(No Model.)

J. M. HALSTED.

DEVICE FOR REGULATING TEMPERATURE.

No. 295,384. Patented Mar. 18, 1884.

Fig. 1.

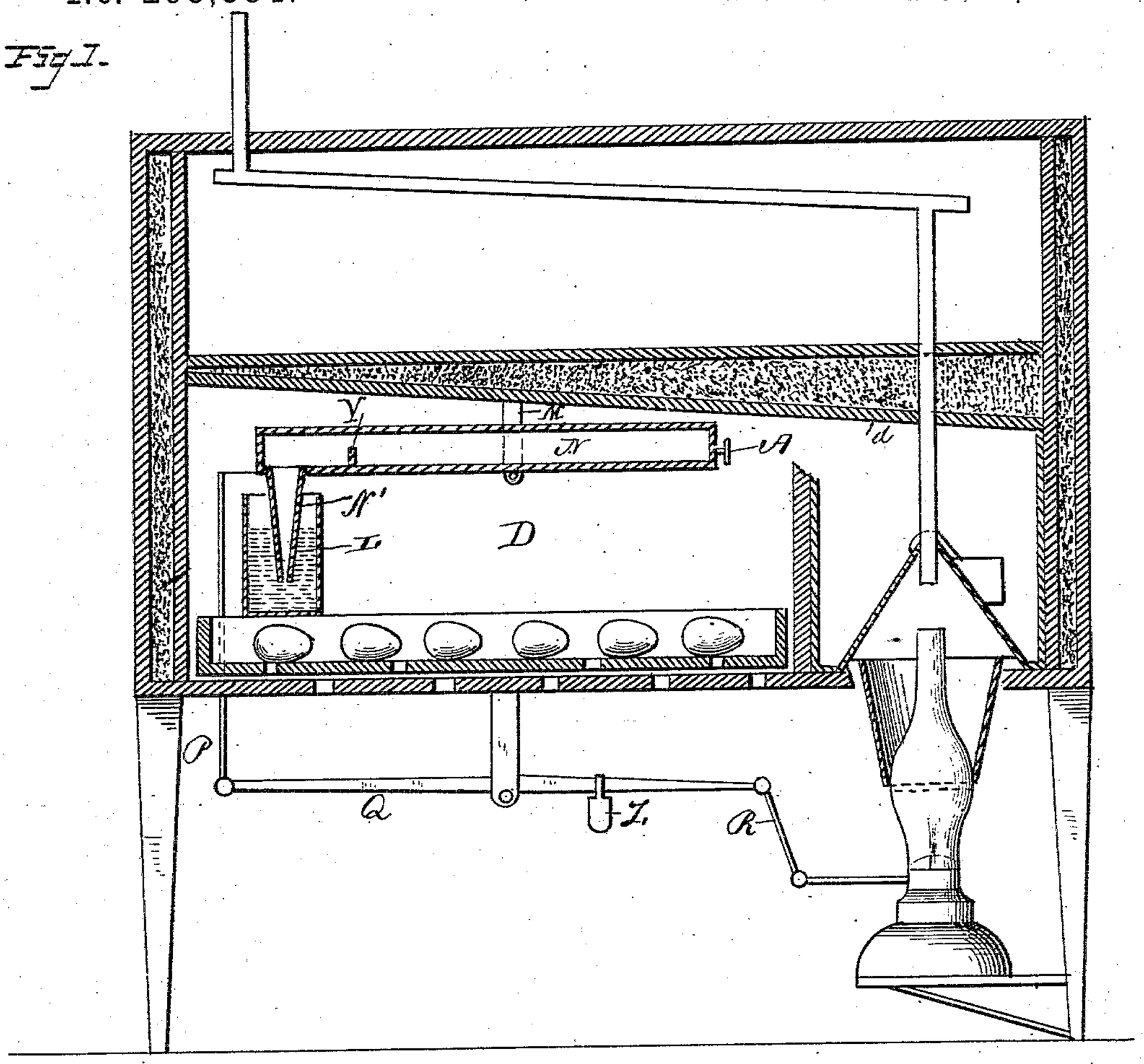


Fig. 2.

