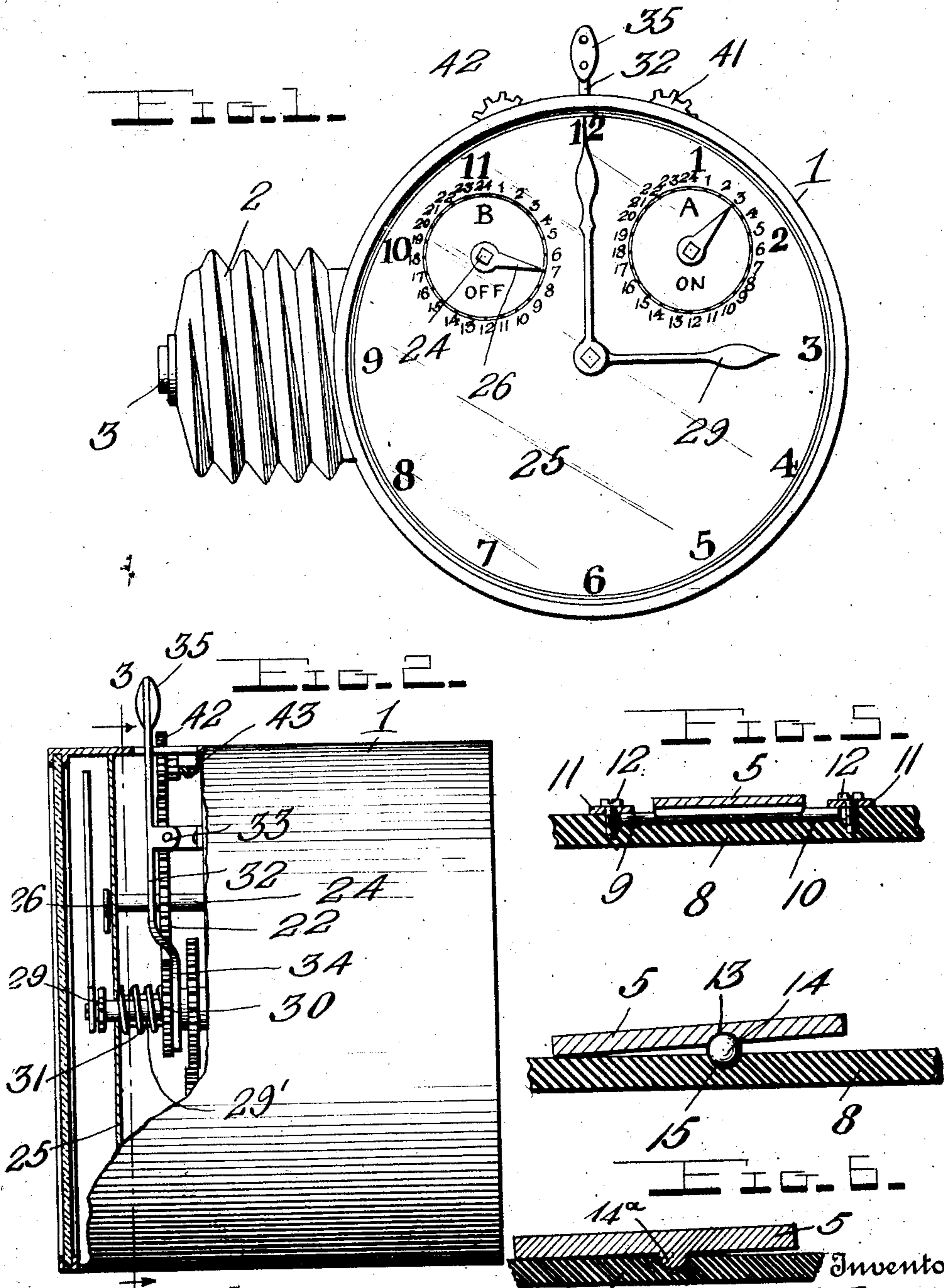


C. E. BUNKER.
ELECTRIC TIME SWITCH.
APPLICATION FILED SEPT. 16, 1909.

Patented June 21, 1910.

2 SHEETS—SHEET 1.

962,307.



Witnesses
Chas. L. Griestauer.
C. H. Griestauer.

