

May 29, 1934.

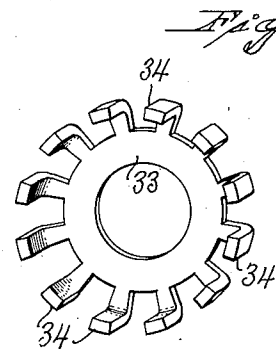
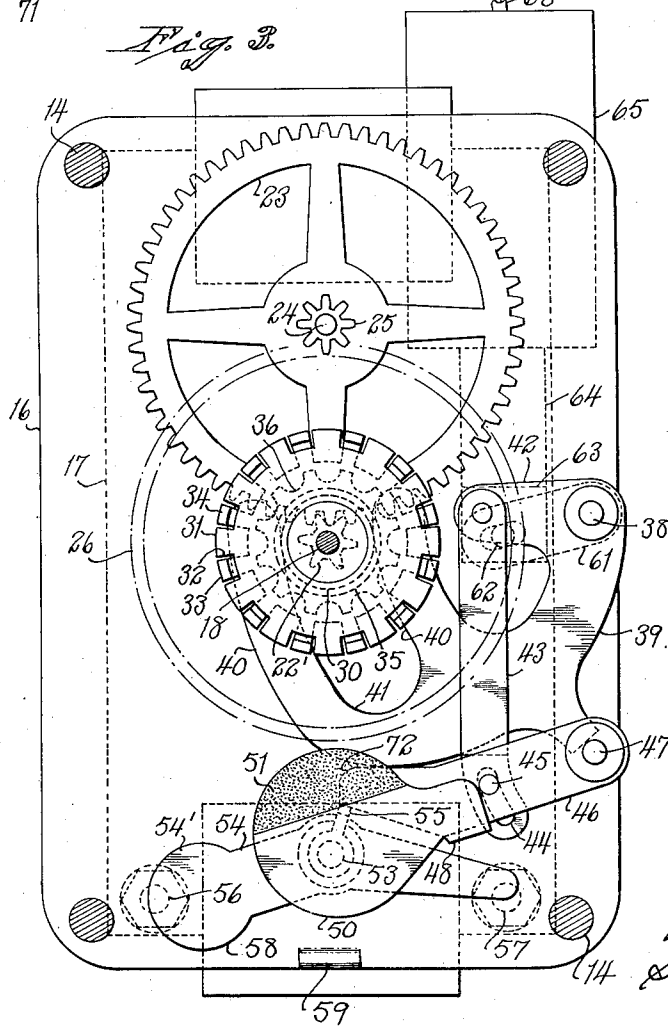
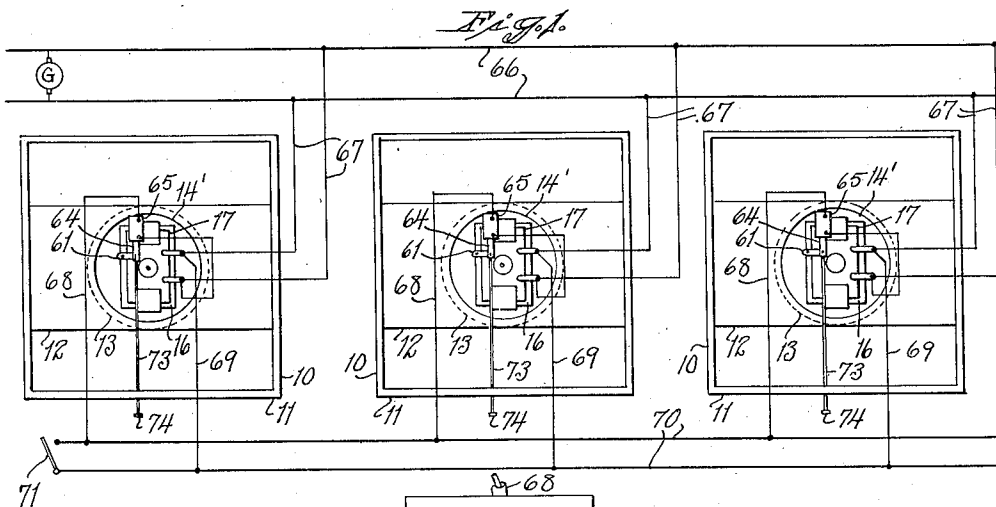
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1,960,508

