N. D. WYMAN.

TEMPERATURE ANNUNCIATOR.

APPLICATION FILED MAY 14, 1907.

913,180. Patented Feb. 23, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

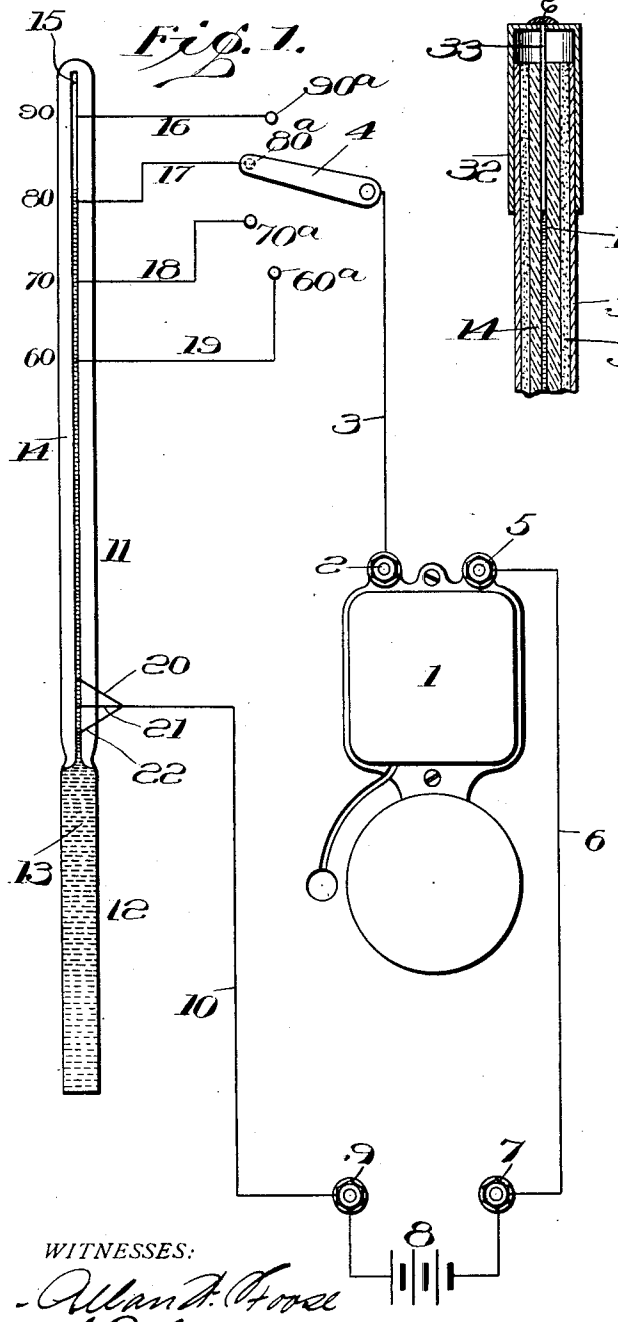
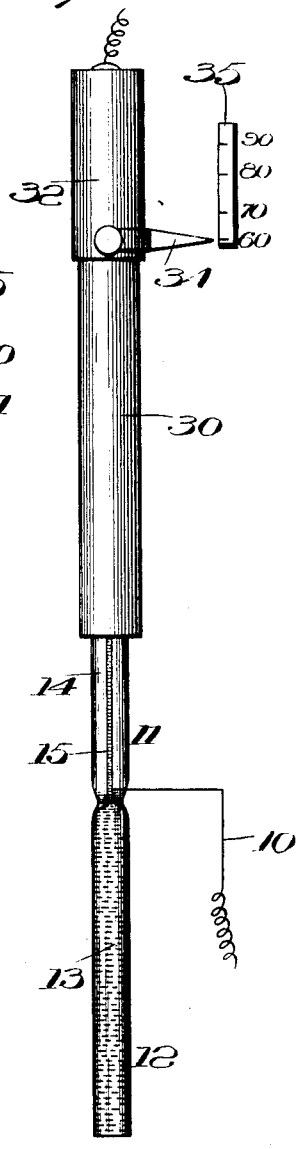


Fig. 3.

Fig. 2.



WITNESSES:

Allan A. Foote

F. Richards

INVENTOR

N. D. Wyman

BY

Wm. A. Megrath

ATTORNEY.

N. D. WYMAN.

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2 SHEETS—SHEET 2.

Fig. 4.

