No. 847,981. PATENTED MAR. 19, 1907.

P. A. BROWN.

THERMOSTAT.

APPLICATION FILED DEC. 8, 1905.

2 SHEETS—SHEET 1.

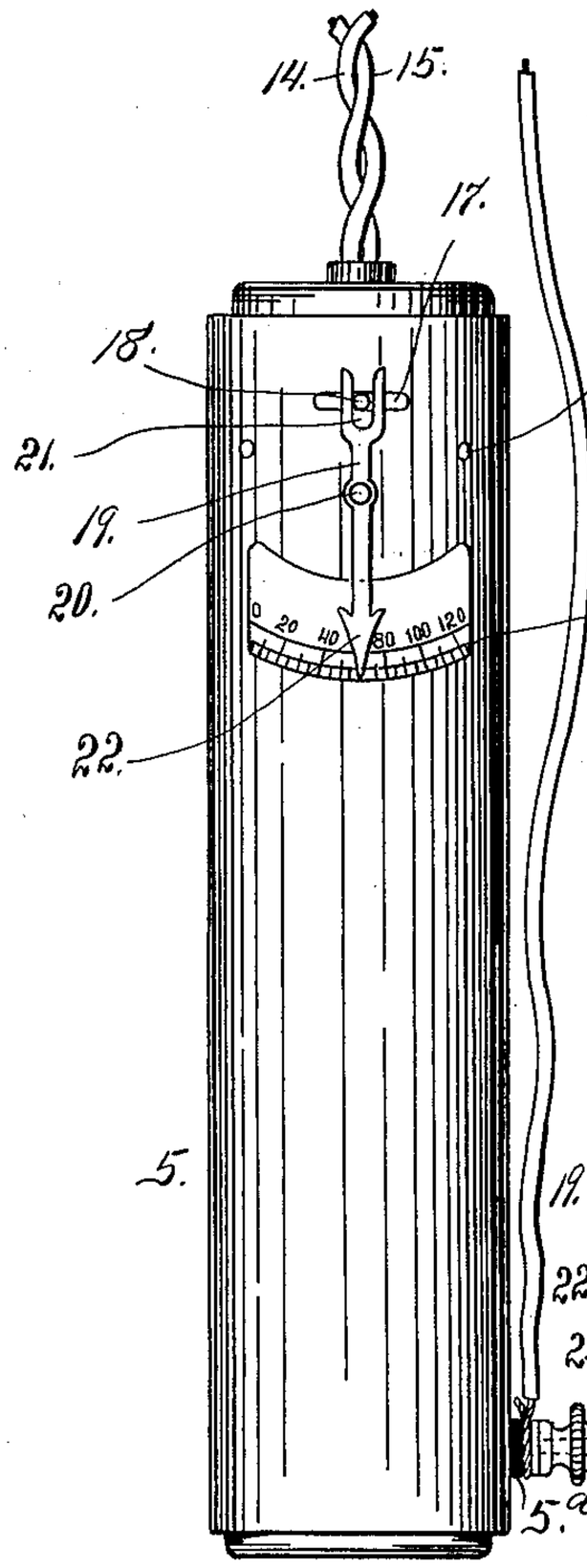

Fig. 1.

