No. 742,494. PATENTED OCT. 27, 1903.

A. ROESCH.

THERMOSTAT.

APPLICATION FILED OCT. 27, 1902.

NO MODEL.

Fig. 1,

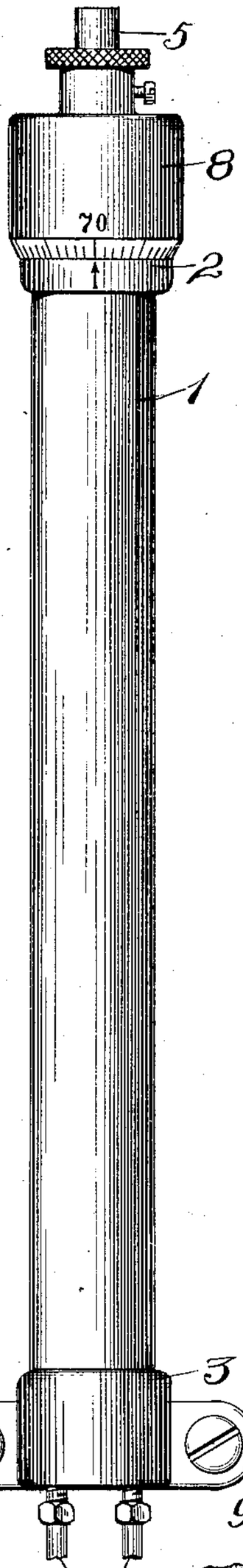
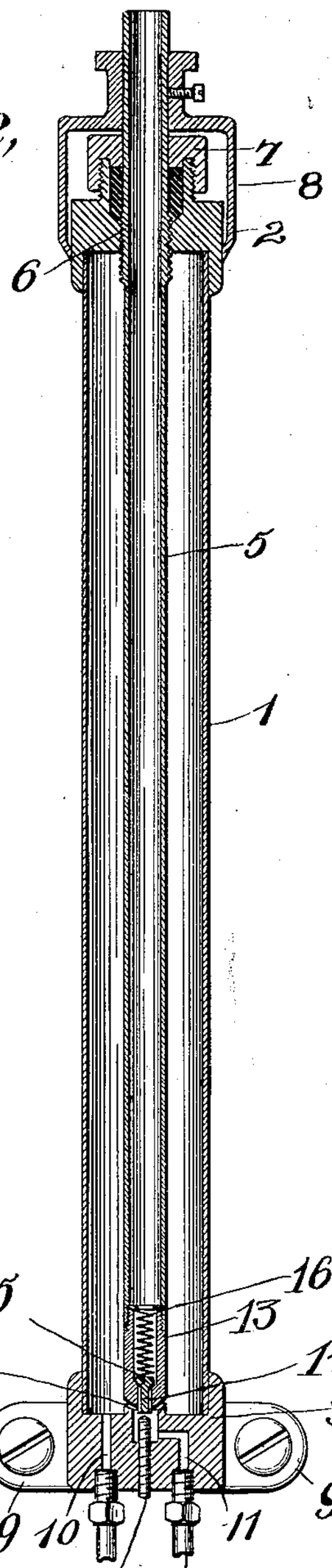
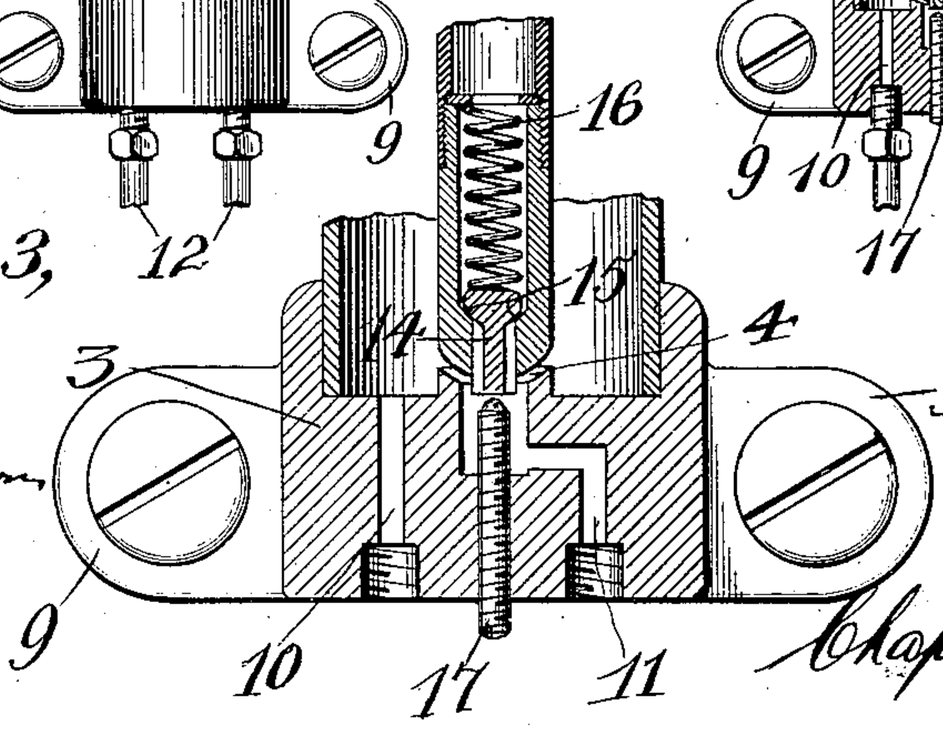


