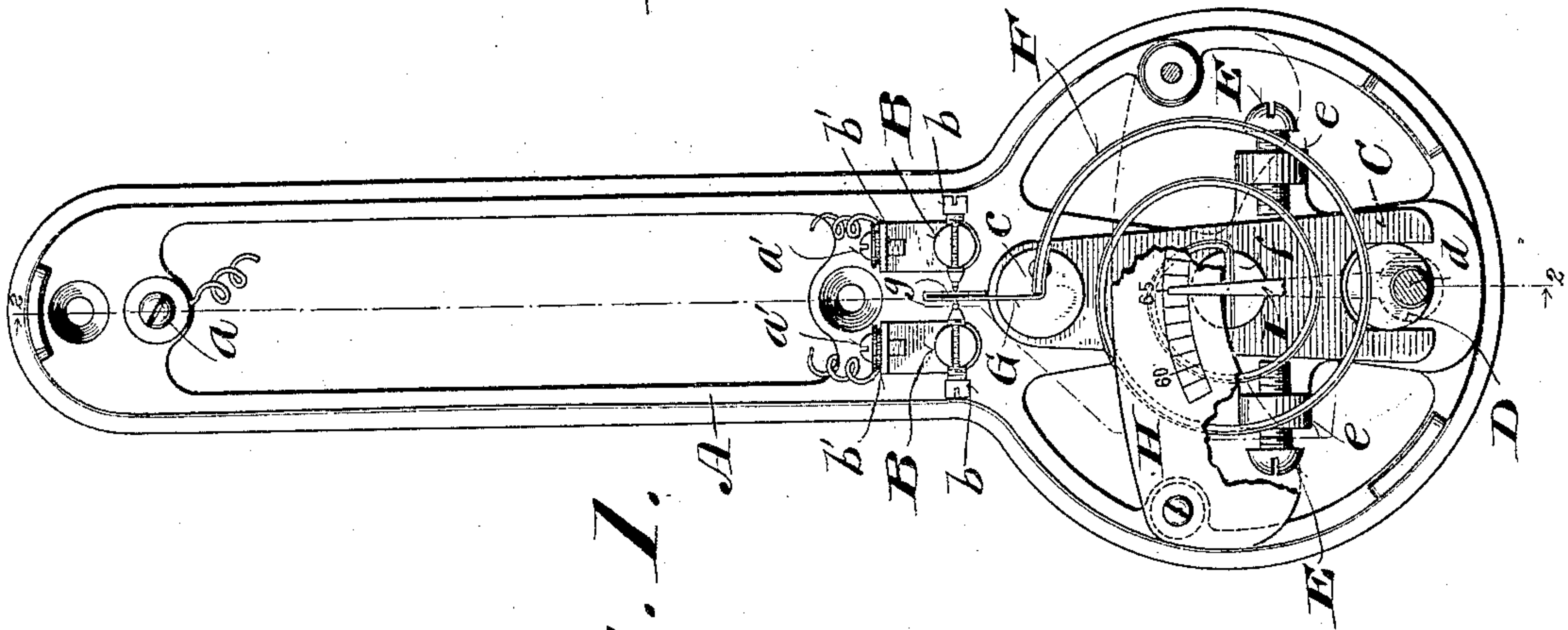
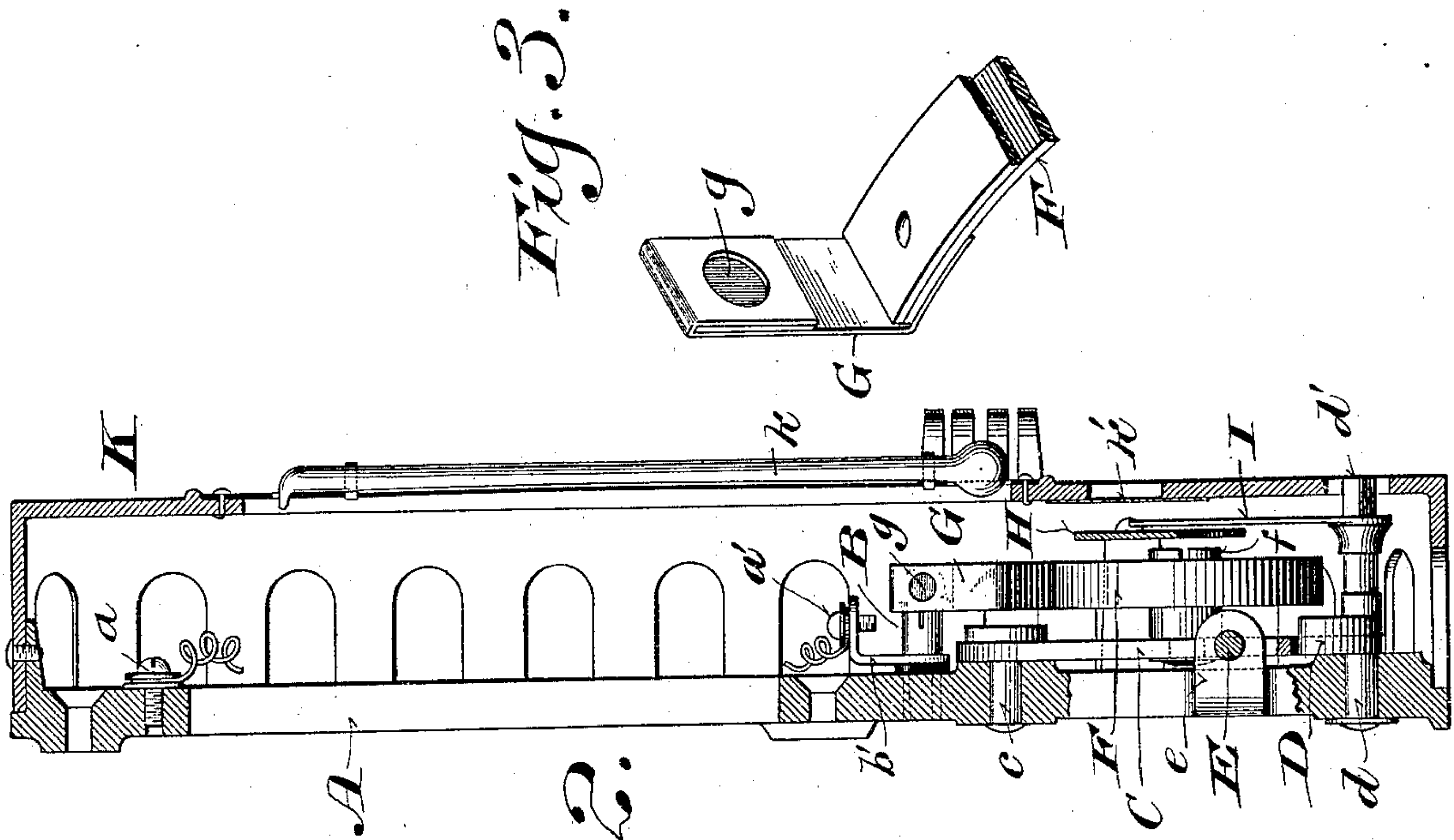


