J. R. CARPENTER.

ELECTRIC THERMOSTAT.

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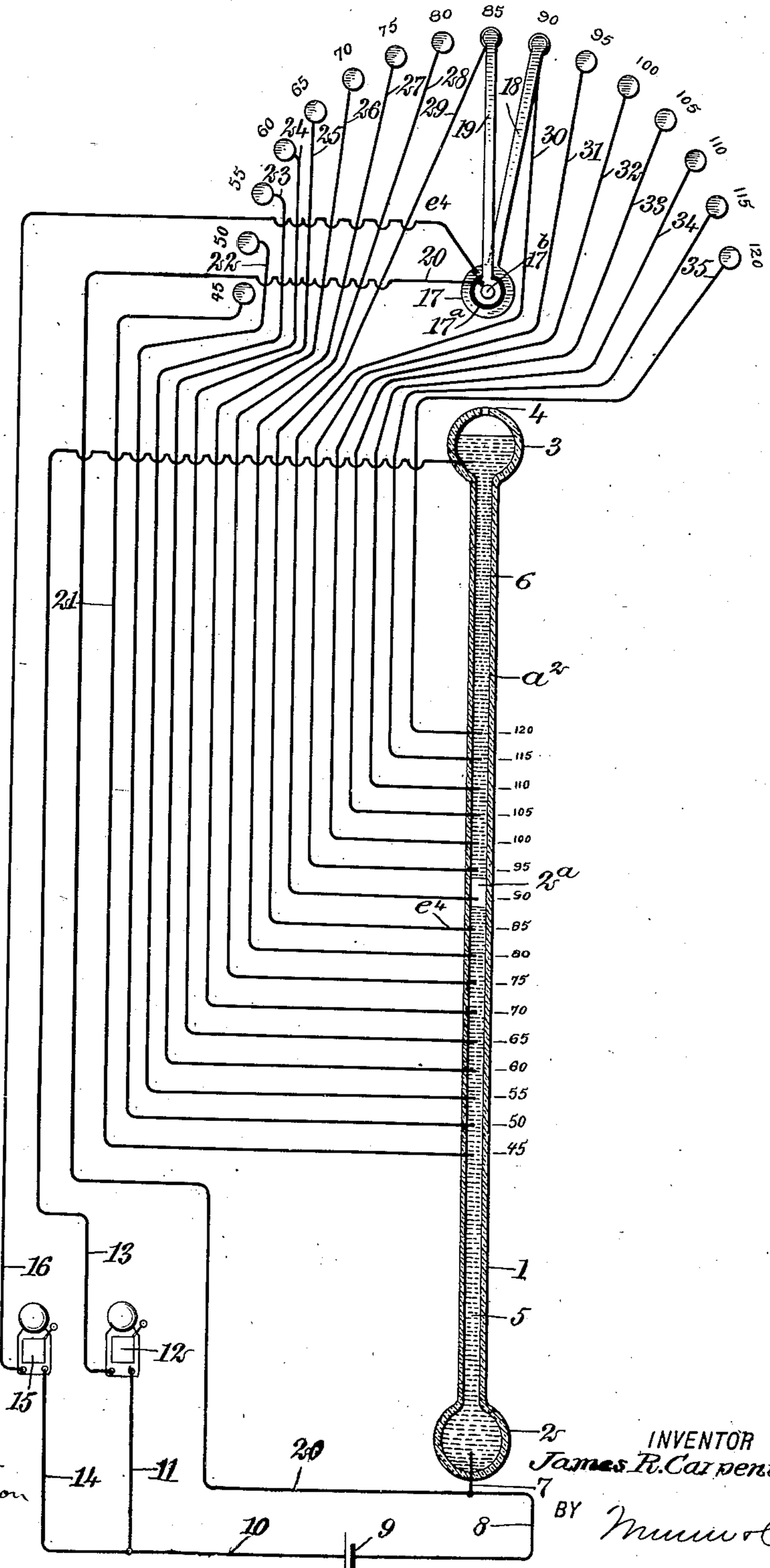
935,460.

Patented Sept. 28, 1909.



UNITED STATES PATENT OFFICE.

JAMES RICELY CARPENTER, OF HANCOCK, MICHIGAN, ASSIGNOR OF ONE-HALF TO THEODORE A. STELLER, OF HOUGHTON, MICHIGAN.

ELECTRIC THERMOSTAT.

935,460. Specification of Letters Patent. Patented Sept. 28, 1909.

Application filed August 31, 1908. Serial No. 450,950.

To all whom it may concern:

Be it known that I, JAMES RICELY CARPENTER, a citizen of the United States, and a resident of Hancock, in the county of Houghton and State of Michigan, have invented a new and Improved Electric Thermostat, of which the following is a full, clear, and exact description.

My invention relates to electric thermostats, my more particular purpose being to provide a construction in which the action is alternative; that is to say, either an increase or a decrease in the temperature beyond a predetermined limit will cause an alarm to be actuated.

My invention further relates to means whereby the device may be readily adjusted for different temperature limits.

More particularly stated, I arrange a thermometer so as to complete a circuit when the temperature is lower and to complete another circuit when the temperature is higher, each circuit being provided with its own bell, or other mechanism. I further provide a switch having two switch arms and a number of contact buttons and so arranged that the operator, by shifting the positions of the respective switch arms, can, within proper limits, control and determine the particular number of degrees as a maximum temperature, and the particular number of degrees as a minimum temperature, which will cause a circuit to be completed by aid of the thermometer.