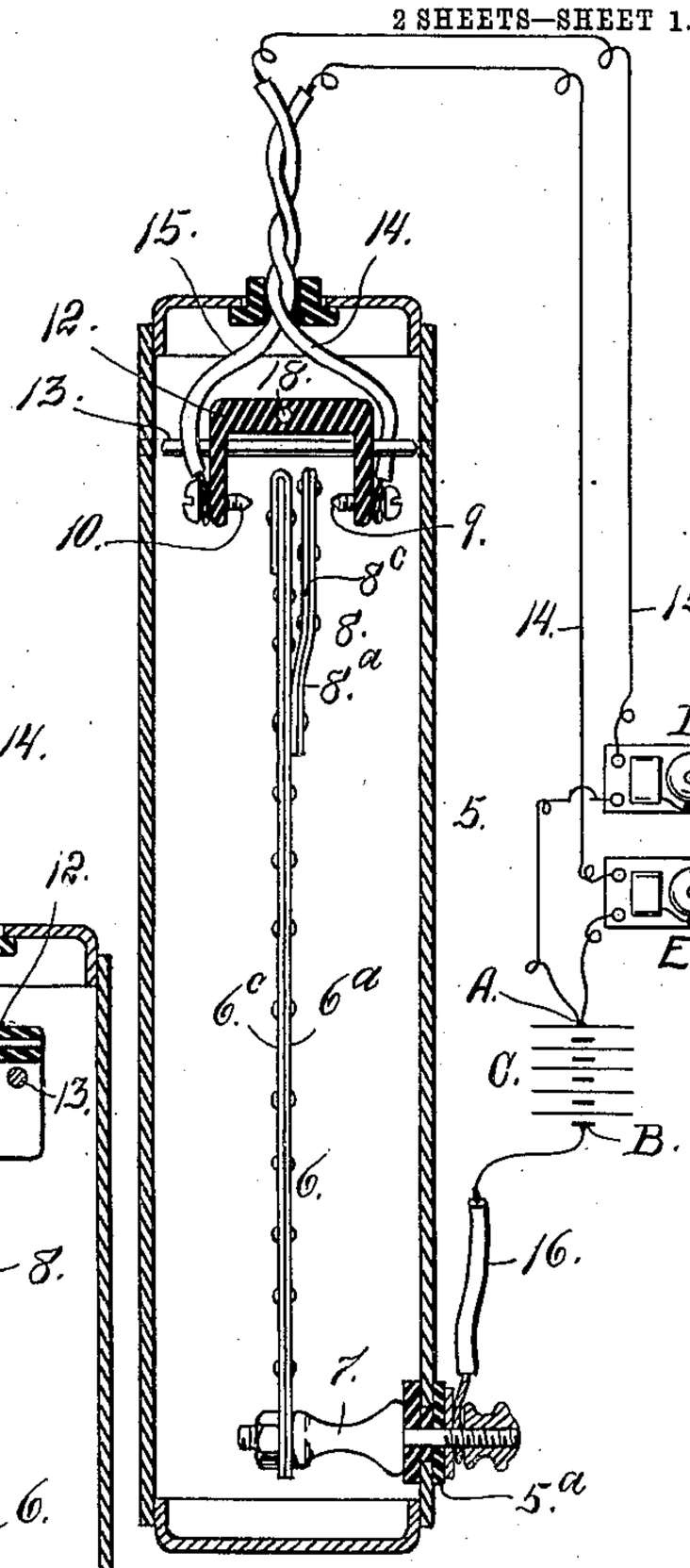

Fig. 2.

