No. 670,931. Patented Apr. 2, 1901.

C. B. GARRETT & W. S. W. BLAKE.

THERMOSTAT.

(Application filed Feb. 6, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

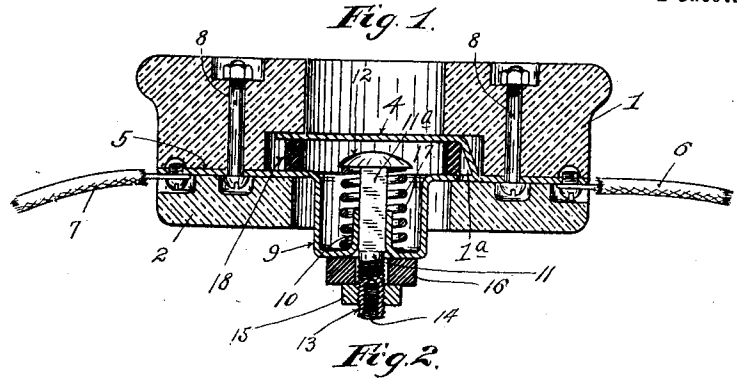


Fig. 2.

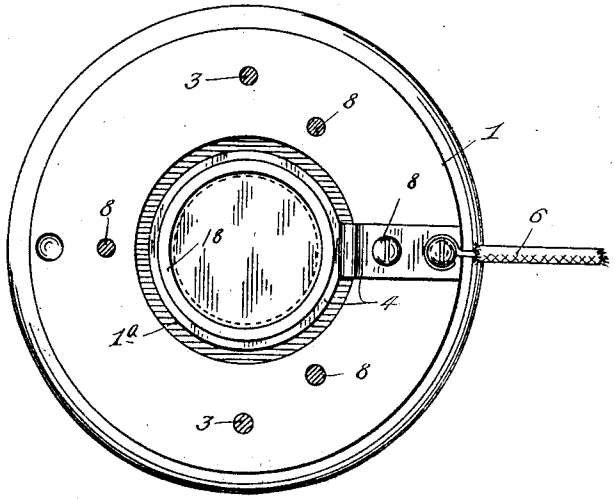
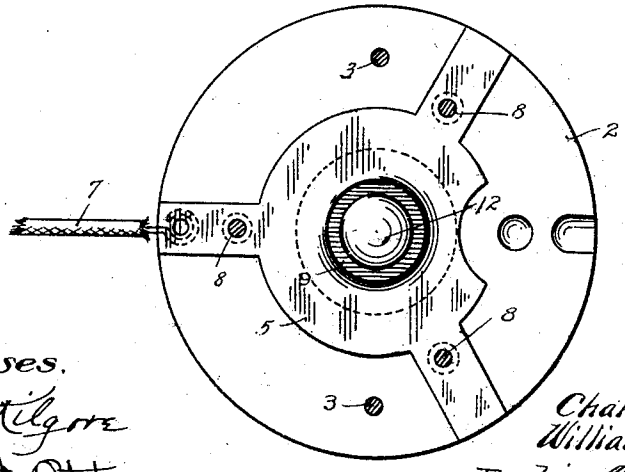


Fig. 3.



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Fig. 4.

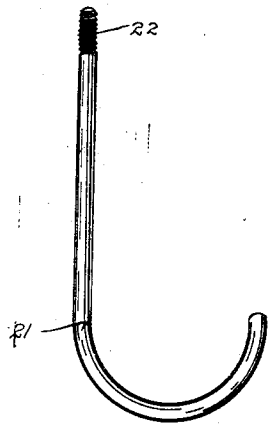


Fig. 5.

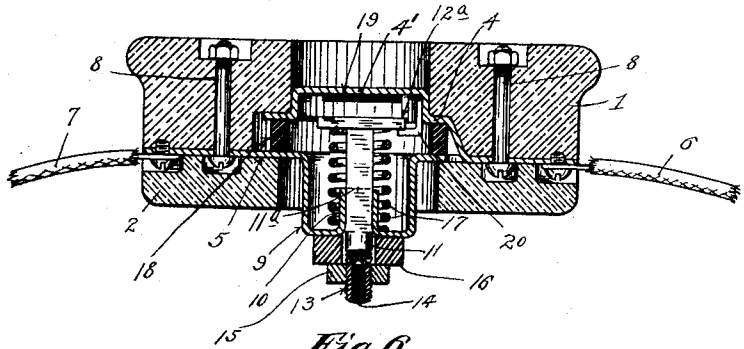
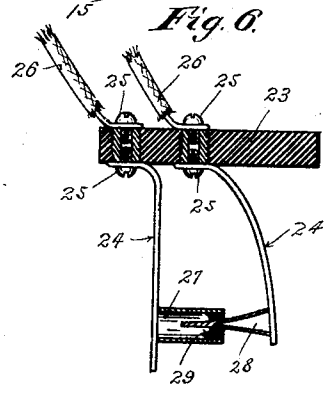


Fig. 6.



