Oct. 11, 1966 R. A. ROBIDOUX 3,278,706

ENCAPSULATED THERMOSTATIC SWITCH WITH SHUNT

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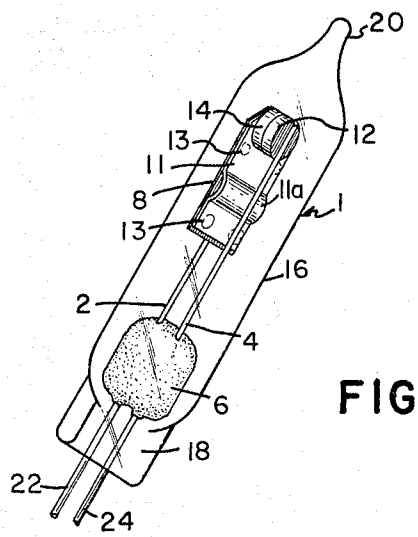


FIG. 1

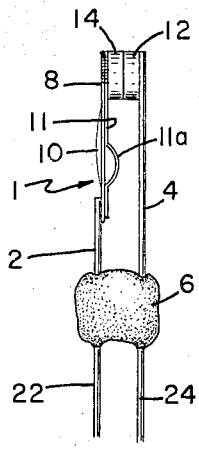


FIG. 2

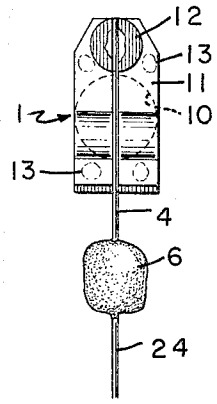


FIG. 3

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3,278,706 ENCAPSULATED THERMOSTATIC SWITCH WITH SHUNT

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2 Claims. (Cl. 200—113)

This invention relates to thermostatic switches and more particularly to those employing temperature sensitive metal plates of the snap action type. The switch is designed and is particularly suited for use in an ambient temperature detecting and/or current sensitive device in connection with the operation of electrical equipment, such as motors for example. Early detection of abnormal ambient temperature conditions in the operation of electrical equipment, such as motors for example, is quite important because the electrical equipment itself is quite expensive and any substantial malfunction thereof usually results in serious interruptions of operations associated therewith.

One switch which has proven satisfactory in meeting the foregoing requirements is shown in the co-pending application of Philip J. Dennis, entitled "Thermostatic Switch," Serial No. 282,786, filed May 23, 1963 and assigned to the same assignee as this invention. That switch comprises a hermetically sealed glass envelope provided with a filling of gas within which the switch assembly is disposed. The switch assembly comprises a glass bead, a pair of posts, a pair of contacts, one movable and the other stationary, and a thermostatic plate having a dimple formed therein. The thermostatic plate is mounted on one of the posts. The movable contact is mounted on the thermostatic plate and is disposed in cooperative relationship with respect to the stationary contact which is mounted on the other post. The posts are embedded in and supported by a glass bead. Circuit breakers of this type are designed to pass the entire current that enters the breaker through the thermostatic plate. This causes a derating of the breaker with respect to temperature when operating in the higher current regions.

Thus a principal object of this invention is to provide an improved thermostatic switch or circuit breaker of the type just described which will not tend to derate with respect to temperature when operated in the higher current regions.

This, and other objects, advantages and features are attained, in accordance with the principles of my invention, by installing a shunt in parallel with the thermostatic plate. A feature of this arrangement is the location of the shunt with respect to the thermostatic plate. It is placed in such a position that the face of the thermostatic plate is protected from electrical arcs when the contacts open.

In the specific embodiment of the invention illustrated in the accompanying drawing:

FIGURE 1 is a perspective view of a thermostatic switch with the envelope within which it is disposed shown in phantom.

FIGURE 2 is an end elevational view of the switch of FIG. 1.

FIGURE 3 is a side elevational view of the switch of FIG. 1.

The switch assembly **1** comprises a pair of Dumet posts **2** and **4** supported by and maintained in spaced relationship with respect to one another by a glass bead **6** through which the posts extend and in which the posts are embedded. A thermostatic plate **8**, having a centrally located dimple **10**, is mounted on post **2**. A nickel-backed silver contact **12** is mounted on post **4**. A shunt **11** is welded at points **13** to the thermostatic plate **8**. A silver cadmium oxide contact **14**, with nickel, steel or copper

steel backing, is welded to the shunt **11** and is normally closed with respect to contact **12**.

As illustrated in FIG. 1, the switch assembly **1** is disposed within a hermetically sealed glass envelope **16** formed from a length of tubing closed at one end by a press **18** and at the other end by an exhaust tip **20**. The Dumet posts **2** and **4** are joined to nickel-plated copper lead-in wires **22** and **24** respectively in the press **18**. In assembling the switch assembly and the envelope, the switch assembly **1**, with lead-in wires **22** and **24** joined to posts **2** and **4** respectively, is inserted into a length of glass tubing and one end of the tubing is heated and pinched to define press **18** which now supports the switch assembly in position within the envelope. The envelope is then evacuated through the other end theerof, provided with a filling of helium-freon, in the proportions of 80 parts helium to 20 parts freon, at a pressure of about 650 mm. of Hg and sealed to define exhaust tip **20**.

Although the nature of the shunt material is not critical, I have found that good results may be obtained with copper, Phosphor bronze or beryllium copper. The shunt **11** overlies the thermostatic plate **8** and is provided with a bend **11***a* which is aligned with and spaced from the dimple **10** so that the shunt will not interfere with or adversely affect the normal operation and movement of the thermostatic plate **8** and particularly the dimple **10** thereof. The position of the shunt is such that it effectively shields the thermostatic plate from arcs which may occur when the breaker opens a high current circuit. Such arcs have a tendency to strike at the contacts and then move along the thermostatic plate, away from the contacts, until their length is too great to support them and they go out. This action tends to heat the thermostatic plate excessively and thus derates the switch. The shunt, however, is not under mechanical stress and is not affected seriously by heating.

The shunt also provides added mechanical stability to the thermostatic plate.

With the shunt, the current through it and the thermostatic plate will divide according to their conductivity, and the combination will be able to handle proportionately heavier current than the thermostatic plate alone can handle. Thus a breaker having a longer initial trip time and an increased current carrying capacity is provided.

What I claim is:

1. A thermostatic switch comprising: a hermetically sealed glass envelope; a first and a second post supported in spaced relationship and substantially parallel to one another within said envelope; a first electrical contact member mounted on said first post; a thermostatic plate, having a centrally located dimple formed therein, mounted on said second post; a shunt mounted on said thermostatic plate, said shunt being provided with a bend therein aligned with said dimple so that the shunt is spaced therefrom; and a second electrical contact member mounted on said shunt, said first and said second electrical contact members being disposed in operative relationship with respect to one another.

2. A thermostatic switch comprising: a hermetically sealed glass envelope; a first and a second post supported in spaced relationship and substantially parallel to one another within said envelope; a first electrical contact member mounted on said first post; a thermostatic plate, having a centrally located dimple formed therein, mounted on said second post; a shunt mounted on said thermostatic plate and being disposed between said thermostatic plate and said first post, said shunt being provided with a bend therein aligned with said dimple so that the shunt is spaced therefrom; and a second electrical contact member mounted on said shunt, said first and said second elec-

trical contact members being disposed in operative relationship with respect to one another.

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