(No Model.)

A. K. RIDER.

THERMOSTAT.

No. 294,405. Patented Mar. 4, 1884.

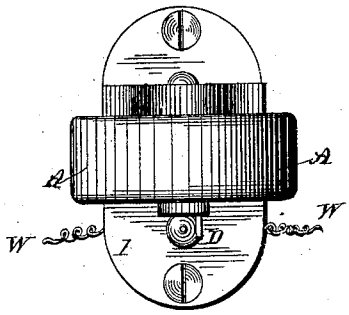


Fig. 4.

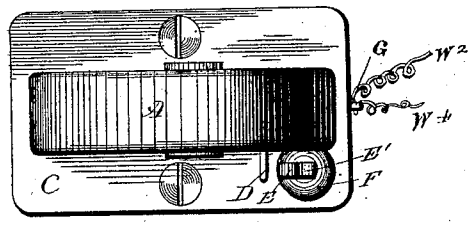


Fig. 2.

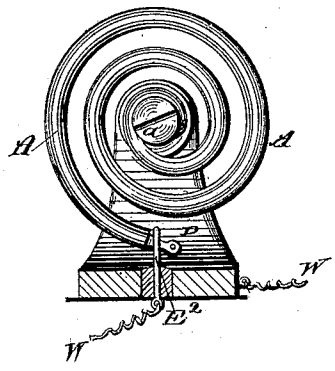


Fig. 3.

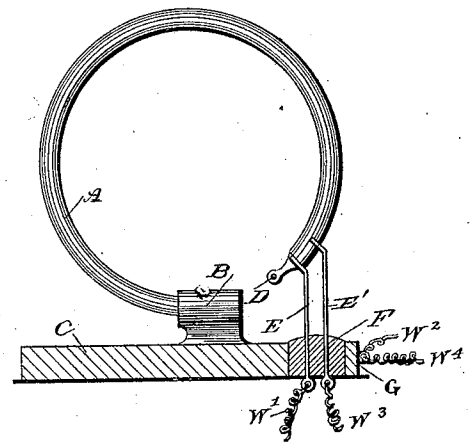


Fig. 1.

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THERMOSTAT.

SPECIFICATION forming part of Letters Patent No. 294,405, dated March 4, 1884.

Application filed November 13, 1883. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER K. RIDER, of Walden, in the county of Orange and State of New York, have invented certain new and useful Improvements in 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 relates to an improvement in thermostats, adapted more particularly to form part of an electric circuit, and so arranged as to hold the circuit open at ordinary temperatures, and to close the same and sound an alarm or alarms at one or more points when the temperature in the room rises to or above a predetermined degree.

The object of this invention is to provide a simple, inexpensive, and reliable means to effect the result with absolute certainty, and to avoid the liability which exists in this class of devices, as at present constructed, to make a false alarm or become inoperative; and with these ends in view my invention consists in the parts and combinations of parts, as will be more fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in side elevation, partly in section, of my improved device. Fig. 2 is a plan view of the same; and Figs. 3 and 4 represent, respectively, a side and plan view of a modified form.

A represents a flattened metallic tube adapted to contain a fluid and arranged circularly, the flattened sides of the tube forming the inner and outer faces. The opposite ends of this tube are hermetically sealed, and one of the said ends is rigidly secured in any suitable manner to a stud, B, projecting outwardly from the base C. The opposite end of the bent tube A is free to move away from the fast end, and is provided with the laterally-projecting contact-pin D, which latter is rigidly secured to the said tube, and is adapted to engage the contact-springs E E′, when the proper amount of expansion has brought the pin D up to them. The contact-springs E E′ project outwardly from the base C, and are insulated separately by passing them through the vulcanite plug F, rigidly secured in the base. These springs are made very light and elastic, to permit their moving past their normal plane without offering much resistance, and their upper ends are preferably faced with platinum, to avoid corrosion. These contact-pins are disposed at right angles to the base C for the greater part of their length, their upper ends, however, being bent to range the center of the circle made by the bent tube, to afford a better and more perfect contact. These springs are preferably set apart about as far as ten degrees of increased temperature would move the pin D. As this thermostat is intended to be very sensitive, the most expansible liquid—such as alcohol or methylic spirit—is employed as the acting fluid, and which is hermetically sealed in the tube in any suitable manner. The base C is made of a suitable conducting material, and is provided with the binding-post G, to which the wires W^2 and W^4 are connected, while the lower ends of the springs E and E′ are connected to wires W′ and W^3. Thus it will be seen that two complete circuits are formed and operated, as will be hereinafter described.

