

L. S. BESLEY.
THERMOSTATIC CIRCUIT CONTROLLER.
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1,102,566.

Patented July 7, 1914.

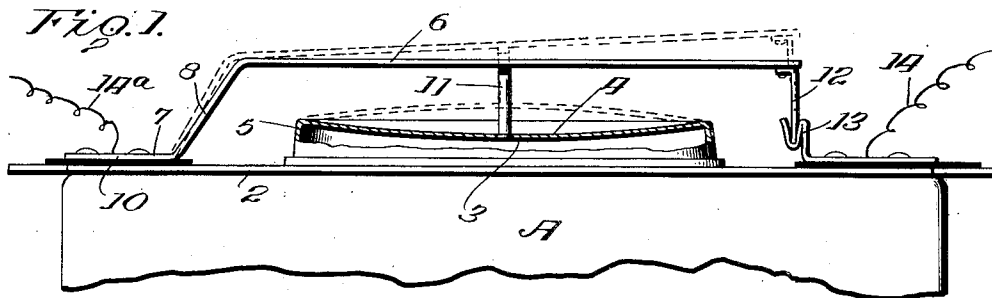
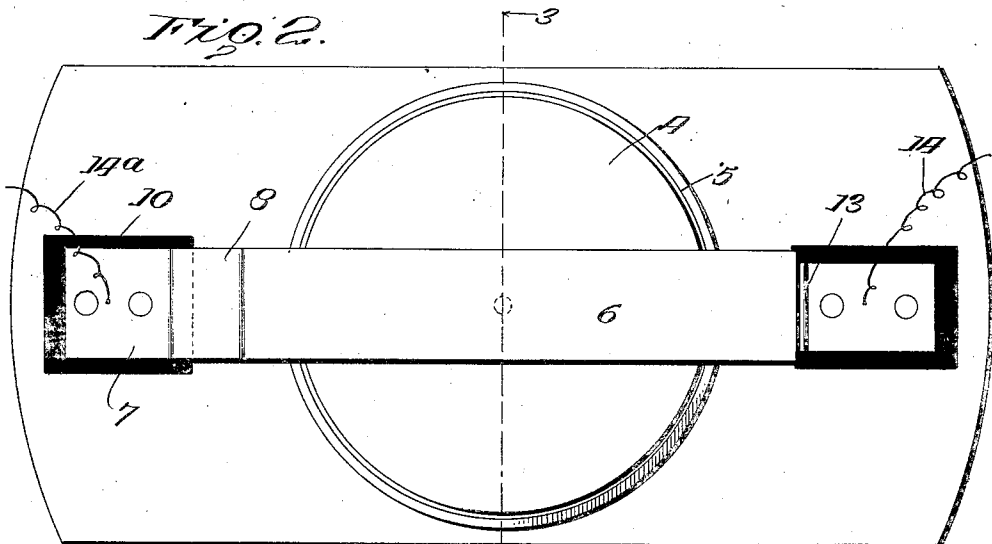
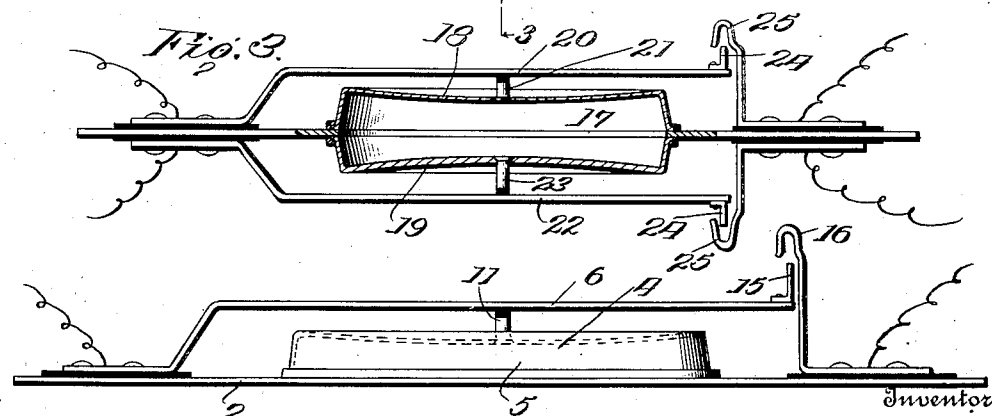


Fig. 4. L.S. Besley

Witnesses
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UNITED STATES PATENT OFFICE.

