(No Model.) 2 Sheets—Sheet 1.

H. A. CHASE & H. F. EATON.

THERMOSTAT.

No. 455,813. Patented July 14, 1891.

Fig: 1.

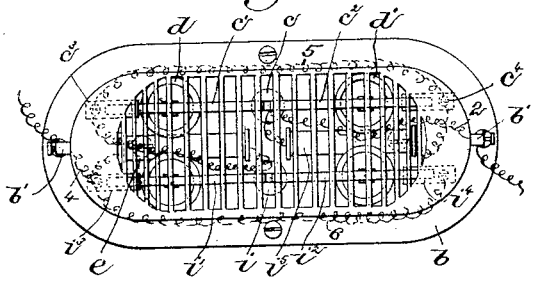


Fig: 2.

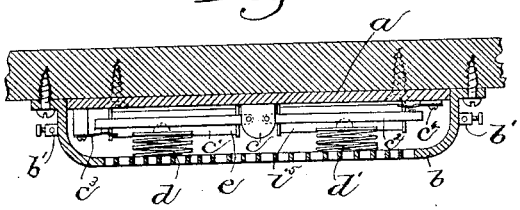
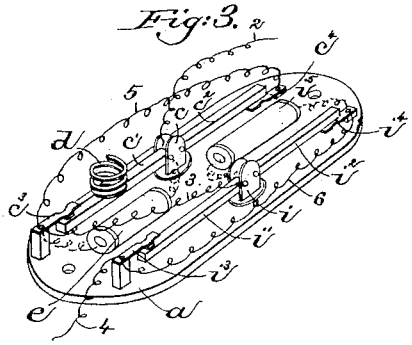


Fig: 3.



Witnesses.
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By Lemby & Gregory Attys.

(No Model.) 2 Sheets—Sheet 2.

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Fig: 4.

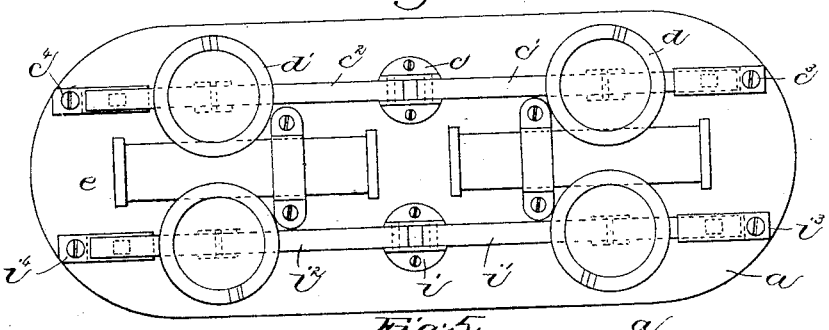


Fig: 5.

