(No Model.) 2 Sheets—Sheet 1.

H. J. HAIGHT.

METALLIC THERMOMETER.

No. 442,879. Patented Dec. 16, 1890.

Fig. 1.

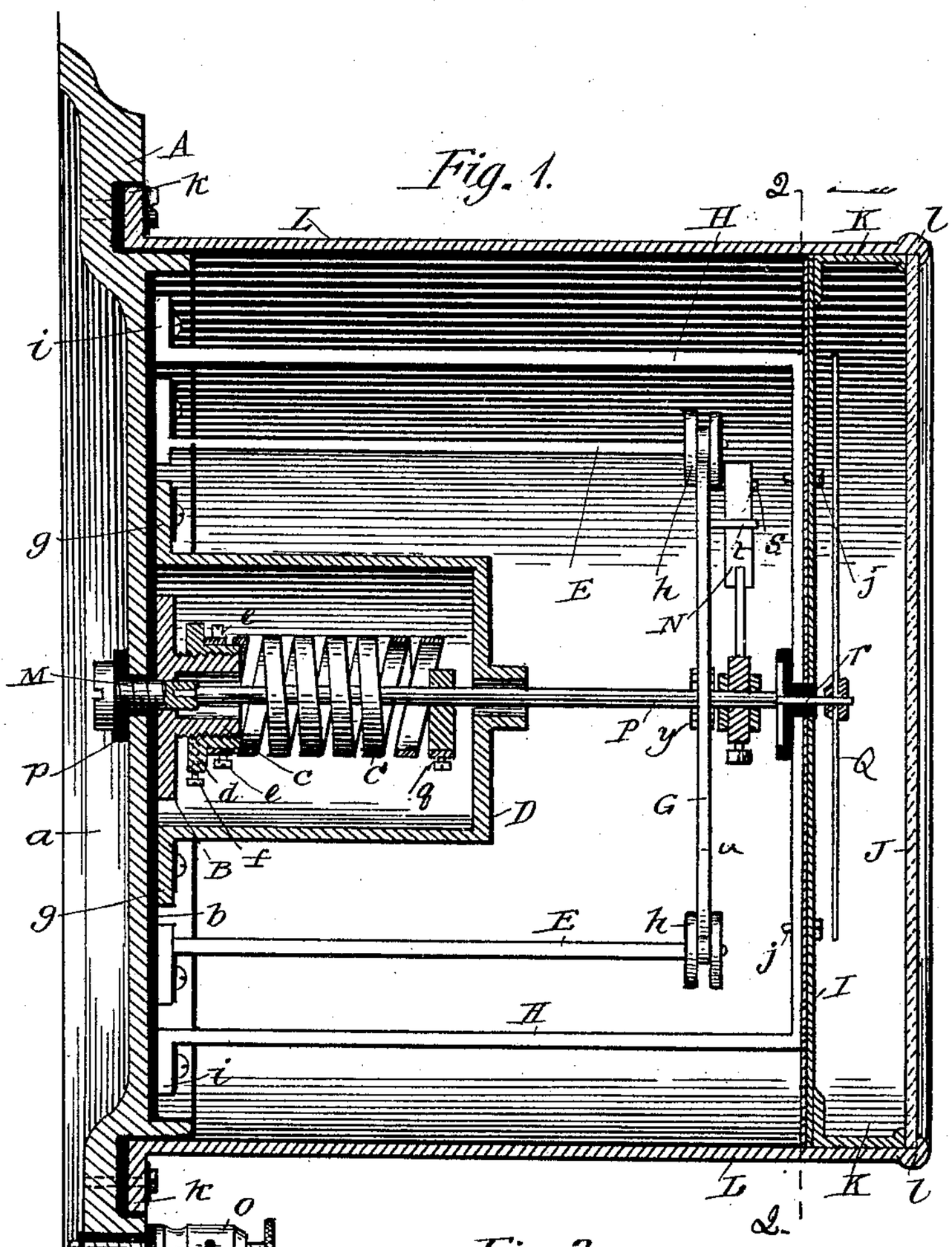
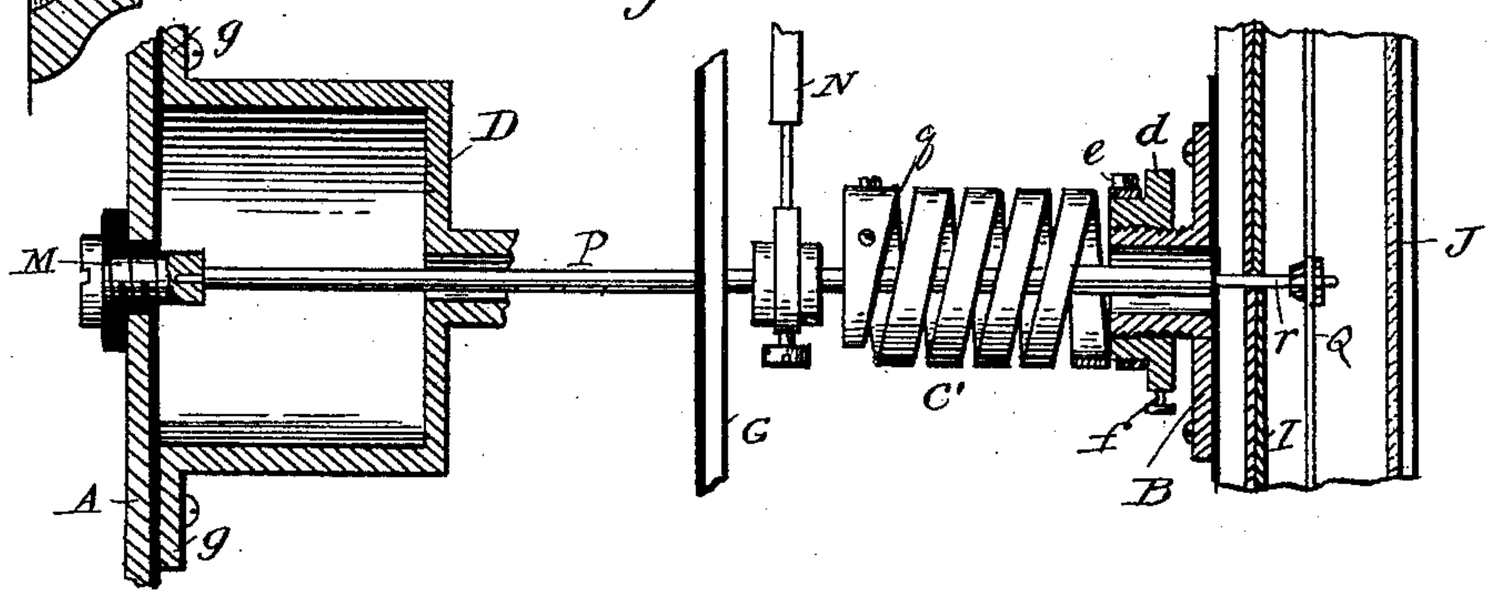


