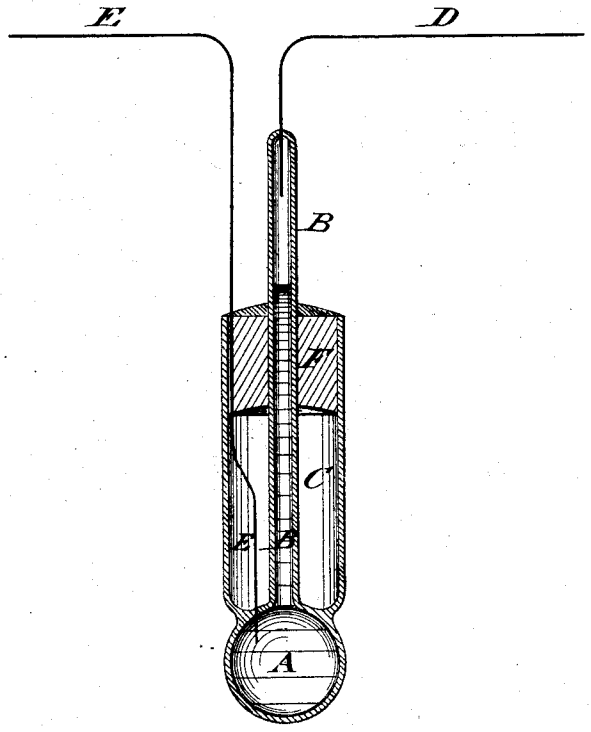
J. H. GUEST.

Electrical Thermostats.

No. 139,953. Patented June 17, 1873.



Witnesses:

Chas. Nida.

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UNITED STATES PATENT OFFICE.

JOHN H. GUEST, OF BROOKLYN, NEW YORK, ASSIGNOR TO AUGUSTA GUEST, OF SAME PLACE.

IMPROVEMENT IN ELECTRICAL THERMOSTATS.

Specification forming part of Letters Patent No. **139,953**, dated June 17, 1873; application filed March 29, 1873.

To all whom it may concern:

Be it known that I, JOHN H. GUEST, of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Fire-Alarm Thermometer, of which the following is a specification:

The figure of the accompanying drawing represents a vertical section of my improved fire-alarm thermometer for buildings and shipping.

The object of this invention is to construct a reliable instrument for closing the circuit of an electric fire-alarm as soon as the temperature of the surrounding air has reached a certain degree of heat.

The alarm-thermometers at present in use have the ends of the wires inserted in the ends of the glass or other vessels containing the mercury, but were insufficient and unreliable in their workings, as, on account of the changes in temperature, and the consequent unequal expansion of the wire and glass, atmospheric air was admitted into the instruments and prevented thereby the desired effect, so that the instruments failed in the object intended. My invention is intended to obviate these insufficiencies by connecting the end of one wire to the mercury of the instrument under a total exclusion of air; and consists of a bulb with an expansion-tube surrounded by an outer vessel, which is closed hermetically by a suitable liquid, cork, and sealing-wax. The end of the wire passes through this outer vessel and the bulb into the mercury, being in continuous contact with it, the action of the instrument being thus not disturbed by the changes of temperature and consequent access of air.

In the drawing, A represents the bulb or vessel containing the mercury; B, the expansion-tube, extending vertically from the bulb A; C, the surrounding vessel or tube, forming one piece with the bulb A and tube B, extending to about two-thirds of the height of the latter, more or less. The conducting-wires D and E connect with a battery and suitable alarm-instrument, the wire D being fused to the top end of the expansion-tube B, and inserted such a distance into it as to correspond with a fixed degree of heat, to which the thermometer is adjusted. The end of wire E passes through the surrounding tube C and bulb A to the mercury, being fused in the glass of the same. The lower part of the tube C is then filled with some suitable liquid—preferably soluble glass—and a cork, F, placed on it after the air between the cork and the liquid has been forced out along the expansion-tube B by slow pressure on the cork. The cork is, for this purpose, perforated to close around expansion-tube B, and of concave shape at the bottom; and is covered and sealed, after the air has escaped to the expansion-tube and surrounding vessel, by suitable cement or sealing-wax, so that no air can penetrate to the solution, and, still less, to the end of wire E, forming the contact with the mercury in bulb A.

Whenever the temperature will rise to the degree to which the thermometer is adjusted the mercury will rise in the expansion-tube, and, coming in contact with the wire therein, establish the circuit and produce the alarm.

The small compass and neat appearance of the instrument allow its application to any part of the buildings or shipping, or to the walls or ceilings, as desired.

All mercurial bulbs heretofore made or patented, either by others or myself, in which a wire has been fused with the glass and in contact with the mercury, have been defective. I have had eight years' practical experience in this business, and feel myself competent to judge correctly on this point.

I do not claim that this instrument will close an electrical circuit or ring a bell any better than a patented mercurial bulb granted to me October 12, 1869, No. 95,796. That is not the object of this improvement. The operation of those put up by me and others is that, after two or three years, the registering-point has become changed—as, for instance, when the bulb was made to close the circuit at 110° heat, it would, to the contrary, close it at a much less or lower point, varying from 5° to 10°. If made to close at 100° it was found to have changed its point to 90° and 95°, &c. How to overcome this defect was the question. Other alarms were then made of metal, which do not register to the point at all; and the idea was conceived to burst a bulb, by which a circuit might be closed. Patent granted to

Augustus Guest, 1870, No. 108,352, and others before and since that time, all on the mercurial plan. Still the registering-point was not perfect.

Now, to make the old plan of fusing the wire with the glass into the mercury prove to be a lasting instrument, I introduce a liquid to surround the wire, and immerse that part of the bulb where the wire is fused in the bulb. This overcomes the trouble.

It will readily be seen that there is an unequal expansion between the metal wire and glass; and, however little that inequality is, it does permit air getting in behind or into the mercurial bulb, and the air being so much more expansive drives the mercury up the tube beyond the first fixed point, and changes the designed point at which the circuit was intended to be closed. By the heat the wire expands, and, after it has contracted, there must be a space left between the wire and the glass, the wire having stretched, and no longer filling the hole in the glass, as it first did.

Now, I claim that surrounding this point with liquid prevents the air getting into the bulb. The air cannot get through the liquid to that point, as there cannot be space around the wire when the temperature increases or decreases.

What I desire to secure by Letters Patent is—

The sealed tube or vessel C, connected with the bulb A, filled with a suitable liquid, and closed to exclude the air from the point of entrance of the wire in the bulb A, substantially as and for the purpose specified.

JOHN H. GUEST.

Witnesses:
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