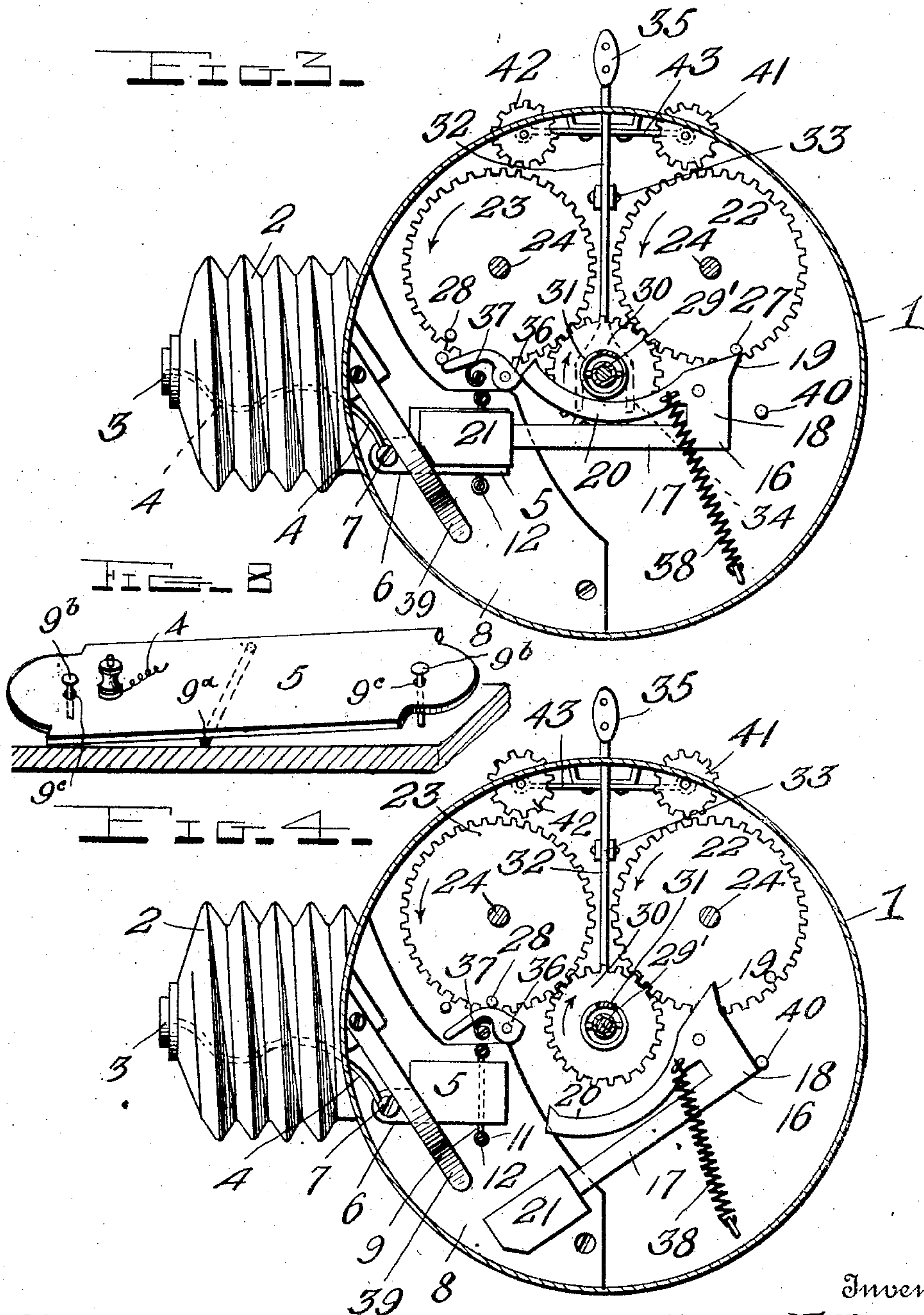
FIG. 7 & 8 Carey E. Bunker
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CAREY E. BUNKER, OF OREGON, MISSOURI

ELECTRIC TIME-SWITCH.

962,307.

Specification of Letters Patent. Patented June 21, 1910.

Application filed September 16, 1909. Serial No. 518,054.