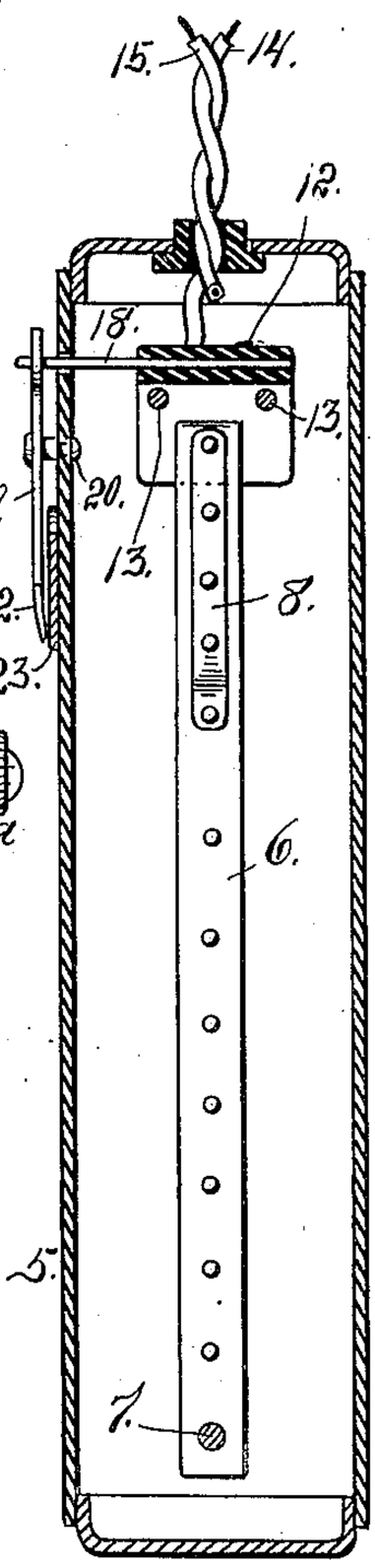

Fig. 3.

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2 SHEETS—SHEET 2.

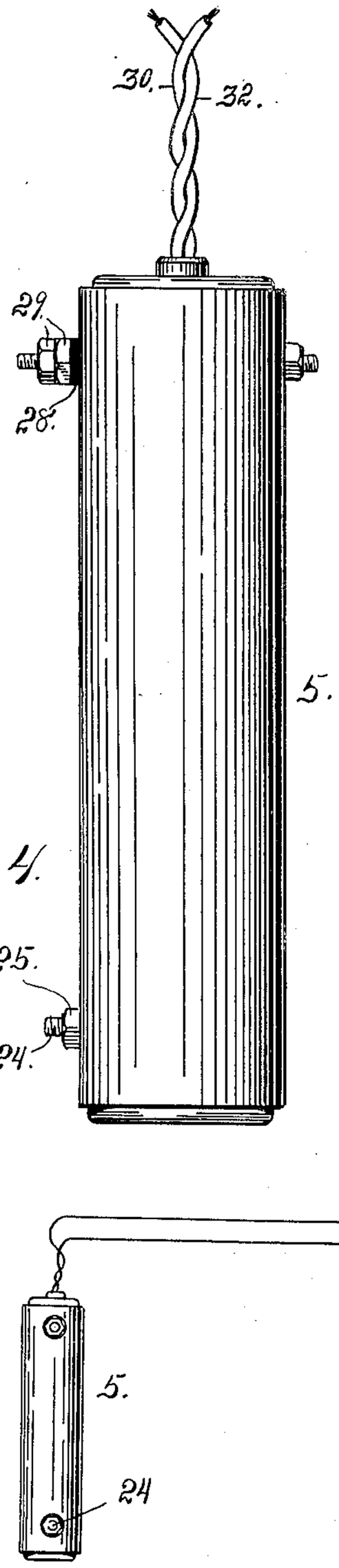

Fig. 4.

