June 16, 1959 V. N. TRAMONTINI 2,891,127

THERMOSTATIC SWITCH ASSEMBLY

Filed Dec. 31, 1956

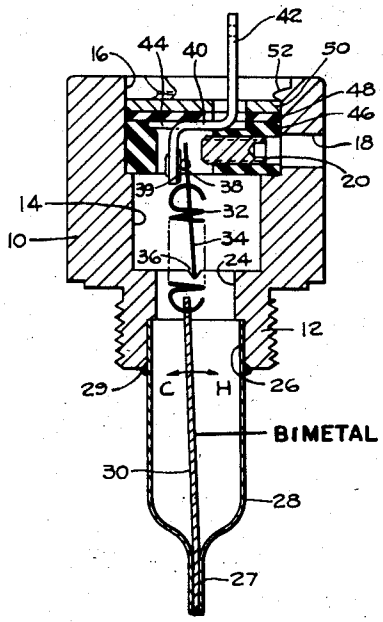


Fig. 1

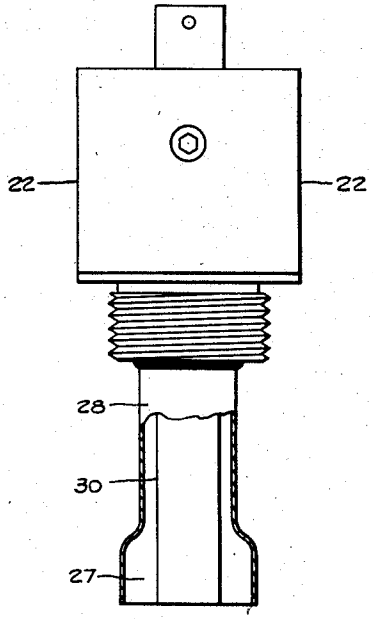


Fig. 2

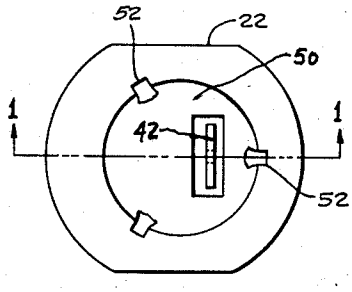


Fig. 3

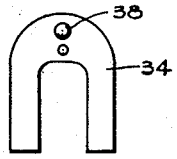


Fig. 4

Inventor
Vernon N. Tramontini

By Ahlberg Kupper & Gradolph

Attys.

United States Patent Office 2,891,127 Patented June 16, 1959

2,891,127

THERMOSTATIC SWITCH ASSEMBLY

Vernon N. Tramontini, Indianapolis, Ind., assignor to Stewart-Warner Corporation, Chicago, Ill., a corporation of Virginia

Application December 31, 1956, Serial No. 631,690

2 Claims. (Cl. 200—138)

The invention relates generally to thermostatic switch assemblies, and particularly to a snap-acting switch mounted in a sealed envelope for immersion in a fluid.

In many uses of thermostatic bimetal operated switches, it is desirable to provide an envelope to seal the thermostatic element and switch from water or other fluid to the temperature of which the thermostat is to be responsive. It is also desirable that it be possible to adjust the thermostatic switch for changing the temperatures at which the switch contacts are opened and at which they will close, and it is desirable that even though the thermostat is located in a sealed envelope, such adjustment may readily be made.

It is therefore an object of the invention to provide a thermostat which is sealed from the atmosphere (to inhibit explosion where explosive gases may be present in the atmosphere), and to seal the switch contacts from the fluid in which the thermostat may be placed, and which may readily be adjusted after assembly is otherwise complete.

A further object is to provide a simple thermostatically operated switch assembly in which the switch is hermetically sealed from the fluid by the temperature of which its operation is controlled.

Other objects will appear from the following description, reference being had to the accompanying drawings, in which:

Fig. 1 is a central vertical section of the switch assembly taken on the line 1—1 of Fig. 3, and shown to an enlarged scale;

Fig. 2 is a fragmentary sectional view, taken from the right as the assembly is viewed in Fig. 1;

Fig. 3 is a top plan view of the assembly; and

Fig. 4 is an elevational view of the movable element of the switch.

Referring to Fig. 1, the thermostatic switch is mounted in a body **10** having a threaded shank **12** by which it may be secured in a container or in means forming a fluid flow passageway of the apparatus with which it is to be used. The body **10** has a bore **14** and an enlarged counterbore **16** at its upper end, and has an opening **18** through which a hollow head set screw **20** and wrench may be inserted. The head **10** may be hexagonal, or, if circular, provided with flats **22** (Fig. 3) for engagement by a wrench.

