Aug. 29, 1939. L. L. CUNNINGHAM 2,171,273

ADJUSTABLE THERMOSTATIC SWITCH

Filed Dec. 24, 1936

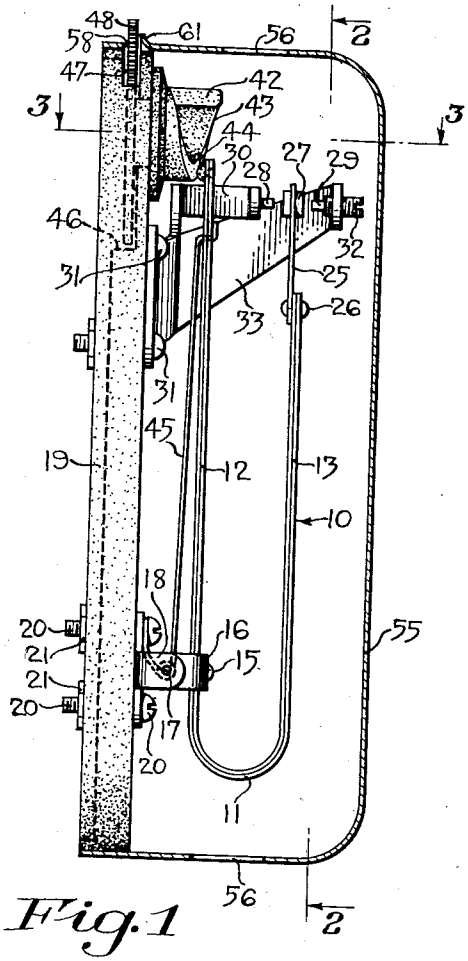


Fig. 1

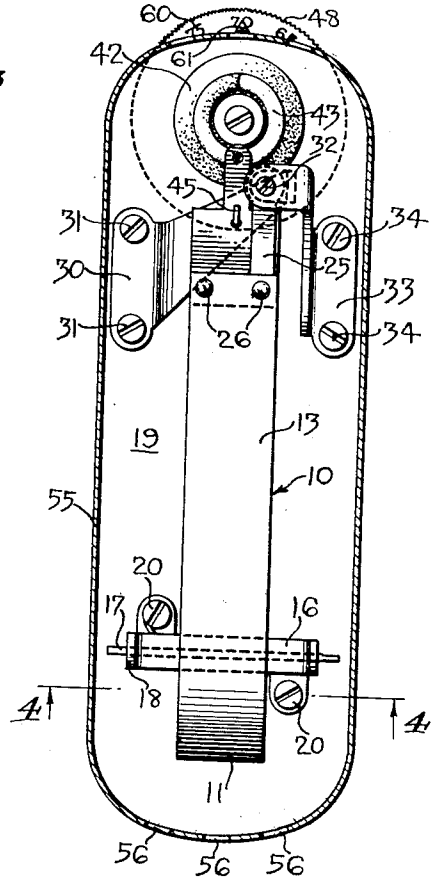


Fig. 2

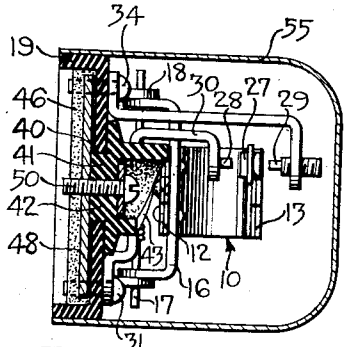


Fig. 3

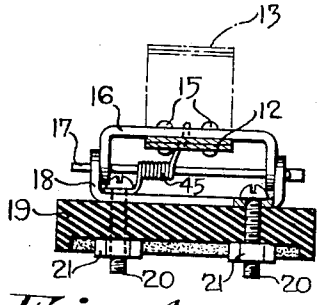


Fig. 4

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2,171,273

UNITED STATES PATENT OFFICE

2,171,273

ADJUSTABLE THERMOSTATIC SWITCH

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Application December 24, 1936, Serial No. 117,621

11 Claims. (Cl. 200—139)

This invention relates to thermostatic switching mechanisms.

An object of this invention is to provide a thermostatic switching mechanism of novel construction whereby the switching mechanism is made very sensitive to variations in temperature affecting the same.

