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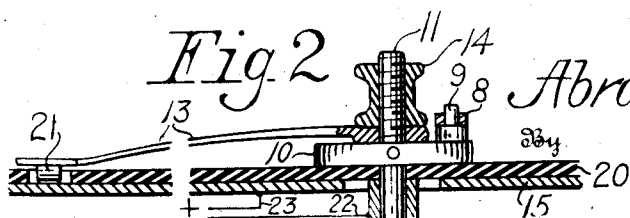
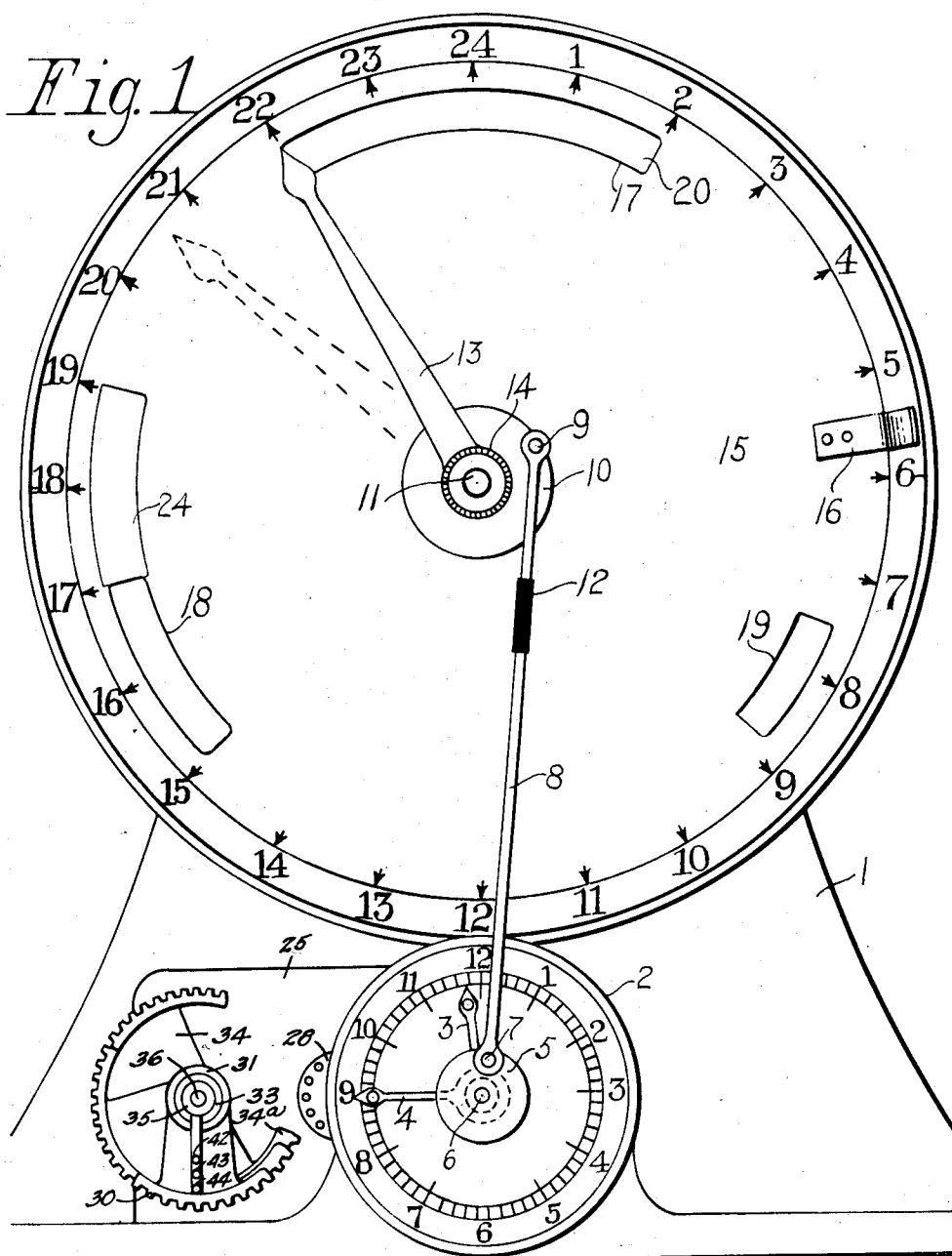
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ELECTRIC SWITCH MECHANISM

