No. 888,381. PATENTED MAY 19, 1908.

W. S. ANDREWS & H. J. MAUGER.

ELECTRIC HEATING DEVICE.

APPLICATION FILED SEPT. 18, 1907.

Fig. 1.

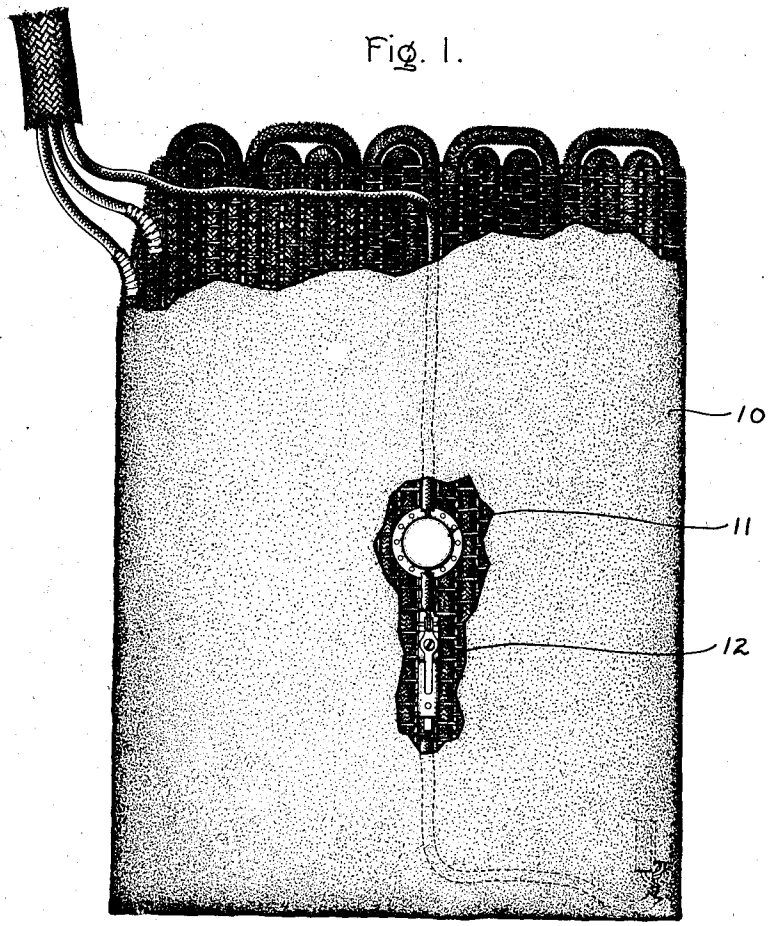


Fig. 2.

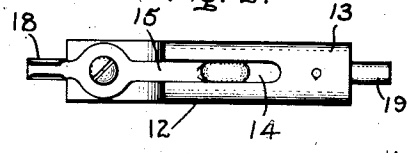


Fig. 3.

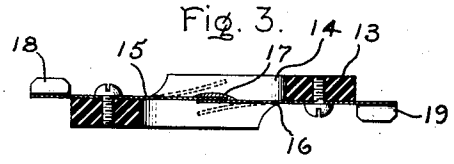
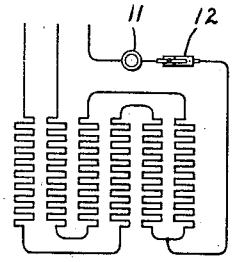


Fig. 4.



Witnesses:

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UNITED STATES PATENT OFFICE.

WILLIAM S. ANDREWS AND HENRY J. MAUGER, OF SCHENECTADY, NEW YORK, ASSIGNORS TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRIC HEATING DEVICE.

No. 888,381. Specification of Letters Patent. Patented May 19, 1908.

Application filed September 18, 1907. Serial No. 393,471.

To all whom it may concern:

Be it known that we, WILLIAM S. ANDREWS and HENRY J. MAUGER, citizens of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Electric Heating Devices, of which the following is a specification.

This invention relates to electric heating devices and has for its object the provision of means whereby the excessive heating of a device of this character is prevented in a reliable, safe and efficient manner.

