

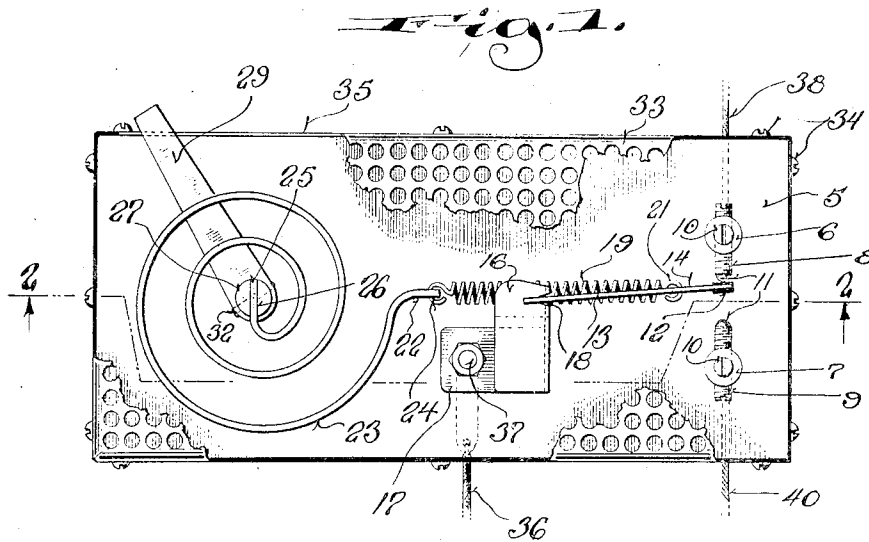
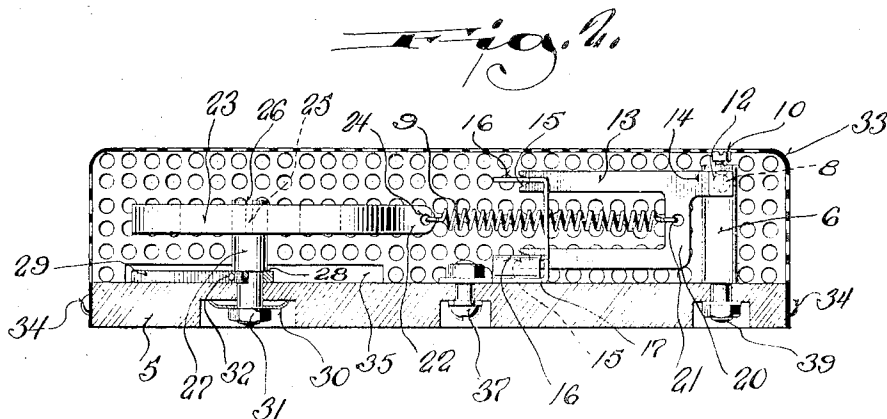
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H. G. PHELPS

THERMOSTATIC INSTRUMENT

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THERMOSTATIC INSTRUMENT.

Application filed January 24, 1924. Serial No. 688,325.

To all whom it may concern:

Be it known that I, HUGH G. PHELPS, a citizen of the United States, and resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Thermostatic Instruments, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

This invention relates to certain new and useful improvements in thermostatic instruments, and refers more particularly to a thermostatically actuated contact making and breaking switch designed for use in connection with refrigerating plants, or in connection with any other device, mechanism, or place where it is desired to co-ordinate a control device with the temperature of a room, space, or other compartment.

Various types of thermostatically actuated contact making and breaking switches have been designed in an effort to meet the demand for such a device, which have been open to many objections such as the inability to obtain a quick making and breaking of the circuits to thus eliminate arcing at the contacts and to permit the ready adjustment of the degree at which the switch actuates without effecting the sensitiveness of the instrument and, at the same time, be of sturdy construction to withstand rough usage.

Having the above and other objections to the present types of thermostatically controlled electrical switches in mind, this invention has for one of its objects to provide a thermostatically controlled switch in which the circuit or circuits in which it is included are quickly made and broken to reduce arcing incidental to the making and breaking of the circuit or circuits to a minimum.

This invention contemplates as another object to provide an instrument of the character described which is extremely sensitive and responsive to variations in temperature and, at the same time, is of sturdy construction.