Filed April 27, 1932

2 Sheets-Sheet 1



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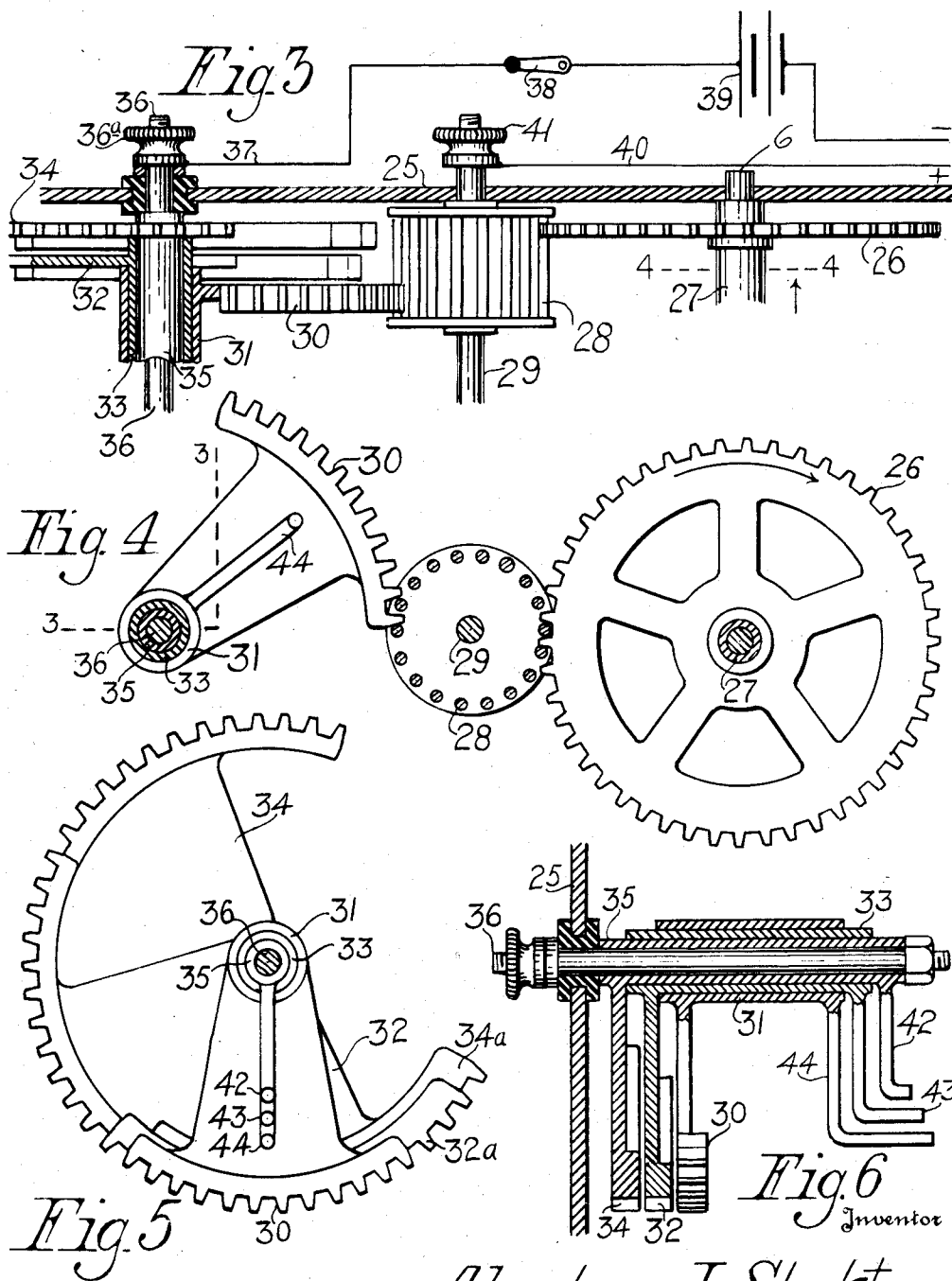
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UNITED STATES PATENT OFFICE

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ELECTRIC SWITCH MECHANISM

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4 Claims. (Cl. 200—36)

This invention relates to back and forth or oppositely operated electric switch mechanism, and has for its object the production of contrivances of special construction and arrangement for making and breaking an electric circuit, the operation effecting the interruption of the current periodically and at set times for any purpose to which it may be applied.

