No. 682,661. Patented Sept. 17, 1901.

# T. J. ZOELLER.

## ELECTRICAL THERMOSTAT.

(Application filed Dec. 14, 1900.)

(No Model.)

Fig. 1

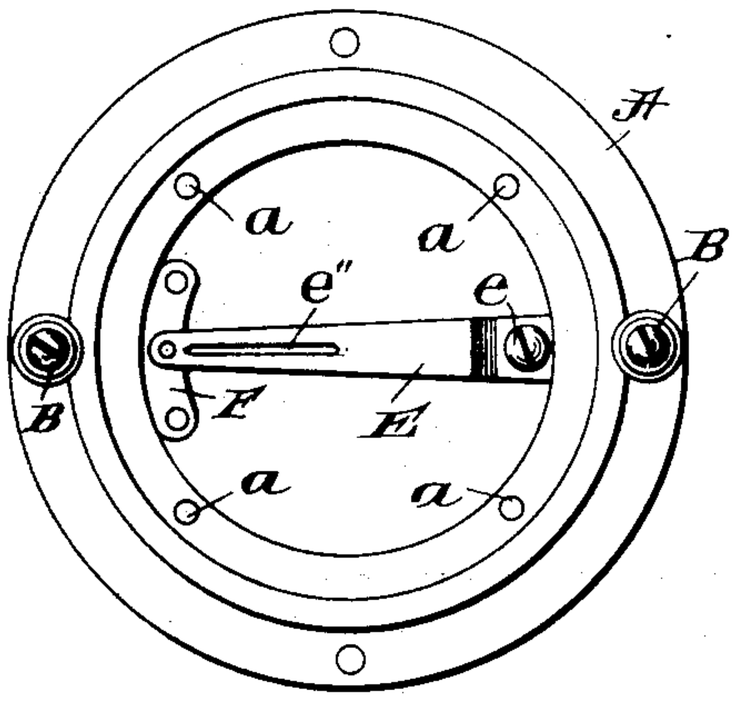



Fig. 2.

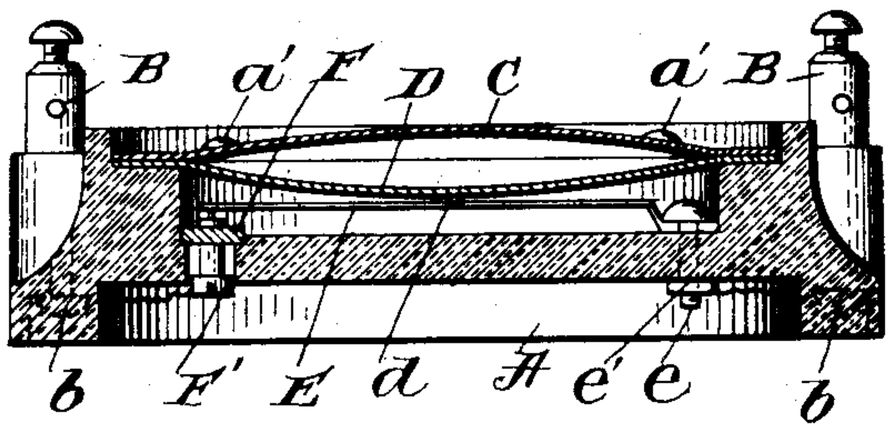



Fig. 3.

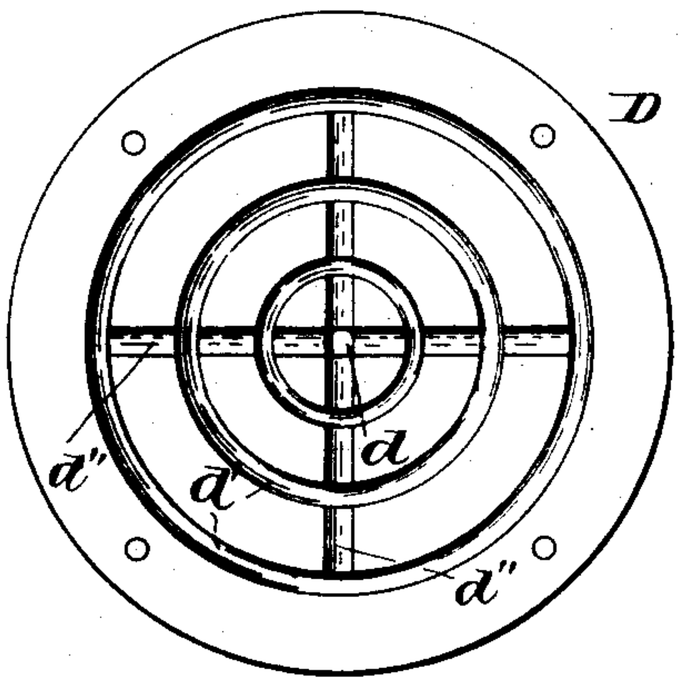
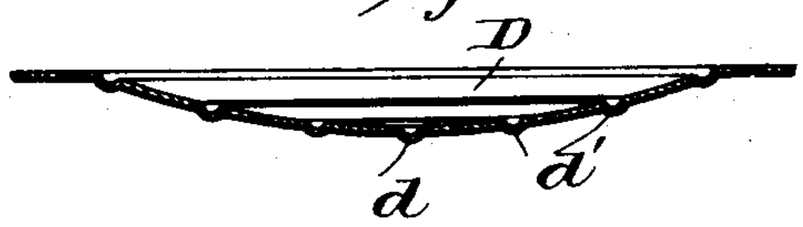



Fig. 4.




