

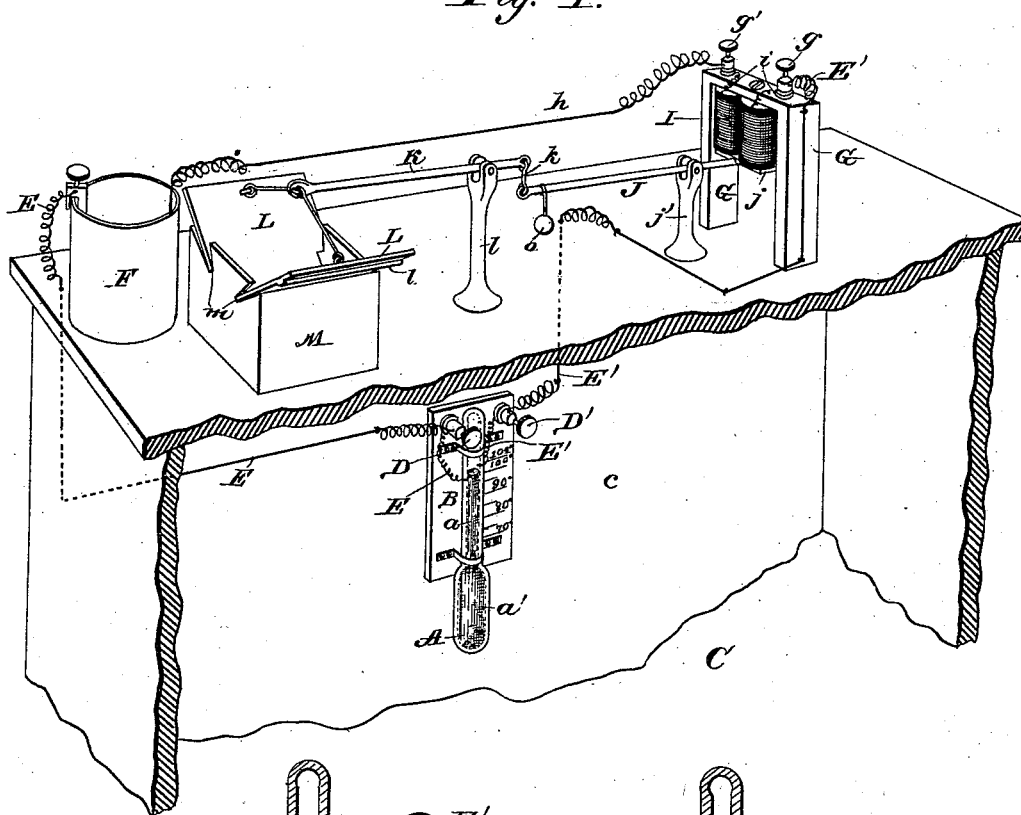
(No Model.)

G. A. MUENCHINGER.  
HEAT REGULATOR FOR INCUBATORS.

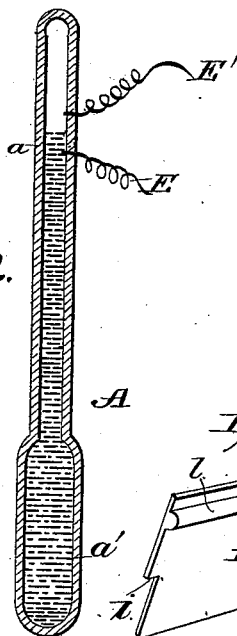
No. 346,938.

Patented Aug. 10, 1886.

*Fig. 1.*



*Fig. 2.*



*Fig. 3.*

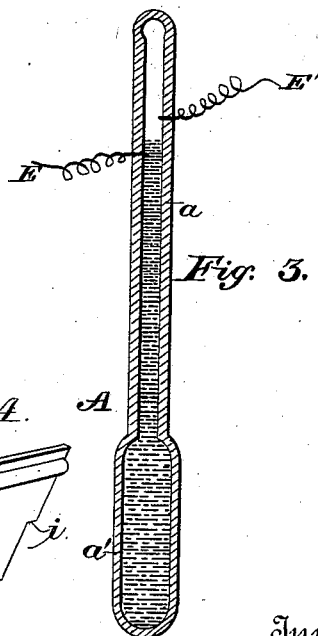
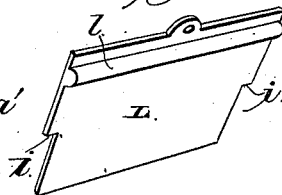


Fig. 4.



