(No Model.)

G. F. BULEN.

THERMOSTAT.

No. 352,442. Patented Nov. 9, 1886.

Fig. 4.

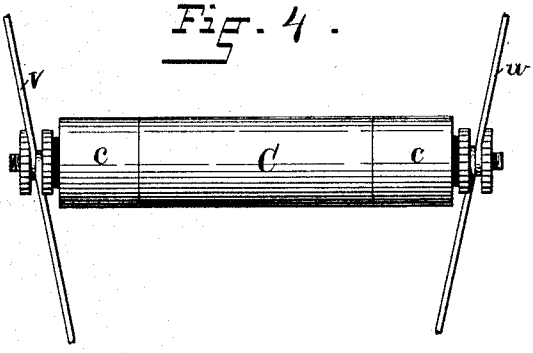


Fig. 3.

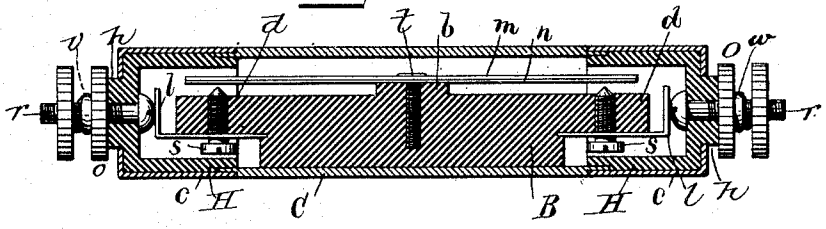


Fig. 2.

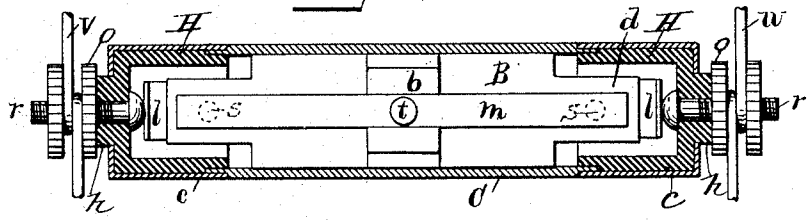
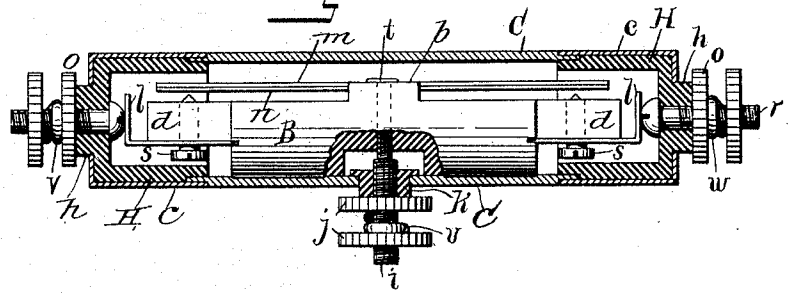


Fig. 1.



WITNESSES:

Willis Fowler,

Dr. F. Bligh.

INVENTOR.

George F. Bulen

by Joseph A. Miller & Co

Attys

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

GEORGE F. BULEN, OF NEW YORK, N. Y., ASSIGNOR TO THE AUTOMATIC FIRE ALARM AND EXTINGUISHER COMPANY, OF SAME PLACE.

THERMOSTAT.

SPECIFICATION forming part of Letters Patent No. 352,442, dated November 9, 1886.

Application filed January 20, 1886. Serial No. 189,127. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. BULEN, of the city, county, and State of New York, have invented certain new and useful Improvements in Thermostats, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to the class of thermostats which utilize the expansive qualities of metals as the operative element for signaling the desired alarm electrically.

The primary object of my invention is the provision of a thermostat in which two successive electric contacts are made with a perceptible interval between them.

My invention also provides a thermostat wherein two electric contacts must be made in order to signal the predetermined alarm, for the purpose hereinafter set out.

To these purposes my invention is in the nature of a composite contact-strip formed of materials having different expansibilities under the action of heat, the said strip being fixed at a point of its length between the ends, which remain perfectly free for making contact, and of the two or more adjustable contacts and their adjuncts, and of further novel constructions, all as hereinafter fully described and claimed.

In the accompanying drawings, Figure 1 represents a vertical longitudinal sectional view of my device complete, with the core B partly broken away. Fig. 2 represents a horizontal longitudinal sectional view of Fig. 1, showing a plan view of the contact-strip and its adjuncts. Fig. 3 represents a vertical longitudinal view of a modified form of my device. Fig. 4 represents a diminished external view in elevation of my device modified.

In the said drawings like letters designate like parts throughout.

The body or core B is made of suitable insulating material, and is of a semi-cylindrical shape, with a boss, *b*, at the center of its flat surface, and the projections *d d* at the ends of said core.

The composite contact strip consists of two layers of metal, *m* and *n*. The layer *n* being less susceptible to expansion by heat than layer *m* upon an abnormal temperature, the coaction of the metallic layers will tend to deflect the ends of the contact-strip, which is set and held on the boss *b* by a screw, *t*. The projections *d d* are each pierced by a contact-screw, *s*, and these screws hold in place the L-shaped spring-arms *l l*. The contact-screw *s*, located to the left hand of the drawings, forms the front contact and the one to the right hand thereof forms the back contact for the thermostat.

