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R. S. TICE

THERMOSTATIC CONTROL

Filed May 9, 1927

Fig. 1.

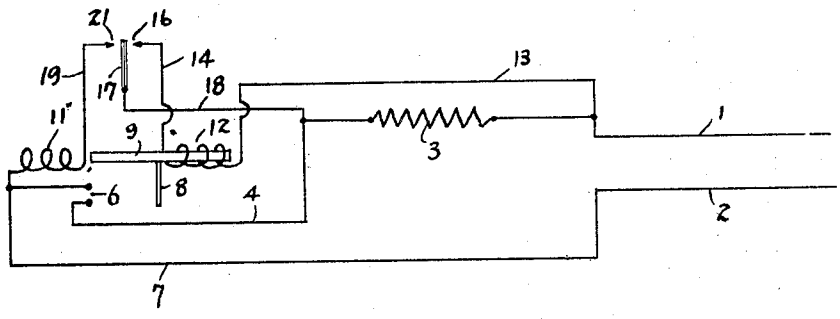
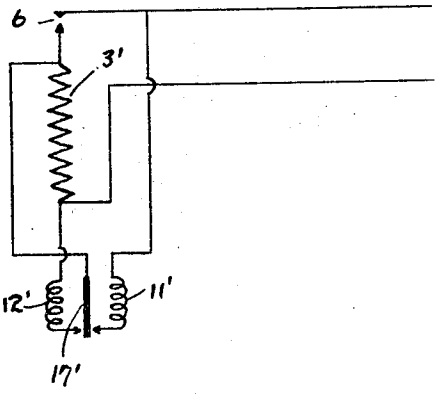


Fig. 2.



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THERMOSTATIC CONTROL.

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The present invention relates to improvements in thermostatic controls for an electrical circuit, and its particular object is to provide electro-magnetic means for opening and closing the circuit in combination with a thermostat rendering the electro-magnetic means active under predetermined conditions, the thermostat and the circuits being arranged in such a manner that either electro-magnet after having become active on the circuit for closing or opening the same automatically ceases to carry current so that the thermostatic control element may open the electro-magnetic circuit without arcing. It is particularly proposed for this purpose to shunt the switch opening circuit across a resistance in the main circuit on one side of the main switch so that the opening of the main switch causes the current to cease in the circuit responsible for the opening movement and to place the switch closing circuit across the switch itself so that this latter circuit is shorted by the switch after the latter has been closed.

Further objects and advantages of my invention will appear as the specification proceeds.

The preferred forms of my invention are illustrated in the accompanying drawing in which

Figure 1 shows a wiring diagram explaining the principle of my invention; and

Figure 2 shows a wiring diagram serving the same purpose arranged slightly differently.

While I have shown only the preferred form of my invention it should be understood that various changes or modifications may be made within the scope of the claims hereto attached without departing from the spirit of my invention. It should be particularly understood that while in this specification I describe my invention as applied to a heating device and a thermostat control therefor, the same principle may be applied to different current consuming devices and different controls therefor.

In the form shown in Figure 1 the main circuit includes the line wires 1 and 2, the heating element 3, the wire 4, the switch 6 and the wire 7. The switch 6 is shown diagrammatically as comprising two stationary contacts adapted to be electrically connected by means of a member 8 carried by the plunger 9 adapted to be acted on for movement in opposite directions by two electromagnets 11 and 12 respectively. When the electromagnet 12 is energized the switch 6 is opened and when the electromagnet 11 is energized the switch 6 is closed.

The electromagnet 12 forms part of a circuit hereinafter referred to as the switch opening circuit and including a wire 13, the electromagnet 12, a wire 14, a stationary contact 16, a movable contact 17 and a wire 18. This circuit is shunted across the heating element 3 to one side of the switch 6 so that when the switch 6 is opened no current flows through the switch opening circuit.

The electromagnet 11 forms part of a circuit hereinafter referred to as the switch closing circuit and includes besides the electromagnet 11 a wire 19, a stationary contact 21, the control element 17 and the wire 18. This switch closing circuit is shunted across the switch 6 and is shorted by the latter after it has closed the same so that no current flows in the switch closing circuit thereafter.

The element 17 which is mounted for movement between the two stationary contacts 16 and 21 is in this particular case a thermostatic element arranged to move toward the contact 16 before rendering the switch opening circuit active when the temperature reaches a certain degree, and to move toward the contact 21 when the temperature falls below a predetermined degree for closing the switch-closing circuit.

The operation of this circuit is as follows: As the temperature falls below a predetermined degree the thermostatic element 17 moves toward the stationary contact 21 and closes the circuit of the electromagnet 11 which pulls the plunger 9 toward it, and causes the member 8 to close the switch 6. Thereby the heating element 3 is rendered active, but at the same time the switch closing circuit carrying the electromagnet 11 is shorted by the switch 6 so that practically no current flows in the switch closing circuit thereafter, and upon a change in the temperature caused by the heating element the thermostatic element 17 may withdraw from the contact 21 without causing any arcing.

As the temperature increases and reaches a predetermined degree the thermostatic element 17 moves toward the contact 16 and closes the switch opening circuit including

the magnet 12 which draws the member 8 away from the switch 6 and thereby opens the latter. This causes the heating element 3 to become inactive but at the same time causes the current to cease in the switch opening circuit containing the magnet 12, because this circuit is shunted across the heating element 3 on one side of the switch 6. As the temperature therefore decreases due to the fact that the heating element has been rendered inactive, the thermostatic element 17 may move away from the contact 16 without causing any arcing.

The diagram of Figure 2 illustrates the same principle in a slightly different arrangement, the main switch being shown at 6', the thermostatic element at 17', the switch opening magnet at 12', and the switch closing magnet at 11'. It will be noted that the switch opening circuit containing the magnet 12' is shunted across the heating element 3' on one side of the switch so that its current ceases with the opening of the switch while the circuit having the electromagnet 11' is shunted across the switch 6' so as to be shorted by the closing of the latter.

I claim:

1. In combination, a circuit containing a current consuming device and a switch in series therewith, a switch closing circuit, and a control element for the latter, the said circuit being shunted across the switch so as to be shorted by the latter after the circuit has closed the switch.

2. In combination, a circuit containing a current consuming device and a switch in series therewith, a switch opening circuit, a switch closing circuit and a common control for the two circuits adapted to close only one at a time, the switch opening circuit being shunted across the current consuming device on one side of the switch so as to be without current when it has opened the switch and the switch closing circuit being shunted across the switch so as to be shorted by the closed switch.

3. The combination with a circuit having a main switch, of two control circuits, one for opening and one for closing the main switch, a thermostat for selectively closing either one of said control circuits, said opening circuit being electrically connected to the main circuit and in series with the main switch, whereby said opening circuit will be closed by said thermostat and will be opened simultaneously with the opening of the main switch, and said closing circuit being electrically connected to the main circuit and in parallel with said main switch, whereby the circuit will be closed by said thermostat and will immediately be by-passed through the main switch upon the main switch being closed.

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