June 30, 1931. R. H. RUSSELL 1,812,718

THERMOSTAT

Filed Jan. 27, 1928

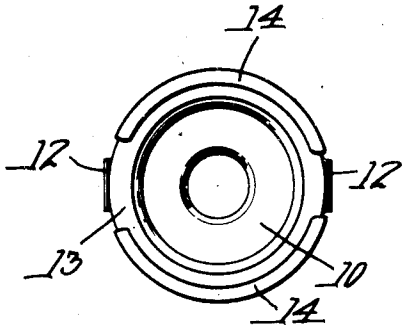


Fig. 1.

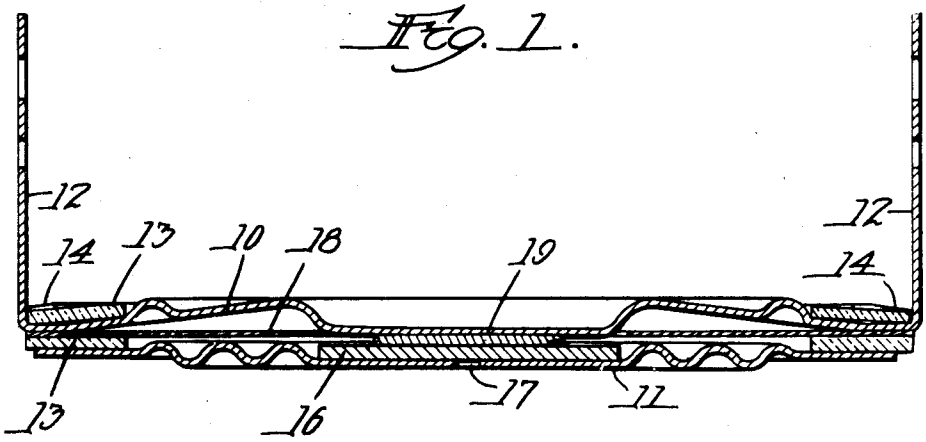


Fig. 2.

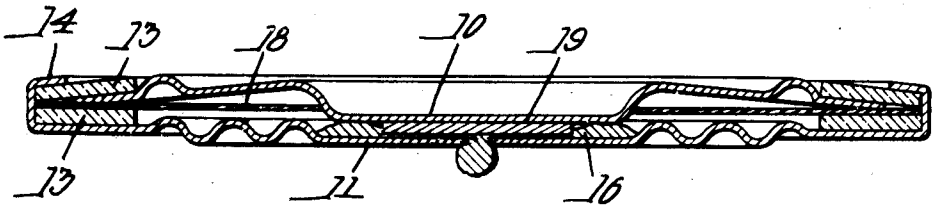


Fig. 3.

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UNITED STATES PATENT OFFICE

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THERMOSTAT

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This invention relates to a thermostat of a well known type in which, when the fusible metal has melted, a globule of metal will be left projecting through a perforation to show that it has to be replaced, and the invention consists in improvements in that type.

The principal objects of the invention are to provide a thermostat of the character above described which will be more sensitive than those that have been manufactured and used heretofore; to provide a fusible metal disc that is adapted to melt and show when the device has been heated to a lower temperature than has been the case heretofore, and to provide an additional element which will be embedded in that metal when it softens and prevent its melting entirely and running out through the small opening provided.

Other objects and advantages will appear hereinafter.

Reference is to be had to the accompanying drawings in which

Fig. 1 is a plan of a thermostat constructed in accordance with this invention;

Fig. 2 is a diametrical cross section of the same on enlarged scale in its normal condition, and

Fig. 3 is a similar view at right angles thereto showing the condition after it has been subjected to heat.

This device is constructed in a similar manner to the above mentioned thermostat and in accordance therewith it has an upper disc 10 and a lower disc 11 of phosphor bronze, each having a circular portion provided with concentric corrugations and flexible to allow for expansion and contraction. Each one of these discs has a radial projection 12 which extends beyond the circular body of the thermostat and is perforated to provide for mounting it and securing it in fixed position and to constitute an electric terminal. At the center, each of these discs has a flat circular portion.