Reference is to be had to the accompanying drawing forming a part of this specification, in which the view shows diagrammatically one form of apparatus embodying my invention, this view showing particularly my thermometer of special construction, the two switch arms movable relatively to each other, the wiring, the two bells, one for indicating a high temperature and the other for indicating a low temperature, and the battery for energizing the entire system.

A tube 1 of glass is provided at its bottom with a bulb 2. It is further provided at its top with a bulb 3 having a vent 4. A quantity of mercury 5 fills the bulb 2 and extends upwardly in the tube 1. A quantity of mercury 6 is disposed partially within the bulb 3 and partially within the upper portion of the tube 1. Disposed intermediate the columns of mercury is a small quantity 2^a of air or other insulating matter. The size of the tube or stem 1 is such that the body 2^a of liquid keeps the columns 5, 6 of mercury at all times separate, and the body 2^a of liquid also insulates the two columns of mercury from each other.

A wire 7 is sealed into the bulb 2 and is connected by a wire 8 with a battery 9, and connected with this battery is a wire 10. A wire 11 leads from the wire 10 to a bell 12, and from the latter a wire 13 leads upwardly to the bulb 3. This wire, at its upper end, is in direct contact with the mercury in the bulb 3. A wire 14 is connected with the wires 10, 11, and is also connected with a bell 15. From the latter a wire 16 leads to a sleeve 17 of metal. All wires used are preferably of platinum or tipped with this metal. Rigidly mounted upon this sleeve and revoluble with it is a switch arm 18.

At 17^a is a sleeve of insulating material and mounted within the same is a stub shaft 17^b. Connected with the latter is a switch arm 19. A wire 20 is connected with the stub shaft 17^b and also with the wires 7, 8. A series of wires 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35 are connected respectively with the contact buttons numbered 45, 50, 55, 60, 65, 70, 75, 80, 85, 90, 95, 100, 105, 110, 115, 120. These numbers represent degrees of temperature and each of the wires 21 to 35, inclusive, thus has a relation to a particular temperature. The numbers 45, 50, 55, etc., also appear as graduations relatively to the tube 1.

The operation of my device is as follows: I will assume for convenience that the apparatus is to be used in connection with a heating plant and that the operator desires an alarm to be sounded whenever the temperature of the apparatus exceeds 90 degrees or drops below 85 degrees Fahrenheit. The operator moves the switch arm 19 upon the button adjacent to the legend 85, and also moves the switch arm 18 upon the contact button adjacent to the legend 90, as will be seen from the top of the figure. The insulating body 2^a now normally covers the lower end of the wire 30. The intention of the operator is to maintain the general temperature as nearly as possible between 85 and 90 degrees. He desires an alarm to be sounded if the mercury column 5 rises to a point where its upper end engages the lower

end of the wire 30. He also desires an alarm to be sounded if the column 6 of mercury drops to such a point that its lower end engages the wire 29. Between these limits, representing respectively 90 and 85 degrees, no alarm is to be sounded. Suppose, now, that the general temperature rises. The column 5 of mercury expands so that the upper end of this column reaches the lower end of the wire 30. The following circuit is thus completed: battery 9, wire 8, wire 7, mercury column 5, wire 30, switch arm 18, wire 16, bell 15, wire 14, wire 10, back to battery 9. This rings the bell 15 and apprises the operator that the general temperature has risen to 90 degrees. Suppose, further, that the temperature drops to 85 degrees. In this event the lower end of the column 6 of mercury reaches the lower end of the wire 29. The following circuit is thereby completed: battery 9, wires 8, 20, stub shaft 17^b, switch arm 19, wire 29, mercury column 6 (now touching end of wire 29), wire 13, bell 12, wires 11, 10, back to battery 9. The operator, noting the particular tone of the bell 12 or 15, can determine from the sound thereof whether the alarm means an excess or a diminution of heat. By moving the switch arms 18, 19 into different positions, the operator may vary, within wide limits, the sensitiveness of the apparatus. For instance, by moving switch arm 18 to the button represented by the legend 95, the maximum temperature must rise to 95 degrees before the bell 15 is sounded. Similarly if the switch arm 19 be moved upon the button represented by the legend 80, the temperature must drop to 80 degrees before the bell 12 is sounded.

While the heat-controlled element in the tube is shown as mercury, I do not limit myself thereto, as any other substance or member, sensitive to changes in temperature, may be employed.

I do not limit myself to any particular form or any special material to be used in the construction of any part except as defined in my claim.

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

An electric thermostat, comprising a maximum and minimum thermometer, an alarm controllable by maximum temperatures thereof, an alarm controllable by minimum temperatures of said thermometer, said alarms including electric circuits, a plurality of contact members connected with said maximum and minimum thermometer, and a plurality of contact levers, one being connected with one of said alarms and the other with the other of said alarms, said contact levers being revoluble about a common center and movable independently of each other, in relation to said contact members for the purpose of engaging and disengaging the same.

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

JAMES RICELY CARPENTER.

Witnesses:
WILLIAM J. KERREDGE,
C. O. OLIVIER.