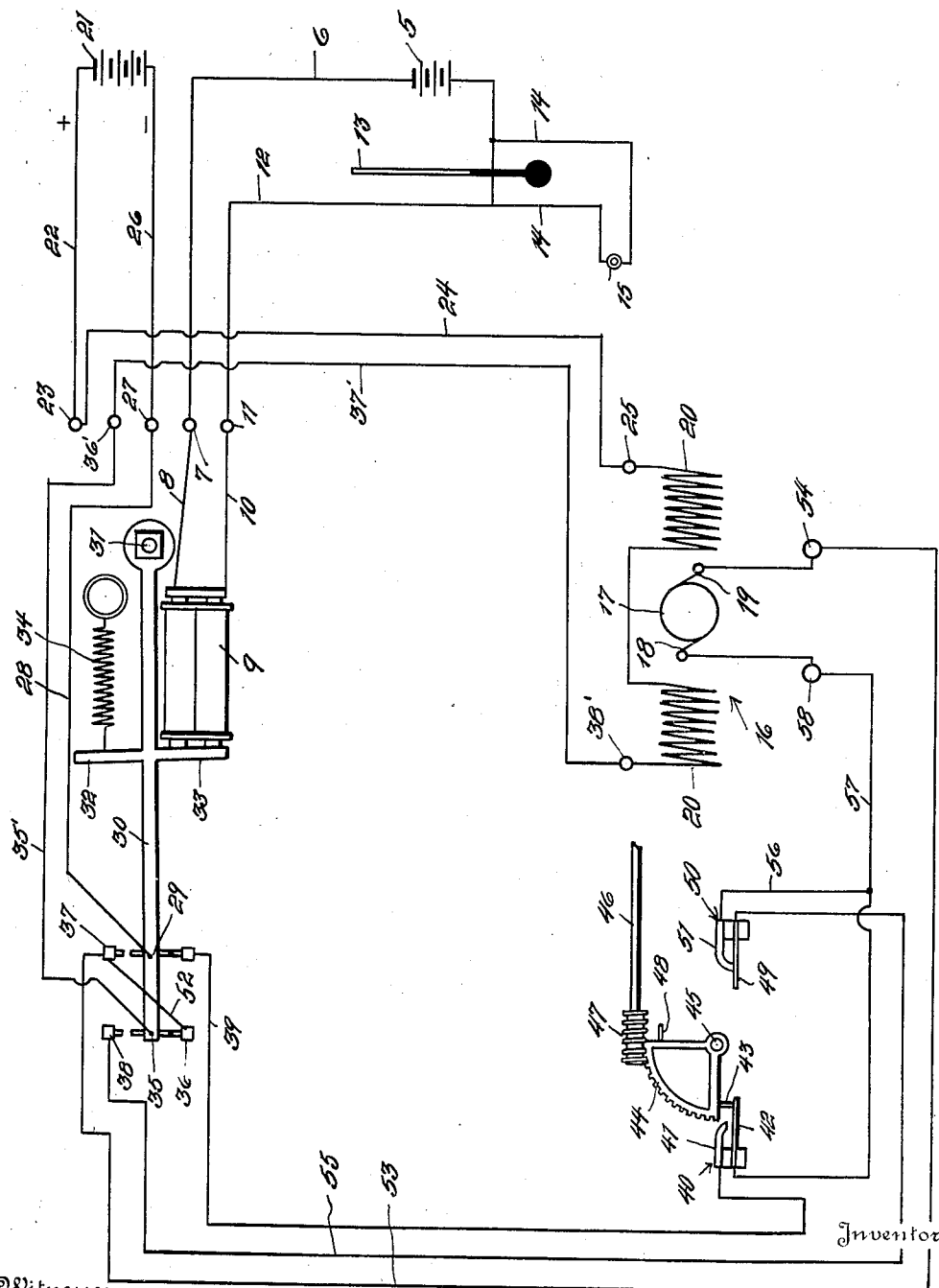


W. A. RAMSEUR.
THERMOSTAT OPERATED CIRCUIT.
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1,226,696.

Patented May 22, 1917.



Witnesses

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THERMOSTAT-OPERATED CIRCUIT.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WELLINGTON A. RAMSEUR, a citizen of the United States, residing at Gainesville, in the county of Hall and State of Georgia, have invented certain new and useful Improvements in Thermostat-Operated Circuits, of which the following is a specification.

My invention relates to apparatus adapted to be automatically actuated upon the rise and fall of the temperature beyond a predetermined degree, for operating a movable element, particularly a valve for controlling the supply of water to a house or dwelling, whereby when the temperature reaches or approaches the freezing point of water, such water will be cut off from the supply pipe and the same allowed to drain, while the apparatus may be advantageously employed for many other purposes, such as to actuate sprinkler systems and fire-extinguishing apparatus of different characters.

