April 28, 1925.

1,535,101

H. W. CHRISTIAN

ELECTRIC TIME SWITCH

Filed Feb. 17. 1923

2 Sheets-Sheet 1

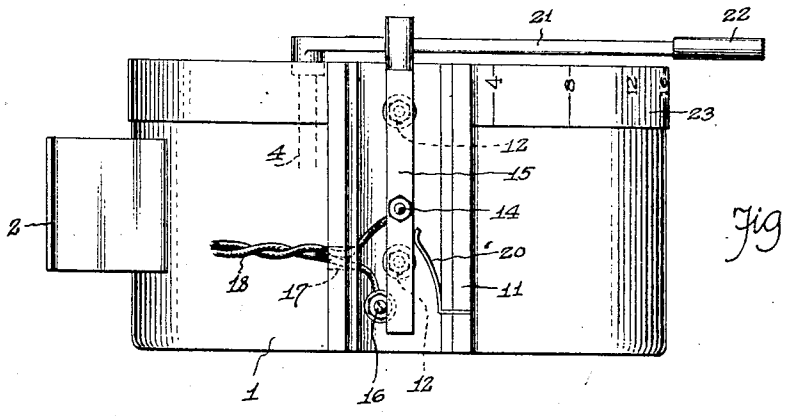


Fig. 1.

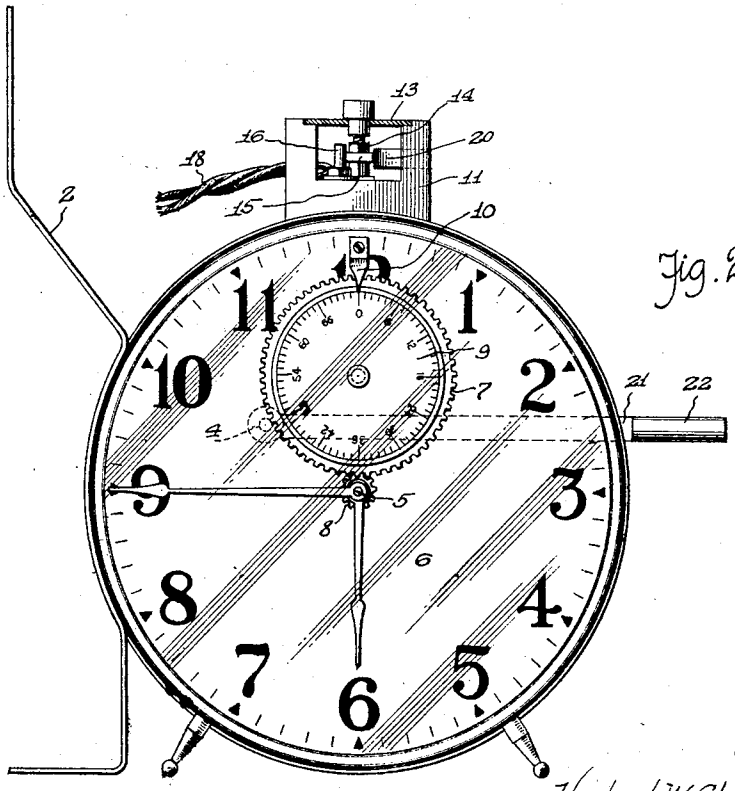


Fig. 2.

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2 Sheets-Sheet 2

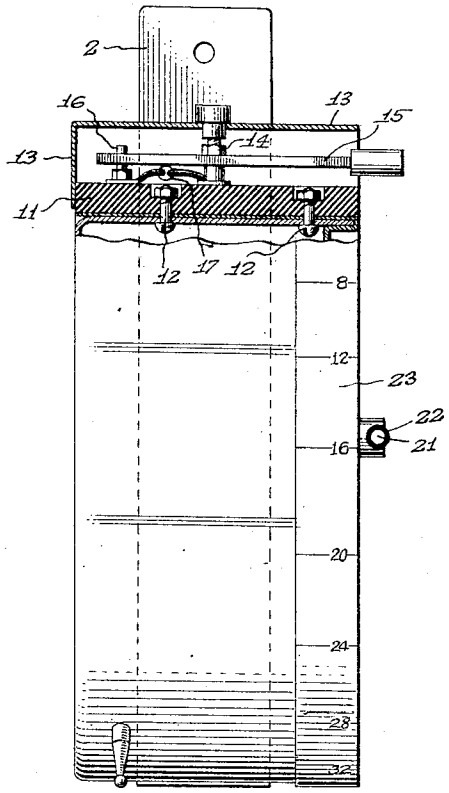


Fig. 3.

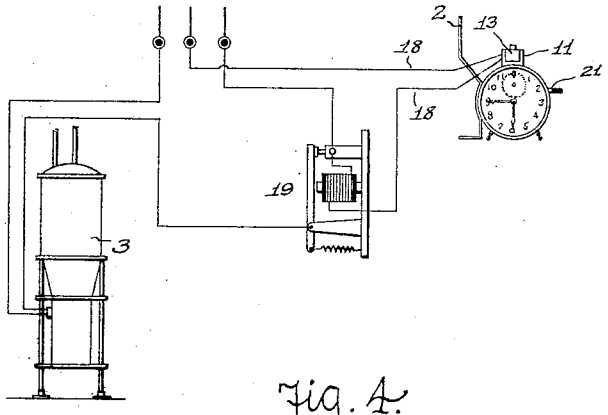


Fig. 4.

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Patented Apr. 28, 1925. 1,535,101

UNITED STATES PATENT OFFICE.

HERBERT W. CHRISTIAN, OF DETROIT, MICHIGAN.

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 predetermined time 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 12. 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 impinges 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 a band 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 and in circuit with the main switch 19 and the water heating apparatus 3, the indicia member 23 can be provided with indicia indicating the number of gallons of water that may be heated in the apparatus 3 during a predetermined time of current consumption. For instance, shifting the kick-off member 21 away from the switch turns on the electrical current through the main switch 19 which includes an electro magnet energized by the closing of the clock switch to close the main switch for a circuit including the heating elements of the water heating apparatus 3. If the kick-off member 21 is swung as far as the graduation sixteen, as shown in Fig. 3, the clock mechanism will be partially wound and placed in operation to gradually swing the kick-off member 21 in a counterclockwise direction, by reason of the clock mechanism rotating the winding arbor 4 in such direction. By the time the kick-off member 21 travels from the graduation sixteen to the switch and kicks off the switch arm 15, sixteen gallons of water have been heated, consequently the clock has only been running while the switch is closed and water heated.

During this heating operation the clock mechanism has caused the gear wheel 7 and the indicia member to revolve until the clock is run down, and the indicia of said dial or indicia member will indicate the amount of current used in heating the sixteen gallons of water. The dial or indicia member 9 therefore serves as a meter and will show the total amount of current used in a predetermined time. This auxiliary meter will permit of the user of the electrically operated water heating apparatus keeping a record of the current consumption, ascertaining if too much current is being used, also the cost of heating each gallon of water. The time switch as a whole will permit of the user heating just enough water for a desired purpose and no more, consequently there may be a saving of electrical current as well as wear on the water heating aparatus.

As indicated in the beginning, I may use the greater part of an ordinary alarm clock mechanism, but I do not care to confine my invention to any particular type of clock mechanism, and the invention may be varied in such other respects as are permissible by the appended claims.

What I claim is:—

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

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.