INSTRUCTIONS

FOR

GENERAL ELECTRIC MASTER CLOCK

Type B

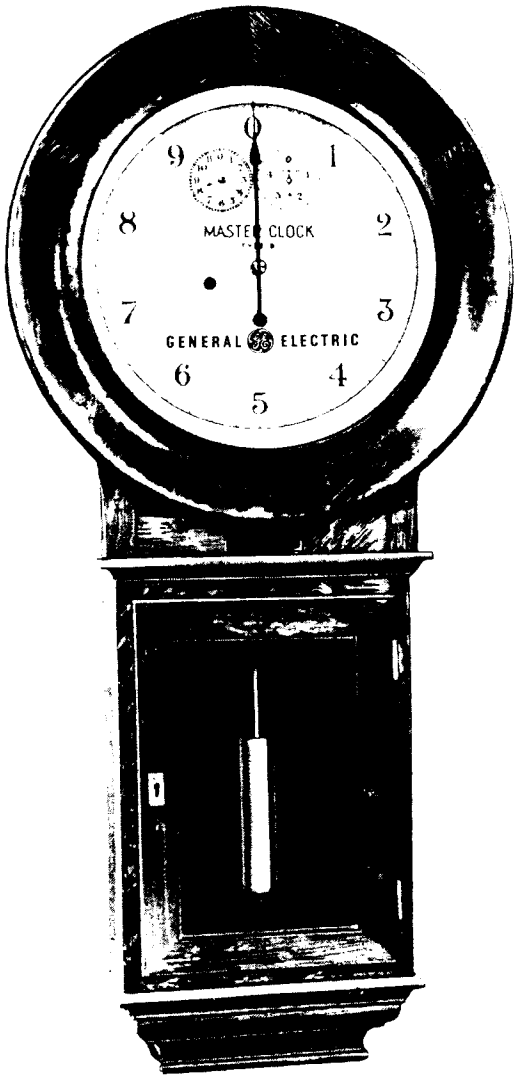

FIGURE 1
Telechron Type B Master Clock

Installation and Operation of Type B Master Clock

It is recommended that only a man familiar with clock or meter movements be allowed to install, start, and regulate this Master Clock.

Use care in unpacking the clock in order not to break the glass or to damage the case. Do not allow any packing material to get inside the case.

CAUTION: ***Do not remove the blocks holding the pendulum until the clock has been permanently mounted. It will, however, be necessary to remove the nuts on the long bolts projecting through the back of the case and to bring the ends of the bolts flush with the back of the case.***

Location

Mount the Master Clock in a location which is firm and free from vibration and, in addition, where it can be clearly observed by the switchboard operator.

Plumbing the case

Having temporarily mounted the clock, plumb the case in two directions with a level, as shown in Fig. 2, so that the pendulum will hang in the proper relation to the movement. Securely fasten the case and check the squaring.

Releasing the pendulum

The blocks holding the pendulum may now be removed. Extreme care should be taken not to twist or to roll the pendulum as this will bend the suspension spring and thus make accurate operation impossible.

Wiring

Connect the terminal block on the top of the case to a reliable source of alternating current of the characteristics marked on the nameplate. The wires at the clock should be flexible in order to prevent the transmission of vibration. Because of the low power consumption (8 volt amperes) the connection can be made to an instrument transformer circuit if desirable.

