T. J. M. DALY AND L. DALTON.

AUTOMATIC THERMOSTAT.

APPLICATION FILED APR. 30, 1919.

1,321,287. Patented Nov. 11, 1919.

Fig. 1.

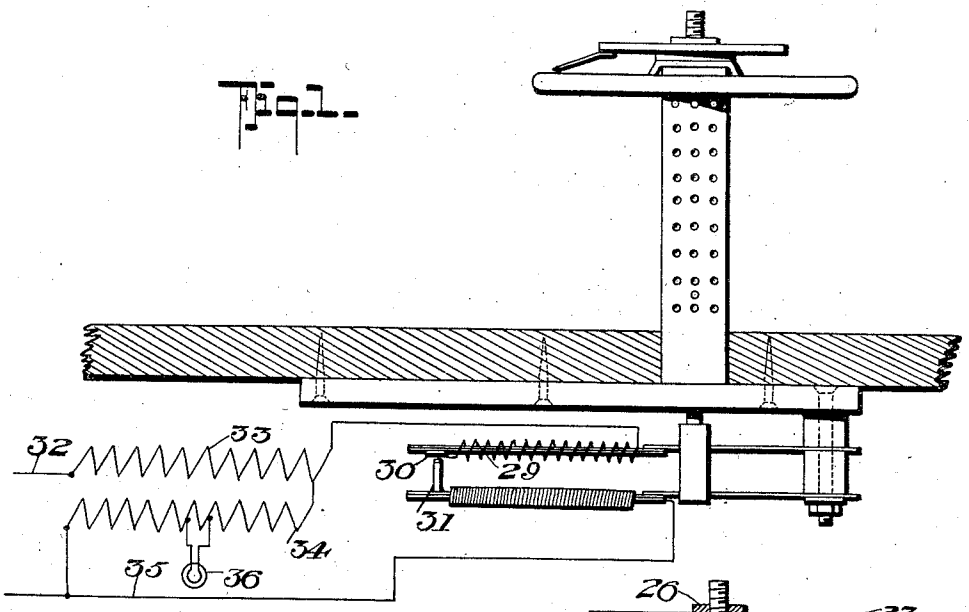


Fig. 3.

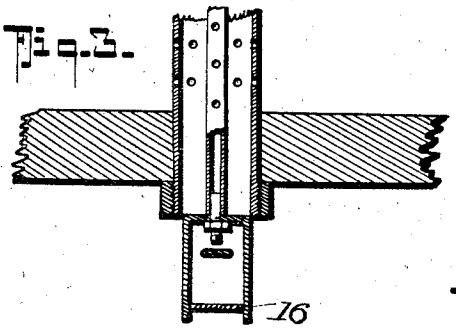


Fig. 2.

WITNESSES

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AUTOMATIC THERMOSTAT.

1,321,287. Specification of Letters Patent. Patented Nov. 11, 1919.

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To all whom it may concern:

Be it known that we, THOMAS JEFFERSON MATTHEWS DALY and LAMAR DALTON, citizens of the United States, and residents of Little Rock, in the county of Pulaski and State of Arkansas, have invented a new and useful Improvement in Automatic Thermostats, of which the following is a specification.

Our invention relates to electrically operated thermostats.

An important object of the invention is to provide a thermostat of the above mentioned character, which is wholly automatic in operation, and has three thermostatic elements, which are actuated by the change in temperature of a resistance coil, the change in temperature in the chamber to be heated, and the change in temperature of the atmosphere in the room or the like within which the chamber is located.

A further object of the invention is to provide a device of the above mentioned character which is of simple construction, and reliable in operation.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this specification and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a side elevation of a device embodying our invention,

Fig. 2 is a central vertical longitudinal sectional view through the same, and,

Fig. 3 is a transverse sectional view taken on line 3—3 of Fig. 2.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of our invention, the numeral 5 designates an upper thermostatic element, embodying an upper strip 6, preferably formed of steel, and a lower strip 7 preferably formed of brass, these strips being securely bound together by solder or the like, as is well known. The lower strip 7 of brass, when the element is heated has the higher co-efficient of expansion and will therefore cause the thermostatic element 5 to move upwardly. This thermostatic element may be formed of any other suitable metals having different co-efficients of expansion. The thermostatic element 5 is carried by a support 8, which is apertured for receiving a bolt 9, carrying insulating sleeves 10, the support 8 being out of contact with the bolt 9 and therefore thoroughly insulated from all other portions of the apparatus. The bolt 9 is secured to a support plate 11, as shown.

Arranged beneath the thermostatic element 5 is a coacting thermostatic element 12, embodying an upper strip 13 of brass, and a lower strip 14 of steel, these strips being bound together in any suitable manner and preferably wrapped with a section of insulated copper wire 15. The thermostatic element 13 is carried by a resilient support 16, apertured for receiving the bolt 9, as shown.

The numeral 17 designates a third thermostatic element, including an inner brass tube 18, which is preferably perforated. At its lower end, this brass tube has connection with a yoke 19, which is suitably attached to the support 16, by solder or the like, this yoke having no electrical connection or contact with the support 8.