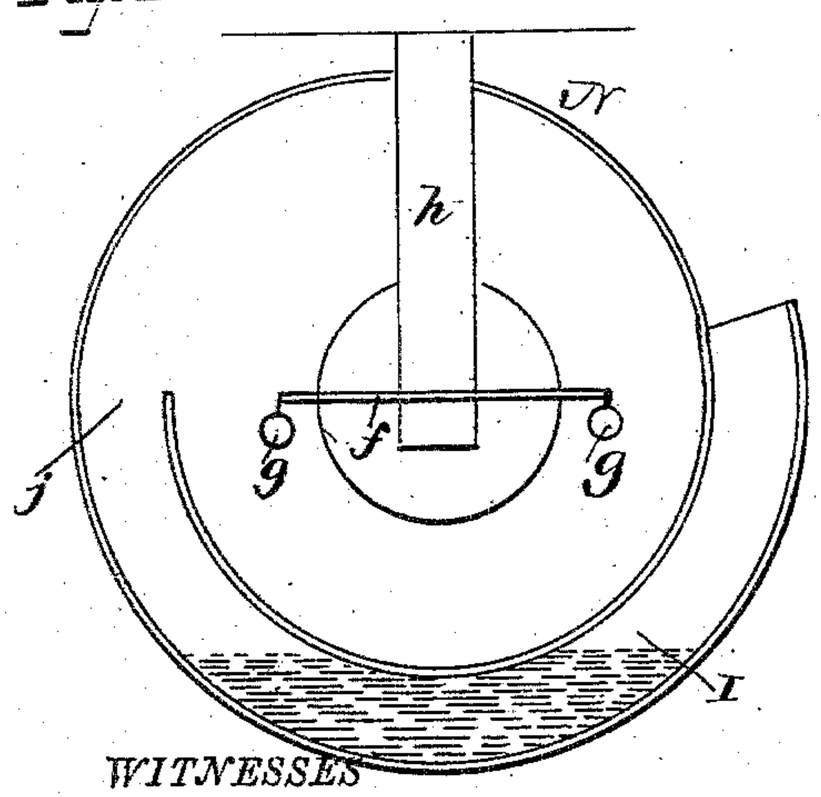
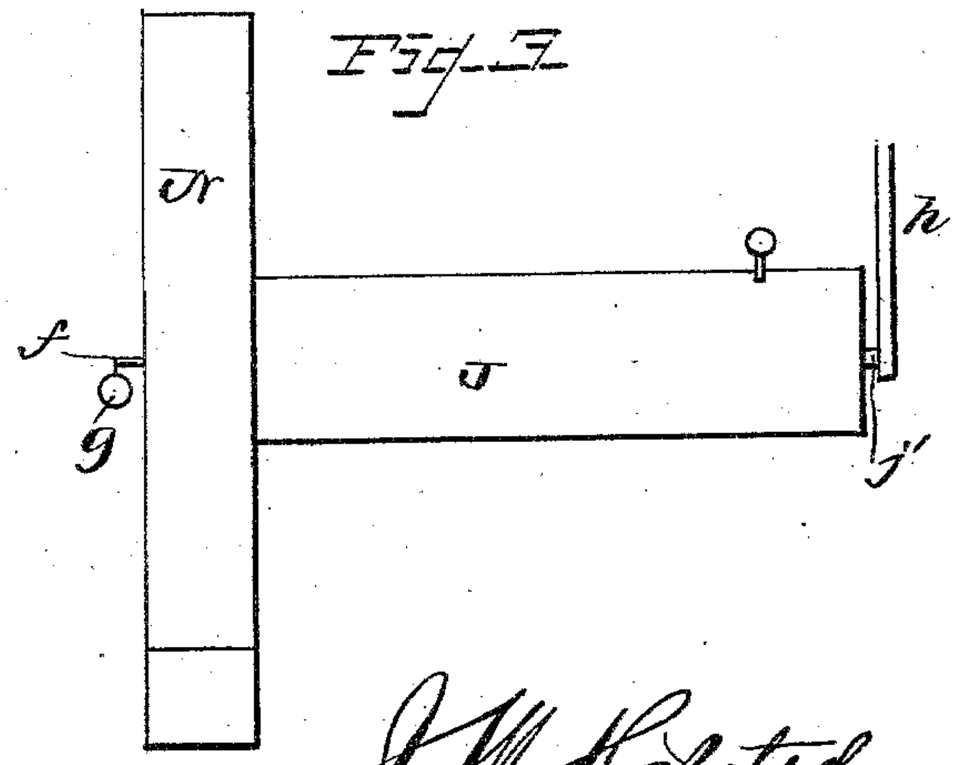


Fig. 3.



WITNESSES

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DEVICE FOR REGULATING TEMPERATURE.

SPECIFICATION forming part of Letters Patent No. 295,384, dated March 18, 1884.

Application filed August 29, 1883. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. HALSTED, a citizen of the United States, residing at Oakland, in the county of Alameda and State of California, have invented a new and useful Device for Regulating the Temperature in Incubators, Hot-Houses, &c., of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to incubators, hot-houses, conservatories, halls, and dwellings generally wherein heat is required to be regulated; and it consists in the improved device therefor, constructed and arranged to operate as hereinafter described, whereby the temperature is both automatically and positively regulated, and its regulator is rendered effective and certain in operation.

In the accompanying drawings, Figure 1 is a sectional elevation, illustrating my invention as applied to an incubator. Fig. 2 is an end view of a modification, and Fig. 3 is a side view of the same.

Referring to the drawings, it will be seen that I have represented my improvement in connection with an incubator similar in its construction to that illustrated and described in United States Letters Patent No. 262,407, August 8, 1882, to which reference is hereby made for a more full understanding of the nature and objects of the invention herein.

