Jan. 16, 1934. T. R. ARDEN 1,944,055

CLOCK OPERATED CIRCUIT CONTROLLER

Original Filed Jan. 20, 1932 3 Sheets-Sheet 1

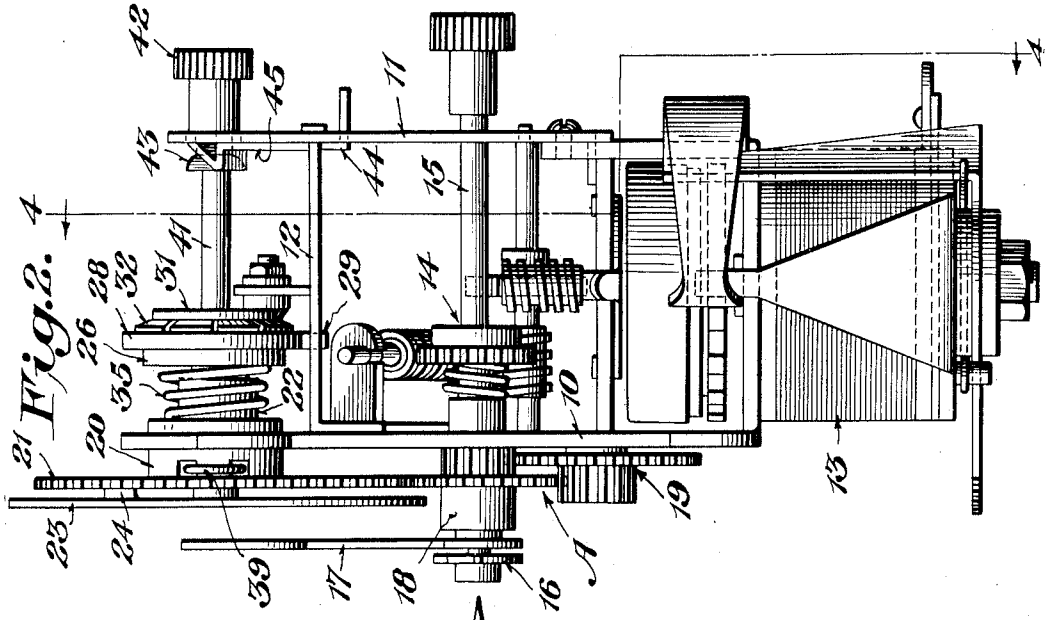


Fig. 2.

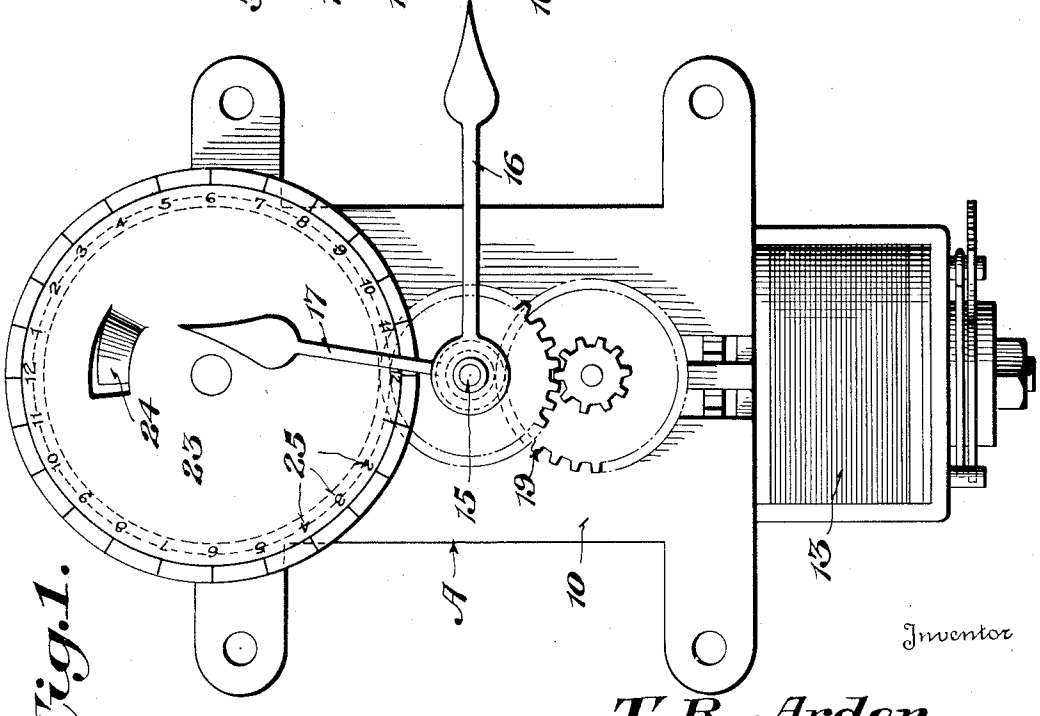


Fig. 1.