TIME INSTRUMENT RESETTING MECHANISM

Filed May 5, 1933

3 Sheets-Sheet 1



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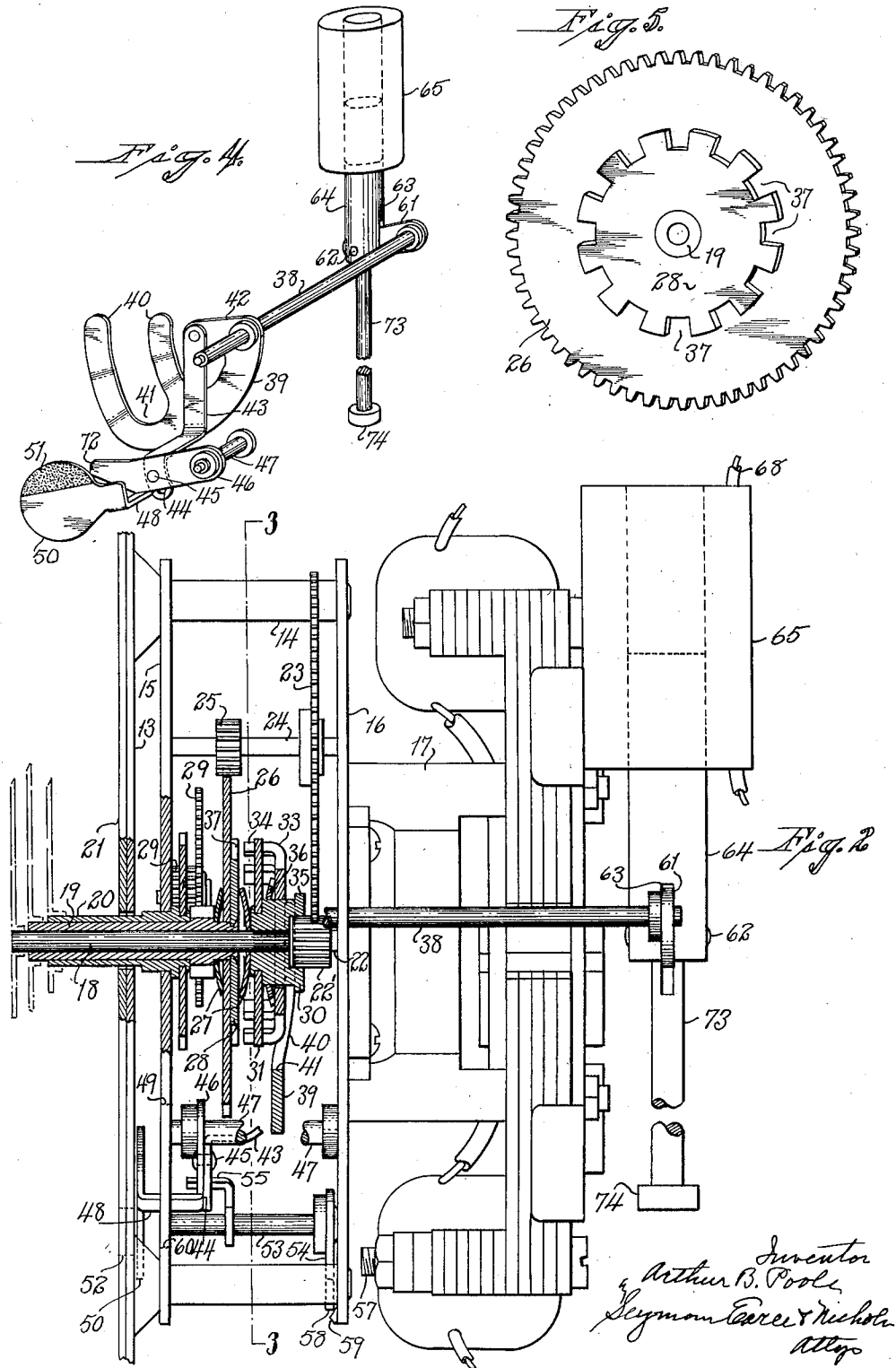
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TIME INSTRUMENT RESETING MECHANISM

