run on the A.C. supply at a synchronised speed (1,500 R.P.M. on 50 cycle mains, 1,800 R.P.M. on 60 cycle mains.) The motor is mounted in a vertical position, and its driving shaft is lengthened by forcing or clamping on a brass or phosphor-bronze extension piece. This extension piece is drilled to take the rotor shaft, and slotted to clear the self-start star. A pin, driven into the brass extension, locates between the magnet poles. and ensures that the rotor will rotate at the same speed as the motor. If the machining operations have been correct, the rotor will be concentric with the motor driving shaft. (This brass extension will have an appearance somewhat similar to that of the centre piece of the magnetiser.)

A standard stator for the rotor under test is modified by removing the bearing and sufficient of the bottom stator half, to give a clear bore through the whole stator. The stator is mounted above the motor, in such a position that, when the rotor under test is located on the motor extension, it asumes a position equivalent to that when in a timepiece. The stator coil windings are connected to a sensitive A.C. millivolt meter, for indication of the E.M.F. obtained when the rotor is driven. The best method of calibrating the apparatus is to apply to the Spares Department for pattern rotors, specially calibrated to top and bottom limits. The readings given by these rotors can be adopted as standards.



NOTE

In general, the foregoing text and attendant drawings are for rotors fitted to the Bijou and Autolarm movements. It will be appreciated, however, that apparatus on a similar principle can be constructed for other types of rotors, should the quantities handled justify the expense.