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Fig. 9.

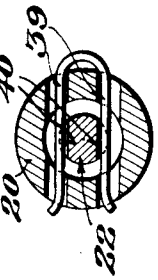


Fig. 7.

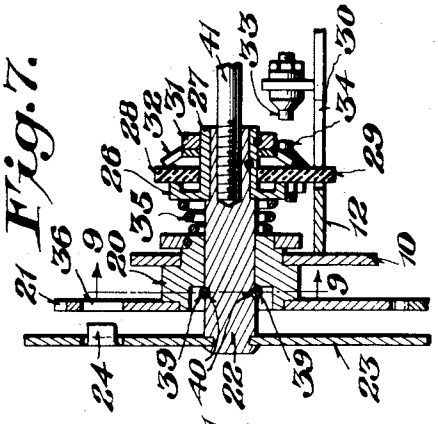


Fig. 8.

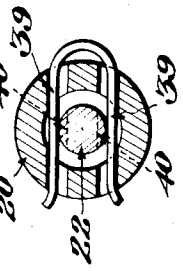


Fig. 6.

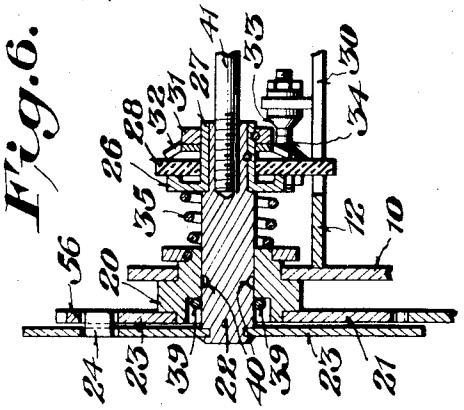
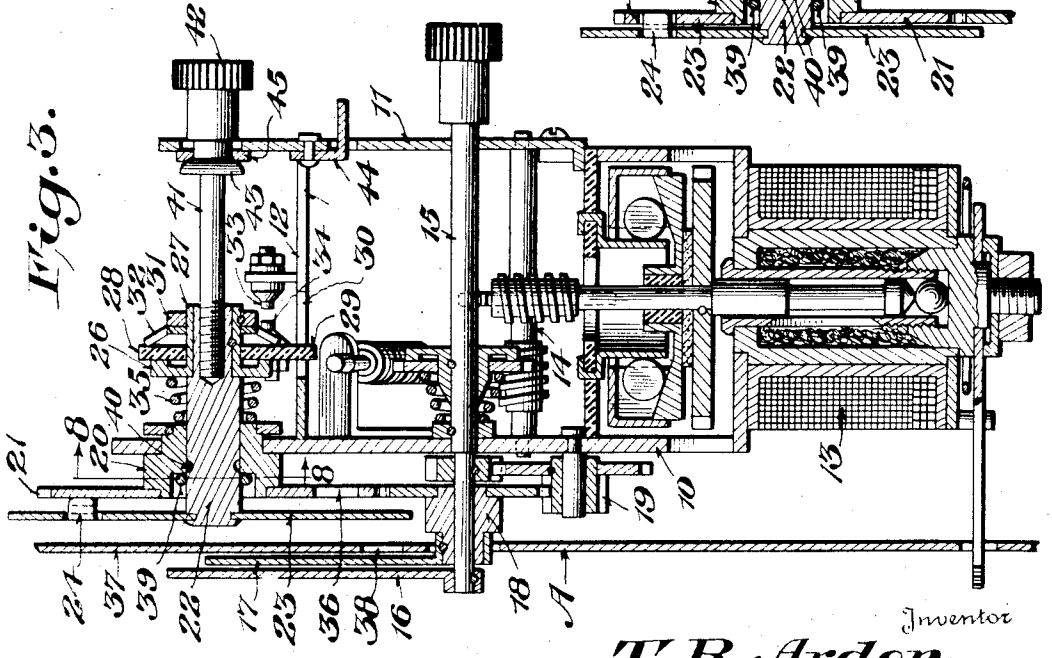


Fig. 5.