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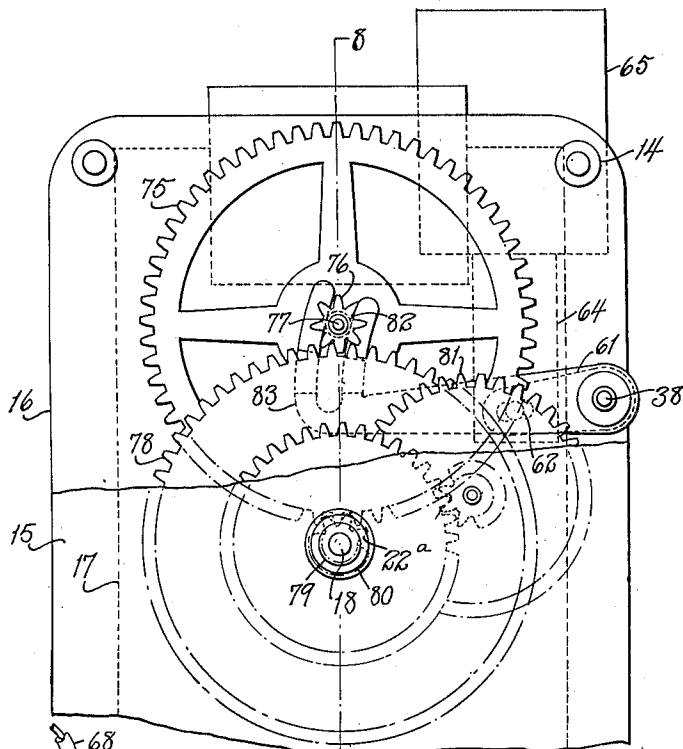


Fig. 7.

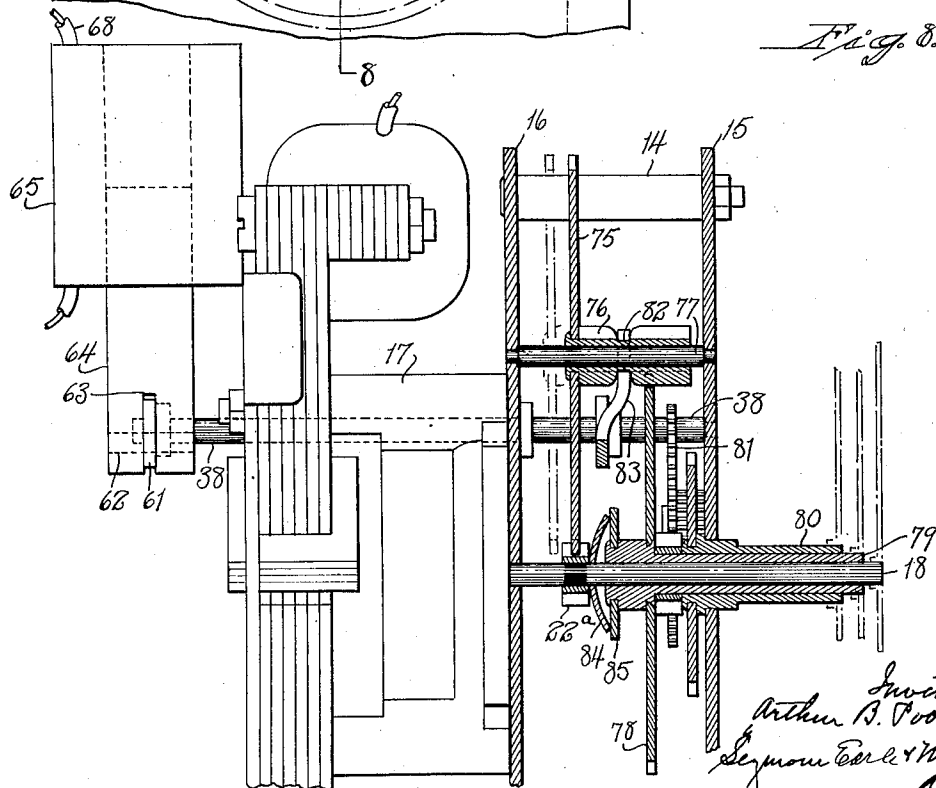


Fig. 8.

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TIME-INSTRUMENT RESETTING-MECHANISM

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13 Claims. (Cl. 58—26)

This invention relates to time-instrument resetting mechanisms and more particularly to combined time-instrument and signal resetting-mechanisms.