Another object of this invention is to provide a novel adjusting means for the switching mechanism.

The particular construction, mode of operation and interrelation of parts utilized for obtaining a compact and sensitive thermostatic switching mechanism, also form objects of this invention.

Other objects and advantages will become apparent to those skilled in the art upon reference to the accompanying specification, claims and drawing.

For a more thorough understanding of this invention reference is made to the accompanying single sheet of drawing, in which:

Figure 1 is a side elevational view of my invention, the cover being shown in section.

Figure 2 is a sectional view taken substantially on the line 2—2 of Figure 1.

Figure 3 is a sectional view taken substantially on the line 3—3 of Figure 1.

Figure 4 is a sectional view taken substantially on the line 4—4 of Figure 2.

Referring now to the drawing and particularly to Figure 1, the temperature responsive device is generally designated at 10 and comprises an elongated strip of bimetallic material bent at 11 to form a U-shaped thermostatic element having legs 12 and 13. By reason of this U-shaped thermostatic element its deflection upon temperature changes affecting the same is great even though the thermostatic element only occupies a relatively small space. Therefore, a compact thermostatic switching mechanism may be made and yet the thermostatic switching mechanism may be very sensitive to slight changes in temperature.

The leg 12 of the thermostatic element 10 may be secured by rivets 15 to a bracket 16. The bracket 16 is mounted on a pin 17 carried by a bracket 18. The bracket 18 is suitably secured to a base 19 preferably formed of insulating material by screws 20 cooperating with nuts 21. By reason of this mounting of the thermostatic device 10 it deflects in response to changes in temperature in a plane perpendicular to the base 19 and also by reason of the mounting of the thermostatic element 10 it may be adjusted in a plane perpendicular to the base 19.

A flexible arm 25 is secured to the leg 13 by rivets 26. The flexible arm 25 carries a contact 27 which is adapted to engage spaced stationary contacts 28 and 29. The contact 28 is carried by a bracket 30 which is suitably secured to the base 19 by screws 31. The contact 29 is carried by a screw 32 which is screw threadedly engaged in a bracket 33. The bracket 33 is secured to the base 19 by screws 34. Upon an increase in temperature affecting the thermostatic element 10 the contact 27 is moved into engagement with the contact 29 and upon a decrease in temperature the contact 27 is moved into engagement with the contact 28. Suitable wiring connections may be secured to the screws 20, 31 and 34 to be controlled by the contacts 27, 28 and 29, these contacts being electrically connected through the brackets to the associated screws, as will be apparent from the drawing.

The base 19 has a circular opening 40 therein which receives a shoulder 41 of a rotatable member 42, and by reason of the circular opening 40 and the shoulder 41 the member 42 is rotatably mounted on the base 19. The member 42 has formed thereon a helical cam surface 43 which is adapted to be engaged by an abutment 44 struck from the leg 12 of the thermostatic device 10. The abutment 44 is held in engagement with the cam surface 43 by means of a spring 45. One end of the spring 45 passes through a suitable opening in the leg 12 of the thermostatic element 10, the intermediate portion of the spring is wrapped around the pivot pin 17 and the other end of the spring is anchored underneath the screw 20. The pin 17 and the spring 45 form a resilient mounting means for the thermostatic element 10 to allow the element 10 to be adjusted and to hold the abutment 44 in engagement with the cam surface 43. Therefore, as the member 42 is rotated about an axis perpendicular to the base 19 the thermostatic element 10 is adjusted in a plane perpendicular to the base 19 whereby the temperature setting of the thermostatic switching mechanism is adjusted.

The base 19 is cut away at 46 and has a slot 47 in the upper end thereof to receive a dial member 48. The dial member 48 extends through the slot 47 so that it is visible from the exterior of the thermostatic switching mechanism. The dial 48 is clamped to the shoulder 41 of the rotatable member 42 by means of a screw 50, and therefore rotation of the dial member 48 causes rotation of the rotatable cam member 42. The dial member 48 and the cam member 42 may be rotated with respect to each other for adjustment purposes by

loosening the screw 50 until the correct adjustment is made and then when the adjusting mechanism is calibrated the screw may again be retightened.

