

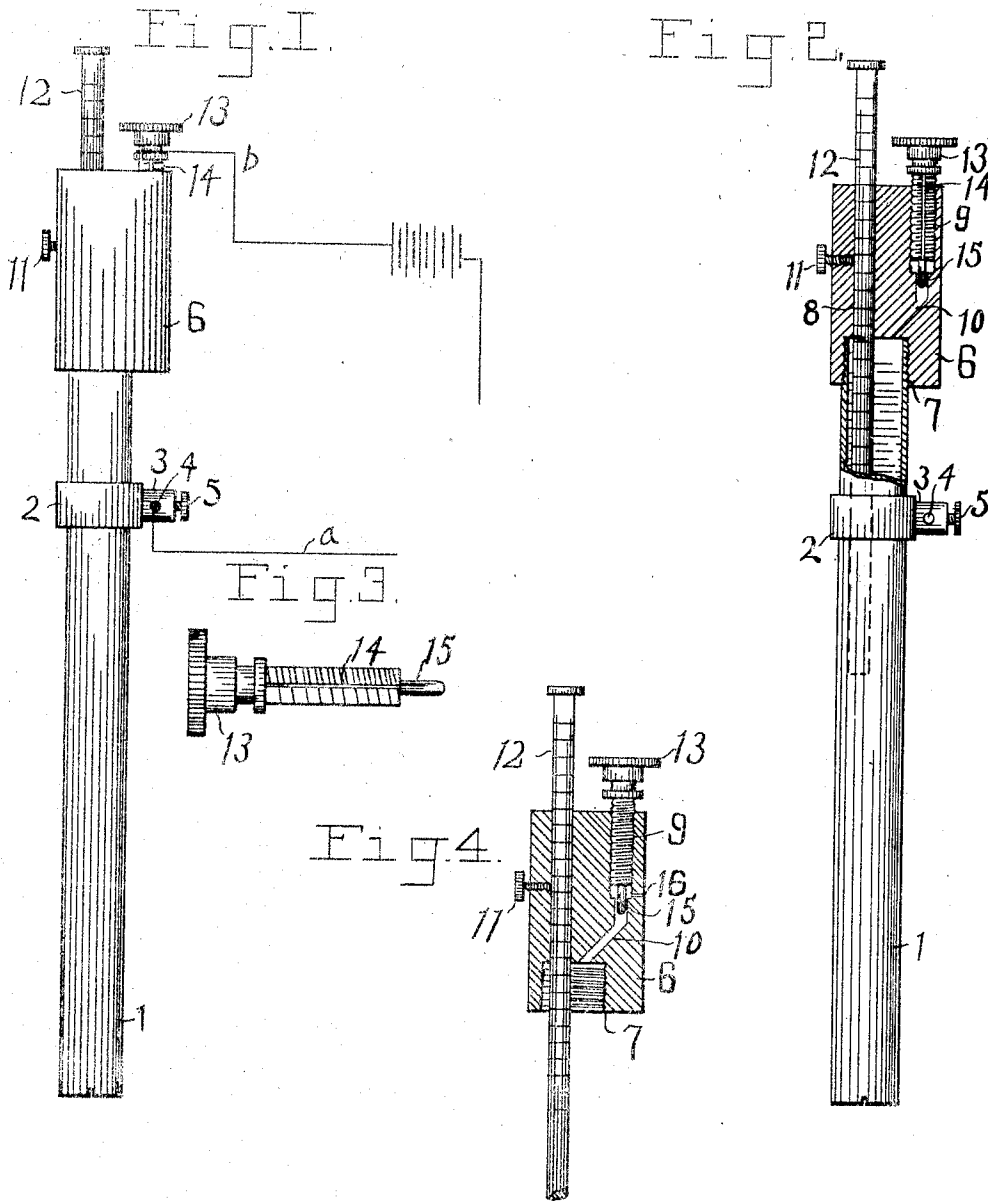
J. BOEKEL.

THERMOSTAT.

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983,345.

Patented Feb. 7, 1911.



WITNESSES

Henry H. Balcock.
Alex. Scott

INVENTOR

Julius Boekel
By W. H. Babcock
Attorney

UNITED STATES PATENT OFFICE.

JULIUS BOEKEL, OF PHILADELPHIA, PENNSYLVANIA.

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To all whom it may concern:

Be it known that I, JULIUS BOEKEL, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Thermostats; and I 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.

This invention relates to thermostats and more particularly to the means of adjusting the same.

It also relates to the particular construction of the adjusting screw and other features hereinafter set forth. Its object is to provide a finer and larger range of adjustment, to provide an escape for the air which would otherwise be compressed at the top of the mercury chamber and so hamper the expanding of the latter and to produce a cheap, simple and perfect instrument, all of these objects being attained by the construction and combination of parts hereinafter more particularly set forth and claimed.

In the accompanying drawings: Figure 1 represents a view in front elevation of a device embodying my invention, circuit wires *a* and *b* being connected to their respective posts and being broken off short, and a battery through which one of said wires runs. Fig. 2 represents a vertical sectional view through the thermostat, omitting the wires and battery; Fig. 3 represents an enlarged detail view of the adjusting screw as shown in Fig. 2; and Fig. 4 represents a slight modification in the upper part of my invention, in which the air-vent extends through from the side of the plug.