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CLOCK OPERATED CIRCUIT CONTROLLER

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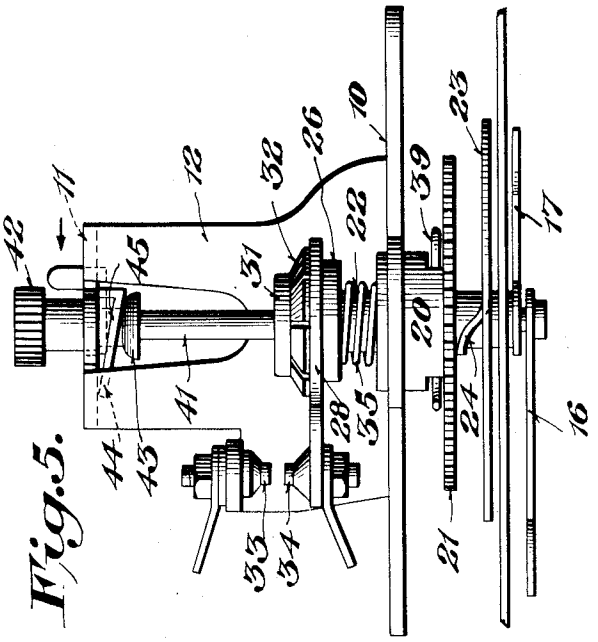


Fig. 5.

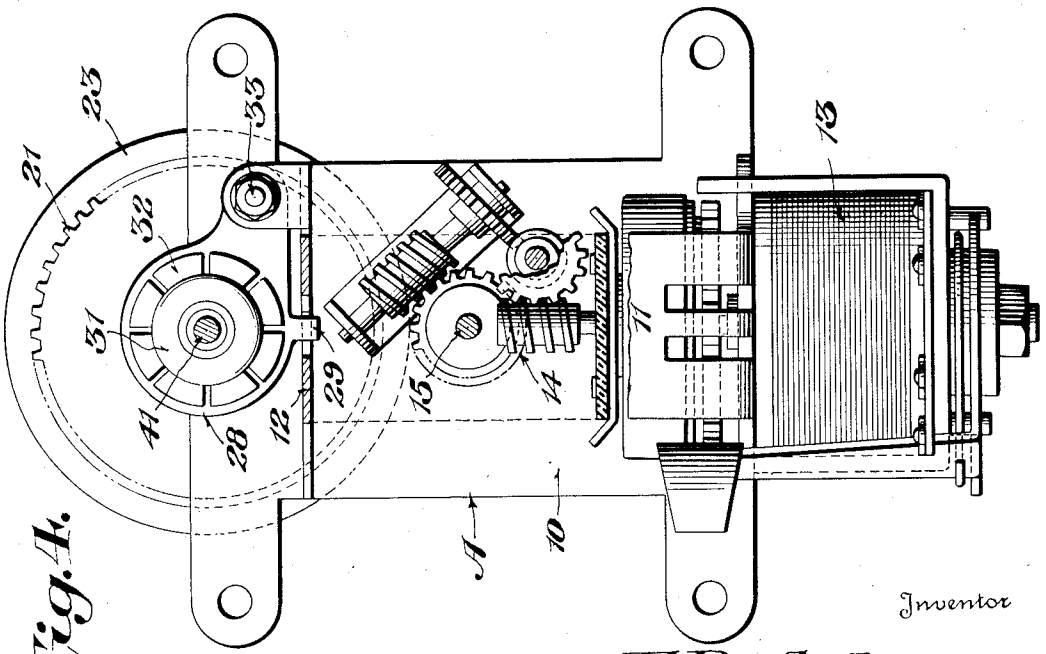


Fig. 4.