Electric clocks, as at present used, are usually arranged for a large number of clocks to be driven from a single power-circuit operating motor, usually synchronous, which is made to operate at proper time rate of speed by controlling the number of alternations of the alternating current which is used for operating the motors of the clocks. When there is a failure of electric power, as not infrequently occurs, all the electric clocks on the circuit come to a stop for a greater or less length of time, until the power again goes on.

It is therefore obvious that although the clocks resume an accurate speed upon the resumption of power, they are not set at the proper time-indicating time.

It is therefore an object of this invention to provide an effective and economical means by which the time-instruments on an electric circuit can be readily reset at the correct time.

Another object of this invention is to provide a mechanism for both resetting the time of the clocks and resetting the signals at the same time that the clocks are reset at proper time-indicating time.

The above and other objects will appear from the following description, appended claims and accompanying drawings forming a part of this specification.

In the accompanying drawings, in which certain ways of carrying out the invention are shown for illustrative purposes:

Fig. 1 is a rear elevation of a plurality of electric clocks with a diagrammatic showing of the electric circuits supplying current to the motors of the clocks and to the mechanism for resetting the clocks;

Fig. 2 is a left-end elevation of a portion of one of the clocks shown in Fig. 1, with part of the mechanism in section;

Fig. 3 is a sectional view on the line 3—3 of Fig. 2, and also showing the signal mechanism in elevation;

Fig. 4 is a perspective view of the signal member and cam for operating the time-resetting mechanism, together with the actuating-means for these parts;

Fig. 5 is a face view of the friction-disks for normal drive of the minute-sleeve;

Fig. 6 is a perspective view of the shiftable clutch-member;

Fig. 7 is a view somewhat similar to Fig. 3 of a modified construction; and

Fig. 8 is a sectional view on line 8—8 of Fig. 7.

Each of the clocks 10 comprises a frame 11 including a cross-support 12 to the front face of which cross-support is secured a dial-plate 13 to which are fastened pillars 14 extending through the annular opening 14' of the cross-support 12 and carrying the front movement-plate 15 and rear movement-plate 16 of the clock movement.

Mounted on the rear of the movement-plate 16 is the motor 17, preferably an alternating-current synchronous electric motor. The minute-sleeve 19 is driven in proper time-relation from the seconds-arbor, and the hour-sleeve 20 is driven in proper time-relation from the minute-sleeve, by suitable gearing.

Mounted on the front of the clock is the dial 21 and through this dial extend the seconds-arbor, minute-sleeve and hour-sleeve respectively carrying the seconds-, minute- and hour-hands, as shown by dot and dash lines.

Secured on the motor-shaft 22 is the drive-or first pinion 22' which meshes with and drives the first-wheel 23 mounted on the arbor 24, which latter has secured thereto a pinion 25 in driving engagement with the minute-wheel 26 normally pressed into frictional driving engagement with the friction-disk 28 by the springs 27, which disk 28 is securely mounted on the minute-sleeve 19. The minute-sleeve 19 drives the hour-sleeve 20 by means of gearing known as the dial-work, generally indicated by the numeral 29.

The seconds-arbor 18 is arranged in line with the motor-shaft 22 and in clutching engagement therewith by means of the hub 30 secured on the seconds-arbor and having an annular recess provided with teeth in engagement with the teeth of the pinion 22'. A flange 31 is secured on the hub 30 and has a plurality of notches 32 arranged in its periphery. Slidably mounted upon the hub 30 is a clutch-member 33 having teeth 34 extending through the notches 32. The clutch-member 33 is normally pressed to the right against the cam-portion 40 of a shift-lever 39 which in turn is pressed against the flange 35, by means of the spring 36.

The friction-disk 28 is approximately the same diameter as the flange 31 and has notches 37 similar to the notches 32 in the flange 31. Secured on the shaft 38 is the shift-lever 39 having a cam-portion 40 provided with a slot 41 sufficiently large to pass over the hub 30. An extension-arm 42 of the shift-lever 39 is connected to a link 43 which extends downward and has its slotted por-

tion 44 engaged with a pin 45 on the signal-member 46, which latter is secured to the first shaft 47.