A cover 55 is adapted to enclose the thermostatic switching mechanism and this cover is provided with a plurality of openings 56 to allow passage of air over the thermostatic element 10. Also the cover 55 is provided with a slot 58 through which is passed a portion of the dial 48 so that the indicia 60 on the dial 48 are visible from the exterior when the cover 55 is in place. Cover 55 may also be provided with a marker in the form of a pointer 61 struck up from the cover 55. This pointer 61 cooperates with the indicia 60 of the dial 48 to indiciate the temperature setting of the thermostatic switching mechanism.

By reason of the above construction an extremely accurate thermostatic switching mechanism is provided and yet the structure is extremely compact and only occupies a relatively small space. Although for purposes of illustration I have shown only one form of my invention, other forms thereof may become apparent to those skilled in the art upon reference to the specification and drawing, and therefore this invention is to be limited only by the scope of the appended claims and prior art.

I claim as my invention:

1. In a thermostatic switch, a base member, a substantially U-shaped thermostatic element, means mounting said thermostatic element for movement perpendicularly of said base member, a fixed contact secured to said base member, a contact operated by said U-shaped thermostatic element for engaging said fixed contact upon said element being subjected to a temperature of predetermined value, means for moving said U-shaped thermostatic element for adjusting the value of the temperature at which engagement takes place, said means including a rotatable member mounted at one end of said base member and having a helical cam surface, the axis of rotation of said member being perpendicular to said base member, a dial having indicia formed on the rotatable member and extending out beyond said base member, a cover for the thermostatic switch having an opening in its end through which at least a portion of the dial extends, and a pointer integral with the cover cooperating with the indicia of the dial for indicating the temperature setting of the thermostatic switch.

2. In a thermostatic switch, a base member, mechanism including a thermostatic element, a stationary contact carried by said base member, a movable contact carried by the thermostatic element for engagement with the stationary contact upon changes in temperature affecting the thermostatic element, a rotatable cam mounted at one end of said base member and adapted to be engaged by the mechanism, spring mounting means for the mechanism for holding the mechanism in engagement with the rotatable cam to afford adjustment of the mechanism upon rotation of the cam, a dial having indicia formed on the rotatable cam and extending out beyond the base member, a cover for the thermostatic switch having an opening in one end thereof through which at least a portion of the dial extends, and a pointer integral with the cover cooperating with the indicia of the dial for indicating the temperature setting of the thermostatic switch.

3. In a thermostatic switch, a base member, mechanism including a thermostatic element, a stationary contact secured to the base member, a movable contact carried by the thermostatic element for engagement with the stationary contact upon changes in temperature affecting the thermostatic element, mounting means for the mechanism to cause said movable contact to move toward and away from the base member upon changes in temperature, a member rotatably mounted in a cutaway portion at one end of the base member and having a helical cam surface adapted to be engaged by the mechanism, the axis of rotation of said member being perpendicular to said base member, said mounting means including resilient means for holding the mechanism against the cam surface whereby the mechanism is adjusted in a plane perpendicular to the base member upon rotation of said member, a dial having indicia formed on the rotatable member and extending beyond the base member, a cover for the thermostatic switch having an opening at one end through which at least a portion of the dial extends, and a pointer on the cover cooperating with the indicia of the dial for indicating the temperature setting of the thermostatic switch.

4. In a thermostatic switch, a base member, mechanism including a substantially U-shaped thermostatic element having two substantially parallel legs, means for mounting said mechanism on said base member with the legs of the thermostatic element substantially parallel to the base member and with one leg more remote from the base member than the other, a stationary contact carried by the base member, a movable contact carried by the more remote leg of the thermostatic element to engage and disengage the fixed contact upon changes in temperature affecting the thermostatic element, a member rotatably mounted in a cutaway portion at one end of the base member having a helical cam surface adapted to be engaged by the mechanism, the axis of rotation of the member being perpendicular to the base member, said mounting means including resilient means for holding the mechanism against the cam surface whereby the mechanism is adjusted in a plane perpendicularly to the base member upon rotation of said member, a dial having indicia formed on the rotatable cam and extending beyond the end of the base member, a cover for the thermostatic switch having an opening at one end thereof through which at least a portion of the dial extends, and a pointer formed integrally with the cover cooperating with the indicia of the dial for indicating the temperature setting of the thermostatic switch.