In the accompanying drawing forming a part of this specification,

The figure is a diagrammatic view of apparatus embodying the invention.

In the drawing, wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 5 designates a source of current included in a thermostat local circuit. Connected with one pole of the source of current is a wire 6, connected with a binding post 7. Connected with the binding post 7 is a wire 8, having one end of the winding of electro-magnet 9 connected therewith. The other end of such winding is connected with a wire 10, connected with a binding post 11. Secured to the binding post 11 is a wire 12, connected with the opposite pole of the source of current 5. Connected in the wire 12 is a thermostat 13 preferably a thermometer, while any other type of thermostat may be employed. The wire 12 is cut and the ends thereof project in spaced relation into the tube of the thermometer and are adapted to be electrically connected upon the rise of the mercury to a predetermined degree, upon the corresponding rise in the temperature. For the purpose of the present invention a thermostat is preferably constructed whereby the circuit remains closed through the wire 12 until the temperature approaches or reaches the freezing point of water, it being desired that the circuit through the wire 12 is opened a little before

the freezing point is reached. In order that the thermostat local circuit may be closed when desired, while the same is open, due to the action of the thermostat, I connect wire 14 with the wire 12, across the thermostat and this wire 14 may lead to any suitable place in the dwelling. A normally open push button switch 15 is connected in the wire 14 and when the same is closed, the thermostat local circuit will be closed, notwithstanding the fact that the same may be opened at the thermostat.

The numeral 16 designates a series wound motor, shown diagrammatically, the same embodying the usual commutator 17, engaged by commutator brushes 18 and 19. Current is supplied to the fields 20 of the motor from a source of current 21, to the positive pole of which is connected a wire 22, secured at the opposite end to a binding post 23. Connected with the binding post 23 is a wire 24, connected with a binding post 25, which connects with the field of the motor 16. Connected with the negative pole of the source of current 21 is a wire 26, secured at one end to a binding post 27. Extending from the binding post 27 is a wire 28, connected with a double acting contact 29, carried by and insulated from a lever 30. The lever 30 is pivoted at 31, and is provided with two laterally extending arms 32 and 33. Attached to the arm 32 is a coil spring 34, adapted to normally hold the lever 30 elevated. The arm 33 is preferably formed of iron and is adapted to be attracted by the magnet 9 and serve as an armature therefor.

Arranged adjacent and below the double acting contact 29 is a stationary contact 34. A second double acting contact 35 is carried by lever 30 and insulated therefrom and has arranged adjacent and below it a stationary contact 36. A wire 35' electrically connects the double acting contact 35 with a binding post 36'. Extending from the binding post 36' is a wire 37', connected with a binding post 38', which has electrical connection with the field 20 of the motor 16, as shown. When the thermostat circuit is closed as is normally the case and as shown in the diagram, the double acting contacts 29 and 35 engage the contacts 34 and 36 respectively. Arranged adjacent and above the double acting contacts 29 and 35 are coacting stationary contacts 37 and 38, with which the double acting contacts respectively engage when the thermostat circuit

is broken. Connected with the contact 34 is a wire 39, having its opposite end connected to a circuit breaker or switch 40. The circuit breaker 40 comprises upper and lower insulated contact elements 41 and 42, the wire 39 being connected with the upper contact element 41, while the lower contact element 42 is normally depressed by a pin 43, carried by a toothed quadrant 44, as shown. The quadrant 44 is rigidly connected with a shaft 45, which is adapted to turn a valve or operate other suitable means for cutting the water on or off upon movement of the segment.

Means for rotating the segment comprises a shaft 46, geared to or having direct connection with the armature shaft of the motor 16. Upon the end of the shaft 46, adjacent the toothed segment is mounted a worm 47, which engages the segment, as shown, for rotation of the same. Upon the opposite side of the segment from the pin 43 is mounted a similar pin 48 for engaging and depressing a lower contact member 49 of a circuit breaker or switch 50, which is identical with the circuit breaker 40, and further comprises an upper contact member 51, insulated from the lower contact member.

The contact 36 has electrical connection with the contact 37 by a wire 52. Connected with the contact 37 is a wire 53, having its opposite end connected with a binding post 54, from which electrical connection is made with the commutator brush 19. A wire 55 connects the contact 38 with the lower contact element 49 of the circuit breaker 50. As shown in the drawing, when the water is on, the upper and lower contact elements of the circuit breaker 50 engage, thus furnishing the wire 55 electrical connection with a wire 56, one end of which is connected to the upper contact element 51, while its other end is connected to a wire 57. The wire 57 connects at one end with binding post 58, from whence electrical connection is had with the commutator brush 18, while the other end of wire 57 connects with the lower contact element 42 of the circuit breaker 40.