Fig. 2,





WITNESSES:

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No. 742,494. Patented October 27, 1903.

UNITED STATES PATENT OFFICE.

ALFRED ROESCH, OF BRIDGEPORT, CONNECTICUT, ASSIGNOR TO DAVIS & ROESCH TEMPERATURE CONTROLLING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

THERMOSTAT.

SPECIFICATION forming part of Letters Patent No. 742,494, dated October 27, 1903.

Application filed October 27, 1902. Serial No. 128,860. (No model.)

To all whom it may concern:

Be it known that I, ALFRED ROESCH, a citizen of the United States of America, and a resident of Bridgeport, county of Fairfield, and State of Connecticut, have invented certain new and useful Improvements in Thermostats, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to thermostats, and particularly to improvements in thermostats adapted for use as temperature-regulators and which may be connected with a heating system.

In carrying out my invention I provide a tube or casing composed of a material having a relatively high coefficient of expansion, such as brass, and within this casing I arrange a rod or tube composed of a material having a relatively low coefficient of expansion, such as iron or steel. I connect the interior tube and the outer casing together at their upper ends, so that during operation they will have no relative movement at this point, and I provide the lower end of the outer tube or casing with a valve-seat and the lower end of the inner rod or tube with a main and secondary valve, the main portion of which is adapted to engage the said valve-seat. I arrange suitable ports and passages, which the valves are adapted to control. The passages comprise an inlet-passage to within the tube or casing upon one side of the main-valve seat and a distributing-passage leading from the other side of the said main-valve seat and which, through suitable connections in a well-known manner, may connect with a heat-controlling device, forming part of a heating system or other moving part, as may be desired. The said valves comprise a main valve, which, as before stated, engages the said valve-seat and controls the passage of fluid therethrough from the inlet-passage to the distributing-passage and a secondary valve carried by the main valve and seated in a secondary valve-seat, arranged within the said main valve and adapted to act as an exhaust or discharge valve for permitting the exhaust or discharge of return motive fluid from the distributing-passage after the main valve has been closed. The construction and arrangement of the secondary valve with respect to the main valve are such that whenever the main valve is closed upon its seat the secondary valve will be opened and when the main valve is lifted away from its seat the secondary valve will be closed. The secondary valve discharges into the interior of the inner tube, and discharge fluid passing therethrough will discharge through the said tube and out at the upper end thereof.

The opening and closing of the valves will be effected by variations of temperature, which acting directly upon the outer tube or casing will cause same to expand and contract to a relatively greater extent than the inner rod or tube, and will therefore move the valves with respect to their seats.

The main object of my present invention is to provide a simple and reliable structure wherein direct movements of a thermostatic member are utilized to directly operate inlet and discharge valves to admit motive fluid and close exhaust at one time and to close admission and open exhaust at another.

