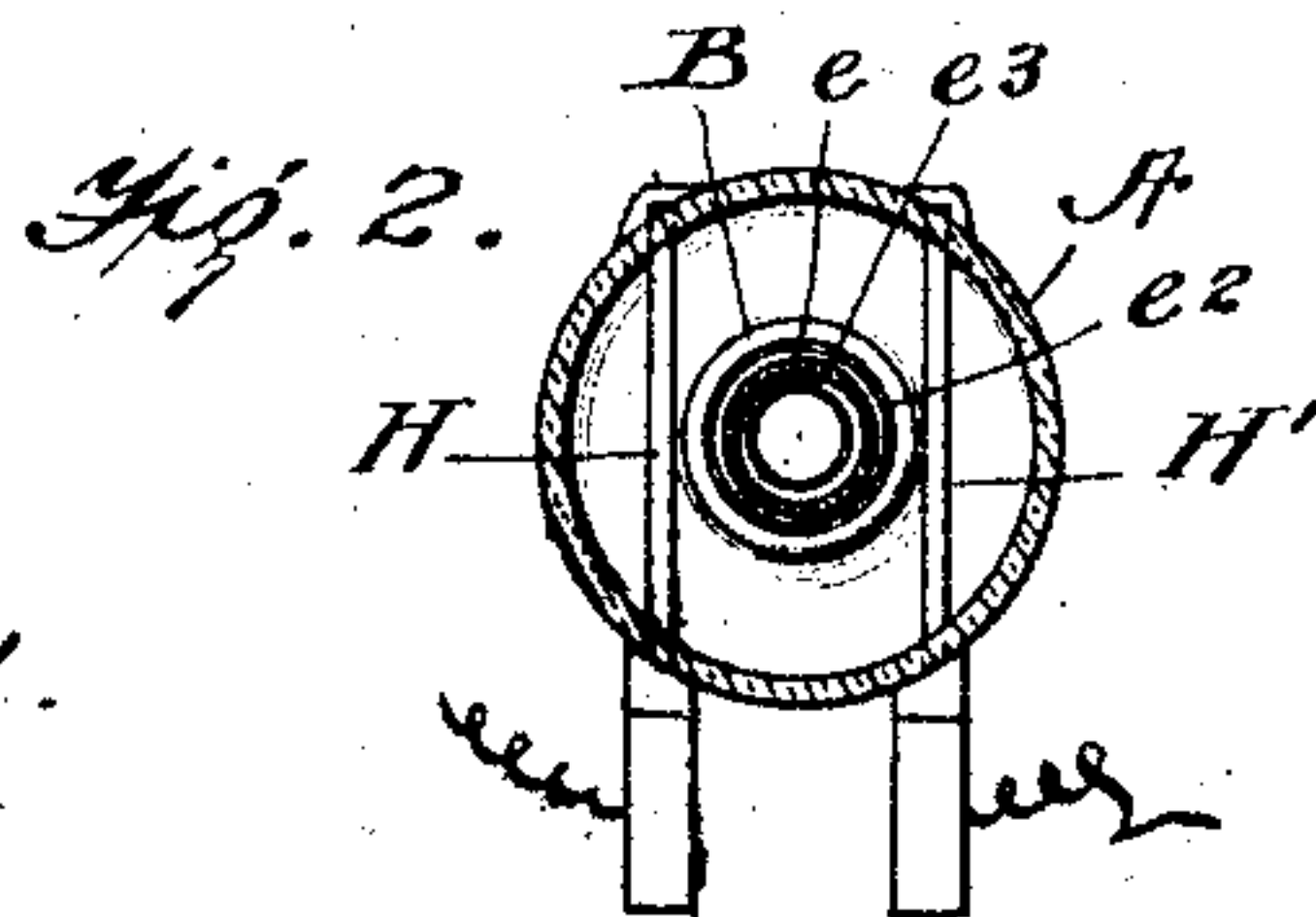
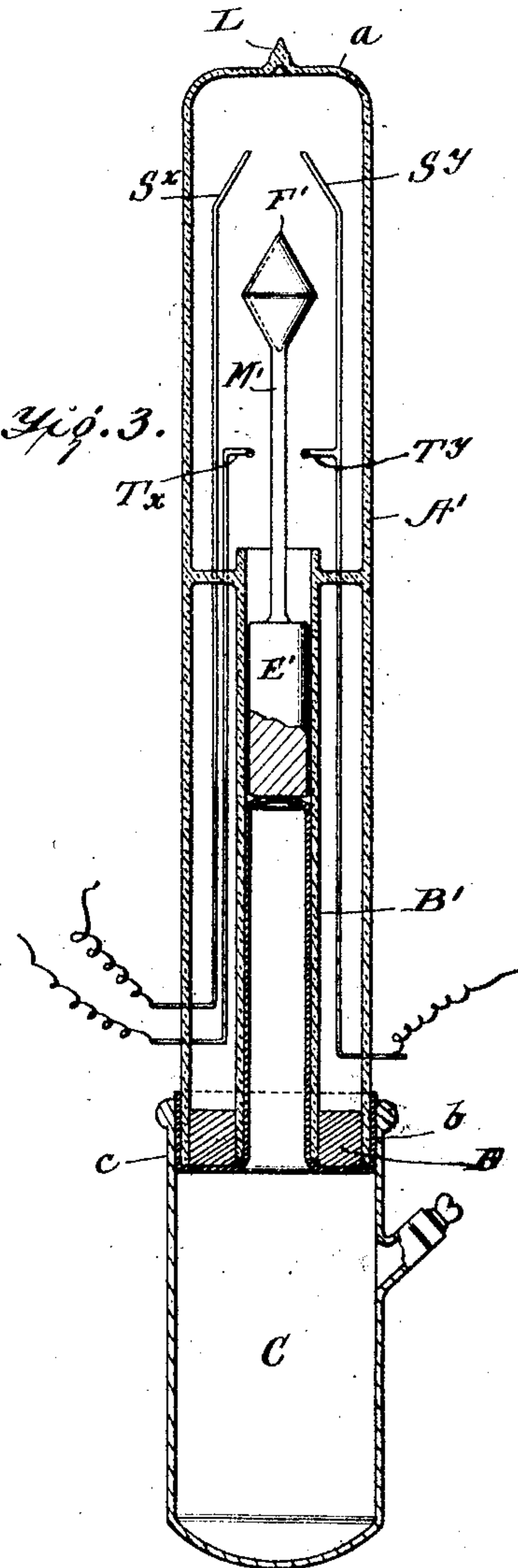