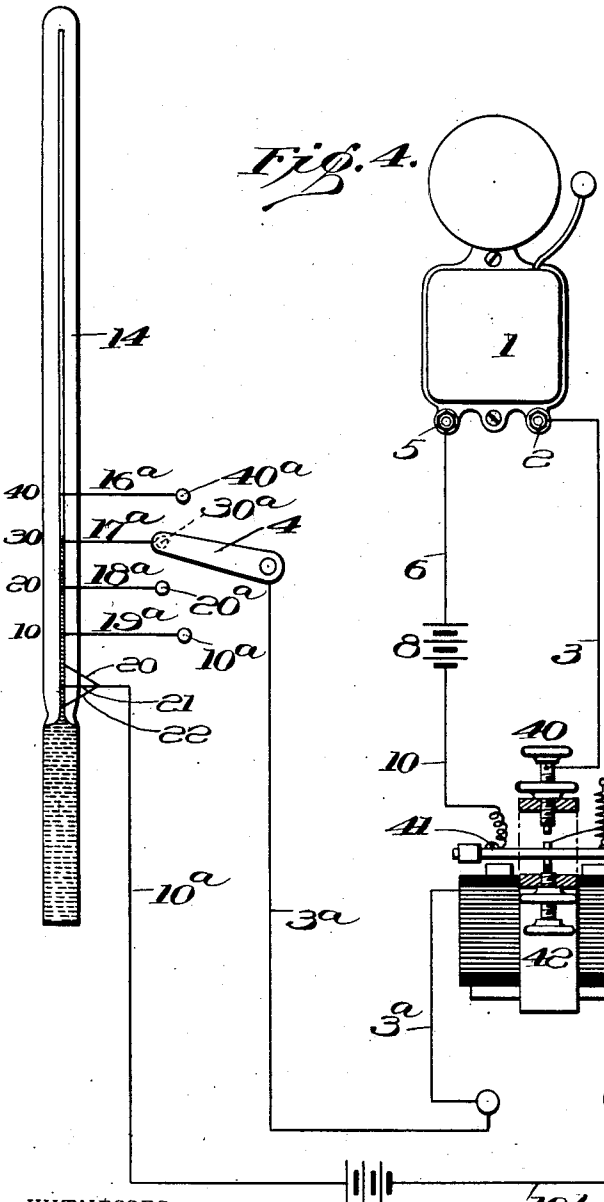
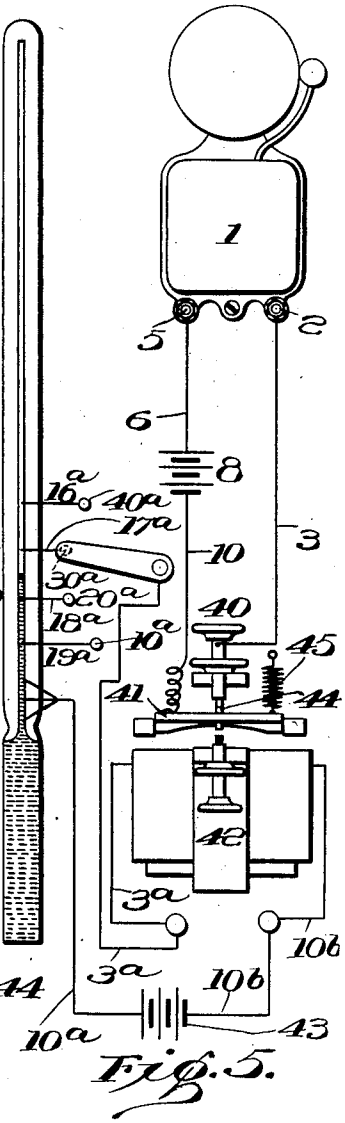


Fig. 5.



WITNESSES:

Allan F. Poore.

F. Richards

INVENTOR

N. D. Wyman

BY

Wm. A. Megrath

ATTORNEY.

UNITED STATES PATENT OFFICE.

NEHEMIAH D. WYMAN, OF MONTCLAIR, NEW JERSEY.

TEMPERATURE-ANNUNCIATOR.

No. 913,180. Specification of Letters Patent. Patented Feb. 23, 1909.

Application filed May 14, 1907. Serial No. 373,694.

To all whom it may concern:

Be it known that I, NEHEMIAH D. WYMAN, a citizen of the United States, and residing at Montclair, Essex county, New Jersey, have invented certain new and useful Improvements in Temperature-Annunciators, of which the following is a specification.