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UNITED STATES PATENT OFFICE

1,944,055

CLOCK-OPERATED CIRCUIT CONTROLLER

Thomas Raymond Arden, Baldwin, N. Y., assignor to American Flyer Manufacturing Company, Chicago, Ill., a corporation of Illinois

Original application January 20, 1932, Serial No. 587,828. Divided and this application November 25, 1932. Serial No. 644,381

5 Claims. (Cl. 200—39)

This invention relates to improvements in clock operated circuit controllers to be used for automatically changing the status of any desired circuit such, for example, as an alarm device circuit, at any predetermined time, and has generally in view to provide a clock operated circuit controller which is of simple, compact construction and of relatively low production cost, which may readily and easily be embodied in a clock of the type disclosed either in my prior Patent #1,838,069, dated December 22, 1931, or in my copending application, Serial No. 587,828, filed January 20, 1932, of which this application is a division, which may readily and easily be set to predetermine the time of its actuation, and which is thoroughly reliable and efficient in operation.

With the foregoing general purposes in view, the invention consists in the novel features of construction, combination and arrangement of parts as will be hereinafter more fully described, illustrated in the accompanying drawings and defined in the appended claims.

In the drawings, wherein like characters of reference denote corresponding parts in the different views:—

Figure 1 is a front elevation of a clock provided with a circuit controller constructed in accordance with the invention.

Figure 2 is a side elevation.

Figure 3 is a central, vertical section through the clock and the circuit controller.

Figure 4 is a section taken approximately on the line 4—4 of Fig. 2.

Figure 5 is a top plan view.

Figure 6 is a sectional view through the circuit controller illustrating the same in a circuit closing position.

Figure 7 is a view similar to Fig. 6 illustrating the status of the circuit controller after the same has been manually operated to a circuit opening position following circuit closing operation thereof.

Figure 8 is a detail cross section on the line 8—8 of Fig. 3; and

Figure 9 is a detail cross section similar to Fig. 8, but taken on the line 9—9 of Fig. 7.

Referring in detail to the practical embodiment of the invention illustrated in the drawings, it will be observed that the clock shown and designated generally as A, is of the same type as is illustrated and described in my aforesaid application, Serial No. 587,828. It is to be understood, however, that this is merely for convenience in explaining the invention and is not to be construed to mean that the circuit controller is in any way restricted to use with such clocks, for, as a matter of fact, it is not. On the contrary, it may be used in association with any clock mechanism, whether of the electrical or mechanical type, so long as the clock mechanism embodies a construction permitting incorporation of the mechanism constituting the invention therein. Therefore, only such elements of the clock A as may be essential to a clear understanding of the invention will be referred to in this description, attention being invited to application, Serial No. 587,828 for a complete description of the clock mechanism in the event such a description is desired. Accordingly, referring again to the drawings, it will be observed that the clock A is inclusive of a frame composed of a front plate 10 and a rear plate 11 connected together near their upper ends by a spacing bar 12, and that carried by said frame is a motor 13 which, through gearing designated generally as 14, drives a minute hand shaft 15 at a rate such that said shaft and the minute hand 16 carried thereby make one complete revolution during each hour of time. It will also be observed that the hour hand 17 is carried by a sleeve 18 rotably mounted on the minute hand shaft 16 and is, by means of gearing designated generally as 19, driven at a rate to make one complete revolution in twelve hours.

Referring now particularly to the present circuit controlling mechanism, it will be observed that a disk-like member 20 is mounted in an opening in the front frame plate 10 for rotation but is held against axial or longitudinal movement, and that fixed to this member is a gear 21 which is driven by one of the gears of the gearing 19 at a rate to make one complete revolution in twenty-four hours.

Mounted within an axial bore in the member 20 for longitudinal movement and rotative adjustment relative to said member is a shaft element 22 on the outer end of which is fastened a disk 23 which is provided with an inwardly directed tongue or lug 24 for cooperation with the gear 21. On its outer face this disk is provided with a circular row of numbers designated as 25, comprising two series, each extending one-half way around the disk with the numbers of each series reading from 1 to 12 in the same direction, the numbers of one series being for use in rotatably adjusting the disk for predetermining the A. M. time of actuation of the circuit controller, and the numbers of the other series being for use in predetermining the P. M. time of actuation of the circuit controller.

Suitably fixed to the shaft element 22 inwardly

of the member 20 is a friction disk 26 having a rearwardly extending hub portion 27 on which is mounted a plate 28. The hub 27 extends through said plate and is rotatable relative thereto, but the plate is held against rotation by reason of a tongue or extension 29 thereof being disposed within a slot 30 in the spacing bar 12, said slot being elongated in a direction longitudinally with respect to the shaft element 22, whereby free movement of the plate with said shaft element when the latter is moved longitudinally is permitted.