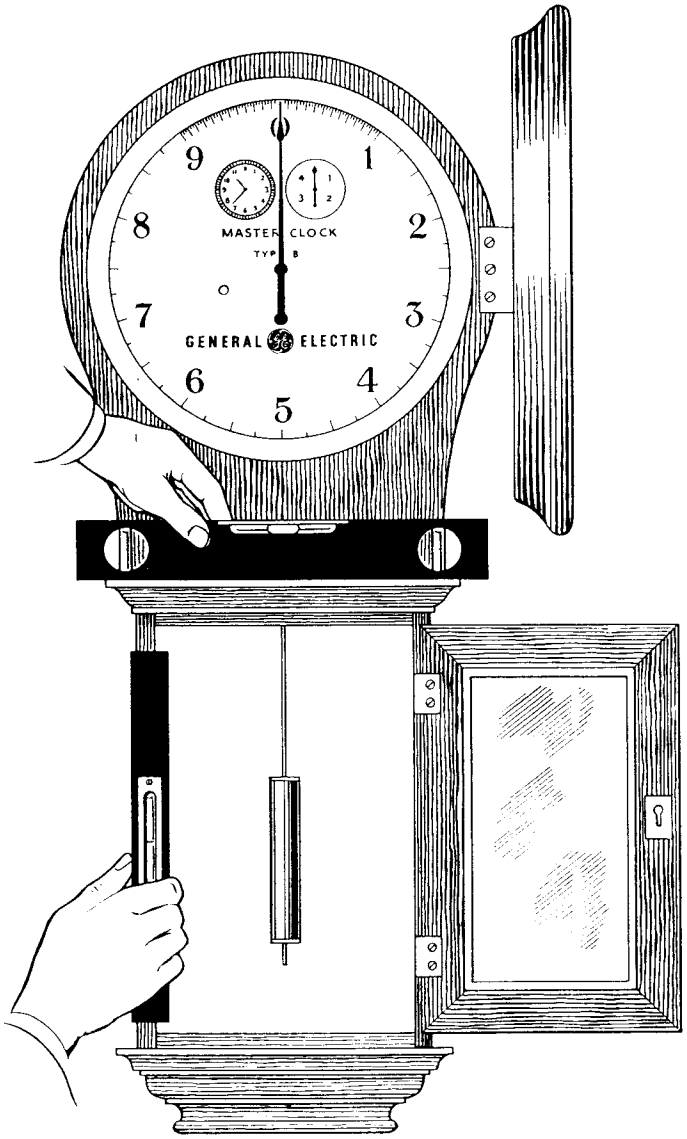

FIGURE 2

Starting the Master Clock

Energize the electrical circuit. Start the pendulum. The hands of the two small dials should be manually set to indicate the correct time. The large hand should be manually set to zero. If the clock is accurately regulated and the average frequency is correct, this hand will remain at zero, pulsating slightly with each beat of the pendulum.

Timing of pendulum movement

In order to facilitate the correction of any errors which may occur in the rate of the pendulum, a weight pan has been mounted on the pendulum rod. It is recommended that all timing errors be corrected by varying the weights rather than by stopping the pendulum and adjusting the position of the bob.

The Master Clock, when tested at the factory, kept accurate time when the weights in the envelope marked "Regulating Weights" were upon the pendulum pan. As mounted in its new location, the clock may require a change in the weights in order to maintain accurate time but this can only be determined after it has been in operation for several days.

If the Master Clock shows by its record that it is LOSING, weights (of the average number of seconds which the clock is losing in twenty-four hours) should be ADDED to the pendulum pan.

If the Master Clock is GAINING, weights (of the same value as the average number of seconds per day that the clock is gaining in twenty-four hours) should be REMOVED from the pendulum pan.

If necessary, the timing of the pendulum can be corrected by turning the adjusting nut at the base of the pendulum bob. If the clock is GAINING, the nut should be LOWERED. If the clock is LOSING, the nut should be RAISED. Each division of the nut will change the rate by approximately one second per day.

As the pendulum is making 80 beats a minute, each movement of the "seconds" hand on the small five minute dial indicates only ¾ of a second rather than a second. This must be taken into consideration when corrections of the timing rate are made.

The weights may best be changed by handling them with a pair of tweezers, moving the latter back and forth with the pendulum. In this manner, the period of swing of the pendulum will not be disturbed.