Fig. 3.



Witnesses

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(No Model.) 2 Sheets—Sheet 2.

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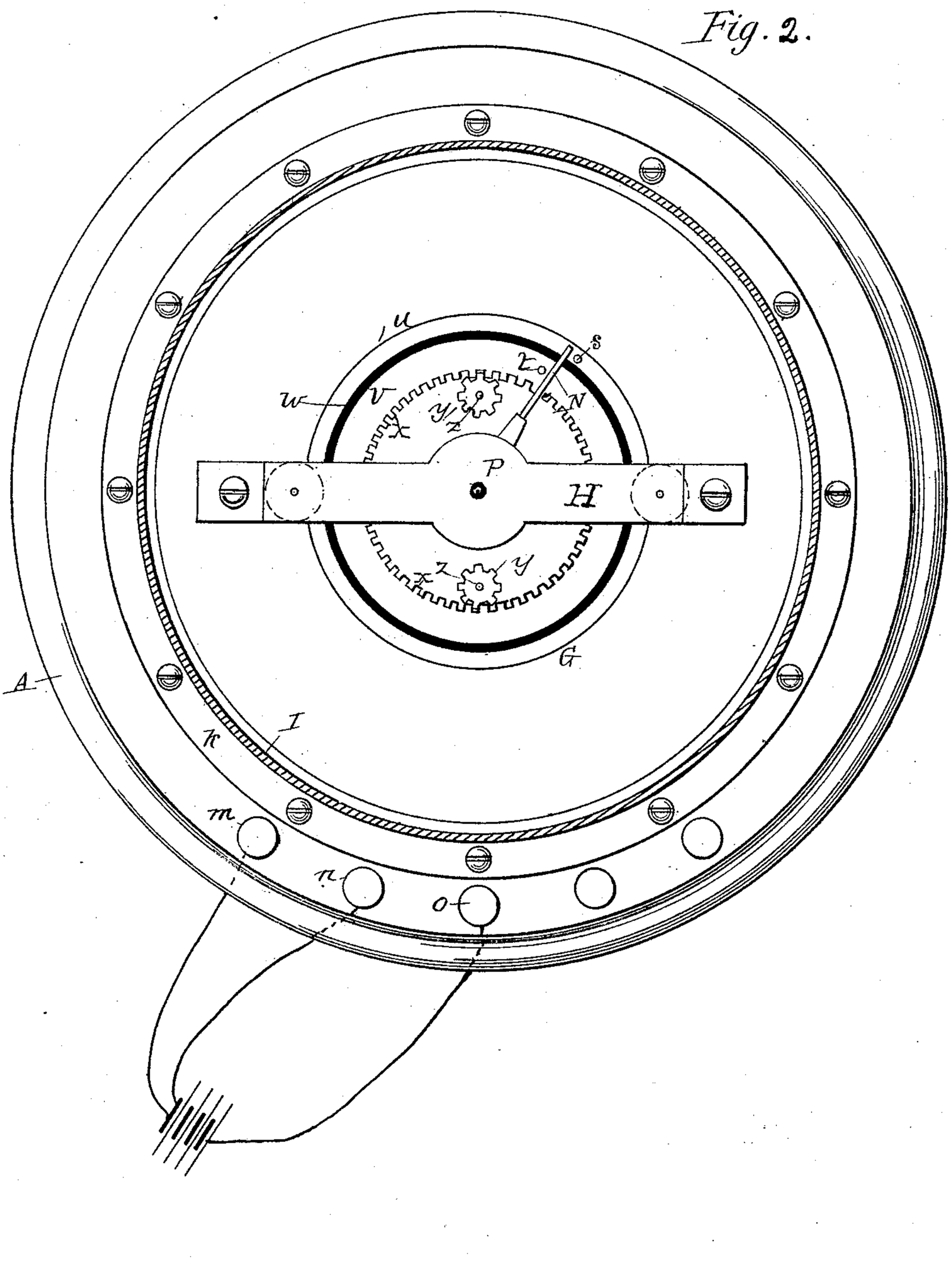
Fig. 2.



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UNITED STATES PATENT OFFICE.

HENRY JANSEN HAIGHT, OF NEW YORK, N. Y.

METALLIC THERMOMETER.

SPECIFICATION forming part of Letters Patent No. 442,879, dated December 16, 1890.

Application filed March 10, 1887. Serial No. 230,377. (No model.)

To all whom it may concern:

Be it known that I, HENRY JANSEN HAIGHT, a citizen of the United States, residing in the city, county, and State of New York, have invented Improvements in Electro-Magnetic Thermoscopes; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, making part of this specification.

This invention relates to electro-magnetic thermoscopes for the transmission by electric currents of thermometric indications from a locality where the temperature is determined to a distant station or place; and the invention consists in various improvements in the construction of the transmitting-instrument, whereby it is rendered more simple, stronger, more durable, and more convenient for use in various situations, and the insulation of parts requiring to be insulated is made more effectual.

The specific features of improvement will be set forth in the following description and defined by the claims.

