

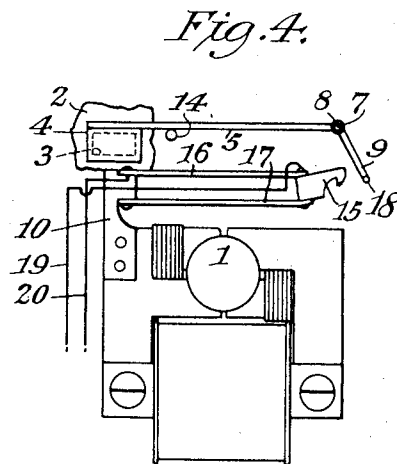
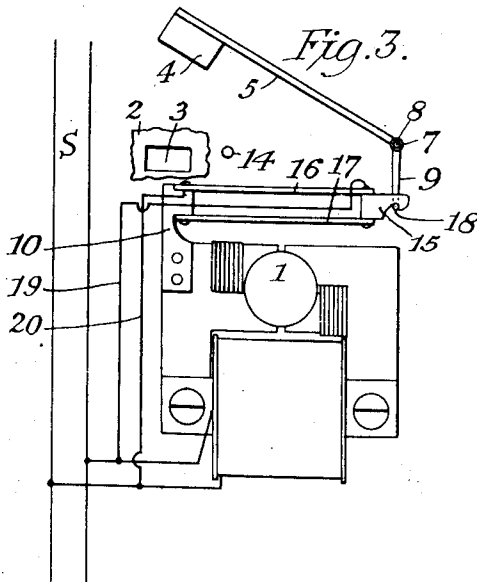
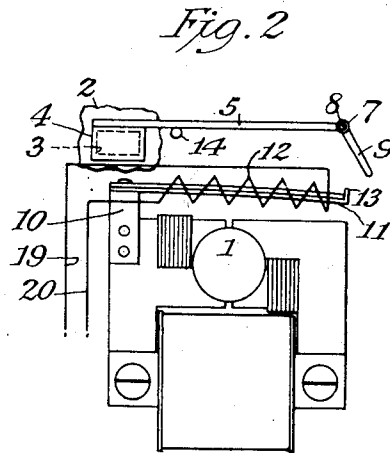
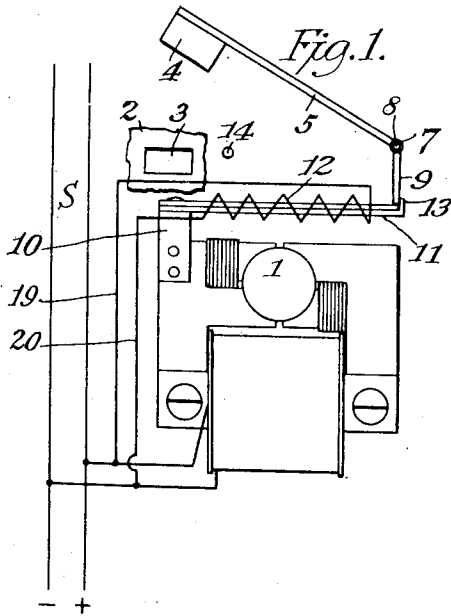
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RETARDED STOP SIGNAL FOR SYNCHRONOUS MOTOR DRIVEN ELECTRICAL CLOCKS

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RETARDED STOP SIGNAL FOR SYNCHRONOUS MOTOR DRIVEN ELECTRICAL CLOCKS

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1 Claim. (Cl. 58—26)

This invention relates to means and devices adapted for operation in connection with electrically operated clocks for automatically indicating momentary failure in the current flow.

5 The object of the invention being to provide means and devices of the above identified character which shall perform the function set forth, in an effective, unfailing, expeditious manner.

A further object of the invention being to provide indicating means wherein in the instances of current flow failure, the indicating means does not at once act, but has a lagging action so that in current failures of such short duration as not to affect the clock, action does not occur.

15 A further object of the invention being to provide electro-thermal means contained in a clock operating circuit for actuating current failure indicating means, of simple and economical construction.

20 In synchronous motor clocks, especially those equipped with a self starting motor, a signal or indicator disk is provided which, in the presence of normal working conditions i. e. as long as the clock is subject to the flow of current, is locked in an inconspicuous position by a keeper in a magnetic shunt of the said motor; but if the voltage fails for some reason or another, the said magnetic field is caused to collapse, with the result the keeper is released and the said indicator disk assumes a visible position.

This type of indicating device, is unsatisfactory in that the indicator of current failures will appear also when such failure is only very brief, caused, in some instances by switching operations in the central station. In such cases the error in the time indication is so slight as to be immaterial. In other words, the clock gives the correct time, in spite of the fact that the warning signal or indicator disk is visible in the clock and this condition is bound to lead eventually to mistakes and uncertainties in the reading of time.

40 Another known type of electric clock attempts to overcome this signal defect by combining the warning signal or indicator with the magnet armature to function as a pendulum which, when the voltage fails, will continue swinging to and fro for a time. In this arrangement of parts, the armature again and again will be moved in front of the seat of the magnetic field (stator) and the result is that when the current resumes its flow, the armature is again attracted, and the warning signal will not appear, and this means further involves the defect that during the interruption or failure of the current, the

warning signal again and again becomes visible, and of course is a misleading condition.