A smaller diameter bore **24** leads to a slightly larger diameter bore **26**, which is provided for the reception of a metallic envelope **28** which is brazed at **29** to provide a hermetic seal. The envelope **28**, while cylindrical at its upper end, has its lower end flattened to generally fish-tail shape, as shown in Fig. 2. The fish-tail portion **27** clamps about a thermostatic bimetal strip **30** and is welded to these portions. The extremities of these parts are sealed by brazing or the like, so as to make the lower end portion fluid-tight at substantial differential pressures.

The upper end of the bimetal strip **30** is perforated to receive the end of a tension coil spring **32**, the other end

of the spring being hooked into a snapover member **34** which, as shown in Fig. 4, is of generally inverted U-shape, the legs thereof resting in notches **36** formed in the body **10** at the bottom of the bore **14**. This snapover member **34** has a contact **38** riveted thereto for engagement with a flat fixed contact **39** riveted to a strip **40** which has a soldering lug **42** formed integrally therewith. The strip **40** fits in a suitably formed recess **44** in a socket **46** of insulating material which is located in the counterbore **16**.

A washer-like element **48** of insulating material has an opening through which the soldering lug portion **42** extends, and is held in position by a similarly shaped metallic washer **50** which has an opening for the soldering lug **42**, and which is held in position by staked projections **52**.

The hollow head set screw provides an adjustable limit stop for the rightward flexing movement of the snap member **34**, and is adjusted to assure that the member **34** will swing past dead center, as when switch **38**, **39** is open.

In the manufacture of this thermostatic switch assembly, the position which the upper end of the bimetal will assume at a given temperature may be varied by bending the lower end fish-tail portion **27** of the envelope **28** sidewardly, thus effectively repositioning the bimetal thermostat **30** in its relation to the notches **36** at such given temperature. The envelope **28** is made of a metal which is sufficiently ductile so that the adjustment may be made very easily. Such adjustment may be made after the thermostatic switch has been completely assembled.

It will be apparent that as the upper end of the thermostat swings to the right, as the result of being heated to the temperature required, the spring **32** will snap the movable contact **38** away from the fixed contact **39** and cause it to abut against the flat end of the hollow-head set screw **20**, and it will be retained in this position until the thermostatic bimetal swings to the left past the dead center position, whereupon the switch will close with a snap action.

The parts are so proportioned as to cause the switch to open and close at different temperatures. For example, in one application of the thermostatic switch, the contacts were arranged to open at 160° F. and to close at 140° F. The switch assembly is, as previously mentioned, hermetically sealed to prevent entrance of any fluid surrounding the envelope **28**. Likewise, it is well sealed against the possibility of any explosive gas mixture, which might surround the body **10**, being ignited by the spark produced incident to the opening and closing of the switch.

While I have shown and described a preferred embodiment of my invention, it will be apparent that numerous variations and modifications thereof may be made without departing from the underlying principles of the invention. I therefore desire, by the following claims, to include within the scope of the invention all such variations and modifications by which substantially the results of my invention may be obtained through the use of substantially the same or equivalent means.

I claim:

1. A thermostatic switch comprising a switch housing, a metallic tubular envelope hermetically secured to the housing and formed with a collapsed end portion projecting therefrom, a bimetal thermostatic strip positioned within said envelope and having one end secured between the walls of the envelope at the end portion thereof, a snap-over member formed with a pair of legs pivotally supported within and by said housing adjacent the end of said bimetal strip removed from said collapsed end portion, said snap-over member having a contact carrying portion interconnecting said legs, and a tension spring

interconnecting said central portion and the removed end of said bimetal strip, said bimetal strip, spring and snap-over member being in general longitudinal alignment with the removed end of said bimetal strip carrying the connected end of said spring to opposite sides of the pivot support in response to varying temperature conditions.

2. A thermostatic switch comprising a switch housing, a metallic tubular envelope hermetically secured to the housing and formed with a collapsed fish-tail end portion projecting therefrom, a bimetal thermostatic strip positioned within said envelope and having one end secured between the walls of the envelope at the fish-tail portion thereof, a U-shaped snap-over member formed with a pair of legs pivotally supported within and by said housing adjacent the end of said bimetal strip removed from said collapsed end portion, said snap-over member having a central portion interconnecting said legs and supporting a contact, a tension spring interconnecting said central portion and the removed end of said bimetal strip, and a second contact co-operating with the contact carried by said snap-over member, said bimetal strip, spring, and snap-over member being in general longitudinal alignment with the removed end of said bimetal strip carrying the connected end of said spring to opposite sides of the pivot support in response to varying temperature conditions.

References Cited in the file of this patent

UNITED STATES PATENTS

1,938,929	Peterson	Dec. 12, 1933
2,374,967	Alexander	May 1, 1945
2,483,685	Willman	Oct. 4, 1949
2,627,003	Porter	Jan. 27, 1953
2,671,143	Stelzer et al.	Mar. 2, 1954
2,792,474	Dales	May 14, 1957