(No Model.)

W. S. JOHNSON.
THERMOSTAT.

No. 557,272.

Patented Mar. 31, 1896.



Witnesses
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UNITED STATES PATENT OFFICE.

WARREN S. JOHNSON, OF MILWAUKEE, WISCONSIN.

THERMOSTAT.

SPECIFICATION forming part of Letters Patent No. 557,272, dated March 31, 1896.

Application filed March 24, 1894. Serial No. 504,930. (No model.)

To all whom it may concern:

Be it known that I, WARREN S. JOHNSON, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Thermostats; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to that class of thermostats which are designed to automatically control electric circuits and to be operated by change of temperature. Its main objects are to facilitate the adjustment of the contacts and generally to improve the construction and operation of instruments of this class.

It consists of certain novel features in the construction and arrangement of component parts of the device, hereinafter particularly described, and pointed out in the claims.

In the accompanying drawings like letters designate the same parts in the several figures.

Figure 1 is a front elevation of a thermostat, the cover being removed and a portion of the scale broken away. Fig. 2 is a vertical section of the complete thermostat, including the cover, on the line 2 2, Fig. 1; and Fig. 3 is a perspective view, on an enlarged scale, of the contact-piece with which the expansion-strip is provided.

A designates the base, which is made of any suitable metal and is provided with binding-screws *a* and *a'* *a'* for the attachment of the wires of the electric circuits in which the thermostat is to be placed.

b b are platinum-pointed contact-screws adjustably held with their points opposite each other in posts B B pivoted in the metal base A and insulated therefrom, as shown in Fig. 2. They are electrically connected with the binding-screws *a'* *a'* by metallic angle-plates *b' b'* mounted upon said posts and with them insulated from the base.

C is a lever which is fulcrumed at one end adjacent to the contact-screws *b b* upon a pin *c* secured in the base and is forked at its other and free end. D is a cam or eccentric accurately fitted between the arms of the forked end of said lever and provided with a spindle

d, which is journaled in the base and formed at its front end with a key-head *d'*, which is exposed through an opening formed in the cover, as shown in Fig. 2. The base is formed on opposite sides of said lever with ears *e e*, in which are threaded, in line with each other, screws E E constituting adjustable stops for limiting the movement of said lever in both directions or locking it in any desired position.

F is an expansion-strip composed of two different metals or materials having different coefficients of expansion. For the sake of compactness it is preferably coiled into a flat spiral, as shown in Fig. 1. It is inserted at one end in a slotted post *f* pivotally secured in the lever C, and is provided at its opposite free end between the contact-screws *b b* with a contact-piece consisting of a thin plate *g*, of platinum or other suitable non-corrosive conducting material, folded into and held between the folds of a metal strip G, and exposed on both sides through an opening made through both folds of said strip, as shown in Fig. 3. By this means a single piece of platinum is made to operate as a contact-piece in connection with both of the contact-screws *b b*, a saving of expensive material is effected, the construction of the device is simplified and its operation rendered certain and reliable by avoiding the use of solder, the lead in which attacks the platinum.

