Patented Apr. 28, 1925.

1,535,101

UNITED STATES PATENT OFFICE.

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ELECTRIC TIME SWITCH.

Application filed February 17, 1923. Serial No. 619,567.

To all whom it may concern:

Be it known that I, HERBERT W. CHRISTIAN, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Electric Time Switches, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to an electric time switch and has special reference to an auxiliary switch which may be associated with a main switch used in connection with an electric water heating apparatus, the main switch controlling the supply of current to the water heating apparatus and the auxiliary switch controlling the length of time which the main switch is closed and consequently the use of electrical energy for water heating purposes.

While the time switch has been especially designed for an electric water heating apparatus, yet it is capable of general use where a current of electricity is to be turned on for a predetermined time, and then automatically cut off.

My invention aims to utilize a clock train or the greater part of an ordinary alarm clock for automatically opening an auxiliary switch at a predetermined time, the clock train only operating while the switch is closed and the alarm clock is equipped with two dial or indicia members, one disclosing numerically the amount of current used for a predetermine period and the other disclosing the quantity of water heated or the work performed by the current in the prescribed time.

My invention further aims to utilize the winding arbor of an ordinary alarm clock as the prime mover of a switch kick-off member or actuating element. It is a well known fact that when an ordinary alarm clock is wound that the winding arbor slowly rotates during the operation or running of the clock and that if the winding arbor is only turned a partial rotation that the clock will run a predetermined time before being completely run down. I utilize this characteristic of the winding arbor of an alarm clock in connection with one of the dial and indicia members to set the clock for operation a predetermined time. This is accomplished by shifting the switch kick-off member to a desired position relative to the dial or indicia member and then releasing the switch kick-off member to be slowly carried back to its original position by the clock mechanism until said clock mechanism ceases to operate, by which time the kick-off member impinges against a switch arm and accomplishes the desired cut off of the current.

Other characteristics of my invention will hereinafter appear as the electric time switch is described by aid of the drawings, wherein Figure 1 is a plan of the electric time switch with the switch per se uncovered;

Fig. 2 is a front elevation of the same showing the principal changes made in connection with the ordinary alarm clock for the purpose of this invention;

Fig. 3 is a side elevation of the electric time switch partly broken away and partly in section, and

Fig. 4 is a diagrammatic view of the electric time switch associated with an electric water heating apparatus having a main switch.

In the drawings, the reference numeral 1 denotes a clock casing and mounted on one side of said casing is a bracket 2 which will permit of the clock being mounted on or attached to a horizontal or vertical support, for instance, a water heating apparatus 3.

In the casing 1 is a conventional form of clock mechanism including a winding arbor 4 and a hand arbor 5. The winding arbor 4 is adapted to be manually rotated to wind a main spring which transmits its power to the hand arbor 5, and as pointed out in the beginning, the winding arbor 4 is also rotated by the main spring of the clock mechanism.

The clock also includes a protected dial 6 and rotatably mounted on the dial is a large gear wheel 7 meshing with a small gear wheel 8 on the hand arbor 5, and mounted on the large gear wheel 7 is an indicia member or auxiliary dial 9 which is calibrated and provided with indicia relative to the consumption of electrical current or the service of the switch associated with the clock. Extending over the edge of the rotary indicia member 9 is a pointer 10.

Mounted on top of the clock casing 1 is a switch block 11, preferably made of insulation material and secured to the clock casing by one or more nut equipped screws. The switch block 11 has a detachable cover 13 and on said switch block is a post 14 supporting a pivoted switch arm 15.
adapted to engage a binding post 16 carried by the switch block 11. One side of the switch block 11 has an opening 17 for leading-in wires 18 which are connected to the posts 14 and 16, and as shown in Fig. 4 the leading-in wires 18 are adapted for an electrical circuit including a main switch 19 and the electrical water heating apparatus 3.

The switch block 11 is provided with a spring or resilient member 20 holding the pivoted switch arm 15 normally in engagement with the binding post 16 to close the circuit and the rear end of said switch arm protrudes from the switch so that it may be actuated to break the circuit.

Mounted on the outer end of the winding arbor 4 is a long crank or kick-off member 21 having a handle 22 by which the kick-off member may be conveniently swung in a clockwise direction to partially wind the clock. The relation between the kick-off member 21 and the switch arm 15 is such that when the kick-off member of the engaging device against the switch arm 15 and opens the switch the clock mechanism is in a run down condition. Swinging of the kick-off member 21 from this switch engaging position starts the clock and the period of operation depends on how far the kick-off member 21 is swung away from the switch.

Mounted on the casing 1, at the rear end thereof, is an end or indicia member 23 which is suitably graduated so that the kick-off member 21 may be moved relative to the graduations.

Assuming that the time switch is electrically connected with a suitable source of electrical energy, a clock mechanism having a winding arbor, and a switch kick-off member on the winding arbor of said clock mechanism and by which member the clock mechanism may be partially wound, said kick-off member being actuated during the operation of the clock mechanism and opening the circuit of the auxiliary switch when the clock mechanism is approximately run down.

1. The combination of an electric water heating apparatus having a main switch and an auxiliary switch in circuit with a source of electrical energy, a clock mechanism having a winding arbor, and a switch kick-off member on the winding arbor of said clock mechanism and by which member the clock mechanism may be partially wound, said kick-off member being actuated during the operation of the clock mechanism and opening the circuit of the auxiliary switch when the clock mechanism is approximately run down.

2. The combination set forth in claim 1, and an indicia member on the side of said clock in proximity to said kick-off member.

3. The combination set forth in claim 1, and a dial member operated by said clock to concurrently indicate the service of said switch.

4. The combination set forth in claim 1, wherein said auxiliary switch includes a spring pressed normally closed switch arm.

5. The combination of a clock mechanism including a hand arbor and a winding arbor, which winding arbor rotates in synchronism with said hand arbor but in an opposite direction during normal running of the clock mechanism, a switch controlling the use of electrical current, a kick-off member on the winding arbor of said clock mechanism by which said clock mechanism may be wound, said clock mechanism actuating said kick-off to effect opening of said switch, and a meter actuated from said hand arbor to indicate the amount of retroy.
current used during a closed position of said switch.

6. The combination set forth in claim 5, wherein said kick-off member holds said switch normally closed.

7. The combination set forth in claim 5, and an indicia member adjacent said kick-off member adapted to cooperate with said kick-off member in predetermining the amount of work to be performed by the electrical current while the switch is closed.

In testimony whereof I affix my signature in presence of two witnesses.

HERBERT W. CHRISTIAN.

Witnesses:

Anna M. Dorr,
Karl H. Butler.