An integral extension 48 of the signal-member 46 extends through the opening 49 (Fig. 2) in the movement-plate 15 and carries the signal-disk 50 having a portion 51 suitably colored as, for example, red, capable of being seen through the aperture 52 in the dial 21 and dial-plate 13 to show that there has been a failure of electric power to the motor. The pivot-shaft 53 has secured thereto a signal-control armature 54 of iron or like material and a latch-member 55. While any suitable signal and armature mechanism may be employed, it is preferred to use the mechanism herein disclosed.

When electric current is flowing in the circuit actuating the electric motor to drive the clock, the electromagnetic pole-pieces 56 and 57 of the electromagnets forming the stators or field-members of the motors hold the armature 54 in the position indicated in Fig. 3 with the latch-member 55, which is secured to the pivot-shaft 53, underneath and supporting the end or latch-engaging portion of the signal-member 46. When there is a failure of electric power, the magnetism leaves the pole-pieces 56 and 57 and armature 54, whereupon the armature 54, due to the greater size and weight of the left-hand portion 54' of the armature, rotates about the pivot-shaft 53 until the lower edge 58 of the armature engages against the struck-out portion 59 of the movement-plate 16, which struck-out portion serves to thus limit the distance the armature 54 can swing away from the poles 56 and 57.

When the armature 54 rotates with the pivot-shaft 53 in the manner stated, the latch 55 also rotates and passes from beneath the signal-member 46, thereby permitting the signal-member 46 and signal-disk 50 to swing downwardly until the extension 48 of the signal-member 50 strikes against the lower edge 60 of the hole 49 in the movement-plate 15, and/or until the pin 45 engages the lower end of the slot 44 of the link 43, to limit the downward movement of the signal-member 46 and signal-disk 50.

When the electric current is again restored in the circuit, it causes the pole-pieces 56 and 57, of the electromagnet to exert pull on the armature 54, and return it to its original position with the latch 55 in its latching position. The signal-member 46, together with the signal 50, is not returned upward again automatically, however, to the latch-engaging position, but remains down with the signal 50 in indicating position. In order to return the signal-member 46 to latch-engaging position, suitable operating-means are provided, including the shaft 38, extension-arm 42, link 43 having the slot 44 engaging the pin 45 on the signal-member 46, and suitable operating-means for swinging or partially rotating the shaft 38. This operating means, in the particular construction disclosed in this application, comprises an arm 61 secured to the shaft 38 and pivoted at 62 and within the slot 63 of the armature 64 of the solenoid 65, which solenoid 65 may be mounted in any suitable relation, for example, to the frame-plate in rear of the motor, as illustrated in the drawings.

The solenoid 65 on each of the clocks 10 of the circuit may be actuated either by electric current from the power source which actuates the motors of the clocks or from a separate source of electric power, such as a battery or other suitable means.

In Fig. 1 of the drawings, 66 represents the

power line from which alternating current flows along branch circuits 67 to the motors 17 of the clocks 10.

In order to operate the solenoids 65, a branch wire 68 constitutes the circuit of each solenoid, and, together with another wire 69, extends from the branch circuits 67 to and joins a pair of wires 70 provided with a switch 71 by means of which electric current can be caused to flow through the solenoids 65, resulting in the armatures 64 thereof being drawn upwardly within the solenoids to swing the shafts 38 and lift the signal-members 46 upwardly about their pivot-shafts 47. When the signal-members 46 swing upwardly, the bevel or cam-surfaces 72 strike against the latch-members 55 and cause the latter to temporarily swing beyond the end of the signal-members 46 and cause the signal-control armatures 54 to temporarily swing somewhat away from the position they normally occupy under the magnetic poles 56 and 57 until the signal-members 46 pass upwardly entirely beyond the latch-members 55, whereupon the magnetic pull on the armatures 54 swing them back to position with the latch-members 55 underneath the ends of the signal-members 46, so that when the switch 71 is thrown open, causing the current to cease in the solenoids 65 and permitting the solenoid-armatures to descend through the train of linkage previously described to permit the links 43 to move downwardly, the signal-members 46 swing downwardly until their ends rest upon the latches 55.

To provide convenient and economical means for manually operating the clocks, suitable means may be provided, such as the push-rods 73 connected to the solenoid-armatures 64 or to the arms 61. The push-rods 73 extend downwardly through the lower portions of the frames of the clocks 10 and are provided with thumb-pieces 74 which are adapted to be pushed upwardly to cause the arms 61 to be actuated in a similar manner to the way they are actuated by the solenoids 65 for resetting the signal-members 46 carrying the signals 50 to normal non-indicating position.

