Dec. 12, 1933. E. G. PETERSEN 1,938,929

THERMOSTATIC SWITCH

Filed April 17, 1931

Fig. 1.

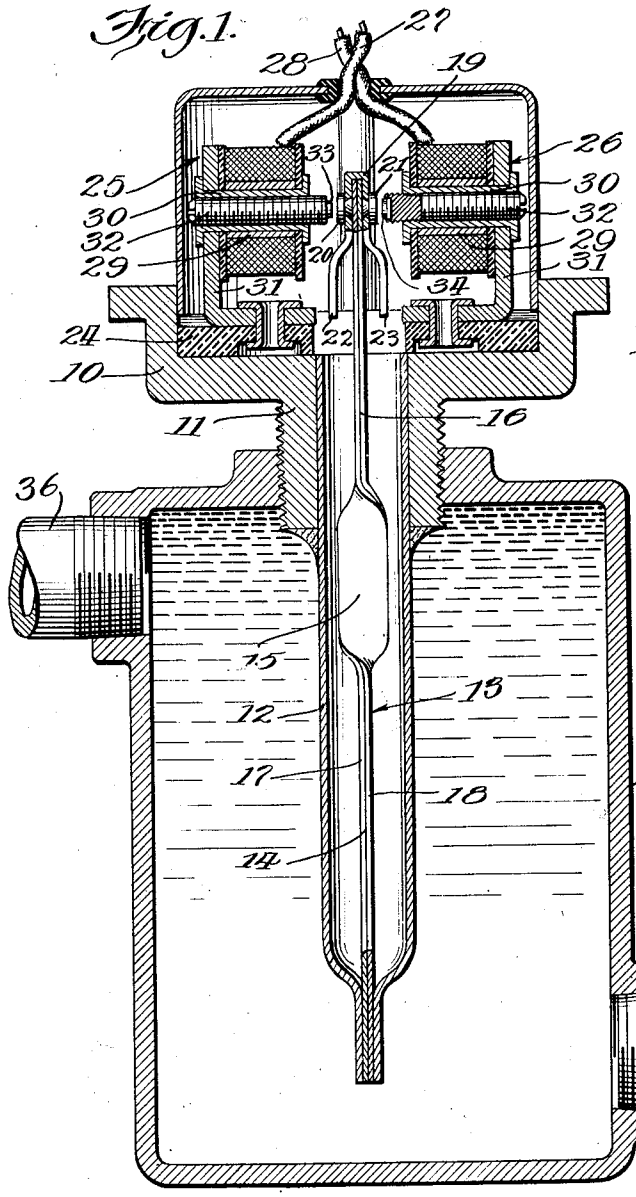
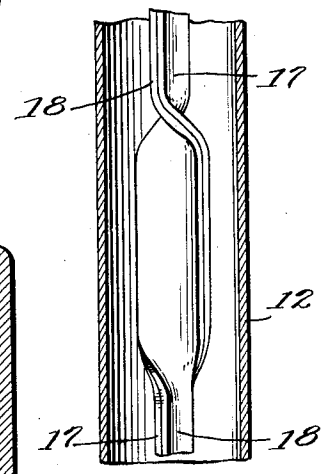


Fig. 2.



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THERMOSTATIC SWITCH

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Application April 17, 1931. Serial No. 530,806

10 Claims. (Cl. 200—138)

This invention relates to thermostatic switches and particularly to switches of the type described and claimed in my copending application Serial No. 513,277, filed February 4, 1931.

One of the objects of the invention is to provide a switch in which localized heat produced in the operation of the switch on the cold side, is employed to make firm contact.

A further object of the invention is to provide a thermostatic strip on which a shoe is mounted in such manner that free flexure is permitted adjacent the shoe.

Other objects, advantages and capabilities will hereinafter appear from the following description of a preferred embodiment of the invention taken in conjunction with the accompanying drawing, in which

Figure 1 is a sectional elevation of a thermostatic switch embodying my invention, mounted in operative position; and

Fig. 2 is a sectional elevational detail of the thermostatic strip, viewed from a different angle.

