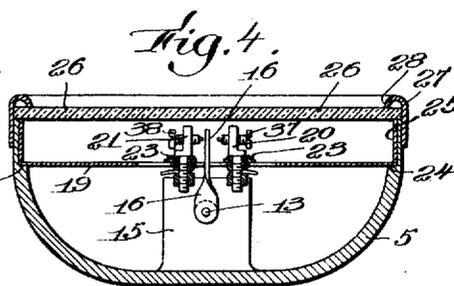
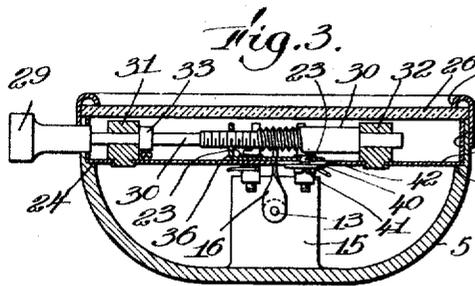
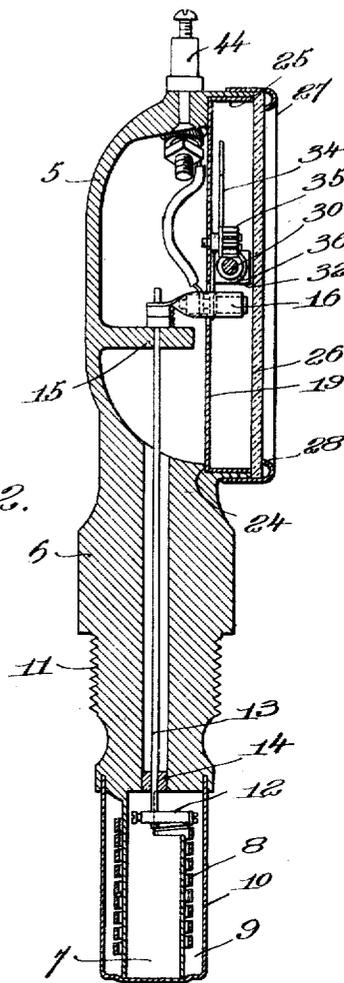
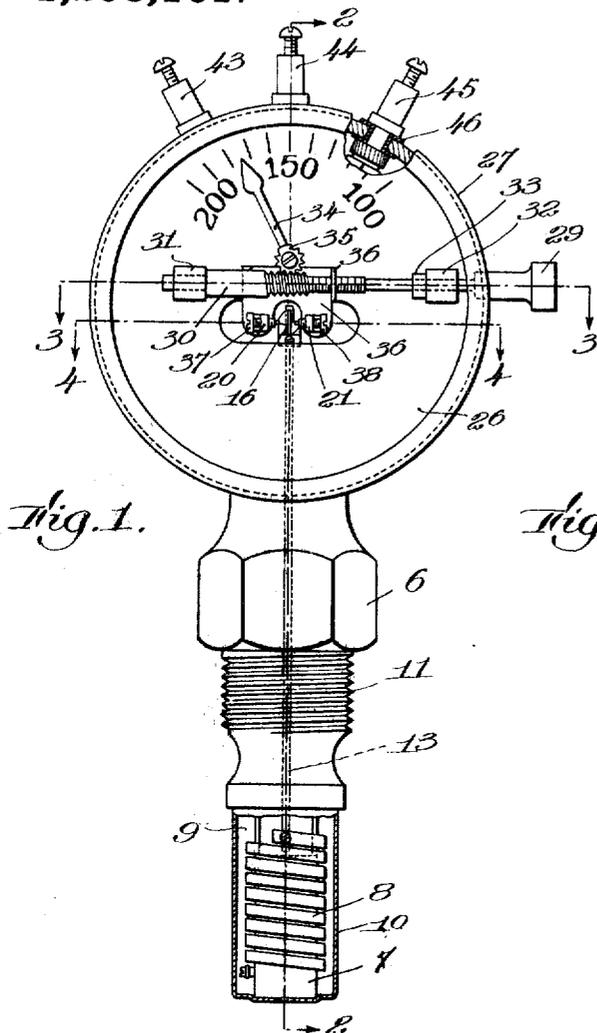


G. E. SPEAR.
THERMOSTAT.

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Inventor:
G. E. Spear
by his attorneys
Phillips Van Curen & Fish

UNITED STATES PATENT OFFICE.

GEORGE E. SPEAR, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO STANDARD THERMOMETER COMPANY, OF PORTLAND, MAINE, A CORPORATION OF MAINE.