My invention relates to that class of temperature annunciators wherein an expansible liquid in a thermometer closes or opens an electric circuit to cause an alarm device to operate when the temperature has risen to or fallen below a predetermined point.

One of the objects of my invention is to so construct such an annunciator that it will be prompt and accurate in operation.

Another object is to produce such a device at reasonable expense and so that it may be readily and quickly installed.

Other objects will appear from the hereinafter description.

The invention consists of certain novel features of construction, combination and arrangement of parts, all of which will be hereinafter set forth and particularly pointed out in the claims.

In the accompanying drawings which form a part of this application, I have illustrated what I now consider to be the best form of my apparatus.

Referring to the drawings in which the same reference character indicates the same part in the several views, Figure 1 is a view of the apparatus to be used for operating the annunciator at high temperatures. Fig. 2 illustrates a modification of certain connections between the thermometer and the annunciator. Fig. 3 is a sectional view showing a detail of the construction of the upper part of Fig. 2. Fig. 4 is a view illustrating the apparatus to be used for low temperatures. Fig. 5 illustrates the same apparatus with some of the parts in different positions from that shown in Fig. 4.

Referring specifically to Fig. 1 of the drawings, the part marked 1 represents an annunciator which, in this case, is an ordinary electric bell. Leading from one of the binding posts 2 of this bell, is a wire 3 which connects to the pivoted arm 4 of a switch. Leading from the other binding post 5, is a wire 6 which is connected to one pole 7 of a battery 8. From the other pole 9 of this battery extends the wire 10. 11 is a liquid thermometer, one end of which is provided with the usual enlargement of bulb 12, which contains an expansible liquid 13, preferably mercury. The tube 14 of the thermometer has the usual bore 15, which communicates with the bulb and into which the mercury rises or falls as the temperature increases or decreases. Projecting through the wall of the tube, at the upper end thereof and into the bore in the path of the mercury column at predetermined points, 60, 70, 80 and 90, respectively, are the ends of a series of conducting wires 16, 17, 18 and 19. The other ends of these wires are connected to terminals 60^a, 70^a, 80^a and 90^a, respectively of a switch, the pivoted arm 4 being adapted to be placed in contact with any one of these terminals to make connection between the wire 3 and either one of the wires 16, 17, 18 or 19. Projecting through the wall of the tube below the wire 19, and near the lower end thereof, but above the bulb 13 is a series of conducting wires 20, 21 and 22, which series is connected to the wire 10. The lower wires 20, 21 and 22 form one terminal of the circuit and either one of the wires 16, 17, 18 or 19 forms the other terminal. When it is desired that the annunciator should operate at a predetermined temperature, the lever 4 is placed on the switch terminal corresponding to that temperature. When the mercury in the tube reaches the end of the wire corresponding to said temperature, the circuit is completed through the mercury column and the bell rings and continues to do so until the temperature is again lowered or the circuit broken by moving the switch lever 4. As illustrated in Fig. 1, the switch-lever 4 is set so that the annunciator will ring at 80°, and this figure shows that the mercury is slightly above the wire 17 fixed in the mercury tube at 80°.

In Figs. 2 and 3 we have shown a different construction of terminal for the thermometer. In this construction the upper end of the thermometer tube is surrounded by a sleeve 30, said sleeve and the thermometer being connected together by cement 31. Tightly but slidably fitted over the upper end of the sleeve is a cap 32, the upper end of which is closed. Projecting from the inner surface of this cap and into the bore 15 of the tube 14, is a wire 33. The wire 3 leading from the annunciator is electrically connected to this wire 33. Secured to the cap 32 is a finger 34 which points to the scale 35, indicating the temperature. In this construction, the wire 10 from the bat-

tery leads directly through the tube and into the mercury column, although in this construction this wire 10 may be provided with three branches 20, 21 and 22 as shown in Fig. 1. In operating this device the cap is raised or lowered until the finger 34 points to the predetermined temperature at which the annunciator is to be sounded as shown at 60°. When the mercury rises in the column until it comes in contact with the inner end of the rod or wire 33, the electric connection is made and the annunciator 1 is operated and will continue to operate until the cap is raised to bring the rod 33 out of contact with the mercury or the temperature falls.