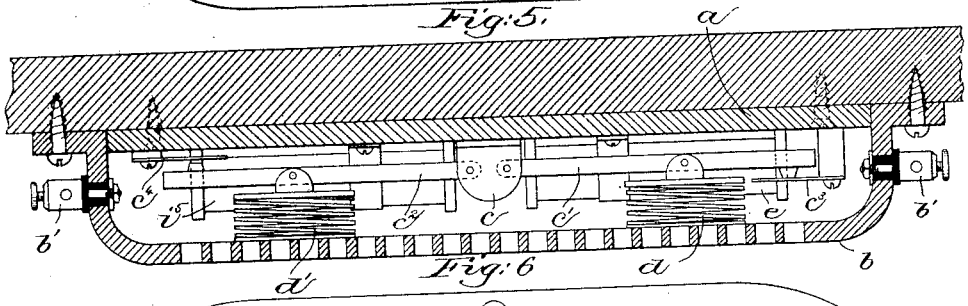


Fig: 6

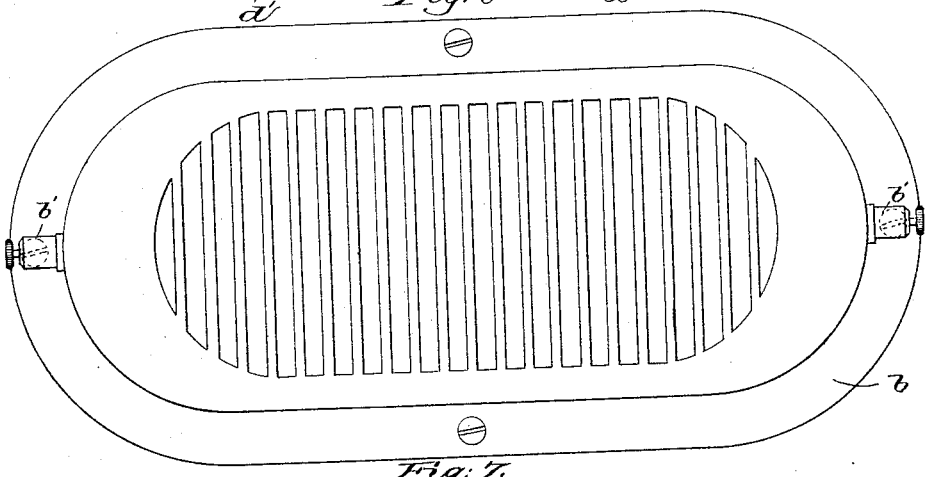
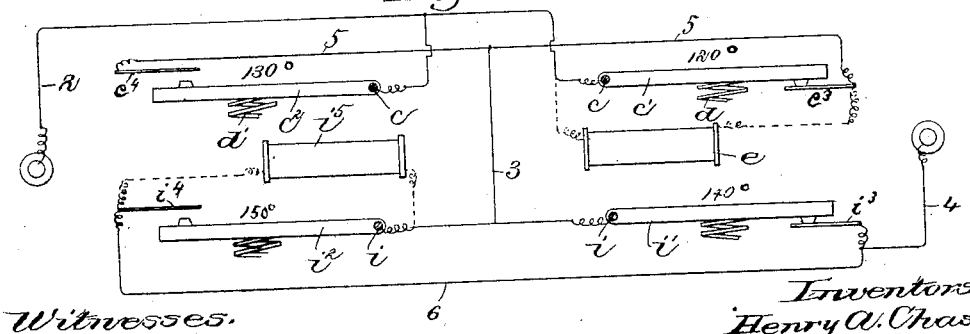


Fig: 7.



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UNITED STATES PATENT OFFICE.

HENRY A. CHASE, OF BOSTON, AND HOWARD F. EATON, OF CAMBRIDGE, MASSACHUSETTS.

THERMOSTAT.

SPECIFICATION forming part of Letters Patent No. 455,813, dated July 14, 1891.

Application filed November 1, 1888. Serial No. 289,732. (No model.)

To all whom it may concern:

Be it known that we, HENRY A. CHASE, of Boston, in the county of Suffolk, and HOWARD F. EATON, of Cambridge, in the county of Middlesex, State of Massachusetts, have invented an Improvement in Thermostats, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention has for its object to improve the construction of thermostats employed for changing the condition of an electric circuit upon an excessive rise in the temperature for use in connection with a fire-alarm register or receiving apparatus.

The thermostat herein described is designed for use in a closed electric circuit and to open the circuit and thereafter close it again one or more times.

In accordance with this invention a lever normally bearing on a suitable contact is employed, and a bimetallic coil or other suitable device sensitive to a rise in temperature is employed to move the said lever. Another lever and co-operating contact are employed, the latter lever normally remaining free from the contact, and a bimetallic coil or other device is employed to move the lever and close the circuit. The coils or equivalent devices are designed to move the levers under different temperatures—as, for instance, to open the circuit at, say, 120° and to close the same at 130°. Another pair of levers and co-operating contacts is also preferably employed, together with coils for each lever, which are designed to again open and close the circuit at, say, 140° and 150°, respectively. Instead of opening the circuit, we preferably employ resistance-coils, which are normally short-circuited or shunted out by the levers, to be thereby introduced by the expansion of the coils or equivalent devices.

Figure 1 shows an under side view of a thermostat embodying this invention; Fig. 2, a longitudinal section of the thermostat shown in Fig. 1; Fig. 3, a perspective view showing the operative parts of the thermostat; Fig. 4, a plan view of the parts of the thermostat shown in Fig. 3; Fig. 5, an enlarged longitudinal section of the thermostat shown in Fig. 1; Fig. 6, a plan view of the shell or case, and Fig. 7 a diagram of the circuit to be referred to.

The plate a, supporting the operating parts, is of any suitable size and shape, and the inclosing case b is perforated and supplied with binding-posts b', the parts being designed to be secured to the ceiling or other desirable place. The binding-posts form the terminals of a circuit, including any usual fire-alarm register or receiving apparatus, (not herein shown,) the same forming no part of this invention.