5. In a thermostatic switch, a base member, a generally U-shaped thermostatic element pivoted to the base member at a point intermediate its ends, a first contact carried by said base member, a second contact moved by the thermostatic element for engagement with said first contact upon changes in temperature affecting the thermostatic element, a rotatable cam mounted on said base member and adapted to cooperate with one end of said thermostatic element, and a spring for maintaining the thermostat in cooperative relation with the cam to afford adjustment of the thermostat upon rotation of the cam.

6. In a thermostatic switch, a base member, a bracket, a generally U-shaped thermostatic element attached at a point intermediate its ends to said bracket, said bracket being pivotally mounted on said base, a first contact carried by said base member, a second contact moved by the thermostatic element for engagement with said first contact upon changes in temperature

affecting the thermostatic element, a rotatable cam mounted on said base member and adapted to cooperate with one end of said thermostatic element, and a spring for maintaining the thermostat in cooperative relation with the cam to afford adjustment of the thermostat upon rotation of the cam.

7. In a thermostatic switch, a base member, a generally U-shaped thermostatic element pivoted to the base member at a point intermediate its ends, a first contact moved by said base member, a second contact carried by one end of said thermostatic element for engagement with said first contact upon changes in temperature affecting the thermostatic element, a rotatable cam mounted on said base member and adapted to cooperate with the other end of said thermostatic element, and a spring for maintaining the thermostat in cooperative relation with the cam to afford adjustment of the thermostat upon rotation of the cam.

8. In a thermostatic switch, a base member, a bracket, a generally U-shaped thermostatic element attached at a point intermediate its end to said bracket, said bracket being pivotally mounted on said base, a first contact carried by said base member, a second contact moved by one end of said thermostatic element for engagement with said first contact upon changes in temperature affecting the thermostatic element, a rotatable cam mounted on said base member and adapted to cooperate with the other end of said thermostatic element, and a spring for maintaining the thermostat in cooperative relation with the cam to afford adjustment of the thermostat upon rotation of the cam.

9. In a device of the character described, comprising in combination a base having a hole extending perpendicularly therethrough near one end thereof, a slot through said end of the base extending longitudinally thereof and in communication with said hole, a helical cam rotatably mounted in said hole, a dial in said slot, said dial being connected to said cam whereby the latter may be rotatably adjusted by the former, indicia on said dial, said dial extending through said slot slightly beyond said base whereby said indicia will be visible, a thermostat mounted on said base, a switch operated by said thermostat, said thermostat being adjustable by said cam, a cover for said base, said cover having a hole therein through which a portion of said dial extends, and a pointer on said cover cooperating with the indicia on said dial.

10. In a device of the character described comprising in combination, a base having a hole extending perpendicularly through one end thereof, means comprising a helical cam and dial rotatably mounted in said hole, a cut away portion in said base receiving said dial, indicia on said dial, said dial extending beyond said base, a thermostat mounted on said base, a switch operated by said thermostat, said thermostat being adjustable by said cam, a cover for said base, said cover having an opening through which a portion of said dial extends whereby said indicia is visible, and means on said cover cooperating with the indicia for indicating the temperature value at which said thermostat will operate said switch.

11. In a device of the character described comprising in combination, a base member, stationary switch contact means, an elongated thermostatic element bent transversely at a portion intermediate the ends thereof, means rotatably mounted on said base comprising a cam having cam adjusting means rotatably mounted on said base and below the operating surface of said cam, said adjusting means extending in a plane parallel and adjacent with a face surface of said base to a position beyond an edge surface of said base, means for mounting said thermostatic element for movement thereof with respect to said base and for positioning said thermostatic element with relation to said cam adjusting means comprising, means resiliently biasing said thermostatic element to position one end thereof for movement related to the operation of said cam adjusting means, the other end of said thermostatic element having switch means actuated by said thermostatic element in response to temperature variation for cooperation with said stationary switch means.

LEWIS L. CUNNINGHAM.

CERTIFICATE OF CORRECTION.

Patent No. 2,171,273. August 29, 1939.

LEWIS L. CUNNINGHAM.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, first column, line 11, claim 7, for the word "moved" read carried; line 12, same claim, for "carried" read moved; line 24, claim 8, for "end" read ends; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 14th day of November, A. D. 1939.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)

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