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THERMOSTATIC CONTROL FOR ELECTRIC HEATING DEVICES.

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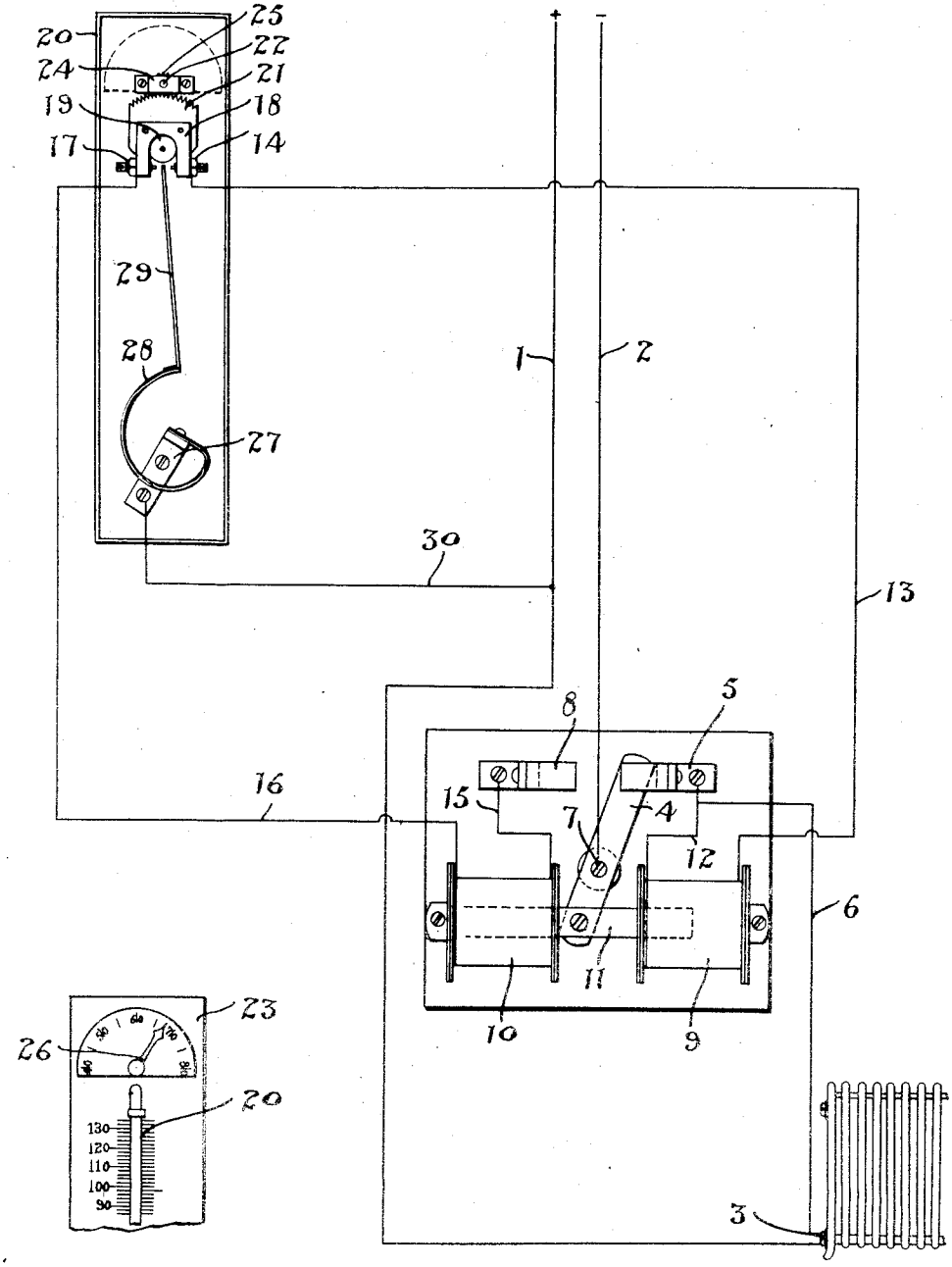


Fig. 2.

Fig. 1.