The frame or standard c is secured to the plate a, to which the levers c' c^2 are pivoted, said levers extending in opposite directions, and one of which, as c', normally resting upon or against the contact c^3 and the other lever c^2 normally lying free from the contact c^4. Bimetallic coils d d' are provided, acting respectively upon the levers c' c^2; but we desire it to be understood that in lieu of the bimetallic coils any other devices sensitive to a rise in temperature may be employed.

It is designed that the coils d d' shall respond or operate under different degrees of temperature—as, for instance, the coil d to expand and move the lever c' at, say, 120°, and the coil d' to expand and move the lever c^2 at, say, 130°. As the levers c' and c^2 are moved, the circuit will be opened and thereafter closed; but we preferably employ a resistance-coil e, which is normally excluded by the lever c', but introduced when the lever c' is moved away from its contact by the coil, so that instead of positively opening the line resistance is added to weaken the current. Another pair of levers i' i^2 is also preferably employed, pivoted to the standard or frame i, the lever i' normally bearing upon the contact i^3 and the lever i^2 normally occupying a position away from the contact i^4, and a resistance-coil i^5 is employed normally shunted out or excluded by the lever i'.

With the parts as described the current passes over the wire 2, lever c', contact c^3, wire 5, wire 3, lever i', contact i^3, and wire 4. (See Figs. 3 and 7.) As the lever c' is moved by the coil d away from the contact c^3, the current will then pass through the resistance-coil e, and when the lever c^2 is moved by its

coil the resistance-coil e will be excluded, the current at such time passing over the wire 2, lever c^2, contact c^4, wire 5, wire 3, lever i', contact i^3, and wire 4. When the lever i' is moved by its coil and its contact with i^3 broken, which coil will be understood as being responsive to a temperature greater than that to which the coils d d' respond, the resistance-coil i^5 will be included, the current passing over the wire 2, lever c^2, contact c^4, wire 5, wire 3, coil i^5, wire 6, and wire 4, and when the lever i^2 is moved by its coil the resistance-coil i^5 will be excluded.

From the foregoing it will be readily understood that the various changes in the current made as described will be transmitted through the circuit, including the register or receiver, (not shown,) to there give the alarm in usual manner.

Thus it will be seen that by the employment of two levers, as c' c^2, co-operating contacts, and operating devices the circuit may be changed and restored, and by the employment of four levers c' c^2 i' i^2 and the co-operating parts the condition of the circuit may be changed and restored twice in succession. The different circuit-changers are made to operate at different temperatures for this reason.

In automatic fire-alarms it has usually been customary to open the circuit at certain temperatures, and thereby sound the alarm; but it often happens that such circuits are opened accidentally by a rise in temperature not due to the breaking out of a fire and the circuit remains open till attended to by hand.

With this thermostat the circuit is closed again and opened by a greater rise in temperature, then closed, and so on, a suitable register recording the same and not making it necessary to have any outside attention to put the apparatus in order for future use.

We do not desire to limit our invention to the precise construction shown, as it may be variously modified and still carry out the essential features of the invention.

We claim—

1. In a thermostat, two independent levers and co-operating contacts, and means, substantially as described, effected by changes in temperature of different degrees, for moving them successively, whereby the normal condition of the circuit may be changed by one lever and thereafter restored by the other lever, combined with an inclosing case or shell, substantially as described.

2. In a thermostat, two independent levers and co-operating contacts, one of the levers normally resting upon or against its contact, combined with two independent co-operating devices, each sensitive to a rise in temperature of a different degree, substantially as described.

3. In a thermostat, two levers and co-operating contacts therefor, and means, substantially as described, for moving them in succession, whereby the condition of the circuit may be changed, combined with a resistance-coil normally shunted out by one of the said levers when resting upon its contact, substantially as described.

4. In a thermostat, the levers c' c^2 and contacts c^3 c^4, and means, substantially as described, for moving the levers, combined with a resistance-coil normally excluded by one of the said levers, which when moved includes the coil, to be again excluded by the movement of the other lever, substantially as described.

5. In a thermostat, four levers and co-operating contacts, two only of which normally rest upon or against the contacts, and means, substantially as described, for moving the levers, combined with resistance-coils normally shunted out by two of the levers, and which when included by said levers are again shunted out by the other two levers, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

HENRY A. CHASE.
HOWARD F. EATON.

Witnesses:
BERNICE J. NOYES,
F. L. EMERY.