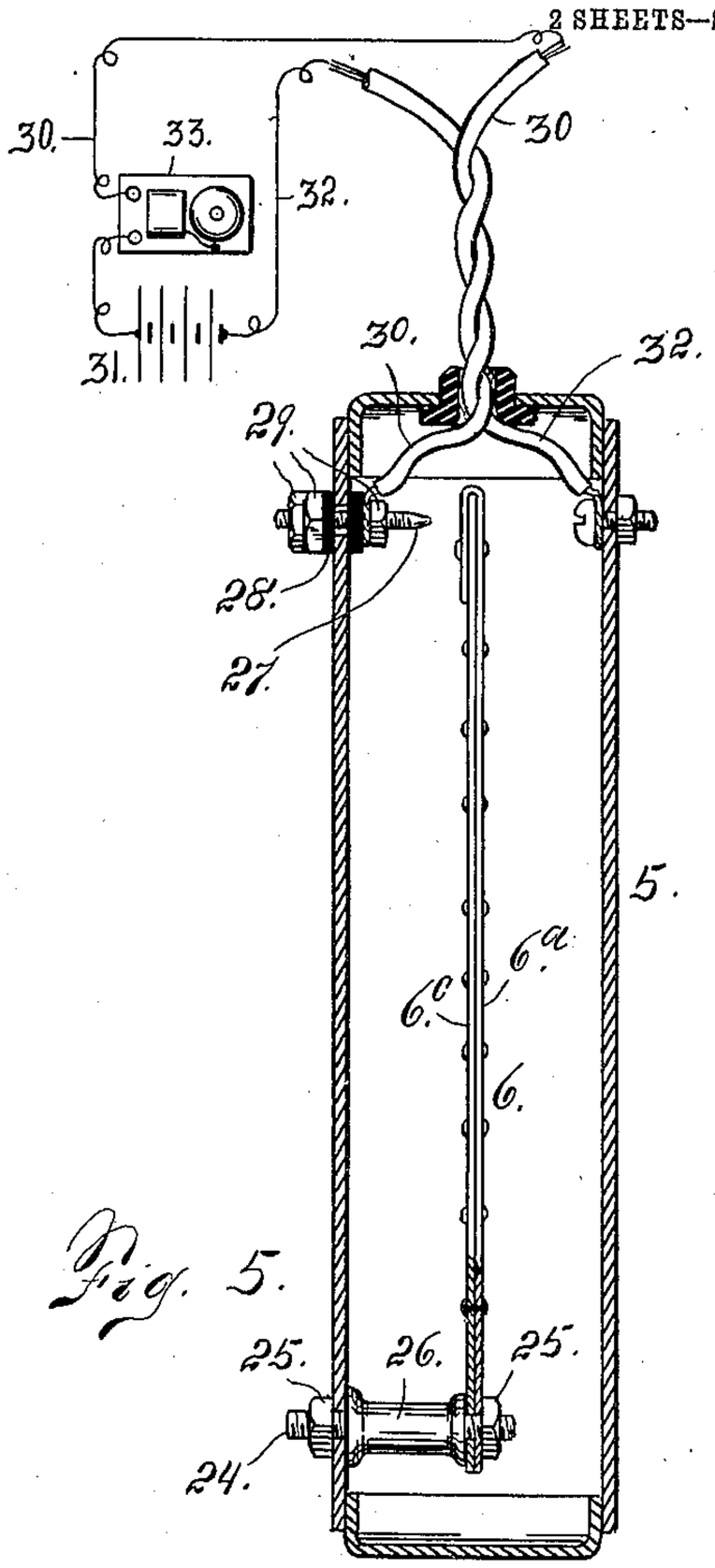

Fig. 5.