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To all whom it may concern:

Be it known that we, JOHN TEMPLETON and GEORGE E. HARRISON, both subjects of the King of Great Britain, and residents of the city of Toronto, county of York, Province of Ontario, in the Dominion of Canada, have invented certain new and useful Improvements in Thermostatic Controls for Electric Heating Devices, described in the following specification and illustrated in the accompanying drawings, that form part of the same.

The principal objects of the invention are, to maintain a constant and uniform temperature within a room, thereby obviating the undesirable effects of overheating and also economizing in the consumption of current.

A further object is to devise a simple and effective automatic electric control which is very positive and safe in its operation.

The principal feature of the invention consists in the novel construction and arrangement of parts, whereby the current supply to the heating element is controlled by a switch in the electric current supply circuit operated by electromagnets arranged in shunt circuits and governed by an adjustable thermostatic circuit closing device.

In the drawings, Figure 1 is a diagrammatic view showing the thermostatic governor, the main switch operating mechanism and the wiring connecting these and the heating element. Fig. 2 is a plan view of the upper end of the face of the thermometer to which the thermostat is connected showing the regulating dial.

Like numerals of reference indicate corresponding parts in each figure.

Referring to the drawings, 1 and 2 are the main electric current supply wires. The wire 1 is connected directly to the heating element 3 which is shown diagrammatically in the drawings as a radiator.

4 is a movable switch arm to which the wire 2 is connected.

5 is a contact adapted to be engaged by the switch 4 in one position having a wire 6 leading therefrom to the heating element 3, thereby completing the electric heating circuit.

The switch 4 is here shown in the form of an arm supported on the pivot 7 and adapted to be swung on said pivot to engage the contact 5 or when swung in the opposite direction to engage a contact 8.

9 and 10 are a pair of electro-magnets arranged adjacent to the switch 4 and spaced a short distance apart and arranged in axial alinement one with the other.

11 is an armature extending into each of the magnets 9 and 10 and bridging the space between their adjacent ends. The armature 11 is pivotally connected to the pivotal switch member 4 intermediate of its length and is adapted upon the energizing of either of the magnets to swing the said switch upon its pivot to move it into electrical contact with either of the contacts 5 or 8.

12 is a wire leading from the contact 5 to the magnet 9.

13 is a wire leading from the magnet 9 and connected at its opposite end to one terminal 14 of the thermostatic control.

15 is a wire connecting the terminal 8 of the main switch with the electro-magnet 10.

16 is a wire leading from the other end of the magnet 10 to the terminal 17 of the thermostatic control. The terminals 14 and 17 are arranged upon an insulating block 18 supported upon a movable member 19 which member is preferably arranged at the back of a thermometer 20.

The block 18 is of bifurcated shape and the terminals are threaded in the ends of the legs having the contact points extending inwardly. The terminals are secured in their adjusted positions by suitable lock nuts arranged on the outer ends.

22 is a spindle journaled at one end in the front plate 23 of the thermometer and at its inner end in a bracket 24 secured to the back of said plate.

25 is a toothed pinion secured to the spindle 22 and meshing with the toothed edge 21 of the adjustable member 19. The outer portion of the spindle projecting beyond the front plate 23 is provided with a thumb nut and indicator point 26 and a suitable scale is arranged upon the front face of the thermometer to indicate the setting.

27 is a plate secured to the back of the

thermometer below the block 18 and supporting a curved bi-metallic thermostat 28 rigidly secured at one end to the plate 27 and having an arm 29 secured to its free end, said arm extending between the contact points of the terminals 14 and 17.

30 is a wire connected to the plate 27 and to the wire 1.

On referring to the diagram it will be seen that the magnet 9 is arranged in a shunt circuit off the main through the wire 2, switch 4, contact 5, wire 12, coil 9 wire 13, contact 14, thermostatic control member and wire 30 to the wire 1. The magnet 10 is arranged in a shunt circuit when the switch 4 is reversed in which the current flows from the wire 2, switch 4, contact 8, wire 15, coil 10 wire 16, terminal 17, thermostatic arm and wire 30 to the main wire 1.

