Feb. 4, 1930. R. KAUCH ET AL 1,745,934

AUTOMATIC CONTROL FOR ELECTRICAL ATTACHMENTS

Filed Aug. 2, 1926

FIG. 1.

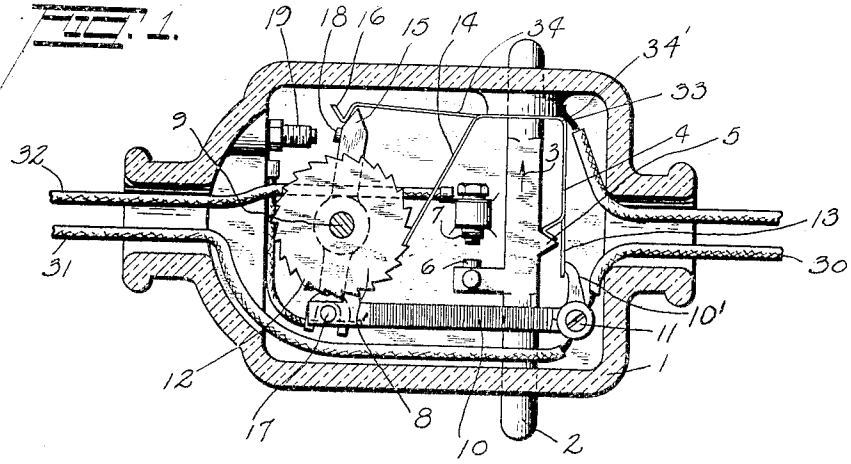


FIG. 2

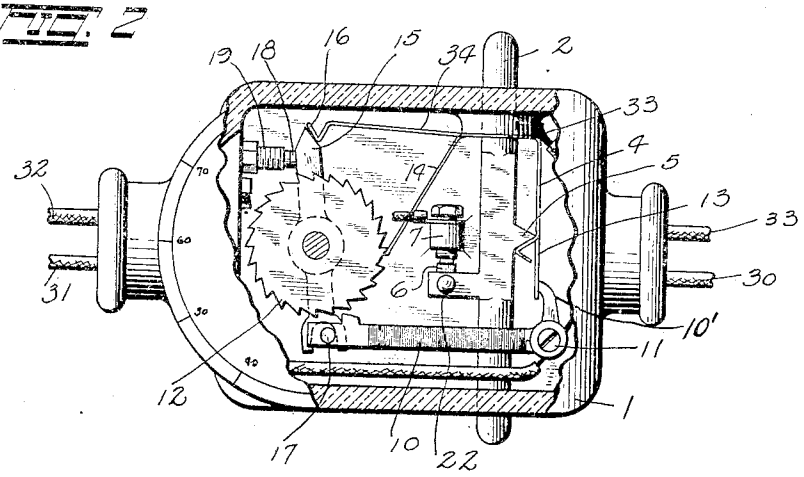
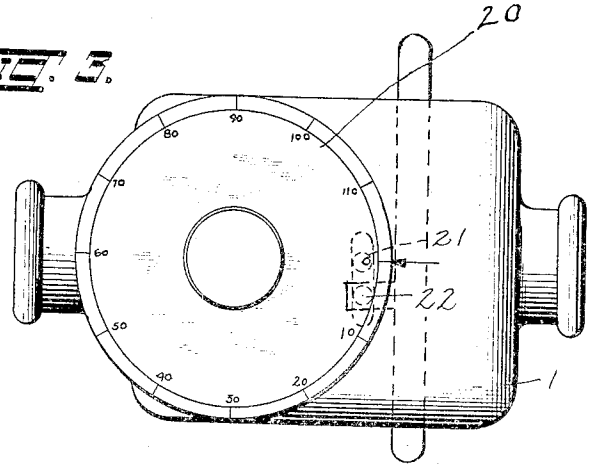


FIG. 3.



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UNITED STATES PATENT OFFICE

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AUTOMATIC CONTROL FOR ELECTRICAL ATTACHMENTS

Application filed August 2, 1926. Serial No. 126,638.

This invention relates to an automatic control for electrical devices and its salient object is to provide means for automatically opening a switch after a predetermined period.

More specifically the object of the invention is to provide an auxiliary circuit shunted across a main circuit and having a thermal member of a definite expansion coefficient which member actuates means for automatically opening a switch in the main circuit.

Another object of this invention is to provide means of certain and simple operation for the above described purposes.

These and other objects will appear from the specification and drawings in which

Fig. 1 is a plan sectional view showing the control in an inoperative position.

Fig. 2 is the same view as Fig. 1, showing the control in an operative position, and

Fig. 3 is a plan view showing the device enclosed and the calibrated regulator.

Referring more particularly to the drawings, 1 represents an outer housing of hard rubber, or other non-conducting material and is designed for insertion of the flexible cord used to connect the attachment it is desired to control, said cord being hereafter known as the main circuit. A switch or plunger 2 the central portion of which is made of conducting material such as copper and the like is shown for this main circuit and when moved in the direction of the arrow 3 will close the circuit for operation and the movement in the opposite direction will of course break or open the circuit.

The plunger is held in position, open or closed, by a flat spring 4 having a V-shaped extension on the end thereof which engages with the pointed projection 5 on the plunger 2. When the plunger is manually moved in the direction of the arrow 3 a main circuit will be closed by the contact established between the point 6 on the plunger and contact screw 7 mounted in the housing 1.