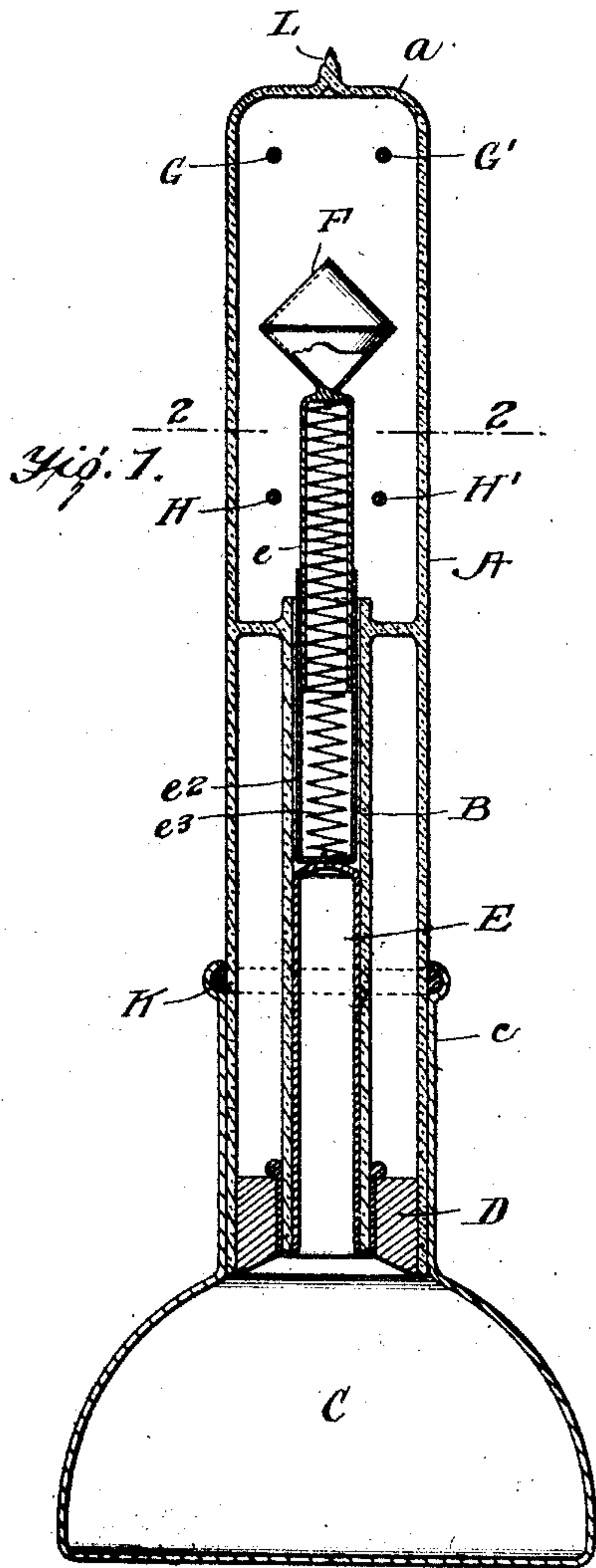