Further objects of my invention are to provide for the convenient escape of exhaust motive fluid through the central hollow valve-carrying rod or tube, to provide for the simple adjustment of the valve-carrying rod and the valves carried thereby with respect to the casing and valve-seat, and to provide for the simple and ready adjustment of the secondary valve with respect to the main valve.

My invention further consists in certain details of construction and combination of parts, as will hereinafter more fully appear.

I will now proceed to describe a thermostat embodying my invention, and will then point out the novel features in claims.

In the drawings, Figure 1 shows a front elevation of a thermostat embodying my invention. Fig. 2 shows a central vertical longitudinal section therethrough. Fig. 3 shows a detail section taken upon the same plane, but on an enlarged scale, of the lower portion comprising the valves and valve mechanism.

The thermostat comprises an outer tube or

casing 1, provided at its upper end with a head or cap 2 and at its lower end with a base 3, containing a main-valve seat 4. A valve-carrying tube or rod 5 is arranged within the outer tube or casing 1 and is secured thereto at its upper end by a screw-threaded connection 6 with the head or cap 2. A suitable gland 7 is provided, and packing may be employed to maintain tight connection between the valve-carrying rod and the outer casing. A flanged cover 8 may be secured to the inner rod or tube 5, as by a set-screw or similar device, the flange of which will inclose the gland and stuffing-box and the edge of which may be graduated to register with a suitable mark upon the casing, whereby an accurate adjustment of the valve-carrying rod with respect to the valve-seat-carrying casing may be obtained.

The base 3 is shown as provided with ears or lugs 9, by which the device as a whole may be supported. An inlet-passage 10 connects with the interior of the tube or casing 1 and a source of fluid-pressure supply, and a passage 11 connects with the opposite side of the main-valve seat and may lead to a heat-controller or other device through a pipe connection 12. The valve-carrying rod 5 has rigidly secured thereto at its lower end a main valve 13, the face of which is adapted to engage the face of the valve-seat 4. The valve 13 is hollow and carries, suitably mounted therein, a secondary valve 14, engaging with a valve-seat 15, integrally formed as a part of the main valve. A spring 16 tends to force the secondary valve normally to its seat.

A stationary abutment 17, (here shown in the form of an adjustable screw,) is arranged in the path of movement of the valve 15 and will be so adjusted that when the valve 13 is closed to its seat 4 the valve 15 will be forced open, but when the valve 13 is lifted away from its seat the secondary valve 15 will be allowed to close.

The operation of the device is as follows: The inner tube or bar 5 is first adjusted with reference to the outer casing to a predetermined position, the graduation upon the exterior of the cap indicating the temperature at which the main valve will be operated. Assuming this point of temperature to be 70° Fahrenheit, the raising of the temperature of the medium surrounding the outer tube or casing 1 will cause same to expand longitudinally until the valve 13 is lifted from its seat 4. When the valve 13 is away from its seat 4, the secondary valve 14 will be upon its seat 15, and motive fluid admitted through the passage 10 to the interior of the casing will pass therethrough to the distributing-passage 11 and will be prevented from exhausting through the valve 15. When the temperature falls below 70°, the outer tube or casing 1 will contract and will close the valve 13 upon its seat 4, thereby preventing further motive fluid from passing to the distributing-passage 11. At the same time the valve 14 will be forced open by engagement with the adjusting-screw 17, and the fluid within the distributing-passage 11 will be permitted to discharge through the valve 15 and through the interior of the valve-carrying tube 5 and out at the top thereof.

By the foregoing it will be seen that the direct relative contraction and expansion between the inner tube 5 and outer tube 1 will cause the opening and closing of the inlet and discharge valves carried by the inner tube. It will further be noted that by reason of the fact that both inlet and exhaust valves are provided the amount of motive fluid employed is reduced to a minimum, and, further, that the motive fluid when exhausted will be conveniently exhausted through the valve-carrying rod out of the top of the device, where it is least likely to be of any annoyance.

When the temperature lowers considerably below the point at which the main valve is closed, the rod 5 will spring or bow slightly; but the said valve will remain seated, because of the fact that the said valve is provided with a convex face. I make no claim to the foregoing, however, in this application, as the same is claimed in a copending application filed January 2, 1902, and serially numbered 88,032.