To all whom it may concern:

Be it known that I, CAREY E. BUNKER, a citizen of the United States, residing at Oregon, in the county of Holt and State of Missouri, have invented certain new and useful Improvements in Electric Time-Switches; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in electric time switches.

One object of the invention is to provide means for automatically turning on and off an electric switch at a predetermined time.

Another object is to provide a simple and improved electric switch mechanism adapted to be applied to and actuated by the hour hand shaft of a clock works whereby the switch will be operated at the proper time, means being provided whereby the operating devices may be easily adjusted or set from the outside of the clock to actuate the switch at any desired time.

With the foregoing and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts, as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a front view of a clock having my invention applied thereto; Fig. 2 is a side view of the same, partly in section; Fig. 3 is a cross sectional view on the line 3—3 of Fig. 2, showing the switch in an operative position; Fig. 4 is a similar view showing the switch in an inoperative position, just after having been released; Fig. 5 is a detail view of the stationary contact plate of the switch, showing the manner in which the same is connected to its base of insulating material. Fig. 6 is a detail view showing another form of connection for the contact plate. Fig. 7 is a similar view showing a modified construction of the connection shown in Fig. 6. Fig. 8 is a detail perspective view of still another form of connection for the contact plate.

Referring more particularly to the drawings, 1 denotes a clock which may be of any suitable construction, to which are connected the terminals of an electric circuit. The terminals of the circuit may be connected to the clock in any suitable manner and in the

present instance I show the clock as being provided on one side with a screw plug 2 having in its outer end a contact plate 3 which is connected by a short conducting wire 4 to a contact plate 5 arranged within the casing of the clock. The shell of the plug and the clock casing and metallic parts thereof serve as the other conductor of the circuit, whereby the electric current is carried to the movable member of the switch, hereinafter described. The stationary member or contact plate 5 of the switch consists of a flat metal plate of suitable size having on one end an extension 6 in which is arranged a binding screw 7 to which the circuit wire 4 is connected.

The contact plate 5 is loosely connected to a block or base 8 of insulating material, preferably by securing to the underside of the plate a rock shaft 9, the ends of which project laterally a short distance beyond the opposite edges of the plate, as shown. The shaft 9 is mounted in a groove 10 formed in the base 8 and is loosely secured at its opposite ends by washer plates 11 and screws 12. This form of mounting for the contact plate 5 is clearly shown in Fig. 5 of the drawings. In Fig. 6 of the drawings, is shown another form of mounting for the plate. In Fig. 6, the contact plate is shown as being provided on its underside with a bearing socket 13 in which is loosely mounted a bearing ball 14 which is adapted to loosely fit a bearing socket 15 formed in the insulating base 8. This bearing may be constructed in the form of a half ball 14^a, the flat side of which, may be permanently secured to either the plate 5 or the base 8 with the round side engaging a socket in the opposite part as shown in Fig. 7. In Fig. 8, is shown another modified form of contact mechanism, in which the plate 5 is provided with a rock shaft 9^a and is loosely held in position at its ends by headed pins 9^b which engage holes 9^c formed in the plate, as shown.

Pivotally mounted at a suitable point on the casing or frame of the clock, is a movable switch member 16 comprising a spring metal bar 17 on one end of which is formed a rectangular head 18 having at one corner an operating lug 19 and having formed thereon a curved longitudinally extending stop arm 20. On the free end of the bar 17 is arranged a contact block 21 which, when the switch member is moved back and forth, is adapted to be brought into and out of en-

gagement with the stationary contact plate 5, thus completing and breaking the electric circuit connected with the clock. By loosely mounting the stationary contact plate 5 in the manner shown in Fig. 5 or in Fig. 6, said contact plate 5 will adjust itself to closely engage the contact member 21 of the movable switch member so that the entire surface of said block and plate will be in engagement thus insuring a perfect electrical connection.

The operating mechanism for the movable switch member 16 comprises a pair of gear wheel 22 and 23 which are revolvably mounted on short stub shafts 24 arranged in the casing of the clock, preferably adjacent to the upper side thereof, as shown. The ends of the shafts 24 project through the dial plate 25 of the clock and have fixedly mounted thereon indicating fingers 26 which are adapted to be turned by the movement of the gears 22 and 23 and which point to scales of divisions A and B representing the twenty-four hours of a day. On the gears 22 and 23 are arranged laterally projecting operating studs or pins 27 and 28, the purpose of which will hereinafter appear.