THERMOSTAT.

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To all whom it may concern:

Be it known that I, GEORGE E. SPEAR, a citizen of the United States, residing at Roxbury, Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Thermostats; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to improvements in thermostats, and more particularly to the type of thermostat used in automatically regulating heating apparatus. The objects of the invention are to secure greater efficiency and a more compact device by means of a novel re-arrangement of the parts composing thermostatic apparatus, and to these ends the invention consists in the thermostat hereinafter described and particularly defined in the claims.

In the drawings accompanying this application and illustrating the preferred embodiment of the invention, Figure 1 is a plan of the improved thermostat with a portion in section showing the thermostatic expansible member; Fig. 2 is a sectional view on line 2—2 of Fig. 1; Fig. 3 is a sectional view on line 3—3 of Fig. 1; and Fig. 4 is a sectional view on line 4—4 of Fig. 1.

The thermostatic apparatus is mounted in a frame consisting of an upper portion or casing 5 in which is inclosed the indicating mechanism and a base or standard 6, projecting from the lower end of which is a tube 7 for supporting the expansible member 8 which is incased in an expansion chamber 9 formed by a cap 10 which fits into the base of the standard. The standard is provided with a threaded portion 11 so that the thermostat may be screwed into the top of a boiler or other heating apparatus, with the chamber projecting into the interior of the same. The active or expansible member is spiral in form and is secured at its lower end to the tube. The upper end is connected by the arm 12 to the rod 13 which extends upwardly through a longitudinal opening in the standard. The rod is suitably supported at 14 and 15, and upon its upper end is adjustably mounted a radial contact piece or circuit closer 16. When the active member is expanded or contracted, according to the temperature,

the contact piece is caused to describe an arc, thereby closing or opening either one of two electric circuits. The heat responsive parts just described are, or may be, of any usual or preferred construction.

The indicating mechanism, which comprises a pointer and its controlling devices and associated parts, is mounted upon a dial plate 19. Adjustable contact member supports or uprights 20 and 21, are insulated from the dial and from the casing by means of washers of mica 23 or in any other suitable manner. The dial plate is supported within the casing and rests upon a shoulder 24 therein, being held in position by a strip of metal 25 upon which rests a glass plate 26 to permit inspection of the dial; a flange or rim 27 which fits tightly around the upper edge of the periphery of the face of the casing is provided with a lip 28 which holds the glass in place. The movements of the pointer of the indicating mechanism and of the adjustable contact members are controlled by a hard rubber knob 29, fastened to the outer end of a threaded movement rod or regulating screw 30 which is mounted in lock bearings 31 and 32 secured to the dial plate; the collar 33, when properly adjusted, prevents endwise motion of the rod. The pointer 34 is secured to a segmental worm 35 which is engaged by the larger of the two threaded portions of the movement rod. The smaller of the threaded portions engages an upright on a reciprocable contact member carrying plate 36, two laterally projecting arms of which support the contact uprights 20 and 21 which carry the adjustable contact members or screws 37 and 38. The contact plate is mounted slidingly on the dial plate and is held against detachment therefrom by a washer 40 which is held in engagement with the dial plate by a screw 41 which travels laterally in a slot 42 in the dial plate. The casing is provided with binding posts 43, 44 and 45 so that the casing may be connected in two electrical circuits, one wire of one circuit being attached to the post 43 which is connected by a wire with the contact upright 20, and one wire of the other circuit being attached to the post 45 which is connected by a wire to the contact upright 21.

A wire common to both circuits is attached to the binding post 44 which is not insulated from the casing. Posts 43 and 110

45 are insulated from the casing by means of bushings 46 made of hard rubber or other insulating material. The above described electric arrangement is such that when the expansion member is caused to expand by the heat, the radial contact piece or circuit closer 16 makes a contact with one of the contact screws and through the casing closes one circuit, thereby operating in one direction the dampers or other devices to which the regulator is connected by any suitable means. When the expansion member is caused to contract by a drop in the temperature, the radial contact piece makes a contact with the other of the contact screws and through the casing closes the other circuit, thereby operating the dampers or other devices in the opposite direction.

In thermostats as hitherto constructed, it has been customary to house the indicating mechanism at a distance from the active thermostatic members, making it necessary to employ intermediary means in adjusting the thermostat to close the circuit at any predetermined degree of temperature. In the present invention, by connecting the indicating pointer and the adjustable contacts with the regulating screw, it is possible to house them both within the casing which has heretofore contained only either the indicating mechanism or the contacts of the thermostat, with the result that an instrument is secured in which the arrangement of the apparatus is more compact. Fewer parts are used, with the consequent result that, inasmuch as the instrument is less liable to get out of order, greater efficiency is assured.