The cylindrical sleeve C, forming a protective casing for the interior of the device, has at its ends the caps *c c*, which contain thimbles H H, of any suitable insulating material, and these thimbles have hubs *h h*, which project through the outer ends of caps *c c* and carry the screws *r r*, whose heads lie in contact with spring-arms *l l*, and on whose shanks take the thumb-nuts *o o*, which form binders for the line-wires *v* and *w*.

The screw *t* is connected with a screw-shank, *i*, having an insulating washer-piece, K, set into the sleeve C, as shown in Fig. 1. The thumb-nuts *j* work on the screw *i* and form a binder for line-wire *u*. These screws *t* and *i* form the central contact, which is in constant communication with the contact-strip at the fixed point thereof.

In the normal condition of the device the open circuit of line-wires *v* and *w* terminates at the points of the respective front and back contacts, *s* and *s*, and the open circuit over wire *u* terminates at the ends of contact-strip *m n* by virtue of the connected central contact, *t i*.

As shown in Fig. 1, the front contact *s* at the left is adjusted nearer than the back contact to the contact-strip *m n*, which, on being deflected by increased temperature, will first make contact with said front contact, thereby completing circuit over line-wires *v* and *u*, and giving a signal. Then subsequently the contact-strip will make back contact with the contact *s* at the right and set lower than the left one, thereby completing the circuit through the length of said strip over wires *v* and *w*, or over wires *u* and *w*, according to how the circuits may be joined up, and giving a second signal, as desired. It is obvious that this sec-

ond signal is quite a perfect confirmation of the fact that there is an abnormal temperature in the neighborhood of the thermostat, for there is no likely accident or derangement in the wires and connections that would give the successive signals as explained.

The condition of the thermostat can at any time be tested to see whether the contact-strip is properly out of contact with screws *s s* by joining up the wires *v* and *u* and *w u* alternately in the respective pairs; or, if the line *u*, connected with the central contact, be a loop-wire, this may be used in testing the condition of the thermostat in an obvious well-known manner.

In the modifications shown in Figs. 3 and 4 the contact-strip must make contact with both the front and back contacts, *s s*, in order to signal, there being only the two wires *v* and *w* here used. The purpose of this double contact-making is important, since it guards against the likelihood of accidental contact-making, whereby the signal is sounded, for where there are two contacts to be made, instead of one, in signaling, the chances of accidental signaling are very much lessened; hence a false signal in such a construction will rarely occur.

The composite contact-strip *m n* may be constructed of any suitable materials and still be within the essence of my invention.

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

1. In combination, a composite contact-strip formed of materials having different expansibilities, said contact-strip fixed at a point between the ends thereof, said ends free, and front and back contacts for said free ends and adjacent thereto, whereby upon a sufficient increase in temperature said ends may make contact with said contacts.

2. In combination, a composite thermostatic contact-strip formed of materials having different expansibilities, said contact-strip fixed at a point between the ends, said ends free, a central contact connected with said strip at a point between said ends, and front and back contacts adjacent to and coacting with said free ends, said front and back contacts adjustable relative to said ends, whereby upon a sufficient rise in temperature said ends may make contact in succession with said respective front and back contacts.

3. In combination, a laminated bimetallic contact-strip formed of flat layers of metals having different expansibilities, a central contact fixed to said contact-strip at a point between the ends, said ends free, and front and back contacts adjacent to and coacting with said free ends, said front and back contacts predeterminately set, whereby upon a sufficient rise in temperature said free ends may close in succession on said front and back contacts, respectively.

4. In combination, a laminated contact-strip formed of materials having different expansibilities, a semi-cylindrical insulating frame or core provided with a central boss and terminal projections, a front and a back and a central contact mounted on said core, said strip fixed near the center of length upon said boss and connected with said central contact, said ends of said strip free and adjacent and coacting with said adjustable front and back contacts, a spring-arm secured to each front and back contact, a tubular sleeve surrounding said core, each end of said sleeve provided and fitted with an insulating-thimble, and an incasing-cap therefor, both having one end closed, and a binding-screw set through said closed ends, said thimbles and caps secured upon the ends of said sleeve, whereby said interior parts are completely housed, substantially as described.

5. In combination, the insulating-core B, provided with a boss, *b*, and projections *d*, the bimetallic contact-strip *m n*, set on said boss, the front contact *s*, and the back contact *s*, substantially as described.

6. In combination, the insulating-core B, provided with a central boss, *b*, and end projection, *d*, the bimetallic contact-strip *m n*, secured upon said boss, the central contact, *t i*, set in said core and connected with said strip, and the front and back contacts, *s* and *s*, substantially as described.

7. In combination, the insulating-core B, provided with boss *b* and projections *d*, the bimetallic contact-strip *m n*, the central contact, *t i*, the front and back contacts, *s s*, provided with spring-arms *l l*, the sleeve C, insulating-thimbles H, the caps *c*, and the binding-screws *r r*, substantially as described.

GEORGE F. BULEN.

Witnesses:
RICHARD J. BROWNELL,
FELIX MCGLOIN.