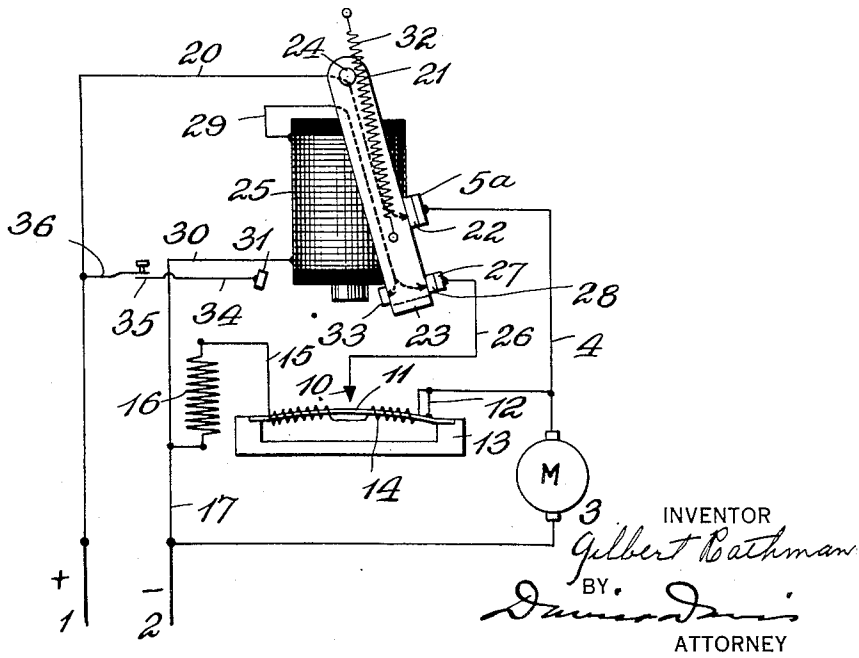


G. RATHMAN.
THERMAL TIME SWITCH.
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1,355,847.

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UNITED STATES PATENT OFFICE.

GILBERT RATHMAN, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO JAMES A. BROWN, OF NEW YORK, N. Y.

THERMAL TIME-SWITCH.

1,355,847.

Specification of Letters Patent.

Patented Oct. 19, 1920.

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To all whom it may concern:

Be it known that I, GILBERT RATHMAN, a citizen of the United States, and resident of the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Thermal Time-Switches, of which the following is a specification.

The main object of the invention is to provide a time switch of very simple construction, to control a motor circuit and to be operated through the expansion of a thermal unit electrically heated and in the motor circuit, when the motor is in operation.

The invention is designed particularly for use in connection with small electric motors which are to be operated for an approximately predetermined interval. The switch is arranged in a shunt from the motor circuit, a heating coil in the shunt operating upon a readily expansible thermal unit which, upon a predetermined movement, closes a circuit through a solenoid or other electromagnetic device which, when energized, opens the motor circuit thereby rendering the motor inoperative and at the same time breaking the circuit through the heating coil and permitting the expansible unit to return to its normal condition.

In the drawing one form of switch embodying the invention is shown.

Referring to the various parts by numerals, 1 and 2 designate the leads of a motor circuit and 3 designates the motor. The lead 2 is connected with a contact 5^a through the motor 3 and a wire 4. An expansible thermal unit 11 is electrically connected by means of a wire 12 to the wire 4. The thermal unit 11 is rigidly secured at its ends in a block 13, and said unit is slightly bowed toward a contact 10. Surrounding the thermal unit is a heating coil 14 one end of which is connected to the lead 1 through wire 4, contacts 5^a and 22, and a wire 20. The other end of the heating coil 14 is connected by a wire 15 to one end of a resistance coil 16, the other end of said resistance coil being connected to lead 2 through a wire 17. The swinging switch arm carries the contact plate 22 and the conductor or wire 20 from lead 1 is connected to said contact plate, so that when the switch arm 21 is in the position shown the motor circuit is completed and the circuit through the heating coil is also completed. The switch arm 21 carries

an armature 23 at one end and is pivoted at its other end at 24 directly over the center of an electromagnet 25, so that the armature 23 is adapted to be swung across the face of the core of the magnet. The contact 10 is connected by a conductor 26 to a contact 27; and the switch arm 21 carries a corresponding contact 28 which is adapted to engage the contact 27 when the motor circuit is complete. Contact 28 is electrically connected by conductor 29 to the coil of the electromagnet 25, the other end of said coil being electrically connected to lead 2 through conductor 30. When the thermal unit 11 is expanded sufficiently to bring it into engagement with the contact 10, the circuit through the electromagnet is completed and the magnet energized, whereupon the armature 23 will be drawn across the face of the core of the magnet and snapped into engagement with the contact 31. Connected to the switch arm 21 is a spring 32, said spring being connected at its upper end directly over the pivot 24 so that said spring serves to snap the switch arm to one side or the other of the center of the core of the electromagnet. The switch arm 21 is provided with a contact 33 which is electrically connected through conductor 29 and the magnet coil and conductor 30 to lead 2 of the motor circuit; and the contact 31 is connected by a conductor 34 to one member of a push button 35, said push button being connected by a conductor 36 to lead 1 of the motor circuit.

When the switch device is in position to open the motor circuit contact 33 is at rest in engagement with contact 31. To close the motor circuit the push button 35 is operated, thereby energizing the electromagnet and snapping the switch arm into the position shown in the drawing, thereby completing the motor circuit through contacts 22 and 5^a and placing the electromagnet conductors in such a condition that when the thermal unit 11 is expanded due to the heat of the coil 14, the electromagnet circuit will be completed through thermal unit 11 and contact 10, thereby snapping the switch arm back to its original position and bringing the contact 33 into engagement with contact 31.

By properly proportioning the thermal units and heating coils and the resistance 16, the thermal units may be brought into engagement with the contacts 10 within a predetermined time.

From the foregoing it is manifest that the apparatus described herein constitutes a very simple time switch; and that the operation of closing the motor circuit sets the switch devices in position for operation.

What I claim is:

A time switch comprising an electro-magnet, a pivoted armature, a spring connected to said armature and arranged to hold it in either of two positions, a thermal coil, a motor circuit arranged to be completed when the magnet armature is in one of its positions, a shunt from the motor circuit through the thermal coil, means for closing the magnet circuit through the thermal unit when the

motor circuit is closed and thereby swing the magnet armature to open the motor circuit and the magnet circuit, and manually operable means for closing the magnet circuit when the motor circuit is open and thereby swing the magnet armature to open the magnet circuit and close the motor circuit and also to render the magnet operable through the thermal unit.

In testimony whereof I hereunto affix my signature.

GILBERT RATHMAN.

Witnesses:

LEO DONOVAN,
WM. E. TOELLE.