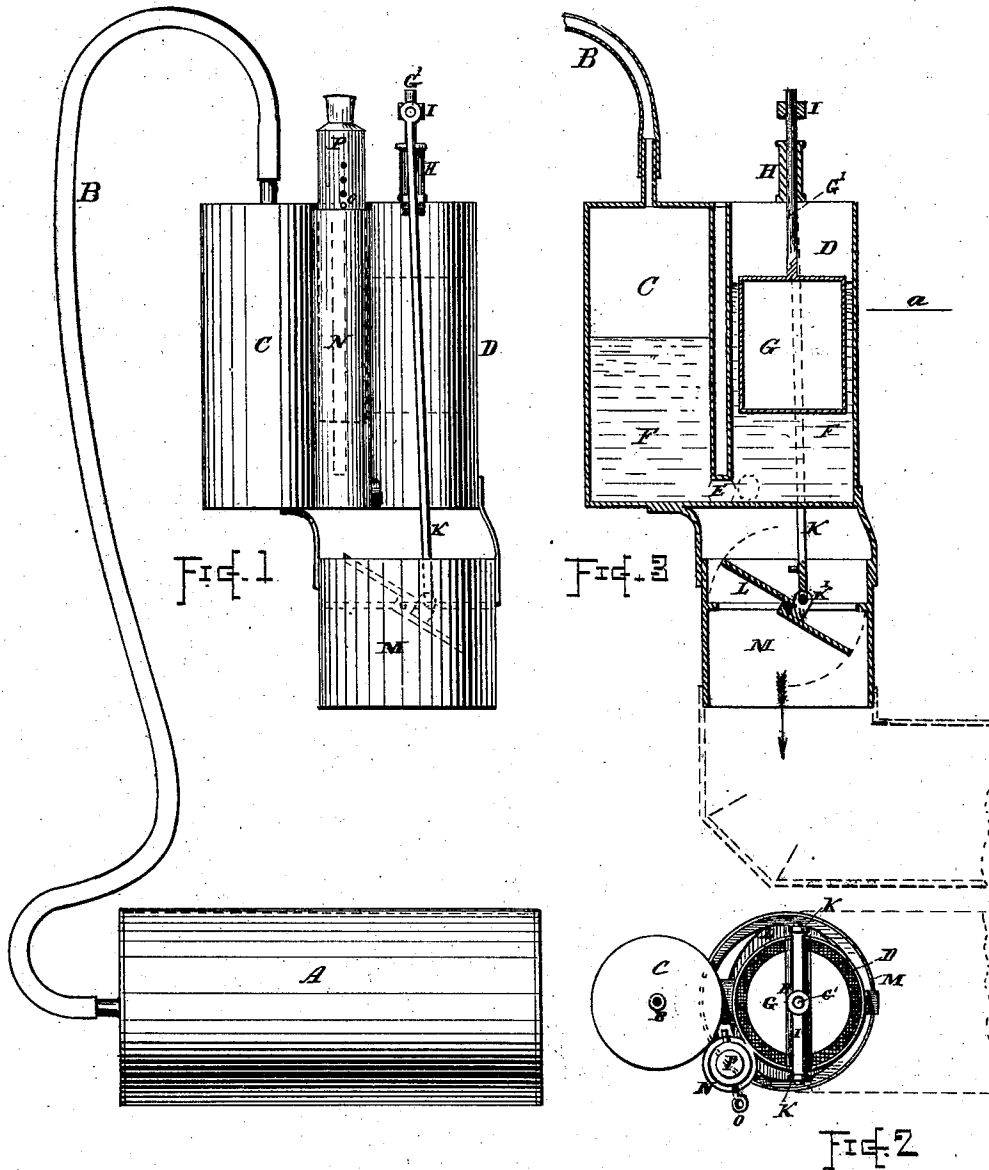


O. PLUMMER.

AUTOMATIC HEAT REGULATOR.

No. 174,379.

Patented March 7, 1876.



Witnesses—
J. E. Beuchley
Freeman Brown

Inventor—
Osgood Plummer
Per Chas. H. Dunleigh
Att.

UNITED STATES PATENT OFFICE.

OSGOOD PLUMMER, OF WORCESTER, MASSACHUSETTS.

IMPROVEMENT IN AUTOMATIC HEAT-REGULATORS.

Specification forming part of Letters Patent No. **174,379**, dated March 7, 1876; application filed January 3, 1876.