A nut or other suitable abutment 31 is carried by the shaft element 22 rearwardly of the plate 28 and between this abutment and the plate is interposed a spring washer 32 or other suitable resilient means which reacts from the abutment against the plate to urge the plate into frictional engagement with the disk 26. Consequently, since the plate 28 is held against rotation, and since the disk 26 is fixed to the shaft element 22, it follows that while said shaft may be forcibly rotated manually, it is held normally against rotation.

A fixed switch contact 33 is mounted on the frame cross member 12 or on any other suitable fixed part of the clock structure, and a cooperating movable contact 34 is carried by the plate 28, while interposed between the inner end of the member 20 and the front end of the disk 26 is a coil spring 35 which tends constantly by reaction from the member 20 and through the disk 26 to slide the shaft element 22 rearwardly to cause the contact 34 carried by the plate 28 to engage the fixed contact 33. Normally, however, the contact 34 is disposed in spaced relation to the contact 33, and rearward movement of the shaft element 22 is prevented by reason of the tongue or lug 24 of the disk 23 engaging the front face of the gear 21, so that normally the spring 35 is ineffective to move the shaft element 22 and the plate 28 rearwardly to cause the contact 34 to engage the contact 33. However, a hole 36 is formed through the gear 20 so that when, by rotation of said gear relative to the disk 23, said hole alines with the tongue or lug 24, rearward movement of the shaft element 22 and the plate 28 by the spring 35 to cause the contact 34 to engage the contact 33 is permitted.

The disk 23 is disposed behind the clock face element 37 and a sight opening 38 is formed through said clock face element at a suitable point to afford a view of the numbers on the front of said disk to facilitate so-called setting or rotative adjustment thereof. In this connection it is preferred that the series of numbers 1 to 12 on the disk related to A. M. time shall be colored black on a white background, and that the other series related to P. M. time shall be colored white on a black background to afford a ready means of distinguishing between A. M. and P. M. time in the setting of the disk. Moreover, in connection with the numbers 25 and the tongue or lug 24 on the disk 23, and the openings 36 and 38 in the gear 21 and the clock face, respectively, it is understood that said numbers and lug and said openings are so located relatively to each other that when the disk is rotated to expose any given number through the opening 38, the tongue or lug 24 of the disk and the hole 36 in the gear are so disposed relatively that the hole 36 is brought into alinement with the tongue or lug when the clock hands 16, 17 indicate a time corresponding to the time indicated by the particular number 25 that is exposed through the sight opening 38 or which, alternatively, is alined with a suitable pointer. Consequently, it follows from the structure so far described, and assuming that a suitable alarm device 39 is under the control of the switch 33—34, that if the disk 23 is set to expose a certain number 25 through the opening 38, the opening 36 in the gear 21 will aline with the tongue or lug 24 when the hands 16, 17 indicate a time corresponding to the time indicated by the exposed number 25 and the spring 35 therefore will be permitted to slide the shaft element 22 and the plate 28 rearwardly to effect engagement of the contact 34 with the contact 33, thus to close the alarm circuit.

Referring now particularly to Figs. 3, 6, 7, 8 and 9 of the drawings, it will be noted that the member 20 carries a U-shaped spring which straddles the shaft element 22 and which is inclusive of a pair of spring arms 39, and that said shaft element is provided in opposite sides thereof with a pair of grooves 40. During normal operation of the clock the tongue or lug 24 rides against the front face of the gear 21 and the grooves 40 are disposed slightly rearwardly of the spring arms 39 as illustrated in Figure 3, so that said spring arms offer no appreciable resistance to nor prevent rearward movement of the shaft element 22 when the opening 36 alines with the tongue or lug 24. However, the grooves 40 and the spring arms 39 bear the same angular relation, respectively, to the tongue 24 and the opening 36. Consequently, when the opening 36 is alined with the tongue 24 it follows that if the shaft element 22 is pushed forwardly a sufficient distance to bring the grooves 40 into the plane of the spring arms 39, the latter will contract into said grooves and thus lock the shaft element against rearward movement. This is illustrated in Fig. 7 of the drawings, and the operation of pushing the shaft element 22 forwardly is adapted to be effected manually to disengage the contact 34 from the contact 33 to break the alarm circuit after the spring 35 has functioned to move the shaft element inwardly to close the alarm circuit as illustrated in Fig. 6. In other words, the structure just described comprises means whereby the alarm, after it has started to sound, may be stopped immediately or as soon thereafter as desired without affecting the capability of the mechanism to again produce the alarm after the elapse of a twenty-four hour period of time. This clearly is seen to be true inasmuch as continued rotation of the gear 21 disalines the opening 36 from the tongue or lug 24, and continued rotation of the shaft element 22 finally results in the spring arms 39 being lifted out of the grooves 40, whereby under the influence of the spring 35, the disk 23 is returned to its normal position shown in Fig. 3 with the tongue or lug 24 riding against the adjacent face of the gear 21 in readiness again to be moved rearwardly to close the alarm circuit when the opening 36 again alines with the tongue or lug 24. Regarding the tongue or lug 24 the side of the same facing the direction of rotation of the gear 21 preferably is inclined or beveled so that if the mechanism is not manually actuated in the manner stated to stop the alarm, continued rotation of the gear 21 will, after the elapse of a suitable time interval, effect a wedging cam action against the tongue or lug to restore the mechanism to its normal status illustrated in Fig. 3.

