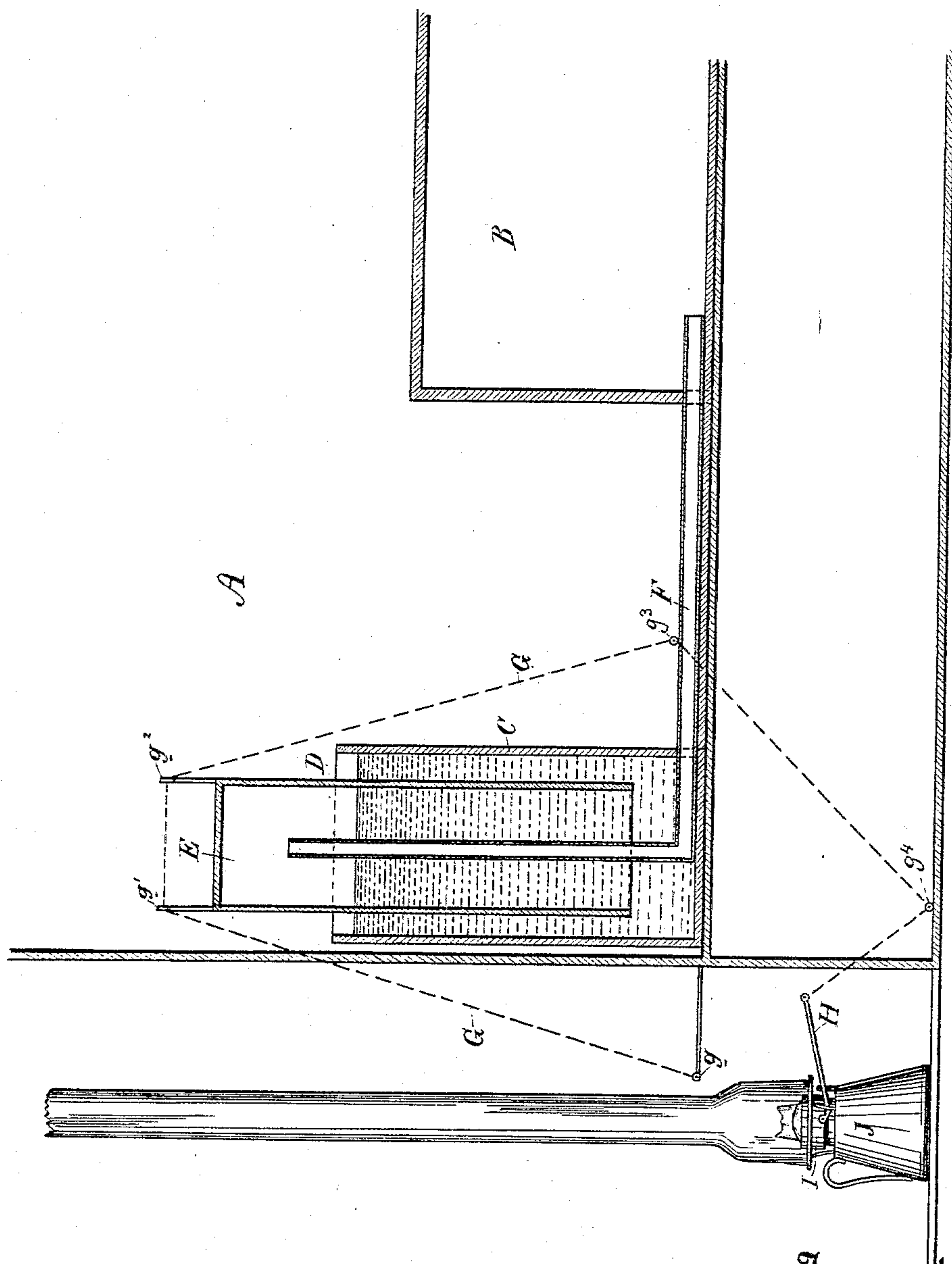


(No Model.)

F. BIVEN.
THERMOSTAT.

No. 323,556.

Patented Aug. 4, 1885.



Witnesses,
Geo. H. Strong.
J. H. Nurse.

Inventor,
Fred Biven
By Dewey & Co.
Attorneys

UNITED STATES PATENT OFFICE.

FREDERICK BIVEN, OF SAN FRANCISCO, ASSIGNOR OF TWO-THIRDS TO
CHARLES C. MOORE AND WILLIAM C. SEAMANDS, OF STOCKTON, CAL.