In the modified construction illustrated in Figs. 7 and 8, the drive- or first-pinion 22^a which is secured on the seconds-arbor 18 is normally in driving engagement with the first-wheel 75 which forms part of, or is secured to the smaller pinion 76 which is mounted to rotate on and slide lengthwise of the arbor 77. The pinion 76 drives the gear wheel 78 which is secured to the minute-sleeve 79, which latter drives the hour-sleeve 80 through the dial-work 81.

The pinion 76 is provided with an annular channel 82 engaged by a slotted cam shift-lever 83 similar to the previously-described cam-arm 39 except that the direction of slope of the cam is opposite.

A spring 84 presses frictionally between the pinion 22^a and the flange 85 which is secured on the minute-sleeve 79. Under normal operating conditions of the clock, the seconds and minute hands are caused to move in proper time-indicating time through the gearing 22^a, 75, 76 and 78.

In operation, when electric current from the power line 66 to the motors 17 operating the clocks fails, the motors all presently come to a standstill and the clock ceases to indicate the correct time. At the same time that this occurs, the failure of power through the electromagnets forming the stators or field-members of the motors also ceases, with the consequence that the pole-pieces 56 and 57 of the electromagnets lose their magnetism and no longer exert a pull on the arma-

tures 54. Due to the heavier weight of the end 54' of each armature 54, the armatures, together with the latches 55, swing to non-latching position until the lower edge 58 of each armature engages a stop 59, thus resulting in the latches 55 swinging out from beneath the signal-members 46 and permitting the latter, with the signals 50, to swing downwardly to bring the red or other colored surface 51 into indicating position opposite the hole 52 in the dial 21 and dial-plate 13 of each clock. Upon resumption of electric current in the power circuit 66, the motors will again drive the clocks at their proper time-indicating speed, but of course the clocks, not having been reset, will not indicate the proper time.

Upon a person glancing at the clock and seeing the red signal-portion 51 showing through the hole 52 of one of the clocks, he notes that the clock must have been stopped for a greater or less period of time. He thereupon learns from any suitable source as to the correct time and upon doing so, closes the switch 71 to energize the solenoids 65, whereupon, referring to the form of the invention shown in Fig. 2, each cam-portion 40 of its shift-lever 39 is swung upwardly to cause the cam-portion 40 to press the clutch-member 33 to the left of Fig. 2 to bring at least some of the clutch-teeth 34 into clutching engagement with the slots 37 of the companion clutch-member 28, whereupon the clutch-member 28 is forced to slide relatively to the minute-wheel 26 so as to travel at the same speed as the hub 30 which is secured on the seconds-arbor 18, thus resulting in the clutch-disk 28 and the minute-sleeve 19 to which it is secured to rotate clockwise at sixty times the proper time-rate speed of the minute-sleeve. In consequence, the minute-sleeve drives the hour-sleeve at sixty times its normal rate of speed. This super-speed drive of the minute- and hour-sleeves and hands of the clocks continues so long as the switch 71 remains closed.

Upon the operator noting when the clock has been speeded up to its correct time-indicating condition, he opens the switch 71, whereupon the circuit is broken through the solenoids 65 with the consequence that the solenoid-armatures 64 drop downwardly and cause the shift-levers 39 to swing downwardly, which permits the springs 36 to push the clutch-members 33 and the teeth 34 thereof away from engagement with the slots 37 in the clutch-members 28, whereupon the clutch-members 28 resume friction-driven engagement with the minute-wheels 26 and the minute- and hour-drives of the clocks instantly proceed to travel at their normal time-rate speed.

In this described operation of resetting the clocks to indicate the correct time, when the switch 71 was closed with resulting actuation of the shift-levers 39, the arms 42 thereof lifted the links 43, whose slotted ends 44, engaging the pins 45 on the signal-members 46, lifted all of the signal-members to bring them to normal non-indicating position with the end-portions of the signal-members 46 resting upon the latches.