1 designates a long cylindrical tube for holding the mercury. Said tube is provided with external screw threads on its upper end and a slot across its bottom end for assisting in screwing and unscrewing the tube or receptacle. The material used in said tube may be of any metal or other substance that will act as a suitable conductor for the electric current or the contacts might be run through a non-conductor material to the mercury.

2 designates the attaching collar, which fits tightly around the tube 1 just below the screw-threads before mentioned, for the wire *a* and is provided with a laterally projecting stud 3. This stud is provided with a hole 4

for the insertion of said wire *a* and is screw-tapped in its end to permit the thumb-screw 5 to be screwed into the stud and to project into the hole 4. After the wire *a* is inserted in the hole 4 the screw 5 will be screwed into the stud and will engage and bind the wire *a* firmly in position.

6 designates a block, closure or plug composed of some non-conductible or insulating material having an internally screw-threaded recess 7 in its lower end corresponding in size to the external size of the externally screw-threaded end of tube 1. Said plug has a straight hole or channel 8 extending straight through from its top to the top of said recess and an internally screw-threaded recess 9, which extends only part way from the top of said plug. A slanting channel or passage 10 connects the lower part of this screw-threaded recess 9 with the top of the recess 7 at a point near the lower end of channel 8. Said plug is screw-tapped at a point near its top to allow the insertion of the screw 11 at right angles to and entering into the channel 8.

12 designates the plunger rod which passes through channel 8 and is locked in any desired position by means of the screw 11. This rod may be graduated in any manner desired, in the present instance being merely provided with circular marks at regular intervals. It has for its object to enter the mercury and, being of medium size, to cause the rise of the mercury in the tube when the rod is lowered and to cause the lowering of the mercury when the rod is partially withdrawn from the tube. Thus it will be seen that by causing the rise and fall of the mercury this rod itself aids greatly in the adjustment of the thermostat, giving it a very wide range or adjustment.

13 designates the adjusting screw which is screwed into the internally screw-threaded recess 9 and the point 15 of which makes electric contact with the mercury when a certain predetermined degree of heat has been attained, thus forming the circuit. The thermostatic device has therefore a liquid contact and a solid contact which close the electric circuit when they meet. Each of these is independently adjustable toward the other, in order that the making or breaking of circuit at will may not exclusively depend on either of the said adjustments. Furthermore the screw 13 takes part in both of these adjustments for it

supplies the air-vent which makes the action of plunger 12 on the fluid possible, besides positively adjusting the contact point 15 toward or from said fluid. The wire 7 before mentioned is secured to the upper end of this screw and around the groove near the lower end of the head of the screw. It might be secured to this screw of course in any suitable manner. So far this screw is old, but it embodies a feature which is thought to be new. This is the vertical groove 14, extending only as far up and down as the screw-threads, thus allowing communication between the inside of the tube and the atmosphere when the screw is not turned home and preventing the escape of or loss of mercury when the screw is turned home for convenience in shipping the article from point to point or carrying it.

This thermostat may of course be used for regulating a heater system, for giving an alarm or other purposes of a somewhat similar nature and therefore I have thought it best to show the thermostat by itself, with its battery and the two wires of the circuit, but no particular device to be operated, for it makes no difference what it operates.

The mercury in the tube extends to near the top thereof (see Fig. 2).

In the modification shown in Fig. 4 the air vent 16, extending through the side of plug 5 from the lower end of the screw-threaded recess 9 takes the place of the groove 14 and is closed in the same way, that is, by turning the screw tightly home.

The operation is as follows: Say the device is adjusted to work or to close the circuit at 80 degrees in the drawings. When that temperature is reached the contact of point 15 and the mercury will take place closing the circuit and operating the apparatus which it controls. If it be desired to adjust the thermostat to close the circuit at 70 degrees, the screw 11 is given about half a turn and the plunger is lowered one mark when the screw is again tightened to lock the plunger rod in place. This forces the rod farther down into the mercury in

the tube and necessarily causes a higher level of the same. Of course it will not have to expand so much to form a contact with the point 15. If on the other hand it be desired to adjust the thermostat to form a circuit at 90 degrees the screw 11 is given a half turn and the plunger is withdrawn one mark when the screw is again tightened to lock the plunger rod in place. -This action of course withdraws the rod one mark from the former position in the mercury and necessarily causes a lower level of the same, thus it will have to expand more to make the contact.

The screw 13 has of course a fair range of adjustability and is to be used mainly in making fine adjustments, though it might be used independent of the plunger rod or they both might be adjusted to their widest range, but it is quicker to adjust roughly by one and then to adjust finely by the other and as said before it gives a very wide range of adjustability.

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

In a thermostatic device forming part of an electric circuit, a receptacle for containing conducting fluid, in combination with a plunger for mechanically raising or lowering the level of said fluid at will, a closure for said receptacle having a bore through which said plunger moves, also a threaded passage in the closure leading to the interior of said receptacle and a screw engaging the threads of said passage for adjustment and having at its lower end a contact point which enters said passage and may be adjusted up or down therein, this screw being also provided with an air-vent groove substantially as set forth.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

JULIUS BOEKEL.

Witnesses:

JOHN H. SCHIERER,
F. MANGOLD.