To all whom it may concern:

Be it known that I, OSGOOD PLUMMER, of the city and county of Worcester, and State of Massachusetts, have invented certain new and useful Improvements in Automatic Heat-Regulators for Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 represents a side view of a heat-regulator constructed in accordance with my invention. Fig. 2 represents a plan view of the same, and Fig. 3 represents a central vertical section of the same.

The nature of my invention consists, first, in the employment, with the air and liquid reservoir, of an auxiliary reservoir, provided with a displacer, whereby the surface-level of the liquid in the main reservoir can be adjusted, as and for the purpose hereinafter set forth; second, in the combination, with an air-chamber or aero-thermometer, of a damper and operating mechanism, the parts of which are constructed and arranged for action as hereinafter described.

In the drawings, A denotes the hollow metallic air-cylinder or aero-thermometer, which is arranged within the apartment to be heated, in the customary manner. B indicates an air-tube extending to the regulator, where it communicates with the chamber C, which is closed at its top, and, in the present instance, is arranged at the side of an open-topped chamber or reservoir, D, of similar size, the two parts C and D being connected near their bottoms by an open port, E, for the free passage of the liquid F, which is contained within the chambers C D, which liquid, when free to take its natural level, fills the reservoir to about the level of line *a*. (See Fig. 3.) G indicates a float immersed in the reservoir, and supported by its buoyancy in the liquid F. Said float is provided with a spindle, G', extending upward through a guide-piece, H, and having a cross-head, I, at its upper end, from which connecting-rods K extend to the damper L, to which they are pivoted, as indicated at K', Fig. 3. The damper L is pivoted to swing in the mouth or rim M, which con-

nects with, and forms a part of, the draft-pipe leading to the furnace fire.

The mechanism operates as follows, the device being adjusted for a certain desired degree of temperature: Should the temperature of the room rise to a higher degree, the air within the aero-thermometer A expands, thereby creating pressure through pipe B, and within the chamber C, which pressure forces the liquid F to flow out from said chamber into chamber D, raising the surface-level of the liquid in said chamber D, and the buoyancy of float G raises the cross-head I, and, by drawing up rods K, thereby closes the damper L and cuts off the supply of air to the fire. Again, should the temperature fall below the desired degree, the air in cylinder A becomes condensed, and, the pressure in chamber C thus being reduced, the liquid is permitted to flow back into said chamber C, and, by allowing the float G to descend in the chamber or reservoir D, effects the opening of the damper L. The float G, operated by the air and liquid, moves with comparatively no friction, thus rendering the action of the apparatus very sensitive, so that a slight change in the degree of temperature will operate the damper, and the movement of the latter being gradual, a very perfect control of the fire results, since just sufficient air is allowed to pass into the furnace to generate the required heat, and not more. The apparatus may be adjusted to operate at a higher or lower degree of temperature by varying the surface-level of the liquid F in the reservoir C D, for which purpose I employ an auxiliary reservoir or chamber, N, communicating with the lower part of the chamber D by a port for the free passage of the liquid, and provided with a displacer or plunger, P, made to fill, or nearly fill, said chamber N, and arranged to adjust, by means of pin *o*, or otherwise, at any desired position within the chamber, as indicated. By adjusting the displacer P at different heights, a greater or less portion of the liquid is transferred from chamber N to the other chambers, and the surface-level of said liquid in the float-chamber is thus varied. By raising the displacer P the apparatus is caused to act at a higher temperature, and by lowering said displacer P the opposite effect is produced.

The float G may be made in any suitable form and of any suitable material, while any suitable liquid may be used for its immersion, water being the most convenient, with a little oil upon its surface to prevent evaporation.

Having described my improved automatic heat-regulator, what I claim therein as new and of my invention, and desire to secure by Letters Patent, is—

1. The combination, with the liquid-reservoir and the damper-operating float, of an auxiliary chamber or reservoir and an adjustable displacer, whereby the surface-level of the liquid in which said float is suspended may be varied and regulated, substantially as and for the purposes set forth.

2. The combination, substantially as described, of the aero-thermometer or cylinder A, connecting-tube B, air and liquid chamber C D, auxiliary chamber N, displacer P, liquid F, float G, and damper L, for the purposes set forth.

3. In combination, substantially as herein described, the aero-thermometer or cylinder A, connecting-tube B, combined air and liquid chambers C D, and liquid F, for the purpose set forth.

OSGOOD PLUMMER.

Witnesses:

CHAS. H. BURLEIGH,
J. E. BEUCHLEY.