In the accompanying drawings, Figure 1 is a central axial section of the main parts of an electro-magnetic transmitting-thermoscope constructed with my improvements; Fig. 2, a transverse section of the same in a plane indicated by the line 2 2 in Fig. 1; Fig. 3, an axial section of a part of the instrument, showing a modification of the construction represented in Fig. 1.

Like letters designate corresponding parts in all of the figures.

In the drawings, A represents the base of the instrument, which is made of metal or other suitable hard material. It has preferably a hollow back or under surface, forming a sunken space or cavity *a*, in which the instrument portions of the wires for the electric circuits required in the apparatus are located, these wires being one for the transmission of temperature-increasing indications, one for the transmission of temperature-decreasing indications, and a return circuit-wire common to the other two.

The essential operative parts of the instrument are, first, a thermostatic coil C, mounted fixedly on the instrument at one end and connected with a shaft or spindle P at the other end, and adapted to turn the shaft or spindle in one direction a certain determined part of a circle for every degree of increasing temperature, and to turn the shaft or spindle in the opposite direction to the same extent for every degree of decreasing temperature, and, second, a circuit closer and breaker controlled by the said shaft or spindle, so that at every movement of the shaft or spindle to the extent of one degree in the direction effected by increasing temperature the increasing-temperature circuit is closed and the indication thereby electrically transmitted to the distant receiving-instrument for displaying a corresponding degree on the same in any manner known in the art, and at every movement of the shaft or spindle to the extent of one degree in the direction effected by decreasing temperature the decreasing-temperature circuit is closed with corresponding effect on the said receiving-instrument.

The construction of this circuit closing and breaking device, as shown in the drawings, is as follows: It consists of a ring G, mounted and adapted to turn in grooves of anti-friction pulleys *h h*, as shown, and a circuit-closing arm N, projecting from the coil shaft or spindle P, acting in connection with the ring. This ring is formed of two metallic annular parts or rings *u v*, insulated from each other by a non-conducting ring or strip *w* interposed between them, as shown in Fig. 2. The inner part *v* of the ring has on its inner edge gear-teeth *x x*, which gear into two pinions *y y*, mounted on shafts *z z*, respectively, the said shafts being turned one degree of the predetermined temperature-scale at a time in one or the other direction through any suitable means known in the art by the respective armatures of two electro-magnets, one in the increasing-temperature and the other in the decreasing-temperature circuit of the apparatus, but having no essential connection with or relation to the present improvements and not represented in the drawings. From the faces of the two ring parts, respectively, project circuit-closing contact-pins *s t*, between which the circuit-closing contact-arm N plays. The lateral space or extent of play allowed to the arm N is equal to a little more than the movement given to

the contact-arm by the variation of one degree in temperature, so that whenever the shaft P is turned by the thermostatic coil to the extent of a temperature degree in the direction of increasing temperature the arm N is brought into contact with the pin *s*, and thereby closes the increasing-temperature circuit, and by means of the electro-magnet in that circuit and the proper pinion *y*, turned by its armature, the ring G is moved round in the increasing-temperature direction to the extent of one temperature degree without bringing the other pin into contact with the arm, and the increasing-temperature circuit is again immediately broken. A similar movement is effected in the decreasing-temperature direction whenever the arm N touches the contact-pin *t*. On the coil shaft or spindle P is also generally placed a hand or index Q, which, in connection with a dial-plate I, indicates the temperature of the place where the instrument is located.

The above principal parts of the instrument have been heretofore known and employed, and form no part of my present invention.

The features of the invention I will now proceed to describe.

First. I employ a central plate or flange B, provided with a tubular extension *c*, on which the thermostatic coil C is mounted. For the purpose of convenient adjustment the thermostatic coil is directly attached to a collar *d* by a set-screw *e* or its equivalent, which collar is screwed upon the tubular extension *c* and is itself held in its adjusted position thereon by a set-screw *f*.