By a well-known mechanical law, the cubical capacity of a tube is lessened by bending the tube, and increased by straightening a tube already bent; or, conversely, a forcible increase in the cubical capacity of a bent tube has the effect of straightening the tube, while a decrease in cubic capacity has the tendency to bend the tube, or permit it to spring back to its normal shape, if under spring-tension; and hence it follows that the increase of bulk of the acting fluid caused by an increase of temperature will straighten the tube to a certain extent and cause the pin D to engage the contact-spring E, and thus close the first circuit by means of the wires W′ and W^2, which are intended to operate the alarm and annunciator in the janitor's or watchman's room of the building. Should this alarm not be promptly attended to, a further advance of ten degrees of temperature will close the second circuit, in consequence of the first spring, E, being brought in contact with the second spring, E′, which will transmit the alarm to the fire or police department through the wires W^3 and W^4.

In the modified form shown in Figs. 3 and 4 the tube is also made flattened, but, instead of being circular, is bent into a volute form.

The central portion of this volute is adapted to embrace the screw or short bolt *a*, which secures it to the base C in such a manner as to hold firmly the extreme end of the inner coil and allow the other coils to have free expansive movement. This tube is intended to be completely filled with the liquid to be employed, and its ends are hermetically sealed. If mercury is employed as the acting fluid, the tube is most conveniently made of iron and its ends welded. A very small hole drilled in one end will, by the aid of heating and cooling, enable the operator to introduce the mercury so as to completely fill the tube, when the minute hole can be securely closed by a pin riveted in and welded or cemented over. The free end of the tube is provided with a laterally-projecting contact-pin, D, arranged at right angles to the plane of the tube, and adapted to engage the insulated contact-pin E^2, insulated from the base of the bracket, when the alarm temperature is reached. The base of the thermostat is also provided with a binding-post in electrical communication with the tube. This device has only one alarm; but it is evident that two could be employed therewith, if desired. It is not absolutely necessary to employ mercury with this form of thermostat, nor is it necessary to completely fill the tube, as it can be satisfactorily operated by partly filling it with a volatile liquid of low boiling-point, the elastic vapor of which would act to operate the thermostat by pressure.

From the foregoing it will be seen that numerous slight changes in the construction and relative arrangement of the several parts might be resorted to without departing from the spirit of my invention, and hence I would have it understood that I do not confine myself to the exact construction shown and described, but consider myself at liberty to make such slight changes and alterations as fairly fall within the spirit and scope of my invention.

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

1. A thermostat consisting, essentially, of a flattened metallic tube filled or partly filled with an expanding fluid, the said tube being bent or coiled into a suitable shape and secured at one end to a base, and provided at its opposite end with a contact-pin, which is adapted to be moved into contact with a pin secured to the base.

2. In a thermostat, the combination, with a tube partly or wholly filled with an expansible or volatile liquid, one end of the said tube being rigidly secured to a base made of conducting material, the opposite end thereof being free and provided with a contact-pin, of two separate contact-pins secured to the base, but insulated therefrom and from each other, the said pins being brought into electrical connection with the said tube by the expansion thereof, substantially as set forth.

3. The combination, with the base and the curved flattened tube secured at one end thereto, and provided at its free end with a contact-pin, the said tube being filled or partly filled with an expansible or volatile liquid, of the plug F, spring-contact pins, and the wires W′, W^2, W^3, and W^1, all of the above parts combined and adapted to operate as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ALEXANDER KIRK RIDER.

Witnesses:
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