Referring to the accompanying drawing, the switch comprises a base 10 which is provided on its underside with an externally threaded boss 11. The boss 11 is provided with a bore which receives a tube 12. The tube 12 is soldered or otherwise secured to the boss 11 and its lower end is flattened or crimped to engage a bimetallic thermostatic strip 13. The lower end of the tube 12 is sealed by dipping in solder or in any other suitable material.

A strip 13 projects out of the tube beyond the base 10, and at two adjacent points at an intermediate position in its length, it is bent through 90° upon its longitudinal axis, both bends being in the same direction. The strip 13 consequently comprises a lower major length 14, a short intermediate length 15 which is located at right angles to the length 14, and an upper major length 16, in which the metals 17 and 18 are reversed with respect to the major length 14. If the metal 17 is the metal of greater expansibility, for example brass, and the metal 18 is the metal of lesser expansibility, for example invar, then increase of temperature will cause the length 14 to flex to the right as viewed in Fig. 1, and the length 16 to flex to the left. Owing to the anchorage of the length 14 the outer end of the strip 13 moves to the right. Decrease of temperature causes the length 14 to flex to the left and the length 16 to flex to the right. Owing to the anchorage of the length 14 the outer end of the strip moves to the left. During change of temperature the short intermediate length 15 also flexes and causes the outer end of the strip to move slightly in the direction of its main planes, this movement having a remarkable effect in cleaning and polishing the contact points providing more perfect electrical engagement therebetween and ensuring long and efficient operation of the device with minimum care and attention.

The outer end of the bimetallic strip 13 is provided with an iron shoe 19 which carries contact points 20 and 21 on either side. The shoe 19 may suitably comprise a strip of iron which is bent around the extremity of the bimetallic strip 13 and is secured thereto in any suitable manner. Below the contact points 20 and 21, the ends of the shoe 19 are bent outwardly to provide inwardly directed legs 22 and 23 which are in spaced relation to the strip 13. This construction permits free flexing of the strip 13 adjacent the contact points 20 and 21.

The base 10 is dished to accommodate a sheet of insulating material 24, which is rigidly secured to the base in any suitable manner. The sheet 24 supports electro-magnets 25 and 26, the windings of which are connected to leads 27 and 28 respectively. The other ends of the windings are electrically connected to the cores of the magnets. The cores may suitably comprise iron sleeves 29 upon which the windings are mounted, iron tubular members 30 by means of which the windings are secured to brackets 31 which are mounted on the sheet 24, and central core members 32, which have a threaded connection with the tubular members 30. The central core members 32 of the magnets 25 and 26 respectively carry contact points 33 and 34 which are adapted to cooperate with the contact points 20 and 21 respectively, carried by the strip 13.

The brackets 31 are preferably in the form of angle irons, the lower extremities of which terminate adjacent the central opening in the sheet 24 through which the strip 13 projects. It will readily be understood that when either of the magnets is energized, the shoe 19 is attracted by its poles, which are the inner end of the bracket 31 and the inner end of the core of the magnet winding.

In operation, the switch may be mounted by means of the boss 11, upon a chamber 35, so that the tube 12 extends into the chamber. This chamber is adapted to receive fluid through pipe 36 and deliver same through pipe 37. The switch may, for example, be employed to control the circuits of a motor in the manner described and claimed in my copending application Serial No.

517,907, filed February 24, 1931, although it may obviously be employed for many other purposes. The chamber 35 may accordingly be considered as inserted in the circulatory cooling liquid system of an automatic vehicle, the liquid from the radiator entering by pipe 36 and passing out of pipe 37. When the liquid in the chamber 35 reaches a predetermined temperature, the heat flowing up the strip 13 flexes same towards the electro-magnet 26. As soon as contact between the points 21 and 34 is made, the circuit through lead 28 is grounded, the magnet is energized, and the shoe 19 is attracted to maintain a firm contact until the circuit is broken exteriorly, for example in the manner shown in my aforesaid application Serial No. 517,907. It is to be noted that in normal use the fluid in the chamber 35 is getting warmer and warmer, and since the lower portion 14 of the strip 13 is subject to the highest temperature, a firm contact is ensured.