In the operation of this device, the contacts 14 and 17 are adjusted by means of the spindle 22 and the coacting parts, the pointer 26 being moved to indicate the desired temperature. The thermostat 28 is so arranged in relation to the contacts 14 and 17 that when the temperature in the room falls below the indicated point the arm 29 engages the contact 17 and closes the shunt circuit through the magnet 10, the switch 4 then being in contact with the contact 8 and the main heater circuit open. Immediately upon the energizing of the magnet 10 the armature 11 is operated to throw the switch 4 into engagement with the contact 5, thus closing the main circuit to the heater, and coincidently breaking the shunt circuit through the magnet 10. As the temperature rises to the desired point the thermostatic arm 29 moves to engage the terminal 14. The switch 4 when in engagement with the contact 5 closes the gap in the shunt circuit to the magnet 9; consequently the movement of the arm 29 into engagement with the contact 14 closes the shunt circuit through said magnet 9 and energizing the armature 11 swings the switch 4 on its pivot to disconnect from the contact 5 breaking the main heating circuit and coincidently breaking the circuit through the coil 9. It will be noted particularly that the magnets 9 and 10 are only energized momentarily, the current being shunted through same to operate the switch 4, which upon being operated, not only effects the opening or closing of the main circuit but causes the breaking of the shunt circuit. The contacts 14 and 17 are therefore utilized entirely for closing the shunt circuits to the electro-magnets but immediately upon the closing of such circuits they are again instantly broken so that when the thermostat arm moves out of contact with either of the contacts 14 and 17 there will be no flow of current and consequently no arcing. This feature is very important as it entirely eliminates all danger from fire and also dispenses with the wear of the contact points due to such arcing.

What we claim as our invention is:—

1. In a thermostatic control for electric heating devices, the combination with the main electric circuit and heating element connected therewith and a switch adapted to open and close said main circuit, of an armature operatively connected to said switch, a pair of electromagnets adapted to operate said armature to open and close said switch, a pair of shunt circuits each including one of said magnets, a thermostat forming an electric contact and arranged common to both of said shunt circuits, a member adjustably supported adjacent to said thermostat, a pair of electric contacts carried on said adjustable member and arranged one in each of said shunt circuits and adapted to be engaged by said thermostat to close the shunt circuits, and means for setting said adjustable member and the contacts carried thereby to close the shunt circuits at the desired periods.

2. In a thermostatic control for electric heating devices, the combination with the main electric circuit and heating element, of a switch arm electrically connected with one lead of the main circuit, a contact adapted to engage said arm and electrically connected to the heating element, an electromagnet electrically connected to said switch contact, a contact adapted to engage said switch arm upon same being disengaged from the aforesaid contact, an electro-magnet electrically connected to the latter contact, an armature operatively connected to said switch arm and operated alternately by said magnets, a pair of electric contacts adjustably mounted and each electrically connected to said electro-magnets and spaced a short distance apart, and a thermostat arm extending between said latter pair of contacts and electrically connected to the lead of the main circuit connected direct to the heating element.

3. A thermostat control for electric heating devices, comprising, in combination with the heating element, a pair of electromagnets, an armature extending between said magnets, a pivotal switch operatively connected with said armature and electrically connected with one lead of the main electric circuit, a contact adapted to engage said switch arm and electrically connected with the heating element, a shunt circuit leading from said contact through one of said magnets, a second electric contact adapted to be engaged by said switch, a shunt circuit connected to said latter contact and leading through the other magnet, and a thermostatic switch arm electrically connected to the other lead of the main circuit leading direct to the heating element, said latter

switch arm being adapted to close either of said shunt circuits.

4. In a thermostatic control for electric heating devices, the combination with the main electric circuit and heating element connected therewith, of a pair of electro-magnets each included in a separate shunt circuit, a switch member adapted to close the main circuit to the heating element and coincidently to close the gap in the shunt circuit to one of said magnets and to be operated to break said main circuit and open said gap in said magnet shunt circuit and coincidently close a gap in the other magnet shunt circuit, an armature operated by said magnets to operate said switch, and a thermostat adapted to effect the closing of said shunt circuits alternately to operate the switch in the main circuit.

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