The operation of the improved thermostat is as follows: The pointer 34 is set at 150 on the dial, supposing for the sake of illustration that that is the critical temperature of the heating agency in the heating apparatus. The contact plate 36 will now be at about the middle of its movement course; the adjustable contact screws 37 and 38 are set at an equal distance from each side of the circuit closing piece 16 which is arranged vertically. The graduations on the dial plate are spaced to correspond to the variations in temperature to which the thermostat is subjected, as they would be indicated on a thermometer. If the heating agency is to be maintained at substantially 150 degrees, the contact screws will be so adjusted in relation to the piece 16 that a slight variation in temperature will serve to cause the piece 16 to be moved either to the left or right and thereby set in operation the apparatus by which the dampers or other devices are controlled to raise or lower the temperature of the heating medium as required. If now it is desired to maintain the heating agency at 200 degrees the knob 29 is turned until the pointer reg-

isters at 200. Now, while the pointer is traveling from 150 to 200, as indicated on the dial, the contact screws will travel toward the right hand, that is to say, the contact screw 38 will travel away from the 150 degrees position of the circuit closing piece and the contact screw 37 will travel toward the 150 degrees position of the circuit closing piece 16. As the temperature of the heating agency rises, the expansion of the expansible member will cause the contact piece 16 to travel also to the right, and when the temperature has reached the predetermined 200 degrees the member 16 will contact with the screw 38, thereby closing its circuit and operating the dampers or other heating regulating means by the usual media.

The turning of the regulating screw 30 which effected a change in the indication of the pointer and a shifting of the contact plate 36 from a central to a right hand position, did not affect the distance between the contact screws 37 and 38, so the same slight variation in temperature will cause an operation of the heat regulating media as when the temperature of heating agency was to be maintained at 150 degrees. A greater or less variation in temperature from the desired point may be secured by adjusting the contact screws in relation to the circuit closing piece. From the foregoing description it is apparent that when the thermostat is once set for any given temperature, a change of temperature may be secured simply by indicating the desired temperature.

Having now described my improved thermostat, what I claim is:—

1. An indicating mechanism for thermostats having, in combination with a circuit closing piece, a reciprocatory contact plate, contact supports mounted thereon, adjustable contact screws in the supports, a pivoted pointer provided with teeth, and a regulating screw lying in substantially the same plane with the pointer and having two threaded portions, one of which is in engagement with the pointer, and the other of which is in engagement with the plate for moving the pointer and the contact screws synchronously.

2. An indicating mechanism for thermostats having, in combination with a circuit closing piece, a dial, a pointer pivoted thereon provided with teeth, a contact plate, contact members carried by the plate, and a regulating screw lying substantially in the same plane with the pointer, in engagement with the pointer teeth and with the contact plate, for moving the pointer relatively to the dial and synchronously therewith the contact members respectively toward and from the circuit closing piece.

3. An indicating mechanism for thermostats having, in combination with a circuit

5 closing piece, a dial, a pointer pivoted thereon provided with teeth, a contact plate, contact members carried by the plate, and a regulating screw having two threaded portions, one of said threaded portions engaging the pointer teeth so that the pointer may be moved relatively to the dial, and the other of said threaded portions engaging the contact plate so that the contact mem-
10 bers may be moved toward and from the circuit closing piece.

15 4. An indicating mechanism for thermostats having, in combination with a circuit closing piece, a dial, a pointer pivoted on the dial and provided with teeth, a reciproca- tory contact plate mounted on the dial, con- tact members carried by the plate, and a regulating screw having two threaded por- tions, one of which is in engagement with

the pointer teeth and the other of which is in 20 engagement with the contact plate, for imparting a pivotal movement to the pointer, and synchronously therewith a reciproca- tory movement to the contact plate.

25 5. An indicating mechanism for thermostats having, in combination with a circuit closing piece, a dial, a pointer pivoted there- on provided with teeth, a contact plate carrying contact members movable toward and from the circuit closing piece, and a reg- 30 ulating screw lying substantially in the plane of the pointer in engagement with the pointer and with the contact plate.

GEORGE E. SPEAR.

Witnesses:

KATHERINE J. DOOLEY,
FRED H. LANGILLE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."