Surrounding the brass tube 18 is an outer perforated tube 20, formed of steel, and having screw-threaded engagement within an opening 21 formed in the plate 11.

The numeral 22 designates a horizontal disk preferably formed of fiber, and having a central aperture 23, to tightly receive the upper end of the outer tube 20, so that the disk may be rigidly secured thereto. The disk 22 carries a dial 24, equipped with a scale indicating temperature degrees. A metallic cap or bushing 25 is arranged upon the top of the tube 20, and receives the screw-threaded upper end of the tube 18, but has no screw-threaded engagement therewith, the tube being slidable therein. A nut 26 has screw-threaded engagement with the upper end of the tube 18 and is rigidly secured to a preferably fiber disk 27, equipped with a pointer 28, to travel in contact with the temperature scale. It is thus seen that by turning the disk 27, the

tube 18 may be slightly raised or lowered, to permanently adjust the thermostatic element 12, toward or away from the thermostatic element 5, it being understood that the combined weight of the rod 18, disk 27 and associated elements is sufficient to overcome the resiliency of the support 16, so that there is no tendency for this support to move these elements upwardly.

Surrounding the thermostatic element 5 is a heating resistance coil 29, formed of insulating wire, and having one end thereof electrically connected with a contact 30 carried by the free end of the thermostatic element 5. This contact element 30 is adapted to engage and disengage a contact element 31 carried by the thermostatic element 12, as shown. The numeral 32 designates a wire having connection with a suitable source of current and connected with one end of the coil 29. This wire has a resistance coil 33 connected in series therewith. A second resistance coil 34 is connected with one end of the coil 33, and the opposite end of the coil 34 is connected with a wire 35, having electrical connection with the thermostatic element 12, as shown. An electric pilot light 36 is preferably connected in shunt with the coil 34.

In the use of the device, the plate 11 may be arranged within the incubator chamber or the like, and attached to the top 37 thereof. It is thus seen that the thermostatic elements 5 and 12 are arranged within the incubator chamber, while the thermostatic element 17 is disposed outwardly of the same in the room containing the incubator. The wire 35 has electrical connection with a suitable heating unit, arranged in the incubator chamber. Upon the increase of current, the coil 29 heats up, and when the temperature reaches a predetermined degree, thermostatic element 5 moves upwardly and breaks the engagement between contacts 30 and 31. This connects coil 34 in series with coil 33 and cuts down the current fed to the heating unit. The increased temperature of the incubator chamber also causes the thermostatic element 12 to move downwardly, which shifts the contact 31 away from the contact 30. The increase in temperature in the room exteriorly of the incubator chamber will cause the thermostatic element 17 to function and bodily move the thermostatic element 12 away from the thermostatic element 5.

It is to be understood that the form of our 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 our invention or the scope of the subjoined claims.

Having thus described our invention, we claim:

1. A device of the character described, comprising a thermostatic element carrying a contact, a second thermostatic element arranged near the first named thermostatic element and carrying a contact to coact with the first named contact, a heating coil surrounding the first named thermostatic element, a circuit in connection with the heating coil and the second named thermostatic element, and a third thermostatic element to bodily shift the second thermostatic element toward and away from the first named thermostatic element.

2. A device of the character described, comprising a thermostatic element having a contact portion, a second thermostatic element carrying a coacting contact portion, a heating coil surrounding the first named thermostatic element and having one end thereof electrically connected with the same, a third thermostatic element arranged upon one side of the first and second named thermostatic elements and connected with the second named thermostatic element to bodily shift it toward and away from the first named thermostatic element, and a circuit connected with the heating coil and the second named thermostatic element.

3. A device of the character described, comprising a thermostatic element embodying a plurality of strips having different co-efficients of expansion whereby the element is adapted to move upwardly when acted upon by heat, a second thermostatic element arranged beneath the first named thermostatic element and formed of strips having different co-efficients of expansion whereby the second named thermostatic element is adapted to move downwardly when acted upon by heat, contacts carried by the thermostatic elements, a heating coil surrounding the first named thermostatic element and having electrical connection with the contact thereof, a circuit connected with the heating coil and the second named thermostatic element, and a third thermostatic element connected with the second named thermostatic element and adapted when acted upon by heat to shift the second thermostatic element downwardly.

4. A device of the character described, comprising a thermostatic element embodying a plurality of strips having different co-efficients of expansion whereby the element is adapted to move upwardly when acted upon by heat, a second thermostatic element arranged beneath the first named thermostatic element and formed of strips having different co-efficients of expansion whereby the second named thermostatic element is adapted to move downwardly when acted upon by heat, contacts carried by the

hermostatic elements, a heating coil surounding the first named thermostatic elenent and having electrical connection with he contact thereof, a circuit connected with he heating coil and the second named thermostatic element, a third thermostatic element connected with the second named thermostatic element and adapted to shift it away from the first named thermostatic element, and adjustable means to regulate the operation of the third named thermostatic element.

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