In Figs. 5 and 6 I have shown the apparatus constructed to be used for low temperatures and where the annunciator is operated when the temperature falls below a predetermined point. In this construction, instead of the annunciator wires 3 and 10 leading directly to the thermometer tube, they are connected to the terminal 40 and the armature 41, respectively, of a relay 42. In this construction the terminals 20, 21 and 22 are connected to the wire 10^a of the local battery 43 and the other wires 10^b of this battery lead to the relay. 16^a, 17^a, 18^a and 19^a are terminal wires projecting through the wall of the tube 14 near the lower end thereof and at predetermined low temperatures as shown, 40°, 30°, 20°, and 10° respectively. These wires are connected to the switch terminals 40^a, 30^a, 20^a and 10^a respectively. Leading from the switch arm to the annunciator is the conducting wire 3^a. In this construction, the relay circuit is normally closed, as the annunciator is to ring only when the temperature falls. As shown in these figures, the annunciator is set to ring when the temperature falls below 30°.

Fig. 4 shows the mercury above 30°, in which case the relay circuit is closed and the armature 41 is pulled towards the pole of the relay, the point 44 of the armature is out of contact with the terminal 40 and the bell circuit is open. When the temperature falls below 30° the mercury in the tube is out of contact with the wire 17^a, whereby the relay circuit is open, the relay magnets are deenergized and the armature 41 is pulled over by the spring 45 so that its point 44 will come in contact with the terminal 40, whereby the annunciator circuit is closed and the annunciator is caused to ring.

Fig. 5 shows the position of the parts when the temperature has fallen below 30° as set forth in Fig. 4.

While I have shown in Figs. 1, 4 and 5, more than one wire for the lower terminal, yet it is to be understood that this is merely the preferred construction, as the wire 10 or 10^a can be run directly through the wall of the tube into the mercury column. It is to be noted also that whether one or more wires are used for this, the lower terminal should be placed in the tube above the bulb. I do this for the reason that I have discovered in all such apparatus with which I am familiar, this terminal has been placed in the bulb itself, which is objectionable for the reason that when the circuit is completed, the mercury in the bulb is heated and as the mercury rises in the tube it becomes separated and it often happens that there is not a complete circuit through the mercury in the tube, and therefore, the annunciator will not ring at the predetermined point. The disadvantage of this, of course, is apparent.

While I have shown the high and low temperature alarms connected to the tube separately, yet it comes well within the scope of my invention to place high and low temperature terminals in the same tube and set the apparatus so that the annunciator will operate at either a predetermined high or low temperature.

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

1. In a device of the class described, an expansible liquid thermometer, a series of terminal wires projecting through the wall of the thermometer tube above the bulb thereof and into communication with the liquid therein, each of said wires connected to a single circuit wire a series of other wires also projecting through the wall of the thermometer tube and above the first mentioned wire at a predetermined point, a battery, an annunciator, circuit wires connected to the battery and annunciator, and a switch connected to one of said circuit wires and adapted to be moved to each one of the series of wires projecting in the thermometer tube, whereby upon the change of temperature the annunciator will be operated.

2. In a device of the class described, an expansible liquid thermometer, a series of wires projecting through the wall of the thermometer tube above the bulb and in communication with the liquid in the tube and connected to a single circuit wire, a sleeve on the upper end of the tube, a cap movable on said sleeve, a wire or rod connected to said cap and projecting into the bore of the tube, a circuit wire connected to said rod, an annunciator, and a battery in the circuit as and for the purpose set forth.

3. In a device of the class described, an expansible liquid thermometer, a series of wires projecting through the wall of the tube of the bulb and into the liquid therein above the bulb and connected to a single circuit wire, another series of wires projecting through the wall of the tube and into the bore thereof above the first mentioned wire, a switch adapted to be moved into contact with each one of the last mentioned wires, a circuit leading from the switch to the first

mentioned wire, a battery in said circuit, a relay in the circuit, another circuit connected to said relay, and an annunciator in said second circuit as and for the purpose set forth.

4. In a device of the class described, an expansible liquid thermometer, a series of wires projecting through the wall of the thermometer tube above the bulb of the tube and into the liquid therein, another series of wires above the first mentioned wires projecting through the wall of the tube and into the bore thereof, each of said second mentioned wires connected to a switch, a switch lever adapted to be connected with any one of said wires, a circuit leading from said switch lever and to the first series of wires, a battery and a relay in said circuit, a second circuit connected to the armature of the relay and to a terminal on said relay, and an annunciator in said circuit as and for the purpose set forth.

In witness whereof I have hereunto set my hand at the city of New York, county of New York and State of New York, this 26th day of April, 1907.

NEHEMIAH D. WYMAN

In presence of—

T. RICHARDS,

ALLAN W. FOOSE.