Where a number of clocks are to be reset, the electrical method will be the preferred mode of resetting, but where a single clock is to be reset, it can readily and economically be done by hand, by operation of the push-rod 73 by the finger-piece 74 by pushing upward upon the latter and holding it up until the clock has been speeded up to indicate the proper time, whereupon the finger-piece 74 is released, and the push-rod 73 drops downwardly and aids the lever 61 to swing down-

wardly as previously described in connection with the electric resetting-clocks.

The modified construction illustrated in Fig. 6 operates in a similar way to the preferred form of the invention shown in Fig. 2, but differs in certain details, as will be presently described. When the shift-lever 83 is actuated to reset the clock, it causes the pinion 76, carrying the gear 75, to slide to the left (Fig. 8) to take the gear 75 out of driven engagement with the drive-pinion 22^a whereupon the friction-spring clutch-member 84 causes the disk 85 and minute-sleeve 79 to which the latter is secured, to travel at the same speed of rotation as the drive-pinion 22^a and seconds-arbor 18.

When the clock has been reset and the shift-lever has been permitted to move downwardly in the manner previously described concerning Fig. 8, the pinion 76 and gear 75 are slid to the right along the arbor 77 to again bring the gear 75 into driving engagement with the first pinion 22^a whereupon the minute-sleeve 79 and hour-sleeve 80 resume their normal correct time-rate speeds, while the friction-disk 85 normally slips relatively to the friction-spring clutch-member 84.

While the arbor 18 and the sleeves 19 and 20 in Fig. 2 each carries and drives a pointer for visually indicating time, it is obvious that either the said arbor or either of the said sleeves may drive a time-disk or the like for controlling or actuating a switch-mechanism. Either the said arbor or either of the said sleeves or equivalent parts may, therefore, be properly termed "time-member" or "time-element," since they discharge a time function such as by propelling pointers or by propelling or controlling a switch or other mechanism at a predetermined time.

The invention may be carried out in other specific ways than those herein set forth without departing from the spirit and essential characteristics of the invention, and the present embodiments are therefore to be considered in all respects as illustrative and not restrictive, and all changes coming within the meaning and equivalency range of the appended claims are intended to be embraced therein.

I claim:

1. In combination, a time-instrument including interdriven minute and hour time-indicating elements, a motor for normally driving said minute time-indicating element at proper time rate of speed, friction-clutch means between said motor and minute time-indicating element, positive drive-means between said motor and minute time-indicating element for normally driving said minute time-indicating element at proper time rate of speed and normally causing said friction-clutch to slip, and means to disengage said positive drive-means to permit said friction-clutch means to selectively drive said minute time-indicating element at many times normal speed for resetting the time-instrument.

2. In combination, a time-instrument including seconds, minute and hour time-indicating elements, gearing for normally interdriving said elements, a motor for driving said seconds time-indicating element at proper time rate of speed, and means for causing said seconds time-indicating element to selectively drive said minute time-indicating element at substantially the normal speed of said seconds time-indicating element for resetting the time-instrument.

3. In combination, a time-instrument including a time-element, an electric motor for normally driving said time-element at proper time rate of

speed, indicating-means normally held in one position by the electric power to said motor and movable to an indicating position upon failure of electric power to said motor, and means for causing said electric motor to selectively drive said time-element at many times normal speed for resetting the time-instrument, said means concurrently causing said indicating-means to return to said one position.

4. In combination, a time-instrument including a time-element, an electric motor for normally driving said time-element at proper time rate of speed, indicating-means normally held in one position by the electric power to said motor and movable to an indicating position upon failure of electric power to said motor, and means for causing said electric motor to selectively drive said time-element at many times normal speed for resetting the time-instrument, said means and a link connected therewith concurrently causing said indicating-means to return to said one position.

5. In combination, a time-instrument including a time-element, an electric motor for normally driving said time-element at proper time rate of speed, indicating-means normally held in one position by the electric power to said motor and movable to an indicating position upon failure of electric power to said motor, and electrically-actuable means for causing said electric motor to selectively drive said time-element at many times normal speed for resetting the time-instrument, said means concurrently causing said indicating-means to return to said one position.

6. In combination, a plurality of time-instruments each including a time-element, separate electric motors all adapted to be driven from a single electric power circuit, each motor for normally driving the time-element of a corresponding time-instrument at proper time rate speed, an indicating-means corresponding to each electric motor and normally held in one position by the electric power to its corresponding motor and movable to an indicating position upon failure of electric power to said motor, separate electrically-actuable means all adapted to be actuated from a single electric circuit and each of which means is adapted for causing a corresponding electric motor to selectively drive the time-element of a corresponding time-instrument at many times normal speed for resetting the time-instrument, said means concurrently causing the corresponding indicating-means to return to said one position.

