

May 24, 1932.

W. W. RIEDEL
THERMOSTATIC SWITCH
Filed Feb. 28, 1930

1,859,985

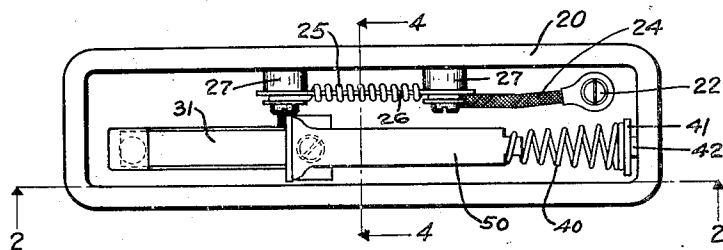


Fig. 1.

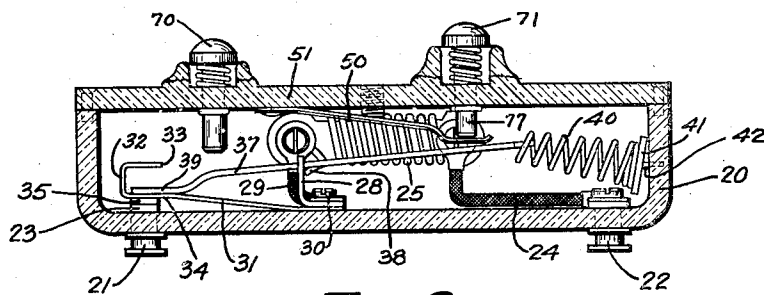


Fig. 2.

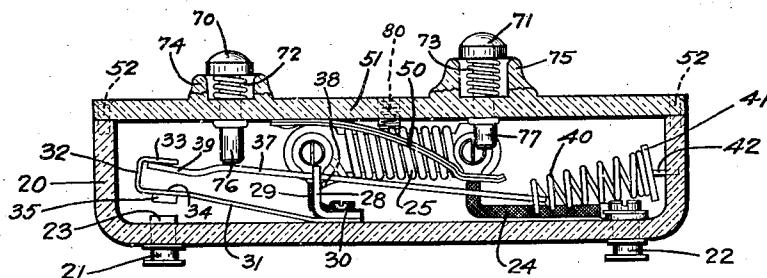


Fig. 3.

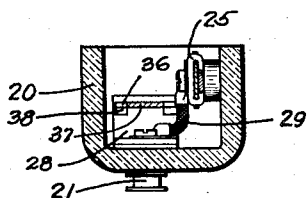


Fig. 4.

Inventor

WALTER W. RIEDEL

334

Spencer, Hardman and Peltz
Attorneys

UNITED STATES PATENT OFFICE

WALTER W. RIEDEL, OF DAYTON, OHIO, ASSIGNOR TO DELCO PRODUCTS CORPORATION,
OF DAYTON, OHIO, A CORPORATION OF DELAWARE

THERMOSTATIC SWITCH

Application filed February 28, 1930. Serial No. 432,100.

This invention relates to improvements in thermostatically controlled switches.

It is among the objects of the present invention to provide a thermostatic switch in which one contact is moved into and out of engagement with a cooperating contact with a hammer-blow effect, thereby substantially assuring sudden engagement or disengagement of said contacts.

Another object of the present invention is to provide a thermostatic switch of simple structure and design, capable of being produced commercially at a minimum expense of time and material.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of one form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a plan view of the switch with the cover removed.

Fig. 2 is a longitudinal sectional view of the switch taken along the line 2—2 of Fig. 1.

Fig. 3 is a view of the switch similar to Fig. 2, however, showing the contacts in another relative position.

Fig. 4 is a transverse section taken along the line 4—4 of Fig. 1.

Referring to the drawings, the numeral 20 designates the casing, made up of any insulating material such as molded bakelite or the like. Two terminals are molded in this casing 20, one designated by the numeral 21, the other by the numeral 22. The terminal 21 extends into the inside of casing 20 and provides the stationary contact 23 therein. The other terminal 22 extends inside the casing 20 and has the lead wire 24 connected thereto. Lead wire 24 is also connected to one end of a heater element 25 which is supported on the usual strip 26, preferably of mica. The strip 26 is carried by the post 27 formed inside the casing 20. Heater element 25 is connected with a bracket 28 through wire 29, said bracket being secured to the bottom of the casing 20 by a screw 30. One end of a flexible arm 31 is clamped between the bracket 28 and the bottom of the casing 20, securely anchoring