It is another object of this invention to provide an instrument of the character described which may be readily adjusted and set as to the degree at which the instrument actuates without necessitating the use of tools.

This invention has for a further object to provide a thermostatic instrument of the character described in which the parts are designed and constructed to permit the ready assembling or disassembling of the device to facilitate its production in quantities at a minimum labor cost and permitting the ready repair or renewal of any part or parts.

And as still further object of this invention resides in the provision of a thermostatic instrument of the character described having a sturdy perforated cover for protecting the instrument against injury.

With the above and other objects in view which will appear as the description proceeds, my invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the herein disclosed invention may be made as come within the scope of the claims.

In the accompanying drawings, I have illustrated one complete example of the physical embodiment of my invention constructed according to the best mode I have so far devised for the practical application of the principles thereof, and in which:

Figure 1 is a top view of a thermostatic instrument embodying my invention, the perforated protecting cover being broken away to permit an unrestricted view of the switch mechanism, and

Figure 2 is a sectional view taken longitudinally through Figure 1 on the plane of the line 2—2.

Referring now more particularly to the accompanying drawing, in which like numerals designate like parts throughout the several views, the numeral 5 designates a panel or base member of preferably non-conductive material such as slate, bakelite, fiber or any other suitable material having mounted thereon adjacent one end a pair of spaced contact carrying posts 6 and 7. The posts 6 and 7 are provided with axially aligned, transverse threaded openings in which contact members 8 and 9 are adjustably threaded and secured in adjusted position by set screws 10 adapted to be screwed thereagainst. Contact points 11 of platinum or any other suitable material are secured on the inner, adjacent ends of the members 8 and 9 for electrical engagement with a movable contact

12, of similar material, carried by a movable arm 13.

The arm 13 is of substantially h-shape, the contact 12 being carried by the outer end of the stem 14 thereof. The outer ends of the legs of the arm 13 are notched, as at 15, and pivotally engage a pair of parallel arms 16 formed on a terminal member 17 secured to the panel 5 inwardly of the posts 6 and 7. As best illustrated in Figure 1, the arms 16 are notched, as at 18, to receive the notched ends of the movable arm 13. The terminal 17 is so spaced from the posts 6 and 7 that the contact 12 is positioned between the points 11 of the contacts 8 and 9 and movement of the arm 13 on its pivots, formed by the interlocking notches 15 and 18 of the arm 13 and terminal 17, respectively, engages and disengages contact 12 with the contact points 11.

The arm 13 is held in its pivotal engagement with the parallel arms 16 of the terminal 17 by a contractile spring 19, one end of which is connected with the transverse portion 20 of the h-shaped arm 13, as at 21, and the other end of which is connected with the outer free end 22 of a thermostatic element 23, as at 24. The spring 19 not only functions to retain the movable arm 13 in its pivotal connection with the terminal 17, but effects the quick engagement and disengagement of the movable contact 12 with either of the contact points 11, in the manner later described.

The thermostatic member 23 is preferably in the form of a strip of bi-metallic metal coiled in the manner illustrated in Figure 1 and having its inner end 25 secured in the slot 26 of a supporting post 27 by closing in the slot 26 to produce a frictional contact or in any other manner, not shown. As will be obvious, changes in temperature results in the movement of the end 22 of the thermostatic member about the center of shaft 27, as one of the metals comprising the bi-metallic strip has a higher coefficient of expansion than the other. This form of thermostatic member is especially sensitive to temperature changes and produced as maximum of movement at the end 22.

The post 27 is pivotally secured to the panel 5 by having its lower end reduced to provide a shoulder 28 which butts against an adjusting arm or lever 29 disposed between it and the upper-face of the panel, and through which the reduced end passes, and has a tension or spring washer 30 confined between an attaching nut 31 on its outer end and the under-face of the panel. The washer 30 is under tension at all times to frictionally hold the post 27 against rotation and prevent the accidental disarrangement of the setting of the thermostatic member 23. The lever 29 is secured to the post 27 by a rivet or other means 32, and instant setting of the

thermostatic member is effected by rotating post 27 against the friction of the washer 30 by means of the lever 29.