7. In combination, a plurality of time-instruments each including a time-element, separate electric motors all adapted to be driven from a single electric power circuit, each motor for normally driving the time-element of a corresponding time-instrument at proper time rate speed, an indicating means corresponding to each electric motor and normally held in one position by the electric power to its corresponding motor and movable to an indicating position upon failure of electric power to said motor, separate electrically-actuable means all adapted to be actuated from said single electric power circuit and each of which means is adapted for causing a corresponding electric motor to selectively drive the time-element of a corresponding time-instrument at many times normal speed for resetting the time-instrument, said means concurrently causing the corresponding indicating-means to return to said one position.

8. In combination, a time-instrument includ-

ing seconds, minute and hour time-indicating elements, gearing for normally interdriving said elements and including a pair of friction-clutch parts between the seconds and minute elements and which normally rotate together, one of said clutch parts being fixedly secured to the minute element, and means rotatable with the seconds element and adapted to be engaged with said one clutch part to cause said one clutch part and the minute element to rotate at substantially the normal speed of said seconds element for resetting the time-instrument.

9. In combination, a time-instrument including concentric seconds, minute and hour time-indicating elements, gearing for normally interdriving said elements and including a pair of friction-clutch parts between the seconds and minute elements and which normally rotate together, one of said clutch parts being fixedly secured to the minute element, and means rotatable with the seconds element and adapted to be engaged with said one clutch part to cause said one clutch part and the minute element to rotate at substantially the normal speed of said seconds element for resetting the time-instrument.

10. In combination, a time-instrument including seconds, minute and hour time-indicating elements, gearing for normally interdriving said elements, a pair of friction-clutch parts, one secured to the seconds element and the other secured to the minute element, said clutch parts normally slipping relatively to each other, and means for disengaging the gearing drive between the seconds and minute elements, whereupon said clutch parts rotate together at substantially the normal speed of said seconds element for resetting the time-instrument.

11. In combination, a time-instrument including concentric seconds, minute and hour time-indicating elements, gearing for normally interdriving said elements, a pair of friction-clutch parts, one secured to the seconds element and the other secured to the minute element, said clutch parts normally slipping relatively to each other, and means for disengaging the gearing drive between the seconds and minute elements, whereupon said clutch parts rotate together at substantially the normal speed of said seconds element for resetting the time-instrument.

12. In combination, a time-instrument including a time-element, an electric motor for normally driving said time-element at proper time rate of speed, clutch-mechanism adapted when in one position to cause said electric motor to drive said time-element at many times normal speed for resetting the time-instrument, indicating-means normally held in one position by the electric power to said motor and movable to an indicating position upon failure of electric power to said motor, a shaft, a clutch actuator connected to said shaft and adapted to actuate said clutch-mechanism, and means connecting said shaft and said indicating-means such that when said shaft is actuated to cause said clutch-actuator to actuate said clutch-mechanism to drive the time-element many times normal speed, said shaft also concurrently causes said indicating-means to return to said one position.

13. In combination, a time-instrument including a time-element, an electric motor for normally driving said time-element at proper time rate of speed, clutch-mechanism adapted when in one position to cause said electric motor to drive said time-element at many times normal speed for resetting the time-instrument, indicating-

means normally held in one position by the electric power to said motor and movable to an indicating position upon failure of electric power to said motor, a shaft, a clutch-actuator connected to said shaft and adapted to actuate said clutch-mechanism, and means including a link connecting said shaft and said indicating-means such that when said shaft is actuated to cause said clutch-actuator to actuate said clutch-mechanism to drive the time-element many times normal speed, said shaft also concurrently causes said indicating-means to return to said one position.

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DISCLAIMER

1,960,508.—*Arthur B. Poole*, Bristol, Conn. TIME-INSTRUMENT RESETTING-MECHANISM. Patent dated May 29, 1934. Disclaimer filed November 4, 1935, by the assignee, *The E. Ingraham Company*.

Hereby disclaims claim 2 of the said patent.
[*Official Gazette November 26, 1935.*]

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