Second. An inclosing inner cylinder D is secured to the base by simple screws passed through foot flanges *g g*, as shown. This cylinder or case is insulated from the base to which it is attached, as indicated by heavy black lines between the parts in the drawings. It may surround the thermostatic coil C, as shown in Fig. 1, but not necessarily, as indicated by the modification shown in Fig. 3. Its inner end opens to the surrounding space of the instrument, and thereby affords a space for the shaft or spindle P without contact with it. In addition to protecting the coil, as shown in Fig. 1, it may serve for attaching any part of the instrument in position near the spindle and to be insulated therefrom.

Third. Posts E E, carrying the grooved antifriction pulleys *h h* for holding the ring-circuit closer and breaker G, are employed. For insulating the parts held these posts are insulated from the base A, to which they are attached by foot screws, as shown in Fig. 1.

Fourth. An arch or bridge H is secured by foot flanges *i i* and screws passed through the same to the base and insulated from the base, as shown in Fig. 1. This arch or bridge supports and insulates the dial-plate I of the instrument, which is attached to its front or arch plate by screws *j j*.

Fifth. A cylindrical case L surrounds all the supporting parts above set forth, and it is itself secured to the base by screws passed through a base flange *k*, and is also insulated therefrom, all as shown in Fig. 1. This case surrounds and keeps firmly in place the dial-plate and has a lip *l* projecting upwardly from its outer or forward edge for the purpose of retaining in place a glass plate J, covering the front of the case. Back of the glass plate and occupying the distance between it and the dial-plate is a flanged ring K, fitting just inside of the case, and preferably, but not necessarily, secured to the dial-plate. Thus, while the outer cylindrical case surrounds all the parts of the instrument, it is not attached to any, and it may be lifted off away from them after it has been unscrewed from the base, whereby access may be readily gained to the interior of the instrument without disturbing the parts or interfering with the continued operation of the instrument, and, as shown, it also assists in holding some of the parts in place. Outside of this case, binding-screws *m n o* for the attachment, respectively, of the increasing-temperature, decreasing-temperature, and return or battery-circuit wires are secured to and insulated from the base, as shown in Figs. 1 and 2. The index shaft or spindle P at its rear or base end is stepped in the inner end of a screw-step M, which is screwed through insulating material *b* in the base and in through the central flange B. One end of the thermostatic coil C is secured adjustably to the shaft or spindle by a set-screw and sleeve *q*. The outer end of the shaft or spindle turns in a bearing *r*, attached to and insulated from the dial-plate I or its supporting bridge or arch H. The circuit-closing contact-arm N is shown adjustably attached to the shaft or spindle for an obvious purpose.

In Fig. 3 I show a modified arrangement of parts of the instrument as compared with the construction shown in Fig. 1. Here the position of the thermostatic coil C is removed to the vicinity of the dial-plate and the carrying-flange B is attached to and insulated from the said dial-plate. The screw-step M is still screwed to and insulated from the base of the instrument and has no immediate connection with the said flange. Other parts of the instrument remain the same as shown in Figs. 1 and 2.

I claim as my invention—

1. The combination of the insulated carrying-flange B, the thermostatic coil C, adjustably attached thereto, and the coil shaft or spindle P, which is operated by said coil and is mounted in insulated bearings, said shaft or spindle carrying a circuit-closer which is in electric connection with one pole of an electric battery, substantially as herein set forth.

2. The combination of the supporting-base A, flange B, inner cylinder D, posts E E, and arch or bridge H, all carrying different parts

of the instrument, which are adapted to be brought into electric communication with an electric battery or batteries and all separately insulated at their places of mounting or attachment to the instrument, whereby short-circuiting is prevented, substantially as herein set forth.

3. The combination, in an electric transmitting-instrument, of the supporting-base A, arch or bridge H, attached to and insulated from the base, dial-plate I, attached to said arch or bridge, and the inclosing-case L, attached to and insulated from the base and holding the dial-plate firmly in position, whereby said dial-plate and case are insulated from those parts of the instrument which electric currents traverse, substantially as herein set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

HENRY JANSEN HAIGHT.

Witnesses:
C. S. NEWELL,
MANLEY A. RAYMOND.