When the temperature in the chamber 35 decreases, the lower length 14 flexes in the opposite direction bringing the points 20 and 33 into contact so that current flows through lead 27, winding of magnet 25, and strip 13 to ground. The magnet 25 is energized and the shoe 19 is attracted to make a firm contact. In the event that poor contact is made between points 20 and 33, localized heat is produced which is carried by conduction to the upper end of the strip 13. Owing to the reversal of the upper portion 16 of this strip with respect to its lower portion 14, this localized heating of the upper end presses the contacts 20 and 33 together more firmly. Owing to the manner in which the shoe 19 is mounted on the strip 13, free flexure is permitted adjacent the point of application of the localized heat.

Although the invention has been described in connection with the specific details of a preferred embodiment thereof, it must be understood that such details are not intended to be limitative of the invention except insofar as set forth in the accompanying claims.

What I claim as new and desire to secure by Letters Patent, is:

1. A thermostatic switch comprising an elongated element movable with change of temperature, lengths of said element being adapted to move in opposite directions and a length adapted to move transversely relative to said directions during change of temperature.

2. A thermostatic switch comprising an elongated element adapted to bend with change of temperature, means fixedly supporting one end thereof, said element being twisted at an intermediate point so that the ends bend in opposite directions during change of temperature.

3. A thermostatic switch comprising a bimetallic strip bent through 180° on a longitudinal axis at an intermediate point in its length.

4. A thermostatic switch comprising a bimetallic strip bent through 90° in the same direction on a longitudinal axis at adjacent points intermediate its length.

5. A thermostatic switch comprising a bimetallic strip carrying a contact point and a magnetizable shoe, an electro-magnet towards which the strip is adapted to move under decreasing temperature, and a contact point adapted to engage the first said contact point to energize said magnet so that it attracts said shoe, said strip being reversed adjacent said contact points, so that localized heating at said contact points results in a firmer contact.

6. A thermostatic switch comprising a bimetallic strip carrying a contact point, an electro-magnet towards which the strip is adapted to move under decreasing temperature, and a contact point adapted to engage the first said contact point to energize said magnet so that it attracts said strip, said strip being reversed adjacent said contact points, so that localized heating at said contact points results in a firmer contact.

7. A thermostatic switch comprising a bimetallic strip carrying a contact point and a magnetizable shoe, an electro-magnet towards which the strip is adapted to move under decreasing temperature, and a contact point adapted to engage the first said contact point to energize said magnet so that it attracts said shoe, the metals of the bi-metallic strip being arranged, adjacent said contact points, so that localized heating at said contact points results in a firmer contact, said shoe being mounted on the strip to permit free flexure of the strip adjacent said contact points.

8. A thermostatic switch comprising an elongated element movable with change of temperature anchored at one end, said element being constructed so that its free length flexes in the opposite direction to the flexure of the length adjacent its anchored end during change of temperature and its intermediate length flexes at right angles to said direction during change of temperature, a contact point carried by the outer end of the strip and a fixed contact point adapted to be engaged thereby.

9. A thermostatic switch comprising an elongated element adapted to flex with change of temperature, a tube enclosing said element, one end of which is rigidly supported therein, said element being twisted through 180° on a longitudinal axis intermediate its length so that the ends bend in opposite directions, a contact point carried by the outer end of the element, and a fixed contact point adapted to be engaged thereby.

10. A thermostatic switch comprising a bimetallic strip carrying a contact point and a magnetizable shoe at one end, a tube in which the strip is located, the other end of the strip being rigidly mounted therein, an electro-magnet towards which the strip is adapted to move under change of temperature, and a contact point adapted to engage the first said contact point to energize said magnet so that it attracts said shoe, said strip being reversed adjacent said contact points so that localized heating at said contact points results in a firmer contact, and said shoe being mounted on the strip to permit free flexure of the strip adjacent said contact points.

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