In one corner of the egg-chamber of chamber D, (see Fig. 1,) I place a cup, L, having a certain quantity of liquid contained in it. This liquid may be water or any other; but I prefer to have a liquid which will not rapidly evaporate, and which will not become rancid. I have found that glycerine serves the purpose, and it is this liquid that I use.

To the ceiling *d* is attached a bracket, M, to which is pivoted an air-tight casing, N, (here shown as a cylinder.) This casing is provided with a neck, N′, which projects downwardly into the liquid in the cup L. The end of the neck is open, and is the only entrance to the cylinder, which is otherwise air-tight. It is hung on its center of gravity with precision, and may easily move upon its pivot-point.

Connected with the end of the casing N is a wire or rod, P, extending down through the bottom of the box or base of the incubator, and connected with the end of a pivoted lever, Q, suspended under the incubator. The other end of lever Q is attached to rods or wires R, which are connected in any suitable manner with the burner of a lamp, and are adapted, upon the movement of the lever Q, to raise or lower the wick, or otherwise to decrease or increase the flame and heat.

The operation of this device is as follows: The casing N being full of air, its neck is extended down within the liquid of the cup L, and the air within is thus confined. As the heat becomes greater and the air within becomes lighter and expands, it presses against the liquid in the neck, and thus forces the casing (which is nicely pivoted) up. It will be seen that the air will not escape through the liquid, as it is easier to move the casing. When the regulating casing or cylinder moves its end upward, by reason of the expansion of the air within it, induced by increased temperature in the incubator, the rod P will move the lever Q to regulate the source of heat.

In the above-described arrangement, should the incubator become very hot at any time, through accident or otherwise, the air in the casing or cylinder becomes overheated and expands to such a degree as to drive the liquid out of the neck N′ downward into the cup L, some of the air escaping up through the liquid into the chamber D. When the air left in the casing cools again, it does not fill the casing entirely, since the original volume has been diminished by the escape of a portion thereof; hence a slight vacuum is formed, to fill which some of the liquid contained in the cup is forced upward into the casing by atmospheric pressure. In this position the air contained in the casing is not sufficient to exert a heavy pressure on the liquid and cause its return to the cup L and raise the casing, as originally intended. I obviate this difficulty by arranging in the end of casing N, or at any other suitable point therein, an air-induction valve, A, the operation of which is very simple. By opening the valve more air is admitted and will rush in to supply the deficiency above mentioned, the liquid in the neck N′ being expelled down into the cup L, when the valve

can be closed, and the casing returns to its normal position, in readiness to be operated anew.

For more effective use of the regulator, I place in the cylinder or casing N a transverse partition, Y, having an opening in the top, thus dividing the casing into two compartments, opening into each other through the top of the partition. This allows a free circulation of the air, and prevents the liquid which may be drawn up through the neck N′ into the cylinder from passing from one part of the casing to the other, as it would be liable to do were the cylinder tipped the wrong way by accident. It also keeps the liquid at the point farthest from the center of gravity of the cylinder, thus allowing its most advantageous action.

In order to facilitate the regulator and cause it to change its limits as regards the degree of temperature necessary to operate it, I use a small weight, Z, adapted to be hung upon the lever Q. If I want to decrease the temperature of an apartment sooner than would be done by the regulator unassisted, I move the weight Z out upon the lever Q, between its pivot-point and lamp-connections, to the point desired. This will cause the cylinder or casing N to rise before it would do so of itself, and thus turn down the lamp sooner than otherwise. The opposite of this result will be obtained by hanging the weight Z upon the lever Q between its pivot and the other end.

In Figs. 2 and 3 I have illustrated a modification of the arrangement hereinbefore described, consisting of a circular casing, N, having a cylindrical extension, J, and a liquid-space, I, arranged around its lower side, the interior of the casing N communicating with the said liquid-space by means of an aperture, *j*. The said casing N is adapted to revolve or turn on its longitudinal axis, and is suspended by journals *j′ j′* in hangers *h* for this purpose. Weights *g*, arranged on a cross-bar, *f*, secured to the forward journal, regulate the amount of inertia to be overcome by the casing, and hence the degree of temperature required to move it. As the temperature rises, the air within the casing N and its extension expands and serves to drive the liquid to one side of the liquid-chamber, and, changing the center of gravity of the casing N, effects a partial rotation of the same, for the purpose described. When the air-induction valve is opened and air admitted, the expanded air becomes condensed, and the weights *g* return the casing N to its first position.

I claim—

1. The combination, in an incubator or similar structure, of a casing adapted by the expansion of air it contains to shift or move devices controlling the heat source, and an air-induction valve admitting air to the casing to effect its return to its first position, substantially as described.

2. The combination, in an incubator or similar structure, of a casing adapted by the expansion of air it contains to act on a liquid cushion contained in a cup beneath to raise said casing, for the purpose described, and an air-induction valve admitting air to the casing, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

JAMES M. HALSTED.

Witnesses:
WILL H. BURRALL,
FRANK G. MCCANN.