(No Model.)

E. S. BRAZELTON & T. J. ZOELLER.

THERMOSTAT

No. 562,353. Patented June 16, 1896.

Fig. 1.

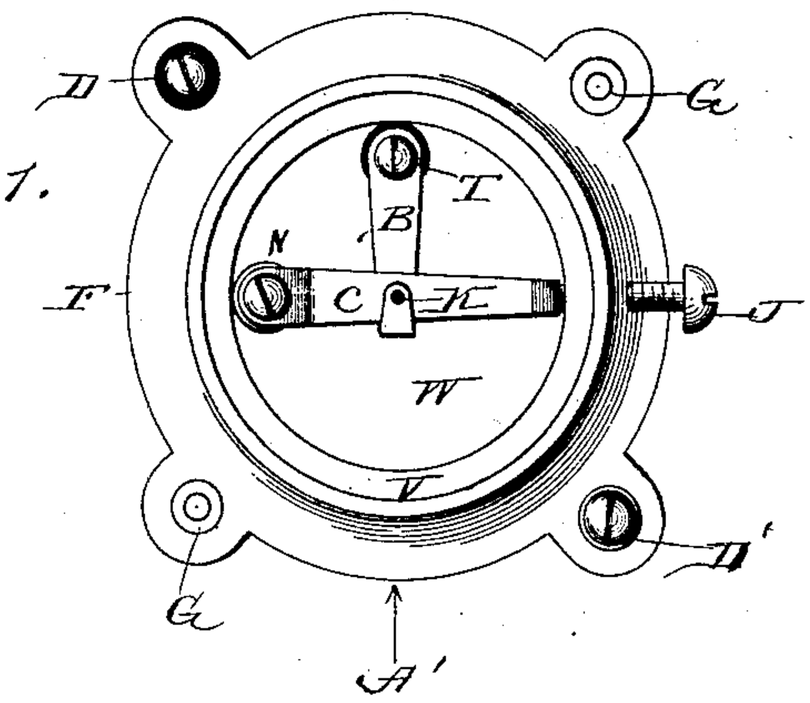


Fig. 2.

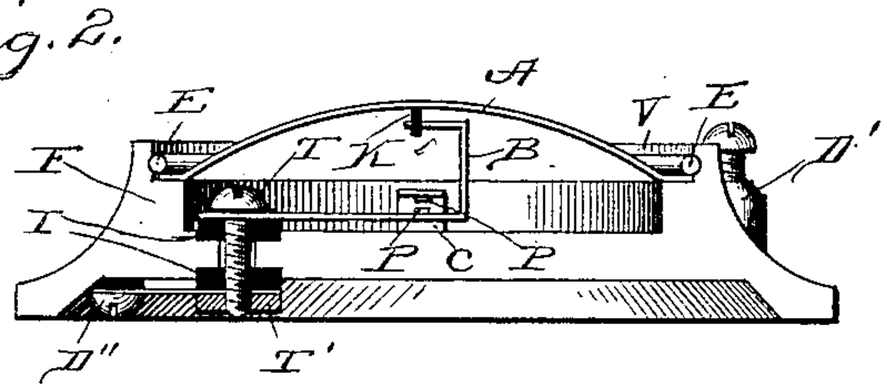
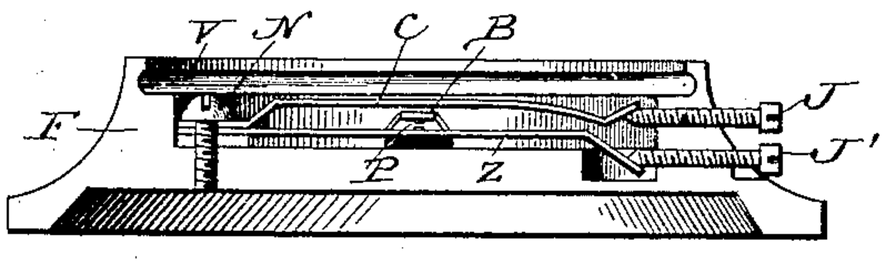


Fig. 3.



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and
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their attys.

UNITED STATES PATENT OFFICE.

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THERMOSTAT.

SPECIFICATION forming part of Letters Patent No. 562,353, dated June 16, 1896.

Application filed May 1, 1895. Serial No. 547,812. (No model.)

To all whom it may concern:

Be it known that we, EDWIN S. BRAZELTON, residing at South Pittsburg, Marion county, and THEODORE J. ZOELLER, residing at Nashville, Davidson county, State of Tennessee, citizens of the United States, have invented certain new and useful Improvements in Thermostats, of which the following is a specification.

Our invention relates to improvements in electrical thermostats.

In the accompanying drawings, which illustrate a practical form of apparatus embodying our invention, Figure 1 is a plan view of the apparatus and its convex aluminium, or zinc, or other metallic expanding medium removed; Fig. 2, a cross-section on the line A′ A′ of Fig. 1, with the addition of the convex piece A and spring-wire ring E; and Fig. 3, a cross-section from F to J of Fig. 1, the convex A and ring E, the better to show the annular groove to receive this ring. Figs. 2 and 3 are on a somewhat larger scale than Fig. 1.

The same letters refer to the same parts in each of the figures.

F (see Fig. 1) represents a frame of suitable material carrying two contact springs or levers B and C, fastened rigidly at T and N, respectively. Spring B is insulated from C and from the frame at T, and carries an insulating-point K, that touches the disk A and is only necessary when frame F is metallic, and it is connected to a binding-post D.