Witnesses

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# UNITED STATES PATENT OFFICE.

THEODORE J. ZOELLER, OF NASHVILLE, TENNESSEE, ASSIGNOR TO THE STANDARD AUTOMATIC FIRE ALARM COMPANY, OF HUNTSVILLE, ALABAMA.

## ELECTRICAL THERMOSTAT.

SPECIFICATION forming part of Letters Patent No. 682,661, dated September 17, 1901.

Application filed December 14, 1900. Serial No. 39,890. (No model.)

*To all whom it may concern:*

Be it known that I, THEODORE J. ZOELLER, a citizen of the United States, residing at Nashville, in the county of Davidson and State of Tennessee, have invented certain new and useful Improvements in Electrical Thermostats; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has relation to electrical thermostats; and it consists in the novel construction and arrangement of its parts, as hereinafter described.

The object of my invention is to provide an electrical thermostat the electrical contact of which is so arranged with relation to the mechanical adjustment that great accuracy in adjusting it to the given conditions of temperature is obtained with slight trouble. This is due to multiplying the motion of the contact-point, as will be hereinafter shown.

The further object of my invention is to provide such a thermostat with a flexible lever or spring carrying one of the contacts having a stable means of adjustment.

The further object of my invention is to provide such a thermostat with an exceedingly-thin metallic disk, preferably of aluminium, as an expanding medium, which gives great sensitiveness and rapidity of action. The method of stamping or forming this disk with cencentric or radially-extending corrugations permits the use of much thinner metal in its construction than could otherwise be used.

In the accompanying drawings, Figure 1 is a plan view of the device with its convex protection-disk and the concave metallic expanding disk removed to show the contact-spring E and plate F. Fig. 2 is a transverse sectional view of the device, showing the convexed disk C, which is perforated and acts as a guard to the concaved metallic expanding disk D, in position. Fig. 3 is a plan view of the concaved metallic disk. Fig. 4 is a sectional view of the concaved metallic expanding disk.

The circular base A is made of porcelain or any other suitable material, upon which is securely mounted the several parts.

E is the spring or lever firmly held by the screw *e* at one end and free to move at the other, at which point it carries a platinum contact. When the spring E is made of sheet metal, a rib or groove *e''* is struck in the free end to stiffen it, whereas the other portion is very pliable and is sprung so as to throw the free end up away from the plate F when the convexed disk D rises or is removed. The plate F is also bolted to the base and has a central hole threaded to receive a platinum-pointed contact-screw F'. (See Fig. 2.)

B B are binding-posts for connecting the circuit-wire, and they are in metallic contact, one with the spring E and the other with the plate F and contact-screw F'. The four perforations shown at *a* are for binding down the expanding disk D and its protecting-disk C. (Not shown, except in section.)

As shown in Fig. 2, the disks D and C fit snugly in the channel of the base and are held down firmly by the screws *a'*. The spring E is shown as being in contact with the screw F', so that an electric current can pass from the binding-post and screw *b* (shown in dotted lines) along a wire to the plate F and screw F', along the spring E to the screw *e*, and along a wire under the nut *e'*, connecting a screw-holding post B. It will readily be seen that when the disk D shall rise at its center, due to contraction, the spring E will follow, the normal tendency being upward against the point *d* at the center of the disk. By this construction and movement of spring the electric circuit would be opened, and when the heat is applied to the disk D it expands and, due to the concavity, it drives its center down, carrying the spring E again in contact with the point on screw F', and should the heat be increased the continued expansion of the disk would not be interfered with, as the flexible part of the spring E would give away to the disk and not distort it. If the spring E did so operate, it would throw the disk out of adjustment and the next contact would not register the same degree as before.

The method of constructing the expanding medium of very thin metal and still retain rigidity enough to maintain its form under practical operation is shown at Fig. 3, where it will be seen that the concentric corrugations *d'* are pressed into the disk during the

process of making it concave. Likewise radial corrugations may be formed instead of concentric ones, if desired, giving the same good results.

In Fig. 4 it will be seen that the disk D is provided at its center with a point *d*, which bears against and controls the movement of the spring E. In place of the point *d* one could be raised on the spring E, if found preferable. It will thus be seen that any movement of the disk D is imparted to the spring E and that the free end of said spring will have about twice the travel of the center of the disk. This increase in the stroke of the contact-points allows great accuracy in adjusting the thermostat to any predetermined degree of heat.

This device is especially adapted to use on open-circuit work, or it may be employed on open or closed circuits under proper condition.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

A thermostat consisting of a base, a convexed disk and a concaved disk meeting at their edges and being secured to the base, said disks being of light dimensions and concaved and convexed on like arcs, a spring-lever mounted on the base behind the disks and having near its free end a stiffening-rib, said lever extending diametrically with relation to the disks, the inner disk coming in contact with the lever at an intermediate point in combination with coöperating contacts.

In testimony whereof I affix my signature in presence of two witnesses.

THEODORE J. ZOELLER.

Witnesses:

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W. A. BRUNSON.