These metal discs are separated from each other by an annular ring 13 of bakelite and on the opposite side of the disc 10 is a similar ring 13 of bakelite of the same size and shape. It will be seen that when the parts are assembled the disc 11 is bent up around the outer edges of these two annular rings of bakelite and secured around the same. The annular flange 14 is also pressed down hard enough to spring the parts into the position indicated so that the two central flat circular areas of the two discs 10 and 11, which register with each other, will normally tend to press against each other with some degree of force.

A flat fusible solder disc 16 is located on the flat center portion of the disc 11. This is not made of the usual solder alloy but is modified by introducing mercury. Enough mercury is mixed with the other metals of the solder to make it melt at a lower temperature than has been customary heretofore. Usually the corresponding discs melt at 162° Fahrenheit but I have compounded my disc so that it is melted at 141°, or 21° lower.

The usual small perforation 17 is located in the center of the disc 11 and the solder disc 16 is in contact with the upper surface of the phosphor bronze disc directly and centrally over this perforation. Above the disc 16 is placed a smaller disc 19 of bakelite or other practically infusible, non-conducting or non-metallic material. This latter disc is borne upon directly by the flat center of the upper disc 10 and the metallic parts are separated from each other electrically by this means. An annular ring of mica 18 is located directly under the upper disc 10 and is used to insulate that from the lower disc at all points except the area of the central flat portion of the large disc. This mica ring has a central perforation preferably as large as the solder disc.

In the use of the device, the flange 14, being bent inwardly to force the whole apparatus into the shape shown in Fig. 2, and the terminals being secured in position and each

one being connected with the opposite side of an electric line, it will be seen that when the fusible disc is heated up to a temperature of 141° Fahrenheit it will start to melt and run out through the perforation. This disc is of such an unstable character when melted, on account of the amount of mercury in it, that it would normally run freely out through this opening. Of course it is one purpose of this thermostat to allow but a relatively small part of the melted solder of the fusible disc to pass through the perforation when the disc is heated up to the melting point, when the small drop of solder thus formed will make it immediately obvious to an inspector that the disc has been heated and is of no further use. It is in connection with this feature that the bakelite disc is used.

As soon as the solder disc melts the two phosphor bronze discs on each side will force the bakelite disc into the body of the solder disc and, leaving only a small thickness of solder between the bakelite and the bottom disc 11, with the usual "button" of solder appearing outside through the perforation, will displace enough solder to force the molten metal upwards and into contact with the upper disc, thereby establishing an electrical connection between the two copper terminals, in the usual way, thus giving the alarm while terminating the utility of the device.

Although I have illustrated and described only one form of the invention I am aware of the fact that modifications can be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claims.

Therefore, I do not wish to be limited in these respects but what I do claim is:—

1. In a thermostat, the combination with a pair of flexible metal discs insulated from each other arranged to exert pressure toward each other so as to come in contact when released, the two discs constituting electric terminals to complete a circuit when in contact, a body of fusible alloy of material thickness in contact with one of said discs and located between the two and an imperforate disc of non-conducting material located between the alloy and the other flexible disc and separating them and of smaller area than the fusible disc, whereby when the alloy melts the insulating material will sink into the body thereof and permit the two flexible discs to be connected through the body of alloy around the edge of the insulating disc.

2. In a thermostat, the combination with a pair of flexible metal discs insulated from each other arranged to exert pressure toward each other so as to come in contact when released, the two discs constituting electric terminals to complete a circuit when in contact, a disc of fusible alloy in contact with one of said discs and located between the two and a disc of non-conducting material located between the alloy disc and the other flexible disc and separating them, and an annular sheet of mica between the two flexible discs for separating them, said mica sheet having a perforation therethrough as large as the alloy disc to allow the alloy to contact with the flexible disc on the other side of the mica sheet when the fusible disc is melted.

In testimony whereof I have hereunto affixed my signature.

ROBERT H. RUSSELL.