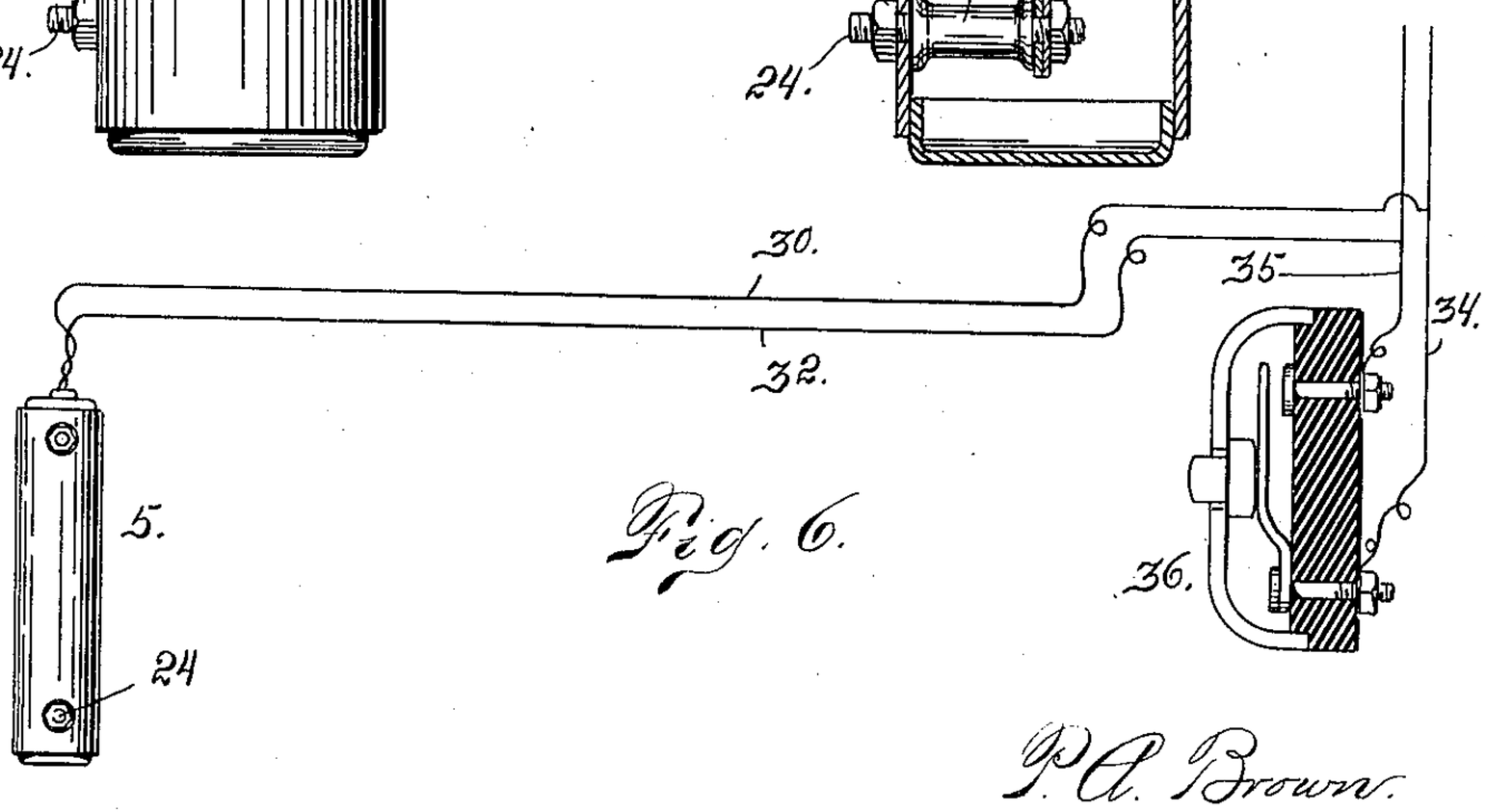

Fig. 6.

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UNITED STATES PATENT OFFICE.

PEABODY A. BROWN, OF DENVER, COLORADO.

THERMOSTAT.

No. 847,981. Specification of Letters Patent. Patented March 19, 1907.

Application filed December 8, 1905. Serial No. 290,991.

To all whom it may concern:

Be it known that I, PEABODY A. BROWN, a citizen of the United States, residing at the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Thermostats; and I do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in thermostats of the class in which is employed a bar composed of two plates of material fastened together and possessing the qualities of expansion and contraction in unequal degrees, the said bar being fixed at one end, while its opposite end is allowed to move between two contacts or toward and away from the single contact, as may be desired.

My improved device is preferably provided with a closed casing in which the movable parts are mounted, thus making it practicable to use the device in liquids or granular material, as may be desired. The device is of course equally adapted for use in all other relations where thermostats are usually employed.

Having briefly outlined my improved device as well as the function it is intended to subserve, I will proceed to describe the same in detail, reference being made to the accompanying drawing, in which is illustrated an embodiment thereof.

In this drawing, Figure 1 is a front elevation of one form of my improved device. Fig. 2 is a vertical section taken through the same. Fig. 3 is a similar section taken at right angles to Fig. 2. Fig. 4 is an elevation showing another form of construction. Fig. 5 is a sectional view of the same. Fig. 6 shows the form of construction shown in Figs. 4 and 5 in use, the same being connected in the same circuit with an ordinary push-button.

The same reference characters indicate the same parts in all the views.

Referring first to Figs. 1 to 3, inclusive, let the numeral 5 designate a casing, which may be made as tight as desired. In this form of construction it is adapted for use either in the ordinary relations in which thermostats are employed or it may be used to throw into granular material, as grain-bins, where it is necessary to ascertain the temperature of the material. It is well known that grain in bins often heats where a considerable quantity of it is placed together, especially if there is any dampness in the mass. A device of this form or of the forms shown in Figs. 4, 5, and 6 may be employed for this purpose. Either form of the device, however, may be dropped into liquid. In this case, however, if the entire casing is immersed it would be necessary that the opening at the top where the conductors escape be tightly closed, and it must be understood that this is contemplated in all forms of the invention, though of course for ordinary purposes where the device is exposed only to the atmosphere it is not necessary that the casing be absolutely tight.