This invention includes a switch member movable clockwise and counterclockwise by suitable clock mechanism, and is provided with means for completing an electric circuit for different periods hourly, such means being adapted further to maintain a continuously open circuit, or a continuously closed circuit, and contrivances are further included for completing the circuit for a given time and then breaking the connection until the parts concerned are again set by hand.

In the accompanying drawings are illustrated the essential members and their combination for accomplishing the purposes for which the invention is designed, and Fig. 1 shows a front view of the back and forth operated switch and the clock, illustrating all parts assembled. Fig. 2 is a sectional view of a portion of the dial or plate swept by the switch arm, representing the arm in this view together with the devices for securing and releasing the arm with respect to its connection with the operating clock mechanism. The electrical conductors also appear in this view.

Fig. 3 is a sectional view of the back wall of a clock casing or frame, somewhat enlarged, showing the parts employed to complete the circuit for a specified portion of an hour, and then gravitationally dropping a movable member thereby breaking the connection until the parts involved are again set by hand. This view also sets forth the operating clock wheels engaged in the operation. The clockworks as a whole are not shown in detail as they form no part of this invention. Fig. 4 is a side view on the same scale as Fig. 3, representing the fifteen minute switch segment provided with gear teeth and its engagement with the lantern gear wheel of the clock mechanism. Fig. 5 illustrates the different forms of the separately adjustable geared switch segments upon the same shaft and shows their relative sizes or extent. Fig. 6 is a vertical section of a portion of the back wall of a clock casing or frame disclosing the shaft or arbor carrying such segments as appear in Fig. 5, and illustrating also their respective positions on the arbor, and the handles or finger pieces by which each segment may be separately moved to set the same.

Throughout the drawings and description the

same number is used to refer to the same part. It is not intended to confine this invention to the precise forms or sizes of the elements as drawn, as they may be obviously modified by any mechanic familiar with clock manufacture.

Considering Fig. 1 of the drawings, a suitable body or stand portion 1 carries the clock 2 usually in the lower position as represented. The operating clockwork may be of any chosen character, having an hour hand 3 and a minute hand 4. A disk 5 is attached to the minute hand arbor 6 and projecting from the disk is a pivot pin 7 engaging the lower end of a connecting rod 8. The rod 8 extends upwardly and pivotally engages a pin 9 upon a circular piece 10 termed for the purposes of this description the switch arm carrier. The carrier 10 is secured positively to a revoluble shaft 11, and is reciprocated by the movements of the connecting rod 8, which rod may include an insulating section 12. The carrier 10 supports the end of the conducting switch arm 13, which has thus one pivoted end and one free end. The switch arm may be secured to or released upon the threaded end of the shaft 11 by means of the thumb nut 14. The shaft 11 passes movably through a plate or circle of insulating material designated by number 15, and the plate is adjustably held in position by means of a spring clip 16 that engages an encircling graduated outer rim as shown. The plate 15 is provided with one or more openings such as 17, 18 and 19, and through any of these openings the switch arm 13 makes a conducting contact with an underlying metal plate 20 by means of the contact end 21 of the switch arm shown in Fig. 2. The extent of the oscillating movement of the switch arm 13 is governed by the size of the clock disk 5. As illustrated in Fig. 1 the arm 13 will sweep alternately right and left in the opening 17 on conducting plate 20 and the circuit is continuously closed until broken by the drop of one of the geared segments hereinafter described, or by the detachment of the arm. If the arm 13 is arranged to sweep the opening 19, either by rotating the plate 15 or adjusting the arm 13, the arm will move back and forth in that opening for a few minutes in every hour if the circuit is to be closed and the current employed. The numbers 1 to 24 about the rim of the upper dial in Fig. 1 of the drawings are merely arbitrary and for the convenience of the user. If the user before retiring at midnight turns the opening 19 to the number 24 of the rim scale, the current will be applied for a few minutes every hour until the user arises and re-sets the devices.