By means of the post *f*, which is made to turn hard in the lever C, the contact-piece *g*, which is carried by the free end of the expansion-strip, may be readily adjusted approximately to its proper position between the contact-screws *b b* and relative to said lever, the exact permanent adjustment of the thermostat being made by turning the contact-screws *b b* in or out of the posts B B in which they are threaded.

H is a graduated scale attached to the base over the expansion-strip and graduated to designate the degrees of temperature at which the contact-piece of the expansion-strip is adjusted and set to engage with one of the contact-screws *b*.

I is an index-hand mounted upon the spindle *d* of cam D and projecting at its free end over or into close proximity with said scale, so as to indicate thereon the degree of temperature at which the instrument is set to close or open an electric circuit.

K designates the cover of the instrument,

constructed to inclose and prevent ready or unauthorized access to the electrical connections, contacts, and adjusting devices hereinbefore mentioned. It is provided with a thermometer *k* in the usual manner for the purpose of verifying the operation of the thermostat, and has a glass or mica closed opening *k'*, through which the graduated portion of the scale and the adjacent end of the index-hand are exposed to view.

It will be observed that the movable contact-piece *g*, carried by the free end of the expansion-strip, is located close to the fulcrum of lever *C*, while the cam *D*, by means of which the thermostat is adjusted to close or open a circuit at different degrees of temperature, is placed at a much greater distance from said fulcrum. By this arrangement a considerable movement of the cam is caused to produce a still greater movement of the free end of the index-hand over the scale and but a comparatively slight movement of said contact-piece, which can thus be readily and accurately set to close or open the circuit at any desired degree of temperature or within very narrow limits of variation.

I do not wish to be understood as limiting myself to the spiral form of the expansion-strip herein shown and described, as my improvements are applicable to a straight or other forms as well. In short, various changes in the minor details of construction and arrangement of parts may be made within the intended scope of my invention.

I claim—

1. In a thermostat the combination with a suitable base provided with opposite contact-points, of a lever fulcrumed to said base, an expansion-strip attached at one end to said lever at a distance from its fulcrum and having a contact-piece at its free end between said points and close to the fulcrum of said lever and means of turning said lever, engaging it at a greater distance from its fulcrum than the contacts, substantially as and for the purposes set forth.

2. In a thermostat the combination with a suitable base provided with opposite contact-points, of a forked lever fulcrumed to said base, an expansion-strip attached at one end to said lever and having at its free end a contact-piece between said points and a cam or eccentric pivoted to said base and engaging the fork of said lever, substantially as and for the purposes set forth.

3. In a thermostat the combination with a suitable base provided with opposite contact-points, a lever fulcrumed to said base, an expansion-strip attached at one end to said lever at a distance from its fulcrum and provided at its free end with a contact-piece between said points, and close to the fulcrum of said lever, a cam or eccentric arranged to turn said lever in either direction, and engaging it at a greater distance from its fulcrum than the contacts, an index connected with said

cam and a graduated scale in proximity therewith to indicate the temperature at which the instrument is set to close or open an electric circuit, substantially as and for the purposes set forth.

4. In a thermostat the combination with a suitable base provided with a cover and with opposite contact-points, a lever fulcrumed to said base, an expansion-strip attached at one end to said lever and provided at its free end with a contact-piece between said points, a cam or eccentric pivoted to said base in engagement with said lever and having a stem provided with a key-head exposed through an opening in the cover, a graduated scale and an index mounted upon the stem of said cam or eccentric and projecting into proximity with the scale so as to indicate thereon the degree of temperature at which the instrument is set to close or open an electric circuit, substantially as and for the purposes set forth.

5. In a thermostat, the combination with a suitable base provided with opposing contact-points, of a lever fulcrumed to said base so as to be moved in the direction of a line connecting said points, an expansion-strip pivotally attached at one end to said lever and provided at its free end with a contact-piece between said points, said expansion-strip being coiled or bent so as to shorten the distance between its contact-piece and its attachment to said lever, and means of turning said lever, engaging it at a greater distance from its fulcrum than the distance of said fulcrum from the contact-piece of the expansion-strip, substantially as and for the purposes set forth.

6. In a thermostat, the combination with a suitable base provided with opposing contact-points, of a lever fulcrumed to said base, adjustable stops on opposite sides of said lever, an expansion-strip attached at one end to said lever and provided at its free end with a contact-piece between said points, said expansion-strip being coiled or bent so as to shorten the distance between its contact-piece and its attachment to said lever, and means of turning said lever, engaging it at a greater distance from its fulcrum than the distance of said fulcrum from the contact-piece of the expansion-strip, substantially as and for the purposes set forth.

7. In a thermostat the combination of two opposite contact-points and an expansion-strip provided between said points with a contact-piece consisting of a plate of non-corrosive material folded into and held by a metal strip and exposed on each side through an opening made in the folds of said strip, substantially as and for the purposes set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

WARREN S. JOHNSON.

Witnesses:

E. B. HENIKA,
CHAS. L. GOSS.