Again referring to Figs. 1, 2, and 3 exclusively, the numeral 6 designates a bar composed of two metals possessing the property of expansion and contraction in unequal degrees, as zinc and iron. Let 6^a designate the zinc plate, and 6^c the iron or less expansible plate. These two plates are riveted together. One extremity of the bar is secured to a stationary part 7, attached to the lower extremity of the casing 5 and insulated therefrom, as shown at 5^a. The upper extremity of this bar is provided on one side with an auxiliary bar 8, whose upper portion is slightly separated from the corresponding portion of the main bar. In this upper portion the less expansible material, as iron, is designated 8^a, while the more expansible metal, as zinc, is designated 8^c. This auxiliary bar 8 is attached to the main bar 6 on what I will term the "cold" side of the device. It will be understood that by virtue of the construction of the bar 7, whereby the plate having the greater expansible property is on the right-hand side, as the temperature increases the bar will bend toward the left, since the plate 6^a becomes longer than the plate 6^c. However, as the temperature lowers the bar will bend toward the right, since the plate 6^a then contracts to a greater extent than the plate 6^c. The upper extremity of this bar normally occupies a position between two adjustable contacts 9 and 10. In the drawing these contacts are shown to be screws, and they are threaded in the plate 12, of insulating material, slidably mounted on a pin 13, made fast in the upper extremity of the casing 5. Through each of these screws

leads a conductor, one of which is designated 14 and the other 15. From the stationary part 7 in the lower part of the device leads a conductor 16. The wires 14 and 15 are located in two distinct circuits, while the wire 16 is common to both circuits. For instance, it may be assumed that the wires 14 and 15 lead to pole A of a battery C, while wire 16 leads to pole B of the same battery. Now if the temperature increases to such an extent that the bar 6 bends, so that its upper extremity moves toward the left and engages the contact 10, the circuit will be completed through the wire 15, the battery C, the wire 16, the contact 7, and the bar 6. Consequently a bell or other signal device D, located in the circuit, will be operated. Now if the temperature becomes sufficiently cold to cause the upper extremity of the bar to move toward the right and engage the contact 9 the circuit will be completed through the wire 14, the battery C, the wire 16, the contact 7, and the bar 6, ringing a bell or operating a signaling device E within the circuit. In order to regulate the contacts 9 and 10 with reference to the upper extremity of the bar 6, the casing 5 is provided with a slot 17, through which protrudes a pin 18, attached to the upper part of the contact-holder 12. A lever 19 is fulcrumed on the casing, as shown at 20. The upper extremity of this lever is bifurcated, as shown at 21, to straddle the pin 18, the arrangement being such that as the lever is moved on its fulcrum the pin will be actuated and the holder 12 shifted toward the right or left, as may be desired, thus regulating the position of the contacts 9 and 10 with reference to the upper extremity of the bar 6. One arm of the lever 19 is formed into a pointer 22, which moves over a graduated segment 23, formed on the casing and provided with figures to indicate degrees. By moving this pointer the holder 12 may be shifted to throw either of the contacts 9 and 10 nearer the upper extremity of the bar 6, or, in other words, by moving this pointer upon the graduated segment 23 the device may be so set that either circuit will close when the temperature has reached a certain degree. In other words, if it is desired to have the upper extremity of the bar 6 engage a contact 10 and close the circuit when the temperature is 80° the pointer 22 is moved to the 80° mark, while if its desired to close the circuit in which the contact 9 is located when the temperature is at 40° the pointer 22 will be set to "40" on the graduated segment 23.