On the hour hand shaft 29 of the clock works is slidably keyed a gear pinion 30 which is normally in operative engagement with the gear wheels 22 and 23 whereby said wheels 22 and 23 are turned in the directions indicated by the arrows thereon by the movement of the hour hand shaft. The pinion 30 is held in position on the hour hand shaft 29 to engage the gears 22 and 23 by means of a coiled spring 31, which is arranged on said shaft between the inner side of the clock dial and the adjacent side of the pinion.

In order to shift the pinion 30 out of engagement with the gears 22 and 23 to permit the latter to be adjusted or turned to the position for opening and closing the switch at the desired time, I preferably provide a shifting lever 32 which is pivotally mounted on the frame work of the clock, as at 33, and is provided with an offset bifurcated lower end 34 which embraces the shaft 29' and engages the rear side of the pinion 30. The upper end of the lever 32 projects through a slot in the top of the clock casing and is provided with a suitable handle 35 by means of which the lever is operated to shift the pinion 30 outwardly on the shaft 29' against the tension of the spring 31 and out of engagement with the gears 22 and 23, thus permitting said gears to be moved without stopping or interfering with the clock mechanism. When the lever is released the spring 31 will force the pinion 30 back on the shaft and into engagement with the gears 22 and 23, whereby they are operated to move the switch at the proper time.

Pivotally mounted in the clock casing, below the gear 23 and in the path of movement

of the arm 20 of the switch member 16 is a stop member 36 which is normally held in operative position to catch and hold the arm 20 and switch member 16 by means of a spring 37. The stop member 36 is provided with a curved stem which projects into the path of movement of the operating pin 28 of the gear 23 whereby when said pin 28 is brought into engagement with the stop member 36, the latter will be tripped and caused to disengage the arm 20, thus releasing the switch member 16. When thus released, the switch member 16 will be retracted by a coiled spring 38 connected thereto, thus disengaging the contact block 21 of said switch from the stationary contact plate 5 and breaking the electric circuit at the desired time.

When the gear 22 has been turned by the pinion 30 to bring the operating pin 27 into engagement with the lug 19 on the head 18 of the switch member, said member will be rocked on its pivot against the tension of the spring 38, thus moving the bar 17 and the arm 20 upwardly and carrying the contact block up and into engagement with the stationary contact member 5, thereby completing the electric circuit. In moving upwardly, the contact block 21 of the switch member is preferably moved over a flat spring 39 which is arranged in the clock casing, as shown. In moving back to an inoperative position, the contact block 21 engages and passes beneath the spring 39 to the position shown in Fig. 4 of the drawings. The spring 39 is arranged at an angle and has its free end in close engagement with the insulating block 8 adjacent to the inoperative position of the contact block 21 whereby when said block is moved upwardly by the operation of the switch member 16, the block will ride up over the spring to a position where it disengages the spring and drops down onto the contact plate 5, thus making a positive and complete engagement therewith. Arranged in the clock casing at a suitable point, is a stop pin 40 with which the pivoted end of the switch member is adapted to be engaged when said member is drawn to an inoperative position by the spring 38, said pin thus limiting the movement of the switch member.

In order to turn the gears 22 and 23 to the position for operating the switch at the desired time, I provide setting gears 41 and 42 which are engaged, respectively, with the gears 22 and 23 and are revolvably mounted in opposite ends of a spring bearing arm 43 which is secured in the upper portion of the clock casing, as shown. The outer portions of the setting wheels 41 and 42 project through suitable slots in the sides of the clock casing and are adapted to be engaged by the thumb or finger and operated in the proper direction to turn the gears 22 and 23

to the desired adjustment for actuating and releasing the switch member in the manner described. It will be understood that the operating pins 27 and 28 on the gears 22 and 23 are arranged almost opposite to the indicating fingers 26 on the outer ends of the shafts 24 of the gears so that when the gears are turned by the setting wheels 41 and 42 to bring the indicating fingers 26 to the desired position on their dials, it will be known that the operating pins on the gears are in the proper position for turning on or off the switch at the desired time. By providing the spring bearing arms 43, the setting wheels 41 and 42 are normally held out of engagement with the gears 22 and 23 and said setting wheels are pressed normally into engagement with the gears when the latter are operated.