this end of the arm 31 to the casing. The free end of the arm is hook-shaped as at 32, the portion 33 of the hook-shaped end being spaced from the portion 34 of the arm. A contact 35 is attached to the arm portion 34. This contact is urged into engagement with the stationary contact 23 by the flexible arm 31. Bracket 28, as shown in Fig. 4, is recessed as at 36 for receiving the lever 37. Intermediate the ends of the lever, tongues 38 are formed thereon which engage the bracket 28 and form the fulcrum point about which said lever 37 oscillates. The one end of the lever designated by the numeral 39 extends into the space between the portions 33 and 34 of the flexible arm 31. The opposite end of the lever 37 has one end of a pressure coil spring 40 attached thereto, the other end of said spring abutting against a block 41 which is pivotally supported by a tongue 42 provided on the end of the casing 20. Spring 40 is adapted yieldably to urge the lever 37 into either one of two extreme positions, said lever being shown in one extreme position in the Fig. 2 and in the opposite extreme position in the Fig. 3. In the position as shown in Fig. 2, spring 40 exerts a force upon the lever 37 to urge its end 38 into engagement with the portion 34 of arm 31 so that the contact 35 is urged into engagement with its cooperating, stationary contact 23. In the position as shown in Fig. 3, lever 37 has the force of the spring 30 exerted thereon so that the end 38 of the lever engages the portion 33 of the arm 31 whereby said arm 31 is flexed to maintain its contact 35 out of engagement with the cooperating stationary contact 23.

A thermostatic member 50, in the form of a strip, is shown anchored at one end to the cover 51, secured to the casing by screws 52. At normal temperatures the free end of the thermostatic strip 50 is in spaced relation to the lever 30, as shown in the Fig. 2. This thermostatic strip 50, however, is arranged to flex at increased temperatures whereby the free end thereof will engage the lever 30 and move it clockwise as regards Fig. 2. Thermostatic strip 50 moves the lever 30 in this direction against the effect of the spring 40 until the lever 37 and spring 40 have aligned

substantially longitudinally, after which any slight movement by the thermostatic strip toward the lever 37 will move the lever 37 beyond this longitudinal alignment, thereby permitting the force of the spring 40 suddenly to flip or snap the arm 37 into the position as shown in Fig. 3, in which position the contacts are disengaged. While the arm 37 and the spring 40 are substantially in longitudinal alignment, the end 38 of the lever is positioned somewhere between the portions 33 and 34 of the flexible arm 31 and, during this time, contact engagement is maintained by the flexible arm 31. However, as soon as the lever 37 is moved beyond this longitudinal alignment and has the force of the spring 30 exerted thereupon to move it clockwise, the end 38 of said lever will strike the portion 33 of the flexible arm 31 with a hammer-blow effect, thus suddenly moving the contact 35 out of engagement with the contact 23.

The numeral 70 designates a starting button, the numeral 71 a stopping button. Both these buttons are held in normally extended position by springs 72 and 73 respectively. Button 70 aligns with an annular extension 74 on the switch cover 51, while button 71 aligns with a similar extension 75 in the switch cover 51. When in normal disconnected position as shown in Fig. 3, the switch may be closed by the depression of button 70 which causes its stem portion 76 to engage with the end 39 of the lever 37 and move it so that spring arm 31 will move the portion 33 thereof to follow the end 38 of the lever 37. As soon as the lever 37 and spring 40 have moved beyond their longitudinal alignment, the spring 40 will quickly snap the lever 37 counter-clockwise so that its arm portion 38 will engage the portion 34 of arm 31 quickly and securely to urge the contact 35 into engagement with the cooperating contact 23.

If during the operation of the device it is desired to discontinue it, then the starting button 71 may be depressed, which causes its stem portion 77 to engage with the thermostatic element 51, pushing said thermostatic lever to be moved so that the spring 40 may eventually snap it clockwise whereby its end 38 will engage the arm portion 33 to move the contact 35 out of engagement with its cooperating contact 23.

The heating unit 25 is in circuit across the contacts 23 and 35 so that excessive current flowing across these contacts or through this circuit will cause said heating unit to be heated beyond a predetermined degree at which it will cause flexing of the thermostat 50 to move the lever 37 to break contact engagement.

Applicant has provided a switch of simple design, made up of elements which may be produced commercially at a minimum expense of time and material.

The switch operates quickly to make and break the contact engagement, thereby substantially eliminating arcing between said contacts. An adjusting screw 80 is provided in the cover 51 by which the thermostatic element 50 may be properly adjusted so that its free end is normally always spaced from the lever 37.

While the form of embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A thermo switch comprising, in combination, a pivoted lever, resilient means engaging said lever yieldably to urge it into either one of two positions; thermostatic means arranged to flex, in response to an increase in temperature so as to move into engagement with the lever and operate it from one position to permit the resilient means quickly to shift said lever into the other position; and switching means separate from the thermostatic means and the lever, said switching means comprising a fixed contact and a movable contact, said movable contact having a portion engageable by the lever so as to be operated by said lever.