The metal plate is spaced from contact with the shaft 11, and suitable conductors are connected, one marked 22 is in connection conductively with the shaft 11, and another conductor 23 is attached to the plate 20. These conductors are joined together when the switch arm is in contact with the plate 20 as illustrated in Fig. 2. The conductors 22 and 23 may be directly connected with a source of electric current and electro-magnetic contrivances actuated thereby, or those conductors may be included in the second circuit controlled by the geared segmental drops hereinafter described.

In addition to the elements previously described, there are included and supported by the rear wall or frame portion 25 of the clockwork mechanism, a gear wheel 26 moved by an hourly rotating sheeve 27. The wheel 25 revolves the lantern wheel 28 on the stationary shaft 29. In Fig. 4 is set out a geared segment 30 which has just been brought by hand into engagement with the gear 28. The segment 30 has the sleeve body 31 freely movable exteriorly upon the like body of a second geared segment 32, and upon the sleeve body 33 of the segment 32 the segment 30 is loose enough to turn downwardly by its own weight when freed from the lantern gear 28. There is also shown a third geared segment 34, and the sleeve body 35 of this segment turns freely within the sleeve 33, all the sleeve bodies of the geared segments are carried by the shaft 36 the end thereof being insulated from the frame 25 of the clockwork. A thumb nut 36a engages the end of the shaft 36 outside the frame 25 and a conductor 37, including a suitable hand switch 38, leads to a battery 39 and thence to any electro-magnetic devices sought to be actuated. A return conductor 40 is joined by the thumb nut 41 to the shaft 29 of the clock wheel 28.

The geared segments mentioned are separately movable, and set by hand individually in positions such as shown by the segment 30 in Fig. 4. To set the segments the sleeve body of segment 34 has a handle or finger piece 42, sleeve 33 has a like handle 43, and sleeve 32 a similar handle 44. The segments and handles are best shown in Fig. 6. The relative sizes of the segments are shown most clearly in Fig. 5. The segment 30 is designed to contact for fifteen minutes, the segment 32 for thirty minutes, and the third segment 34 for forty-five minutes. These sizes may be varied in different machines. In Fig. 5 it will be noted that the segment 32 has a weighted portion 32a, and the segment 34 a weighted portion 34a. These weighted portions are proportioned to bring the segments when they are dropped free from the lantern wheel 28.

The operation of the various devices of this invention may be made plain as follows:

Considering the parts illustrated in Figs. 1 and 2 of the drawings, it will be understood that the connecting rod is constantly reciprocated by the clock mechanism and the carrier correspondingly rocked. When attached to the carrier the arm 13 will have its free end moved back and forth upon the insulating plate 15. The switch arm is very flexible and resilient, and the contact end 21 is rounded in order that it may readily enter or pass out of any opening in the insulating plate. The ends of those openings may be slightly beveled to aid in raising the end 21 out of the opening. It will be noted further that if the swing of the free end of the arm is greater than the length of the opening, the end 21 will press

slightly upon the surface of the insulating plate back and forth. To prevent wear of the insulating plate a protecting strip 24 of metal may be used. Again, it will be observed that if the thumb screw 14 be unscrewed and the arm released from the carrier, it will remain at rest. As represented in full lines in Fig. 1, the circuit is maintained complete, but if the arm is placed with its free end upon the insulating plate as shown in broken lines, the circuit is kept open. Let it be assumed that the arm is arranged to sweep one of the smaller openings 18 or 19, or what is the same in result, suppose the plate 15 by means of the clip 16 is turned around so that the arm sweeps only a portion of the opening 20. Thus, the current will be applied for only a small time each hour. Also, it will be observed that the minute hand 4 is in the position set out in Fig. 1 as the hour hand approaches each hour number on the clock face. If the attendant should so desire, and would adjust the switch arm as the hour hand approaches two o'clock, the circuit will then be completed for a time each hour thereafter.