THERMOSTAT.

SPECIFICATION forming part of Letters Patent No. 323,556, dated August 4, 1885.

Application filed April 27, 1885. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK BIVEN, of the city and county of San Francisco, State of California, have invented an Improvement in Heat-Regulators; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of heat-regulators in which the expansive force of the air is utilized for the purpose of transmitting power through suitable intermediate mechanism to cause a variation in the amount of heat supplied; and my invention consists of an air-tight independent air-chamber located within the apartment to be regulated, an inverted vertically-moving casing or vessel containing a liquid seal, a connection between said inverted vessel and the air-chamber, and a peculiar string or lever connection between the vertically-moving casing or vessel and the heat-adjusting apparatus, all of which I shall hereinafter fully explain.

I herein illustrate my regulating apparatus in connection with the egg-chamber of an incubator.

Referring to the accompanying drawing, the figure is a side elevation of my regulator.

A represents the egg-chamber of an incubator. In one end of this chamber is located an air-tight chamber, B, of any suitable shape and dimensions. Near the air-chamber is a vessel, C, containing a liquid, D.

E is a casing or vessel inverted in the liquid in the vessel C, and small enough to fall and rise in said vessel.

F is a pipe which leads from the air-chamber B through the side of the vessel C, and thence extends upwardly through the liquid D and the vessel E into the air-space in the top of said vessel.

G is a flexible string, of any suitable material, which is attached at the point *g*. It thence extends upwardly through a suitable guide-socket, *g'*, on one edge of the top of the inverted vessel E, and over to a second guide-socket, *g''*, on the other edge of the top of said vessel; thence downwardly through suitable guide-sockets, *g'''* and *g''''*, and up again to the lever H, by which the sleeve I is operated to regulate the flame of the lamp J.

The operation of the device is as follows: When the temperature of the egg-chamber A rises, the air within chamber B expands, and, passing through pipe F, raises the inverted vessel E. This movement of said vessel pulls the string G so as to lower the lever H and move the sleeve I upwardly to partially inclose and thereby reduce the flame of the lamp in a manner which is usual and well known.

There is a novelty in the manner of attaching the string G to the vertically-moving inverted vessel E. It might, of course, be secured by one end to said vessel, and thence pass to the lever H; but in such a case the amount of motion imparted to the lever H would be exactly the same as that which the inverted vessel E receives; but by attaching the string at the point *g* and thence carrying it up over the top of the vessel E and down again on the other side it is obvious that said vessel, in moving a certain distance, causes the lever H to move twice that distance, whereby the apparatus is rendered very delicate, in that a very small movement of vessel E is sufficient to cause a greater movement of the lever H.

The whole apparatus is very simple and inexpensive, and at the same time is very effective and accurate in its operation.

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

1. A heat-regulating device comprising an air-tight chamber within the apartment to be regulated, a vessel containing a liquid, an inverted vertically-moving vessel, a connection between the air-chamber and the inverted vessel whereby the expansive force of the air causes the vertical movement of the vessel, and a connection—such as a string, G—between said vessel and the device regulating or controlling the source of heat, substantially as herein described.

2. In a heat-regulating apparatus, the vessel C, containing the liquid, and the inverted vertically-moving vessel E, adapted to be operated by means of the expansive force of air, in combination with a string, G, attached below and at one side of the vessel, and thence extending upwardly over the top of the vessel and downwardly on its other side, suit-

able guides through which the end of the cord passes, and a heat-adjusting device whereby the movement of the vessel E imparts an increased movement to the heat-adjusting device, substantially as herein described.

3. A heat-regulating apparatus comprising the air-tight air-chamber B within the apartment to be regulated, the vessel C, containing a liquid, D, the vessel E, inverted in said liquid, the pipe F, connecting the air-chamber B with the vessel E, a heat-adjusting device, and a connection between said vessel and the heat-adjusting device, substantially as herein described.

4. A heat-regulating apparatus comprising the air-tight air-chamber B within the apart-

ment to be regulated, the vessel C, containing liquid D, the vessel E, inverted into the liquid, whereby a seal is formed, the pipe F, connecting the air-chamber B with the vessel E, the string G, attached below and at one side of the vessel E, and passing over its top and down its other side through suitable guides, and the heat-controlling lever H, to which the string is attached, substantially as herein described.

In witness whereof I have hereunto set my hand.

FREDERICK BIVEN.

Witnesses:

S. H. NOURSE,
C. D. COLE.