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UNITED STATES PATENT OFFICE.

CHARLES B. GARRETT AND WILLIAM S. W. BLAKE, OF MINNEAPOLIS, MINNESOTA, ASSIGNORS OF ONE-THIRD TO MARTIN DYKE, OF SAME PLACE.

THERMOSTAT.

SPECIFICATION forming part of Letters Patent No. 670,931, dated April 2, 1901.

Application filed February 6, 1900. Serial No. 4,167. (No model.)

To all whom it may concern:

Be it known that we, CHARLES B. GARRETT and WILLIAM S. W. BLAKE, citizens of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Thermostats; and we 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.

Our invention has for its object to provide an improved thermostat; and to this end it consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

The invention is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Figure 1 is a horizontal section taken centrally through the preferred form of our improved thermostat. Figs. 2 and 3 are plan views showing the two principal sections of the thermostat looking at both of the same from their inner sides, the same being turned in opposite directions. Fig. 4 is a detail of a handpiece for use in setting the thermostat. Fig. 5 is a view corresponding to Fig. 1, but illustrating a modified construction; and Fig. 6 is a horizontal section showing still another modified construction.

Referring first to the preferred construction illustrated in Fig. 1, the numerals 1 and 2 indicate a pair of annular sections, which are preferably of porcelain, being preferably held together by two or more screws 3.

The numerals 4 and 5 indicate a pair of metal circuit-terminals or contact-pieces, from which, as shown, circuit-wires 6 and 7 respectively lead. The said terminals 4 and 5 are shown as held to the porcelain section 1 by screws or bolts 8, and the member 4, as shown, is offset within a recess 1^a of said section 1, being at its inner end of disk-like form, while the member 5 terminates at its inner end in a cap or cup-like section 9, having an inturned sleeve portion 10, which is preferably square or angular in cross-section, for a purpose which will presently appear.

The numeral 11 indicates a contact plunger or bolt provided with a square or angular portion 11^a, that fits and works within the inturned sleeve 10 of the terminal 5 and terminates at its inner end in a contact-head 12. At its outer end the bolt or plunger 11 is provided with external screw-threads 13 and with internal screw-threads 14. A nut 15 is when the device is set screwed onto the threads 13.

To set the device, a fusible stop, as shown, in the nature of a washer, (indicated at 16,) is placed on the outer end of the bolt or plunger 11 between the nut 15 and the adjacent head of the cup 9 of the circuit-terminal 5. This fusible washer holds the head 12 of the bolt 11 out of contact with the disk-like head of the circuit-terminal 4, and thus normally the circuit is broken at the thermostat. A coiled spring 17, which, as shown, is placed around the bolt 11 and is compressed between the bolt-head 12 and the bottom of the cup 9, puts the bolt 11 under strain to move inward.

The fusible stop or washer 16 may be made of any suitable fusible material which under ordinary temperatures has sufficient solidity to resist the tension of the spring 17. We contemplate the use of sealing-wax, rosin, or compositions thereof; but composite metals of sufficiently low fusibility may be employed for the purpose.

The thermostat above described is what would be termed an "open-circuit" thermostat, for the reason that the circuit is thereby normally broken. As shown and preferred, an insulating spacing-ring 18 is placed between the inner portions of the circuit-terminals 4 and 5.

When the fusible stop or washer 16 is melted by the action of heat thereon, the spring 17 will force inward the contact bolt or plunger 11, and its head 12 will be forced against and make contact with the adjacent portion of the circuit-terminal 4, and as the said bolt has continuous contact with the sleeve portion 10 of the circuit-terminal 5 the circuit will of course be closed through the thermostat.

Fig. 5 illustrates a construction of the thermostat designed as a closed-circuit thermo-

stat, and the construction thereof is the same as that illustrated in Fig. 1, with the following exception: The head 12^a of the contact bolt or plunger 11 is preferably made wider than in the former construction, and an insulating-piece 19 is placed on the depressed disk-like inner extremity 4' of the circuit-terminal 4 for engagement with the said head 12^a when the bolt is thrown inward to prevent closing of the circuit. Normally the head 12^a is held outward and in engagement with a contact-finger 20 of the terminal 4. With this construction the circuit through the thermostat is normally closed and the circuit is broken by the inward movement of the contact bolt or plunger 11, which carries the head 12^a out of contact with the finger 20, and thus breaks the circuit. Of course in this construction, as in the prior construction, the fusible washer or stop 16 holds the plunger or bolt 11 outward or in its normal position. After the thermostat has been thrown into action a person may readily tell by an inspection of the fusible plug or washer whether the thermostat is operated by heat acting to fuse the washer or whether the plug was broken mechanically by accident or design.