The operation of the apparatus is as follows:

The conditions shown in the drawing are those when the temperature is above freezing and the water turned on. The mercury is above 32° and consequently the thermostat circuit is closed and the electro-magnet 9 energized. The electro-magnet has attracted the arm 33, pulling the lever 30 down and causing the double acting contacts 29 and 35 to engage the contacts 34 and 36 respectively. This being the case, a circuit is closed and current flows from the positive pole of the source of current 21, to binding post 23, thence to binding post

25, through the fields of the motor to binding post 38', binding post 36', double acting contact 35, contact 36, wire 52, contact 37, wire 53, binding post 54, brush 19, through the motor armature to brush 18, binding post 58, wire 57, contact breaker 50, wire 55 to contact 38, where the circuit is broken. It is obvious that in this condition the motor ceases to turn, the quadrant remains stationary, and the water is turned on.

With the water on and the circuit as above, suppose the temperature falls below freezing point. The thermostat circuit is broken by the mercury falling below the sealed ends of the wire 63 and the electro-magnet 9 is demagnetized, allowing the coil spring 34 to pull lever 30 upwardly, causing the double acting contacts 29 and 35 to engage contacts 37 and 38 respectively.

A circuit is now closed and current flows in this closed circuit from the positive pole of the source of current 21, wire 22, binding post 23, wire 24, binding post 25, through the fields of motor to binding post 38', wire 37', binding post 36', wire 35', double acting contact 35, contact 36, wire 52, contact breaker 50, wire 57, binding post 58, commutator brush 18, through armature 17 to commutator brush 19, binding post 54, wire 53, contact 37, double acting contact 29, wire 28, binding post 27, wire 26, and back to source of current 21. It will be noted that in this circuit the current enters the motor from the opposite side to that traced in the previous circuit. It is thus seen that the motor is reversed and the shaft 46 rotated, which through worm 47, rotates the toothed segment 44 in a clockwise direction, cutting off the water by means of the turning of the shaft 45. When the segment has moved a predetermined distance the pin 48 engages and depresses lower contact element 49 of contact breaker 50, thus breaking the circuit at this point, whereupon the apparatus remains at rest with the water cut off.

Given the conditions above, with the mercury below the sealed ends of wire 12 and the water cut off, suppose a rise of temperature. The mercury then closes the thermostat circuit, energizing the electro-magnet 9 which attracts arm 33 and causes double acting contacts 29 and 35 to engage contacts 34 and 36 respectively. The circuit will be closed and current will flow in this circuit, from the positive side of source of current 21, through wire 22, binding post 23, wire 24, binding post 25, fields 20, binding post 38, wire 37', binding post 36', wire 35', double acting contact 35, contact 36, wire 52, contact 37, wire 53, binding post 54, commutator brush 19, brush 18, binding post 58, wire 57, circuit breaker 40, (circuit breaker 50 being open), wire 39, contact 34, double acting contact 29, wire 28, binding post 27, wire 26, thence back to the opposite pole of

the source of current 21. It will be noted that the motor is reversed and also that the positive wire from source of current 21, leads to binding post 25 during all operations, thus keeping the direction of the current always the same in the fields, while the reversal of the motor current always occurs in the armature. The operation of the motor turns the quadrant 44 to the left, which turns the shaft 45 to turn on the supply of water. When the quadrant 44 has reached the end of this movement, the pin 43 engages the contact 42 and opens the circuit at this point, whereby the operation of the motor ceases.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claim.

Having thus described my invention, I claim:

In apparatus of the character described, a source of current, a movable member, a pair of double actuating contacts carried by the

movable member, means electrically connecting the pair of double acting contacts with the opposite poles of the source of current, a motor, a pair of stationary contacts arranged upon one side of the double actuating contacts and adapted to be engaged thereby, wires connecting the pair of stationary contacts with the opposite poles of the motor for supplying the current there-through in opposite directions, a second pair of stationary contacts arranged upon the other side of the double acting contacts to engage therewith, means electrically connecting one contact of the second pair with one contact of the first pair, a wire connected with the other contact of the second pair and connected with one of the wires which is connected with the motor, switches connected in the last two named wires, a member driven by the motor to actuate the switches, and means to move the member in opposite directions.

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

WELLINGTON A. RAMSEUR.

Witnesses:

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