It will be observed that the auxiliary bar 8 is located on the side of the bar 6 toward the contact 9, or on what I will term the "cold" side of the bar, since as the temperature falls the bar moves toward the contact 9 by virtue of the fact that the parts 6^a, possessing the property of expansion and contraction to the greater degree, is upon the same side of the bar—that is, the side toward the contact 9. It will be readily understood that as the bar 6 and the auxiliary bar 8 move toward the right until the auxiliary bar touches the contact 9 or is about to touch the said contact, there will generally be a spark, owing to the fact that the current jumps a short distance from the contact to the bar before actual electrical contact takes place. The tendency of this spark is to heat the auxiliary bar, and this heating tendency under normal conditions—that is, in the absence of the auxiliary bar 8—would have a tendency to cause the bar 6 to recede from the contact 9 or move toward the left, referring to Fig. 2. However, by the use of the auxiliary bar 8, with its plate 8^c, which possesses the greater degree of expansion and contraction on the opposite side from the contact 9, as soon as this auxiliary bar is heated by reason of the arc, as above described, the tendency of the auxiliary bar will be to approach the contact 9 rather than recede therefrom. This auxiliary member therefore performs an important function and is an element of considerable value in a device of this character.

Referring now more especially to Figs. 4, 5, and 6, let the numeral 5 designate the case, and 6 the vibrating bar composed of the plates 6^a and 6^c, possessing the property of expansion and contraction in unequal degrees the same as in the other views. In this form of construction the lower extremity of the member is secured to the casing by a bolt 24, to which is applied nuts 25, a spacing-sleeve 26 being interposed between the inner wall of the casing and the bar. In this case the bar is not insulated in the casing. It may be also stated that in this form of the device only one circuit is employed and no attempt is made to close the circuit on the cold side of the device. The object of this instrument is to indicate the presence of heat beyond a predetermined degree. A single contact 27 therefore is all that is required. This contact is insulated from the casing, as shown at 28, and is held in place by nuts 29. By adjusting these nuts it is evident that the position of the contact with reference to the upper extremity of the bar 6 may be regulated at will. A conductor 30 leads from the contact to one pole of an electrical source 31, while a conductor 32 leads from the casing to the other pole of the source. An alarm device 33 may be located in the circuit. The operation of the device as thus far described is as follows: As the temperature rises in the vicinity of the instrument to a predetermined degree the upper extremity of the bar 6 will engage the contact 27 and close the circuit in which the alarm device 33 is located, thus notifying any one within hearing distance that the heat has attained a certain degree. It is evident that the travel of the

circuit will be from one pole of the source through the conductor 30 to the contact 27, thence through the bar 6 and the casing 5, and thence to the conductor 32, through which it passes to the other pole of the source, completing the circuit.

In the construction shown in Fig. 6 the device is shown connected with wires 34 and 35 of a push-button circuit 36. In this case the alarm device (not shown) with which the push-button 36 is connected also serves as the alarm device to be operated by the thermostat when the temperature rises to the necessary or predetermined degree to cause the bar 6 to engage the contact 27. The circuit-wires connected with the thermostat in this view are designated 32, the same as in Figs. 4 and 5.

Having thus described my invention, what I claim is—

1. A thermostat including a bar adapted to change its shape as the temperature varies, a support upon which the bar is mounted, contacts also mounted on the support on opposite sides of the bar, the free extremity of the bar being provided with an auxiliary member located on the side of the bar toward the cold contact and also being composed of two plates of material possessing the properties of expansion and contraction in unequal degrees, the plate of material possessing the said properties in the higher degree being on the side thereof farther from the cold contact for the purpose set forth.

2. A thermostat including a bar, a support to which one extremity of the bar is fixed, contacts located on opposite sides of the bar, distinct circuits in which the respective contacts are located, the bar being composed of two plates of material possessing the properties of expansion and contraction in unequal degrees, the said bar being provided with an auxiliary member fixed thereto at one extremity, the auxiliary member being located on the side of the bar toward the cold contact and being also composed of two plates of material possessing the properties of expansion and contraction in unequal degrees, the plate of material possessing the said properties in the higher degree, of the auxiliary member, being on the side thereof farther from the cold contact for the purpose set forth.

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

PEABODY A. BROWN.

Witnesses:

DENA NELSON,

OTTO E. HODDICK.