For use in connection with the thermostats above described I preferably employ a hooked handpiece 21, which is screw-threaded at its end 22 to adapt it to be screwed into the internal threads 14 of the contact plungers or bolts 11. When the handpiece 21 is thus applied to one of the contact bolts or plungers 11, the same may be drawn downward or outward against its spring 17, and while it is thus drawn the nut 15 and the washer or stop 16 may be removed and a new washer or stop 16 substituted for the one removed. The stem of the handpiece 21 is of such diameter that the nuts 15 and washers 16 may be slipped in either direction from end to end over the same. This is important, as it permits the washers or fusible stops 16 to be replaced while the handpiece is applied to draw the contact bolt or plunger downward. The engagement of the squared or angular portion 11^a of the contact-bolt 11 with the correspondingly-formed sleeve 10 holds said bolt against rotation as the nut 15 is turned.

Another very important feature, which is common to both of the forms of thermostats above described, will now be considered.

The insulating-ring 18, which spaces apart the enlarged inner extremities of the circuit-terminals 4 and 5, forms an air-tight joint between them, and the fusible washer or stop 16 forms an air-tight joint between the bulged portion 9 of the terminal 5 and the nut 15. The nut 15 being tightly screwed onto the threads 13 forms an air-tight joint with the bolt or plunger 11. If found desirable, the so-called "washer" 16 might be coated with an adhesive material before it is placed in working position, or it might be slightly heated on its faces to insure an extremely tight joint. In the above manner the internal parts of the thermostat, including the parts which make and break the circuit by contact and separation, are incased within an air-tight and dust-proof housing. This prevents dust from getting into the thermostat and onto the contacting portions, and it also prevents the said parts from corroding or becoming oxidized. The above construction we consider broadly new.

In the construction illustrated in Fig. 6, 23 indicates a support, of insulating material, to which a pair of circuit-terminals, in the form of flat springs 24, are secured by binding-screws 25, to which the line-wires 26 are attached. One of the members 24 has a tubular lateral extension or sleeve 27, and the other has a conical metallic extension 28, which is adapted to telescope into the sleeve 27, but is, when the thermostat is set or inoperative, held from such telescoping movement by a ring or body 29, of sealing-wax or other fusible material, which is secured within the outer end of the sleeve 27. If the sleeve 27 be of metal or of conducting material, then it is necessary that the fusible ring or stop 29 be a non-conductor of electricity, so that the circuit through the thermostat will be normally broken. When the ring 29 is fused, it will permit the inner end of the conical extension 28 of the one spring-terminal 24 to be thrown into contact with the other member of the said spring contacts or terminals 24. Thus it will be noted that the points of contact between the contacting portions of the two circuit-terminals or members of the thermostat are remote from the point where the fusible stop is applied. This is an important feature and is a feature in common with the construction above described.

The uses of a thermostat are well understood and are too numerous to justify an attempt at their enumeration. A thermostat such as is the subject-matter of this application is especially adapted for use in connection with automatic fire alarm and extinguishing systems.

What we claim, and desire to secure by Letters Patent of the United States, is as follows:

1. In a thermostat, the combination with a pair of circuit-terminals, of a plunger or bolt movable through one of said terminals, and held against rotation with respect thereto, a spring applied to force said plunger or bolt in one direction, a nut on the end of said plunger, and a perforated fusible washer applied on said plunger between said nut and the circuit-terminal in which said plunger is mounted, which washer may be slipped onto said plunger and into working position only when said nut is removed from the said plunger, substantially as described.

2. In a thermostat, the combination with the circuit-terminals 4 and 5, the latter having the bulged portion 9 and angular sleeve 10, of the contact-bolt 11 having the head 12, with angular portion 11^a and nut 15, the spring

17 applied to said bolt, and the fusible washer 16 applied on the said bolt between the nut 15 and the bulged portion 9, substantially as described.

3. In a thermostat, the combination with a contact bolt or plunger and a fusible stop for holding the same inoperative, of a handpiece detachably securable to said plunger, and adapted to hold the same inoperative while said stop is removed, substantially as described.

4. In a thermostat, the combination with a pair of circuit-terminals, of a spring-pressed contact bolt or plunger mounted in one of the said terminals, a nut screw-threaded on one end of said bolt, a fusible washer adapted to be placed on said bolt inward of said nut, and the handpiece 21 adapted to be screwed into the end of the said bolt, to move the same against its spring, the said handpiece being of such size that the said nut and fusible washer may be passed over the same, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

CHARLES B. GARRETT.
WILLIAM S. W. BLAKE.

Witnesses:
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