In the use of electric heaters it is not uncommon to include a switch which will automatically open before a certain destructive temperature is reached and will again close when the temperature is reduced. Thermostat switches of this character are not always reliable in that they are liable to get out of order and fail to open the circuit at the desired temperature. In such devices as heating pads and the like, it is exceedingly important that the safety device be thoroughly reliable as these devices are frequently used in positions where, if overheated, the results are apt to be exceedingly serious.

The object of our invention is to provide means whereby the circuit will positively open upon the occurrence of excessive heating and will not again automatically close. We arrange this form of cut-out in connection with a thermostat which ordinarily will open and close the circuit upon prearranged variations of temperatures. If, however, this switch fails at any time to open the circuit, the cut-out will be sure to operate to permanently open the circuit.

In the accompanying drawing, we have shown, for purposes of illustration, our invention applied to a heating pad.

In these drawings Figure 1 is a plan view of a heating pad equipped with our improvements, certain portions being broken away to show the construction; Fig. 2 is a view of the cut-out; Fig. 3 is a longitudinal section of the same; and Fig. 4 is a diagram of circuits.

Referring to the drawings, 10 is a heating pad which may be of some well known construction, as, for instance, that shown in the patent of Soden, 473,133, April 19, 1892. The particular construction of this heating pad forms no part of our invention, although we prefer to use a form in which our protective devices may be easily embedded or concealed from view and not in any danger of being tampered with. Secured within the heating pad in some way, as, for instance, by sewing it in place, is a thermostatic switch 11. This switch may be of any well-known construction, such, for instance, as that in the patent to Meek, No. 568,451, September 29, 1896. This thermostat is in thermal relation with the heating conductors so that it will be affected by the variations in temperature of the pad itself. This thermostat is in series with the heater and when it opens will interrupt the heating current. In series with this thermostatic switch is a cut-out 12. This cut-out is arranged so as to automatically and permanently open the circuit upon a prearranged rise in temperature and consists of an insulating support 13, having a slotted central portion 14. Secured at opposite ends of the support are spring contact strips 15 and 16, which may be of any spring metal, preferably, a good conducting material, as spring brass, although other materials may be employed if desired. These strips may be arranged by bending or otherwise so that the ends are apart as shown in the dotted lines in Fig. 3. The ends are then brought together and secured in place by fusible metal 17, such as lead, solder or some easily fusible metal. The strips are provided with terminals 18 and 19 for connecting in the inner circuit. This cut-out is also secured within the heating pad so as to be in good thermal relation therewith and responsive to changes of temperature. Ordinarily, when the heating pad becomes excessively hot so as to endanger it, the thermostatic switch will open the circuit and again close it when the temperature is reduced. If, however, this fails to operate, the fusible metal 17 will melt, allowing the strips 15 and 16 to spring apart and open the circuit. This cut-out is, of course, intended only as an emergency device. When the circuit has been opened by this cut-out it will become necessary to open up the heating pad and again solder the strips together.

Various modifications of our invention will, of course, suggest themselves to those skilled in the art without departing from the

spirit of our invention, the scope of which is set forth in the annexed claims.

What we claim as new and desire to secure by Letters Patent of the United States, is,—

1. The combination with an electric heater of a thermostatic switch in circuit therewith and a fusible cut-out in series with said switch and in thermal relation with the heater.

2. The combination with an electric heater of a thermostatic switch in series therewith and a cut-out in series with said switch and in thermal relation with the heater, said cut-out being biased to open position and normally closed by a fusible metal.

3. The combination with an electric heater of a thermostatic switch and a fusible cut-out in series with each other in the heater circuit, said devices being in thermal relation with the heater and operated independently of the amount of current flowing.

4. The combination with an electric heater of a cut-out in series therewith comprising contacts spring pressed toward an open position and normally closed by a fusible metal.

5. The combination with an electric heater of a cut-out in circuit therewith comprising spring contact strips arranged in open position and normally sprung to a closed position and sealed by a fusible metal.

In witness whereof, we have hereunto set our hands this 16th day of September, 1907.

WILLIAM S. ANDREWS.
HENRY J. MAUGER.

Witnesses:
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