2. A thermo switch comprising, in combination, a pivoted lever capable of clockwise and counter-clockwise movement into two extreme positions; resilient means engaging the said lever and adapted yieldably to urge said lever into one or the other of said extreme positions; thermostatic means, arranged in juxtaposition to said lever, and adapted at increased temperatures to engage the lever and move it from one extreme position into a position in which the spring may quickly shift said lever into the opposite extreme position; and switching means comprising a fixed contact and a movable contact supported upon a flexible strip which is adapted to be engaged by the lever to operate the movable contact.

3. A thermo switch comprising, in combination, a lever pivoted intermediate its ends; a spring engaging one end of the pivoted lever and yieldably urging said lever in one or the other direction; a thermostatic strip arranged to flex, in response to a change in temperature, so as to engage with said lever and move it against the effect of said spring into a position in which said spring may continue to move said lever in the same direction; a flexible strip anchored at one end, the free end being engageable by the lever; a fixed contact; and a contact carried at the free end of the flexible strip.

4. A thermo switch comprising, in combination, a pivotally supported lever capable of moving into two extreme positions; a spring engaging one end of the lever and yieldably urging said lever into one or the

other of said extreme positions; a thermostatic strip anchored at one end, the free end thereof lying in juxtaposition to said lever at normal temperatures, said strip being adapted to flex at increased temperatures to engage with the lever and move it from its one extreme position against the effect of the spring into an intermediate position in which said spring quickly moves said lever from the thermostatic strip into the opposite extreme position; and a switching device operated by the end of the lever opposite that engaged by the spring.

5. A thermo switch comprising, in combination, two cooperating contacts, one of which is movable relative to the other; a lever pivotally supported intermediate its ends, one end of said lever engaging the movable contact; a spring engaging the other end of the lever yieldably urges it into one or the other of its extreme positions in which the movable contact is maintained either in or out of engagement with its cooperating contacts respectively; and a thermostatic strip normally engaged from this lever, but arranged to flex at increased temperatures to engage with said lever and move it into a position in which the spring exerts a force in the same direction upon said lever, quickly to move the lever toward the extreme position in which the movable contact is disengaged from its cooperating contact.

6. A thermo switch comprising, in combination, two cooperating contacts one of which is movable relative to the other; a lever pivotally supported intermediate its ends; a lost motion connection between one end of the lever and the movable contact; a spring engaging the other end of the lever and yieldably urging it into two extreme positions, in one of which said lever will maintain the movable contact in engagement with the stationary contact, in the other extreme position said lever will maintain the movable contact out of engagement with its cooperating contact; and a thermostatic member normally disengaged from the lever, but adapted at increased temperatures to flex and engage the lever to move it against the effect of the spring into a position in which said spring will quickly operate the lever to disengage the contacts.

7. A thermo switch comprising, in combination, a casing; a contact insulatingly supported within said casing; a movable contact a flexible arm supporting said contact and normally urging it into engagement with the stationary contact; a bracket securing the flexible contact carrying arm within the housing; a lever pivotally supported by said bracket; a lost motion connection between the flexible contact arm and one end of the lever; a spring having its one end abutting against the housing and the other end engaging the end of the lever opposite that

engaging the flexible contact arm, said spring yieldably urging the lever into two positions, one of which maintains the contacts in engagement, the other maintaining said contacts out of engagement; and a thermostatic strip normally disengaged from the lever, but arranged to flex at increased temperatures for engaging the lever and moving it against the effect of the spring into a position in which said spring will quickly urge the lever to strike the flexible contact arm to disengage the contacts.

8. A thermo switch comprising, in combination, two cooperating contacts, one of which is movable relative to the other; a flexible arm carrying the movable contact, said flexible arm being provided with a hook end; a bracket securing the one end of the flexible arm; a lever pivotally supported by said bracket, one end of the lever extending into the hook end of the flexible arm, providing a lost motion connection between said lever and arm; a spring having one end engaging the other end of said lever, said spring urging said lever into one or the other of its extreme positions in which the movable contact is maintained in or out of engagement with the stationary contact respectively; and a thermostatic element, spaced from the lever at normal temperatures but arranged, at increased temperatures, to flex and engage the lever to move it into a position against the effect of the spring, in which position said spring quickly moves the lever into engagement with the flexible contact arm with a hammer-blow effect quickly to disengage its contact from its cooperating stationary contact.

9. A thermo switch comprising, in combination, a toggle comprising a pivoted lever having its one free end engaged by a spring, one end of which is pivotally secured; a thermostat arranged to flex in response to increasing temperatures and engage said lever to move the toggle so that the spring will quickly shift the lever into another of its extreme positions; and a switching means comprising a stationary contact and a fixed arm supporting a cooperating contact, said fixed arm having an extending portion engageable by the lever to move the contact in accordance with the position of said lever.

In testimony whereof I hereto affix my signature.

WALTER W. RIEDEL.