The pendulum time of the clock should be compared with correct time signals each day, always at the same hour, and a record should be kept of the daily change in the time rate. If the timing is incorrect, the necessary correction should be made by adjusting the weights on the pendulum pan. While the master clock is in operation for maintaining a correct average frequency, the various hands should not be manually reset to correct a small error in time. The small dials can be reset to correct time, without touching the hands, by grasping the pendulum bob and by vibrating it faster than its normal rate to make the hands gain or by holding it stationary if the hands are fast. As soon as the hand on the right hand dial registers the correct time, the pendulum should be released and permitted to swing through its normal arc. The large hand should then be brought back to zero by controlling the speed of the generators. It should be remembered that any manual correction of the large hand, after the clock has once been placed in operation, will mean that all synchronous timing devices on the line will differ from the correct time by the amount of the change. However, it is to be expected that, if an interruption occurs for a period of more than ten to fifteen seconds, it will be necessary to reset the large hand with the fingers, for an interruption of any length would take too long to reset by varying the speed and still maintain the approximate frequency.

Radio Time Signals

U. S. Naval Observatory time signals are available from stations NSS, NPG, NPM and NBA. National Bureau of Standards time signals are broadcast as part of a standard frequency broadcast service from station WWV.

Pendulum Spring

The spring of the pendulum movement was wound before it was shipped from the factory and, unless

it runs for more than a day while the motor is standing still, it will not require any additional winding. If the spring should run down, which will occur if the motor stops and the clock continues to run for several days, it will be necessary to rewind it by inserting the key through the hole in the dial, choosing a time when one of the spokes of the large gear is not in the way. The spring should not be tightly wound. If it were, the motor might tend to overwind it. An easy way to avoid this danger, if the spring has been tightly wound, is to allow the clock to run for at least twelve hours before starting the motor.

CAUTION: ***Do not permit the motor of the Master Clock to run for any considerable length of time if the pendulum is standing still. If, for any reason, the pendulum movement should stop and the motor should continue to run, the clock spring might be overwound and broken.***

Operation of Master Clocks

When the clock has been accurately regulated by a number of successive timing tests, it is ready to be used in controlling the frequency. It will then be the duty of the switchboard operator to watch the large hand. If he finds that it is tending to move to the right of the zero, he should adjust the speed control switches so as to lower the frequency by a small amount. At the end of fifteen or twenty minutes, another observation will determine whether a further correction of the speed is necessary. If the hand tends to move to the left of the zero, the speed should be slightly raised. In general, the control of the speed should be such as to keep this large hand continually pointing to zero. It probably will not be necessary to make an adjustment more often than once every half hour although this period depends on several factors such as large variations in load, sensitiveness of turbine governors, etc.

Overhaul

The Master Clock should be cleaned and overhauled every two years. At the same time, it is recommended that the small motor unit be replaced.

No difficulty will be encountered in changing the units and the only care necessary is to locate the new motor casing in the field in the same position as the old. When necessary, it may be possible to ship a similar master clock as a temporary replacement while the original master clock is returned to the factory for overhaul and repairs. Such an overhaul results in practically a new movement at a very reasonable charge. Please contact the factory to determine whether or not a replacement is available.

Wall Clock

Although a General Electric Wall Clock is not furnished with the Type B Master Clock, it is very desirable to mount such a clock near the master clock in order to give the switchboard operator a check on the system.

Any communications concerning the operation, construction, etc. of General Electric Master Clocks should be addressed to the Special Clock Sales Department.

GENERAL ELECTRIC

Warranty

We guarantee each new GENERAL ELECTRIC PRODUCT sold by us to be free from defects in material and workmanship for a period of one year from delivery while in normal use and service, and while supplied with the power specified on the nameplate. Our obligation under this warranty is limited to repairing or replacing at our factory any part or parts which our examination shall disclose to have been defective within the warranty period.

GENERAL ELECTRIC COMPANY
CLOCK AND TIMER DEPARTMENT
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