But, it is often advantageous in heating a dwelling that the heat shall be turned on for a specified time, and then turned off until again necessary. Therefore this invention is provided with the additional attachments illustrated in the Figs. 3 to 6 of the drawings, of which Fig. 4 is most explanatory. In Fig. 4 the fifteen minute segment has been just engaged by hand with the wheel 28. The circuit is completed. As the hour wheel 26 rotates segment 30 turns downwardly and at the end of the period is dropped into the position shown in Fig. 5 and the circuit is broken. One or the other of the segments must be set again by hand to continue the operation. In a similar manner the second and larger segment 32 may be arranged by hand so that the end of the geared portion shown uppermost at the left in Fig. 5 will engage the lantern pinion 28. The segment 32 may be formed with double the number of teeth possessed by segment 30. Therefore, twice the period of time must elapse before the last of the teeth of segment 32 engages the pinion. The segment will then be released and will drop, its descent being aided by the weighted rim 32a in which the teeth are formed. The object of the weighted or heavier rim is in addition to aiding the fall of the segment, to hold the same in about the lower position illustrated in Fig. 5, in which position it is entirely free from contact with the pinion 28 and the circuit is broken permanently until the segment is re-set by hand. Also, it is intended that the still larger segment 34 may be turned by hand to bring the end tooth shown uppermost in Fig. 5 into engagement with the lantern pinion. Now, a still longer period of time must pass, for example 45 minutes, before the last teeth of the segment series engage and are held by the pinion. The segment is finally dropped as in the former instances. The relatively heavier toothed rim 34a of the segment aiding the falling movement, and causing the segment after it drops to assume substantially the position set out in Fig. 5 and out of touch with pinion 28 and maintaining an open circuit. It is not intended to limit those segments to any particular size or form, nor is it desired to confine the invention to use with any special electrically operated mechanism, and no such mechanism is shown. It is intended, and it is believed to be apparent that the conductors 22 and 23 shown in Fig. 2 may be included in the

same circuit with the conductors 37 and 40 shown in Fig. 3 and led to heater damper actuating devices or the like.

Having now described this invention and its operation, I claim:—

1. In a back and forth operating electric switch mechanism, a clock, in combination with a member revolved by the clock, a connecting rod pivotally attached to the said member at one end and having a reciprocating movement, an insulating plate, a revoluble shaft passing through the plate, a metal plate arranged beneath said insulating plate, said shaft being insulated from the metal plate, a switch carrying device secured to the shaft and revoluble therewith upon said insulating plate, the remaining end of said connecting rod being pivotally connected with the said device, a conducting switch arm movably engaging said shaft, a thumb nut for securing and releasing said switch arm upon said switch carrying device, the said insulating plate having an opening in the path of the end of said switch arm whereby contact may be made through the insulating plate with the metal plate, and conductors connected with the metal plate and with the said shaft.

2. In electric switch mechanism, in combination, operating clockwork having a gear wheel provided with a predetermined number of teeth, a segmental geared member having a sleeve body, means for supporting said body rotatively, said segmental gear having a predetermined number of teeth less than the number of teeth on the gear wheel, the said sleeve body being constructed and

arranged to be grasped and turned by hand to set said segmental member in connection with the gear wheel whereby as the wheel revolves the member will be disengaged and drop from the wheel, thereby separating said member and wheel.

3. In electric switch mechanism, in combination, operating clockwork having a gear wheel provided with a predetermined number of teeth, a plurality of segmental members each having a different number of teeth, the number of teeth of each of said members being less than the number of teeth on said wheel, each of said members having a sleeve body, said bodies being arranged one within the other and provided with means whereby each body may be grasped by hand and turned independently to set a segment into connection with said wheel, means for supporting said bodies rotatively whereby when said wheel revolves the connected segment will be disengaged and drop away from the wheel, thereby separating said segment and wheel.

4. In an electric switch mechanism of the character described, operating clockwork mechanism having a gear wheel, a plurality of pivotal geared segments of different extent and separately movable each arranged to be supported by the said clockwork wheel for a period of time to complete an electric circuit and to be dropped at the end of such period to break the circuit, and conductors extending between the said segments and clockwork wheel and adapted to be connected and disconnected by the said segments.

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