A ratchet wheel 8 is provided which is rotatably mounted on a shaft 9 positioned between opposite sides of the outer housing 1. The ratchet wheel is moved in a clockwise direction by means of the movement imparted to the same by the expansion of the expansible dielectric core of a resistance coil 10. This core is pivotally mounted on a fulcrum screw 11 located in the housing and has a projection on the end thereof hereinafter referred to as a "ratchet arm", which as shown in Fig. 1 is maintained in contactual relation with the ratchet teeth 12 of the ratchet 8 thru the medium of a resilient element 13 which yieldingly contacts with the extension arm 10′ integral with the core of the resistance coil 10. The ratchet wheel is held against counter clockwise movement by the spring 14 bearing against the ratchet teeth. A rocker arm 15 is freely mounted on the shaft 9 and held in the position as shown in Fig. 1 and Fig. 2 by a spring 16 which forms part of the auxiliary circuit. A pin 17 preferably of an insulated material mounted on the end of the expansible core of the resistance coil 10 extends downward between the arms of the forked end of the rocker lever 15. The opening in the end of the lever is such as to allow clearance around the pin. The upper end of the lever is provided with a point 18 which contacts with a contact screw 19 when the core contracts.

The spring members 4, 13, 14 and 34 are integrally jointed and forming a unitary member 34′. This unitary member is provided with an opening to receive plunger 2 and is maintained in assembly and in electrical contact with wire 33 by the constant inward flexing of the members or arms 13 and 14 and the outward deflection of arm 34 by engagement with extension from arm 10′, ratchet wheel 8, lever 15 and plunger 2 respectively.

The ratchet wheel is provided with a calibrated disc 20 which carries a pin 21 which contacts with a pin 22 on the plunger 2 to push it downward and open the main circuit as will appear from the action of the device which is as follows:

The electric current passing through the resistance coil (10), will cause expansion of the core. The longitudinal movement thus imparted to the core in expanding will move the pin 17 and the ratchet arm. This movement will rotate the ratchet wheel one notch and its position will be maintained through

action of the spring (14). The last part of the movement, due to the expansion of the core will throw the rocker lever (15) into a position so as to break the electrical connection between the contact point (18) and the contact screw (19), which breaks the electrical connection of the resistance coil (10) and permits the core to cool and contract to a position where the ratchet arm will engage with the next tooth of the ratchet wheel 8. The latter part of this function will cause a second engagement between the pin (17) and the forked end of the rocker lever (15), which will throw the rocker lever to the opposite position wherein electrical connection will be made between the contact point (18) and the contact screw (19). This cycle of operation will be repeated at time intervals depending upon the coefficient of expansion of the material used in the core and the intensity of the electrical current passing through the resistance coil (10). The length of time required for one complete cycle of operation may be calibrated on the disc (20), Fig. 3 graduated in such a way as to show the time in minutes if so desired to return the pin (21) to a position of engagement with the pin (22). The pin (21) is fixed to the disc (20). The pin (22) is mounted upon the switch plunger (2) and engagement between these pins will cause the switch plunger to be thrown to the off position, at which time electrical connection to the accessory or attachment controlled, and the electrical mechanism included in the device, will be broken as shown in Fig. 1.

There are, as stated, two circuits, a main circuit and an auxiliary circuit shunted across the main circuit. The main circuit consists of the wire 30 to 31 back thru 32 to the plunger contact 6 and 7, up the plunger to 33 and out. The auxiliary circuit follows wire 30 thru the resistance coil 10, to the contact screw 19, thru 18 to the spring 16, over thru 34 to 33 and out.

While we have described and shown in the annexed drawings a very simple and efficient embodiment of our invention, it is within the scope of this invention to change the mechanical details, without limiting ourselves to the specific mechanical combinations disclosed. It is also within the scope of this invention to reverse the whole operation for the purpose of closing the main switch rather than opening it. Other uses and rearrangements of the parts might be suggested, but the scope of this invention will appear from the following claims:

We claim:

1. An automatic control for electrical devices comprising a main circuit and a switch therein, a contact member, an auxiliary circuit shunted across said main circuit and connected to said member, a thermal member of definite expansion coefficient effected by said auxiliary circuit, a lever actuated by said thermal member for periodically interrupting said auxiliary circuit, a resilient member for further actuating said lever and for holding the same in a make and break position relative to said contact member and means actuated by the thermal member for controlling the main switch.

2. An automatic control for electrical devices comprising a main circuit and a switch therein, an auxiliary circuit shunted across said main circuit containing means for periodically interrupting said auxiliary circuit, means actuated by the interrupting means for actuating said main switch, and resilient means for further actuating the switch and for holding it positively in an open or closed position.

3. An automatic control for electrical devices comprising a main circuit and a switch therein, an auxiliary circuit shunted across said main circuit, a thermal member of a definite expansion coefficient effected by said auxiliary circuit, a lever actuated by said thermal member, means for further increasing the movement of said lever whereby the auxiliary circuit is periodically interrupted and means actuated as a result of the said interruption whereby the main switch is actuated.

In testimony whereof we affix our signatures.

ROBERT KAUCH.
CHARLES L. PAULUS.