What I claim is—

1. In a thermostat, the combination with two members having different coefficients of expansion, one member provided with a valve-seat, and the other with a main valve for coaction with said seat, of a secondary valve carried by, and movable with respect to, said main valve.

2. In a thermostat, the combination with two members having different coefficients of expansion, one member provided with a valve-seat, and the other with a hollow main valve for coaction with said seat, of a secondary valve mounted within said hollow main valve and carried thereby.

3. In a thermostat, the combination with two members having different coefficients of expansion, the one provided with a valve-seat, and the other with a main valve for coaction with said seat, of a secondary valve carried by said main valve, and adapted to be moved upon a movement of the main valve to engage its seat by engagement with a stationary abutment.

4. In a thermostat, the combination with two members having different coefficients of expansion, the one provided with a valve-seat, and the other with a main valve for coaction with said seat, of a secondary valve carried by said main valve, and an adjustable abutment carried by the first-named member and adapted to engage the secondary valve upon movement of the primary valve to engage its valve-seat.

5. In a thermostat, the combination of two members arranged one within the other and

connected together at one end, the outer member comprising a tube or casing, said members having different coefficients of expansion and provided at their free ends, and rigid therewith, the one with a valve-seat and the other with a main valve, the said main valve carrying also a secondary valve movable with respect thereto.

6. In a thermostat, the combination of two members arranged one within the other and connected together at one end, the outer member comprising a tube or casing and having a greater coefficient of expansion than the inner member, and provided at its free end with a valve-seat rigid therewith, and the other said member provided at its free end with a main valve, also rigid therewith, and a secondary valve carried by said main valve and movable with respect thereto.

7. In a thermostat, the combination of a tube or casing and a tubular bar, arranged one within the other and connected together at one end, said tube and tubular bar having different coefficients of expansion, and provided at their free ends, and rigid therewith, the one with a valve-seat and the other with a main valve, the said main valve carrying also a secondary valve movable with respect thereto.

8. In a thermostat, the combination of a tube or casing and a tubular bar, arranged one within the other and connected together at one end, the said tube or casing having a greater coefficient of expansion than the said tubular bar, and provided at its free end with a valve-seat rigid therewith, and the said tubular bar provided at its free end with a main valve, also rigid therewith, and a secondary valve carried by said main valve and movable with respect thereto.

9. In a thermostat, the combination of an outer tube or casing, and an inner tube arranged within the outer tube or casing, and connected thereto at one end, the said outer and inner tubes having different coefficients of expansion, and provided at their free ends, and rigid therewith, the one with a valve-seat and the other with a main valve, the said main valve carrying also a secondary valve movable with respect thereto.

10. In a thermostat, the combination of an outer tube or casing, and an inner tube arranged within the outer tube or casing and connected thereto at one end, the said outer tube or casing having a greater coefficient of expansion than the said inner tube, and provided at its free end with a valve-seat rigid therewith, and the said inner tube provided at its free end with a main valve, also rigid therewith, and a secondary valve carried by said main valve and movable with respect thereto.

11. In a thermostat, the combination with an outer tube or casing, a base therefor at one end and a cap at the other, said base comprising a valve-seat, and having an inlet-passage leading to one side of the valve-seat, and a distributing-passage leading from the other side of said valve-seat, of an inner tube connected at one end to the said cap, a hollow main valve carried by the tube at its other end and adapted to engage the valve-seat in the base, and a secondary valve mounted in the hollow main valve and projecting through same into the said distributing-passage, and adapted to engage a stationary abutment upon the base, substantially as specified.

12. In a thermostat, the combination with a tube 1, having a base 3 provided with an inlet-passage 10 and a distributing-passage 11, an adjustable abutment 17 for said base, and a cap 2 at the opposite end of said tube, of an inner tube 5 adjustably secured to said cap 2 at one of its ends, a hollow main valve 13 carried by said tube at its opposite end, and a secondary valve 15 carried by said hollow main valve, and adapted, when open, to connect the distributing-passage 11 with the interior of the hollow inner tube 5, substantially as specified.

In witness whereof I have hereunto set my hand this 16th day of October, 1902.

ALFRED ROESCH.

Witnesses:
C. F. CARRINGTON,
M. M. CONOVER.