In order to provide a support for the rear end portion of the shaft element 22, and to provide for convenient manual rotative adjustment and pushing forward of said shaft element, the same either

has formed therewith, or formed separately therefrom and suitably connected therewith, an extension 41 which is journaled in the frame plate 11 and which extends rearwardly of said frame plate and at its rear end is provided with a suitable finger engageable head 42. Preferably this extension is formed separate from the shaft element 22 and has a threaded connection with said shaft element by a thread which is loosened by rotation of the disk 23 in the direction of rotation of the gear 21 so that it is not possible to rotatably adjust said disk in a direction which might possibly harm the mechanism.

At various different times it may be desired not to use the circuit controlling mechanism. Therefore, in order to provide a practical means of rendering said mechanism temporarily inoperative, the shaft element extension 41 is provided with a collar 43, and an L-shaped lever 44 is pivoted to the frame element 11 and is provided with an arm 45 which, by swinging of said lever, is adapted to engage behind the collar 43 to hold the shaft element 22 against rearward movement. Thus, even when the opening 36 becomes alined with the tongue or lug 24, rearward movement of the shaft element 22 will be prevented and as a consequence the contact 34 will be held spaced from the contact 33 so that the circuit will not be closed. The lever 44 preferably is disposed at the inner side of the plate 11 and the plate preferably is slotted to accommodate an outwardly directed end of the lever which is exposed at the rear of the clock for finger engagement to effect manipulation of the lever.

From the foregoing description considered in connection with the accompanying drawings it is believed that the construction, operation and advantages of the invention will be clearly understood. It is desired to point out, however, that while only a single specific embodiment of the invention has been illustrated, the mechanism is readily capable of embodiment in various other specifically different mechanical structures within the spirit and the scope of the invention as defined in the appended claims.

I claim:—

1. In a clock, a clock mechanism, a member mounted for rotation and held against axial movement, a connection between the clock mechanism and said member whereby one complete rotation is imparted to the latter during a twenty-four hour period of time, a rotatably adjustable shaft element slidable through said member, friction means holding said shaft normally against rotation, spring means constantly tending to slide said shaft element in one direction through said member, means normally restraining said shaft element against sliding movement by said spring means, means whereby rotation of said member effects release of said restraining means, a fixed contact, and a cooperating movable contact operatively connected with said shaft element and normally spaced from said fixed contact so as to engage said fixed contact upon release of said restraining means and sliding of said shaft element by said spring means.

2. The combination as set forth in claim 1 including means operable upon manually sliding the shaft element in a direction to disengage the contacts to latch the shaft element against sliding movement by the spring means.

3. The combination as set forth in claim 1 including means operable upon manually sliding the shaft element in a direction to disengage the contacts to temporarily latch the shaft element against sliding movement by the spring means, and means whereby rotation of the shaft element releases said latch means and restores the restraining means.

4. The combination as set forth in claim 1 including a non-rotatable plate connected with the shaft element for axial movement therewith and carrying the movable contact, and friction means between said plate and said shaft element to hold the latter normally against rotation.

5. A time controlled circuit controller as set forth in claim 1 in which the clock operated rotatable member is provided with a hole and in which the shaft element is provided with a lug to ride normally against said rotatable member to hold the shaft element against longitudinal movement and to enter said hole to permit the shaft element to be moved longitudinally by the spring means when the rotatable member reaches a predetermined position of rotation.

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