R. H. WAITE.
THERMOSTAT.

APPLICATION FILED JUNE 16, 1909.

975,909.

Patented Nov. 15, 1910.



WITNESSES

L. H. Schmidt.
L. A. Stanley

INVENTOR
RICHARD HYDE WAITE,
BY *Munn & Co.*
ATTORNEYS

UNITED STATES PATENT OFFICE.

RICHARD HYDE WAITE, OF DENVER, COLORADO.

THERMOSTAT.

975,909.

Specification of Letters Patent. Patented Nov. 15, 1910.

Application filed June 16, 1909. Serial No. 502,454.

To all whom it may concern:

Be it known that I, RICHARD HYDE WAITE, a citizen of the United States, and a resident of Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Thermostats, of which the following is a specification.

My invention relates to improvements in thermostats for closing electric circuits, and it consists in the constructions, combinations and arrangements herein described and claimed.

An object of my invention is to provide a thermostat which may be used to close a circuit at a high temperature, as in case of a fire, and thus sound an alarm or to close a circuit at a predetermined low temperature. In the latter case the device may be used to sound an alarm if crops are in danger of frost or to operate devices for starting smudge fires.

A further object of my invention is to provide a thermostat operated by the expansion and contraction of mercury in which the fluid is inclosed in a vessel from which it cannot escape even if vaporized and in which the movement of the contact maker is accomplished by means of a resilient tube which is stretched by the force of the expanding fluid.

Other objects and advantages will appear in the following specification and the novel features of the device will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings in which—

Figure 1 is a vertical section through the device; Fig. 2 is a horizontal section along the line 2—2 of Fig. 1, and Fig. 3 is a vertical section through a modified form of the device.

In carrying out my invention I provide an outer tube or casing A, preferably of glass, having a smaller concentric tube B disposed therein. The outer casing is closed at the upper end *a*, and the lower end *b* projects into the open end *c* of a receptacle C arranged to contain mercury or other liquid. In the lower end of the tube A is a centrally perforated partition D through the opening of which the tube B extends. In the lower end of the tube B is a rubber thimble E which extends under the lower edge of the tube and is bent up so as to lie between the tube and the partition D.

In the upper part of the tube B is the movable plunger. This comprises two hollow telescopic sections *e* and *e*² containing a spiral spring *e*³; the upper section bearing the metallic contact head F which has the shape of a double cone and is designed to make connection between the upper terminals G' and G and between the lower terminals H' and H. The lower receptacle C is made gas tight by a resilient ring K which fits in a groove at the top of the part *c* and bears against the tube or casing A.

From the foregoing description of the various parts of the device the operation thereof may be readily understood. The air from the upper part of the casing A is exhausted and the casing is sealed at L. The rubber thimble E and the receptacle C are filled with mercury, the exact amount depending upon the calibration of the device. When the device is heated the expansion of the mercury causes the resilient tube to stretch and to move the plunger *e* so as to bring the head F into contact with the terminals G and G' thereby completing a circuit through them. When the temperature lowers the mercury contracts and the contraction of the tube E allows the plunger to fall until the head contacts with the lower terminals H and H'. The purpose of the telescopic sections *e* and *e*² is to allow the head to engage the terminals G and G' and in case the temperature should increase to permit the lower section to rise without moving the upper.

In Fig. 3 I have shown a modified form. In this form the plunger E' is solid and has a rod M' projecting from it which bears the head F' arranged to engage the two upper contact springs S^x and S^y and the lower terminals T^x and T^y. In this form of the device the end of the rubber thimble is between the main casing A' and the partition D'.

In the preferred form and in the modification the upper terminals are in one electric circuit and the lower terminals are in another. The device may be made to sound an alarm by closing the circuit as in case of fire when the temperature rises or to sound an alarm when the temperature drops below a predetermined point. The inclosure of the mercury in an air tight receptacle prevents the failure of the apparatus to work on account of the vaporization of the mercury when the temperature rises.

I claim:

1. A thermostat comprising a fluid receptacle, a fluid in said receptacle, a resilient tube closed at its upper end and forming an
5 extension of said receptacle, a rigid tube surrounding said resilient tube, a plunger in said rigid tube adapted to be moved by said resilient extension, a contact head carried by said plunger, upper fixed contacts
10 arranged to be engaged by said contact head when the resilient tube is extended through the expansion of the fluid and lower contacts arranged to be engaged by the contact head when the resilient tube retracts from
15 the contraction of the fluid.
2. In a thermostat, a casing, a fluid receptacle secured to the lower part of said

casing, a rigid tube in said casing, a plunger in said rigid tube, said plunger consisting of telescopic members, one of said members bearing a contact head, a resilient tube closed at one end and in communication with the fluid receptacle at the other end said resilient tube disposed in said rigid tube and arranged to engage the other of said telescopic members, a spring normally forcing said telescopic members apart, upper and lower fixed contacts arranged to be engaged by said contact head, and an expansible fluid in said receptacle and said resilient tube.

RICHARD HYDE WAITE.

Witnesses:

C. E. HERRINGTON,
F. M. HARTKNOCH.