The setting wheels 41 and 42 are preferably formed of wood fiber or similar insulating material and the clock casing may be arranged in a casing of suitable insulating material such as porcelain, wood fiber or the like (not shown) to insure a perfect insulation from electric currents while setting or winding the clock, when in position in the circuit.

From the foregoing description, taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention, as defined in the appended claims.

Having thus described my invention, what I claim is:

1. In an electric time switch, the combination with a clock works, of a spring retracted switch member having an electrical connection with one terminal of an electric circuit, a pivotally mounted contact plate having an electrical connection with the other terminal of the circuit, a contact block carried by said switch member and adapted to be engaged with said contact plate to complete the electric circuit, a switch operating gear adapted to move said switch member into engagement with said contact plate, thereby closing the electric circuit, a stop arm carried by said switch member, a catch adapted to be engaged by said stop arm to hold the switch member in closed position, a gear adapted to trip said catch and release said switch member, a pinion slidably keyed to the hour hand shaft of the clock works, and adapted to normally engage and operate said gears, means to disengage said pinion from said gears, and means whereby the latter are set to open and close the switch at the desired time.

2. In an electric time switch, the combination with a clock works, of a pivotally mounted spring retracted switch member, an operating lug on one end of said switch member, a stop arm carried by said member, a contact block on the free end thereof, a pivotally mounted contact plate arranged in said clock and adapted to be engaged by the contact block on said switch member, an elevating spring adapted to be engaged by the contact block on said switch member and to be elevated to a position for engagement with said contact plate, a switch closing gear revolubly mounted in the clock, an operating pin carried by said wheel and adapted to engage the operating lug on said switch member, whereby the latter is moved to a closed position, a spring retracted catch adapted to be engaged by the stop arm on said switch member and to hold the latter in closed position, a revolubly mounted gear, an operating pin carried by said gear and adapted to trip said catch, thereby releasing said switch member, a spring to retract said member to an inoperative position when released from said catch, an operating pinion mounted on the hour hand shaft of the clock and operatively engaged with said gears to turn the same in proper direction to open and close the switch.

3. In a time switch, the combination with a clock arranged in and forming part of an electric circuit and having connected thereto an electric plug, of a pivotally mounted switch member, a stationary contact member adapted to be engaged by said switch member, a catch to hold the switch member in engagement with said contact plate to close the electric circuit, a gear adapted to move said switch to a closed position and into engagement with said catch, a gear adapted to trip said catch and release said switch, an operating pinion slidably keyed to the hour hand shaft of the clock, and engaging said gears to operate the latter in the proper direction, a shifting lever adapted to move said pinion out of engagement with said gears whereby the latter may be adjusted without interfering with the operation of the clock, and spring retracted set wheels adapted to be projected into engagement with said gears whereby the latter are turned and set from the outside of the clock.

4. In a time switch, the combination with a clock, of a spring retracted switch member, a contact member comprising a plate having a loose pivotal connection whereby when engaged by said switch member a positive connection is made, a revolubly mounted operating gear, means on said gear to engage said switch member and to move the latter to a closed position, a catch adapted to hold said switch member in closed position against the tension of its spring, a catch releasing gear, means carried by said gear to

trip said catch and thereby release said switch member, a spring retracted pinion slidably keyed on the hour hand shaft of the clock works, a shifting lever engaged with said pinion and projecting beyond one side of the clock, whereby the pinion may be shifted out of engagement with said gears from the outer side of the clock, spring bearing brackets arranged in said clock, set wheels revolubly mounted in said brackets and projecting through the sides of the clock whereby said set wheels are adapted to be pushed inwardly and into operative engagement with said gears to turn the same to the

desired position when disengaged from said pinion, hour dials arranged on the dial of the clock, and indicating pointers arranged on the shafts of said gears and pointing to the numbers on said dials whereby the position of the operating devices on said gears is indicated. 15 20

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CAREY E. BUNKER.

Witnesses:

FRANK C. CASTLE,
CHARLES J. BUNKER.