Another bad point is that in this type, the duration of such interruptions that should not be indicated is dependent upon the duration of the pendulum swings of the indicator.

The above defects are successively overcome by reason that the indicator, upon failure of the potential, is caused to become operative only with a certain slight time-lag or retardation as will hereinafter appear.

In the drawing there is illustrated two embodiments of the invention, in which

Fig. 1 is a diagrammatic view of the retarded electro-thermal signal or indicator shown in connection with the motor of an electric clock, and showing the indicator plate raised or in the inoperative position;

Fig. 2 is a view similar to Fig. 1 but showing the signal plate as dropped to the operative position back of and in registration with a window or aperture in the clock dial;

Fig. 3 is a diagrammatic view similar to Figs. 1 and 2, but illustrating a modified form of electro-thermal signal device with the signal plate in the inoperative or raised position;

Fig. 4 is a view similar to Fig. 3, but showing the signal plate in the lowered or operative position.

Referring to the drawing in detail, the numeral 1, designates a self-starting synchronous motor of a clock. The dial, a portion of which is shown at 2, has an aperture 3, through which an indicator, plate or disk 4, may be seen when its supporting arm 5, is free to drop onto a stop pin, hereinafter referred to.

The arm 5 has a sleeve 7 pivoted on a fixed pin or shaft 8, and extending from said sleeve is a trip-arm 9.

Connected at one end to a suitable bracket 10, is an electro-thermal bi-metal signal-tripping strip 11, having a winding 12, through which the strip is heated so long as the motor 1, is subject to the action of current. The said bi-metal strip 11, has a hook 13 at its end and is so constructed and formed that when in a heated condition, is straight, with the said hook 13 in interlocking engagement with the free end of the trip-arm 9.

When the clock operating current fails momentarily, the bi-metal strip 11 cools and by becoming warped or curved, assumes an inoperative position, whereupon the trip arm 9 is released and through the action of gravitation, the signal plate 4 and its arm 5, may drop to the signalling position with the arm 5, resting on the

stop pin 14, as in Fig. 2, with the signal plate 4, visible through the aperture 3, and after the time is corrected the signal means may be reset by hand. This signal plate 4, may carry the printed word "reset" or it may be brightly colored or otherwise formed or treated to be easily identified as an indicator or signal.

In the modified form shown in Figs. 3 and 4 of the drawing a lock hook 15 is attached to two parallel supports 16 and 17. One of said supports, here shown as 16, being directly or indirectly heated by a shunt of the motor circuit and is so proportioned that, when in a heated condition, it is of a length to cause the said lock-hook to move inside the range of the trip-arm 9, which has a terminal angular bend 18, to interlock with said hook.

In this form, when a failure in current flow occurs, the support 16 becomes cooled and contracts, incidentally moving or rocking the lock-hook 15 upwardly, as shown in Fig. 4, thereby swinging free of the angular bend 18 of the trip-arm 9, thus permitting the indicator plate 4 and its supporting arm 5 to drop to the operative signalling position as shown in Fig. 4. The hook 15 is arranged with the cooperating end of the member 17 for slight bending or hinged movement, during expansion and contraction of the member 16.

The last described form or arrangement offers the advantage over the embodiment shown in Figs. 1 and 2, in that temperature changes in the air surrounding the clock are unable to affect the locking of the indicator.

In the drawing, the heating element of the electro-thermal means is connected with the supply line S, by conductors 19 and 20, in parallel to the motor, which offers the advantage that the indicator device may be moved away from the clockwork proper, to any convenient location inside the housing and may, if desired, be mounted outside the clock as will be obvious.

It will be noted from the above description that in the form of Figs. 1 and 2, the conductors are connected to the ends of a heating coil surround-

ing the bi-metal electro-thermal signal tripping element 11, while in Figs. 3 and 4 said conductors are directly connected to the ends of one strip of the bi-metal electro-thermal device, thus heating that member only. Suitable insulation, not represented in the drawing, is provided.

It will thus be noted that the full releasing actions of the hooks 13 in one form and 15, in the other, are not instantaneous, there being a slight drag in their operations due to the time required for the heat responsive elements of the electro-thermal devices to cool, so that short failures in current flow caused in the supply circuit by switching operations or from other causes are of no practical importance in so far as the indication or reading of the time is concerned and so these short interruptions will not be recorded or signalled owing, as above stated, to the time lag in the release of the warning means.

In fact, trouble indication in the supply of current, will become active only if current failures are of such duration as to exceed a determined limit of time, or error, so that misunderstandings and uncertainties in time indication or reading may be reliably obviated.

What I claim is:

In combination, a clock mechanism having operating means including a synchronous electric motor, a signal including a pivoted lever having an angularly disposed end, and means for controlling said signal, said means including an arm having a free terminal, a thermostatic arm disposed parallel with the first mentioned arm and having a terminal adjacent the first mentioned terminal, a lock hook carried by said terminals, a branch circuit connected with the circuit of said motor and wherein said thermostatic arm is disposed so that the latter may be heated to urge said hook into releasable engagement with said end while current flows in the circuit, whereby on failure of current said thermostatic arm may be cooled and contract to release said end and operate said signal.

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