LEWIS S. BESLEY, OF SALT LAKE CITY, UTAH.

THERMOSTATIC CIRCUIT-CONTROLLER.

1,102,566.

Specification of Letters Patent.

Patented July 7, 1914.

Application filed January 29, 1912. Serial No. 674,124.

To all whom it may concern:

Be it known that I, LEWIS S. BESLEY, citizen of the United States, residing at Salt Lake City, in the county of Salt Lake and State of Utah, have invented certain new and useful Improvements in Thermostatic Circuit-Controllers, of which the following is a specification.

My invention relates to means for making or breaking an electric circuit, and particularly to said means when controlled by a thermostatic device.

The object of the invention is to provide a very simple circuit controller wherein the expansion or contraction of a fluid within an inclosed chamber will act to make or break a circuit and thus control the passage of current through said circuit, the device being particularly adapted, though not necessarily, to be used with electric cookers.

A further object is to provide a device of this character including a resilient diaphragm of spring metal, which diaphragm when forced beyond a predetermined point by the expansion of the fluid behind the diaphragm will spring outward sufficiently to close or open a switch or break a connection between certain contact points, and which when the pressure behind the diaphragm is increased beyond a predetermined point will spring back to its original position through the resilience of the diaphragm itself.

A further object is to provide a very simple, cheap, easily operated and easily constructed device for the above purpose which will be entirely effective in operation.

My invention is illustrated in the accompanying drawings wherein:

Figure 1 is a side elevation of my device partly in section. Fig. 2 is a plan view thereof. Fig. 3 is a sectional elevation of a modified form of my device. Fig. 4 is a side elevation of my device embodying the same general construction as that shown in Fig. 1 but designed to close a circuit upon an expansion of fluid within the chamber.

Corresponding and like parts are referred to in the following description and indicated in all the views of the accompanying drawings by the same reference characters.

Referring to these drawings, 2 designates a base plate which should be sufficiently thick or otherwise formed so as to be entirely rigid. Mounted upon the face of the base plate is a chamber 3 inclosing an elastic

fluid. This chamber is shown as composed of a resilient diaphragm 4 having an inwardly extending marginal flange 5 rigidly connected to the face of the base plate, either by means of rivets or by being soldered thereto. I do not wish to limit myself to any particular manner of forming this chamber or attaching the chamber to the base plate.

The resilient plate 4 is normally forced fully inward by the resilience of the metal of which the diaphragm or plate is composed. This diaphragm 4 is of such character, however, that when the diaphragm is forced beyond a straight line connecting the upper edges of the flanges 5, the diaphragm will spring outward from its own resilience, and the elasticity of the fluid beneath. Extending over the diaphragm 4 is a spring 6 of any suitable material and shown as having at one end an inwardly extending base portion 7 angularly turned as at 8 to engage with the face of the plate 2 to which it is riveted by rivets 9. Any other method of attaching the spring to the plate 2 may be used. Preferably, the spring 6 is insulated from the plate 2 by means of the insulation 10. The spring 6 extends over the diaphragm 4 as before described and beyond the same, and carries a pin 11 which is resiliently forced against the face of the diaphragm 4 by the resilience of the spring. As the plate 4 is pressed outward by the expansion of the elastic fluid beneath it will bear against the face of the pin 11 and lift against the force of the spring 6. It will of course be understood that the expansive force of the inclosed fluid is sufficient to overcome the resilience of the spring 6 which is relatively light and which in the position shown in Fig. 1 has only sufficient strength to hold the pin 11 in engagement with the face of the diaphragm 4. The pin 11 is preferably insulated from the spring 6. It will be readily understood that if a hinge were placed at 8 the member 6 would then act by gravity instead of by spring. Also that if the member 6 itself lie upon the diaphragm the pin might be dispensed with. The free extremity of the spring 6 carries upon it a contact member designated 12 which is shown as forming a switch blade and adapted to be received between a cleft contact member designated 13 and which is mounted upon the face of the plate 2 but in-

5 sulated therefrom. This contact member 13 is connected in circuit with any suitable apparatus by means of the wire 14, and the extremity of the spring 6 is also connected in circuit with said apparatus by the wire 14^a. It will be understood, however, that the wires 14 and 14^a might form part of a circuit including opposed contact pieces between which the switch blade 12 is adapted to be received and which the switch blade is adapted to bridge. I do not, however, illustrate this construction as it will be evident to any electrician that the circuit might be made through the blade 12 in a number of ways.