D and D′ are binding-posts to which are connected the terminals of an electric circuit to include an alarm-bell, &c. Either one of them must be insulated, and the insulated one must be connected to the insulated spring B in case the frame F is made of metal. The spring B is sprung upward. Spring C is sprung downward, but is governed by adjusting-screw J.

G and G are screws for fastening the thermostat in any position desired.

A shield or cover, if desired, may be placed over and serve to protect the thin aluminium or zinc expanding medium A, which is a disk slightly convexed upwardly. This thin convex metallic medium has a flange Y, that rests on the bottom of the annular space V in the frame, the circumference of such space coinciding with the perimeter of this medium, so that this perimeter fits snugly in the frame. A stiff wire ring, the end showing at E and E, Fig. 3, is pressed into the annular space V, pressing on flange Y, thereby holding the expanding medium in place. Spring B has a platinum point P on its upper side and an insulating-point K, and has a tendency to spring upward and come in contact with spring C; but this is governed by the convex piece A. (See Fig. 2.) C has also a platinum point P, but on its lower side.

When heat is applied to concave disk A, it simply expands in its place and assumes more convexity, arching higher in the center, and thus allowing spring B to rise and make contact with C.

With our construction the convex or outer side of the expanding medium is exposed to and actuated by the rays of heat, thus allowing springs B and C to come in contact, this convex medium also serving to shield the contacts on levers or springs which it covers. Spring C has normally a tendency to spring downward, but it is restrained by the adjusting-screw J, which has a cone-point to bear against the incline at the end of spring C. By turning this screw inward it raises C from B more and more, thereby obviously requiring higher temperature before they can come in contact.

The arrangement of the contact spring-levers, it will be seen, is such as will cause spring B to follow the piece A to an adjustable point of electrical contact against C, and whereby it will operate in any position. We prefer to make the piece A of thin aluminium for the reason that its coefficient of expansion is high, and because it is a good conductor of heat, giving rapidity of action, and also because it does not deteriorate. The edge of this piece A, abutting as it does against the wall of the recess or space in which it is lodged in the frame, precludes it from spreading or slipping laterally in any direction.

The carrying of the temperature many degrees above or below the set or indicating

point does not alter the adjustment of the same.

Spring B is rigidly held at one end by screw T, which passes through insulating-washers I into nut T′.

Screw T connects with the binding-post by a wire from nut T′ to screw D″.

Our apparatus, it will now be seen, may either be applied to an alarm system, substantially as in the application of E. S. Brazelton, Serial No. 532,565, for indicating a fire in buildings in which annunciators having a push-button are used, instead of using the customary heat-destructible links, or it may be used as a distinct thermostat system in itself.

By attaching a wire to each of the contact-poles D and D′ and extending these wires one to each contact-spring of the push-button in connection with an annunciator the circuit would be closed by expansion of the thermostat by heat, thus producing the same result as by pushing the button.

A supplementary spring Z (shown only in Fig. 3) may, if desired, be placed below spring B, its terminal inclining downward and provided with an adjusting-screw J′, so that it may indicate a fall in temperature, and this is desirable to have in a sick-room.

In practice the convexity of the expanding medium A is much less than shown in sketch Fig. 2.

The frame F is made of cast-iron, and is so made principally to withstand rough usage, and as the greater mass of iron is exceedingly slower in absorbing heat than the thin aluminium, and therefore much slower in expanding, the combination makes a cheap and reliable instrument. Where it is necessary for a more accurate instrument, the frame F is to be made of brown glazed pottery material.

Where it is necessary to indicate temperature only when it goes below a normal point, spring B should be placed over C, so that the contraction of expanding medium A will compress B against C.

It will be noticed that the construction of this thermostat is such that when the temperature is raised much above the point set for it to indicate, and when allowed to cool off again, the thermostat will be found to return to its original condition and not in any way alter its adjustment. This point we make as distinguishing from any other instruments of this character known to us.

Our invention gives reliability of action, and allows of an indefinite number of times of testing the thermostat without changing the predetermined point at which the instrument is set to indicate.

We are aware that fusible solder has been used, which must be melted off before an alarm can be given, and that in such case resoldering is necessary before the device can be used again. We are also aware that the rapid expansion of air in a closed chamber has been utilized to break an electric circuit, and that volatile chemicals confined in chambers of metal have been used to cause electric contacts. We neither employ nor use any such means.

It will be observed that our invention does not have nor depend for its action upon any chamber or vessel filled with confined air, but that it is actuated by the outer air operating upon the convex outer side of the diaphragm.

We claim—

1. In a thermostat, the frame F having an annular groove V, and a clamping-ring E, holding an expanding diaphragm that controls the movement of a platinum-pointed contact-spring B, in combination with a cooperating contact, as and in the manner herein set forth.

2. In a thermostat, in combination, a frame having an annular groove, a section of a hollow sphere of thin metal having its perimeter flanged as set forth, a spring-ring whereby it may be firmly clamped in place in such frame, and coöperating contact-pieces, all substantially as and for the purposes set forth.

3. In combination with the frame, the arched disk A held thereon as described, the contact spring-lever B, contacting with the concave side of the disk, the spring-lever C, sprung downward and adapted to be lifted by lever B, the adjusting-screw J, fastening-screw T, screw D″, a wire connecting T with D″, and the binding-posts D D′, the combination being and operating substantially as and for the purposes set forth.

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