The entire device is protected by a relatively strong perforated cover 33 which is telescoped thereover and secured to the panel by suitable fastenings 34, an elongated slot or opening 35 being provided therein to permit the projection therethrough of the outer end of lever 29.

As will be readily apparent to those skilled in the art to which an invention of this character appertains, the instrument is suitably mounted in a room, compartment, refrigerator, or other space and a conductor 36, of the circuit or circuits in which the instrument is to be concluded, is electrically connected with the post 37 of the terminal 17; another conductor 38 is electrically connected with the terminal 39 of the post 6 and another conductor 40 is electrically connected with the terminal, not shown, of the post 7.

With the parts in their position illustrated in Figure 1, assuming that the metal having the higher coefficient of expansion is on the inner side of the thermostatic member, an increase in the temperature of the compartment, space or room in which the instrument is located results in the movement of the end 22 of the thermostatic member toward the post 7, and as the end 22 passes beyond an imaginary line drawn centrally through the arm 22 and its pivot, the energy stored within the spring 19 exerts itself producing a quick movement of the outer end of the arm 13 from the contact 8 toward the contact 9, quickly breaking the circuit between the movable contact 12 and the point 11 of the contact 8 and quickly making the circuit between the contact 12 and the point 11 of the contact 9.

A contraction of the thermostatic member due to a decrease of the temperature of the space, room or compartment in which the instrument is located results in a reverse movement of the thermostatic member. As will be readily apparent, adjustment of the instrument may be readily accomplished by setting of the contacts 8 and 9 or by setting of the end 22 of the thermostatic member though the lever 29, as previously described, and in the initial assembly of the instrument, the contacts 8 and 9 are approximately set at a desired position and further setting is accomplished by the lever 29.

The arm 13 and the terminal 17 are preferably stamped from bendable metal and to permit their production in quantity at low cost. All of the parts may be readily disassembled or assembled and the covering 33 affords ample protection against injury to the parts.

The humidity conditions within a refrigerator make it impossible to employ high

voltage when the thermostatic switch actuates slowly, as the current discharges across the contacts resulting in a premature functioning of the device. With the device illustrated in the drawing and described above, high voltage may be employed as a maximum distance between the fixed contacts is provided and further the movable contact actuates with a quick, snappy action.

10 What I claim as my invention is:

1. In an instrument of the character described, a panel member, a post having its inner end reduced and rotatably mounted in the panel member, tension means yieldably resisting the rotation of the post, means for rotating the post to any desired position, a coiled thermostatic strip, means securing the inner end of the strip to the post, the outer end of the strip being free and moving in an arc as the strip contracts and expands under the influence of temperature changes, and a circuit making and breaking device actuated by the movement of the strip outer end.

2. In an instrument of the character described, a panel member, a pair of spaced terminals mounted on the panel member adjacent one end, a thermo responsive member mounted adjacent the other end of the panel member and extending toward the terminals but spaced therefrom, the end of the thermo member moving transversely of the panel member as the same contracts and expands under the influence of the temperature changes, a support fixed to the panel member medially of the spaced terminals and the thermo responsive member end, a movable contact having its outer end located between the terminals and selectively engageable therewith and the inner end

engaging the support, and a contractile spring having one end secured to the outer portion of the movable contact and its other end secured to the end of the thermo responsive member, whereby the tension of the spring holds the contact in position and moves the contact in accordance with the movement of the thermo responsive member.

3. In an instrument of the character described, a panel member, a stationary contact carried by the panel, a terminal member secured to the panel member and spaced from said contact member, a pair of spaced projections carried by said terminal member and having their edges adjacent said stationary contact notched, a substantially h-shaped movable arm having the outer ends of the legs thereof notched to receive the notches of the terminal projections, a contact fixed to the outer end of the vertical portion of the h and adapted to electrically engage said stationary contact, a thermostatic member mounted on the panel member and having one end free and arranged to be moved by expansion or contraction of said thermostatic member, and a spring connecting said thermostatic member free end and the transverse portion of said movable arm to retain said arm in pivotal engagement with the terminal, movement of the thermostatic member free end beyond an imaginary line drawn longitudinally through said movable arm and its pivotal connection with the terminal resulting in a quick movement of said movable arm in the direction of movement of the thermostatic member free end.

In testimony whereof I affix my signature.

HUGH G. PHELPS.