10 The plate 2 forms part of or rests on any suitable apparatus, chamber or other device which is intended to be heated to a certain point as by electrical heating devices connected in circuit with the wires 14, 14^a, these heating devices however not being shown. When the heat within the chamber A or other device connected to the plate 2 rises a certain amount, it will heat the air or other fluid contained within the chamber 3. This will cause the fluid to expand, and as it expands it will force outward upon the diaphragm 4. When the diaphragm 4 has been forced slightly beyond its median position, the resilience of the diaphragm will cause it to buckle, as before explained, and to fly outward to its full position, thus lifting the spring 6 and carrying the contact member 12 out of engagement with the contact member 13, thus opening the switch formed by these contact members 12 and 13 and breaking the current through the wires 14, 14^a. When the temperature decreases within the heater or other chamber A, the air or other fluid within the chamber 3 will contract and the spring 6 which is then under tension will force the diaphragm 4 inward to a point beyond its median position, whereupon the diaphragm will buckle inward and the spring 6 will carry the blade or contact member 12 into engagement with the contact member 13 and the circuit will be once more completed. It will be seen that a switch constructed in accordance with this invention is entirely automatic in its action and makes or breaks the circuit through the electrical apparatus connected thereto automatically upon the rise or fall of the temperature beyond a certain predetermined degree.

15 While I have shown in Fig. 1 my device as being adapted to break a circuit upon a rise of the temperature beyond a certain degree, it is also possible to use the device for making a circuit upon such rise, as for instance where it is desired to close a draft of a furnace upon an increase of temperature beyond a certain point. In this case, the spring 6 is provided with a terminal end 15 which extends in an opposite di-

rection to the terminal end 12 and is adapted to engage with a cleft contact member 16 supported above or on the outside face of the spring 6. In this case, normally the spring will hold the member 15 out of contact with the contact piece 16, but when the air within the chamber 3 has expanded beyond a certain point, the spring of the diaphragm 4 will throw the contact member 15 into engagement with the member 16, thus completing the circuit through the wires 14, 14^a.

It will of course be understood that I do not wish to be limited to any particular form of contact members or, in other words, to any particular form of switch, as my invention is adapted to be used with a number of different forms of electrical switches. Further it will be obvious that the chamber 3 might be used to operate two switches. Thus in Fig. 3 I show another form of my device in which 17 designates a casing or chamber inclosing expansive fluid. Both sides of the chamber are formed by resilient diaphragms designated 18 and 19, these being made of thin resilient metal adapted to spring inward or outward, that is, to buckle when forced either inward or outward beyond a median position. A spring 20 carries upon it a pin 21 bearing yieldingly against the diaphragm 18, while the spring 22 carries upon it the pin 23 yieldingly bearing against the diaphragm 19. Each of these springs 20 and 22 carries upon it in any suitable manner a contact member 24. These members coact with the contact members 25, each connected in circuit with any suitable apparatus. It will be obvious that with this device by making the diaphragms 18 and 19 of unequal strength, the thermostat could be used for indicating unequal temperatures. Further, it will be obvious that by securing a number of these thermostats to one casing, the thermostats having diaphragms of different degrees of strength, an indefinite number of indications could be indicated.

I have referred above to the fact that a certain temperature could be indicated, for the reason that my device while entirely adapted to break the circuit through electrically actuated apparatus is also adapted to actuate certain apparatus so as to indicate the temperature at which the thermostat operated.

My device is adapted for fire-alarm systems, electric heaters, sprinkler systems, and for use in a large number of other circumstances.

What I claim is:

1. A thermostatic circuit controller including in its organization a fluid inclosing chamber having its opposite sides formed, each by a resilient diaphragm, outwardly yieldable as the fluid within the chamber

expands but movable inward as the fluid within the chamber contracts, said plates having different moduli of elasticity.

2. A thermostatic circuit controller including a support, a fluid inclosing chamber carried by the support and having a resilient buckling diaphragm adapted to buckle both inwardly and outwardly, but prevented by its own resiliency from remaining in a medial position, an electric contact member extending over said diaphragm and constantly engaging the same, said member having a lateral terminal, and

a second contact member having a terminal adapted to receive the terminal of the first, said co-acting terminals when in engagement being arranged to bear against each other to provide sufficient frictional contact to prevent disengagement during the early movement of the diaphragm.

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

LEWIS S. BESLEY. [L. s.]

Witnesses:

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