Witnesses

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# UNITED STATES PATENT OFFICE.

GUSTAVE A. MUENCHINGER, OF NEWPORT, RHODE ISLAND.

## HEAT-REGULATOR FOR INCUBATORS.

SPECIFICATION forming part of Letters Patent No. 346,938, dated August 10, 1886.

Application filed March 3, 1886. Serial No. 193,897. (No model.)

*To all whom it may concern:*

Be it known that I, GUSTAVE A. MUENCHINGER, a citizen of the United States, residing at Newport, in the county of Newport and State of Rhode Island, have invented new and useful Improvements in Regulators for Incubators, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to improvements in regulators for incubators; and it consists of the peculiar and novel construction and combination of parts, substantially as hereinafter fully set forth, and specifically pointed out in the claims.

The primary object of my invention is to provide an improved regulator for automatically opening the exit-port of the chamber of an incubator when the temperature therein reaches or is elevated above a certain predetermined point, and which shall also close the port when the temperature lowers to its normal condition.

A further object of the invention is to provide an improved regulator that can be readily applied to any class of incubators, and which shall be thoroughly effective and reliable in operation, cheap and inexpensive of manufacture, and simple and durable in construction.

In the accompanying drawings, Figure 1 is a sectional view through the chamber of an incubator, showing my improved regulator in perspective. Figs. 2 and 3 are vertical sectional views through the thermometer. Fig. 4 is a detail perspective view of the pivoted damper or valve.

Like letters of reference in the several figures of the drawings denote corresponding parts.

In carrying my invention into practice I employ a mercurial thermometer, A, which is made of glass, as is usual, and has the tube *a*, which is made cylindrical in form, and the bowl *a'*, which in lieu of being made globular in form, as is customary, is made tubular and of a greater diameter than the cylindrical tube *a*, whereby the mercury therein is exposed to more surface or greater area, and the device is consequently rendered more and extremely sensitive to variations in changes of temperature. The tube is suitably held or secured upon a base or block, B, which is secured

within the chamber of the incubator C, which is of any preferred or well-known class. The base or block, and the thermometer thereon, is secured to one of the inclosing-walls of the chamber, immediately above and in close proximity to the tray or receptacle containing the eggs, so that the thermometer will be affected to actuate the mechanism for opening the damper, when the temperature above the egg-tray rises above a certain point. The base or block carries a scale, as is usual, whereby to observe the height of temperature, and it also carries binding-posts D D' for the wires E E' of the electric circuit. These wires are properly secured and held by the binding-posts, which may both be arranged on one side of the thermometer-tube and one above the other, to adapt the ends of both wires to enter the tube from the same side; but I prefer to arrange the posts on opposite sides of the tube *a*, so that the wires will enter the same on opposite sides. The wire E enters the tube at a point below the height therein at which the temperature in the chamber is to be maintained, and the end of the wire E' enters the tube at that point—in the case shown herein at 104° Fahrenheit—and the ends or extremities of the wires enter the tube at points therein that are very close together, and still at different heights therein, so that when the mercury rises in the tube it will have but a very short space to traverse between the ends of the wires, whereby it is only necessary to electrify a very small quantity of the mercury in order to complete the electric circuit, and the device is rendered more sensitive and efficient in its operation. The wire E from the lower point in the tube runs through a proper opening in the ceiling or top wall of the incubator C, and connects with one of the electrodes of a galvanic battery or cell, F, and the wire E' also runs through the ceiling of the incubator and connects with a binding-post, *g*, which is suitably supported on a bracket or frame, G, which is secured to the incubator C. This supporting-frame also has a similar binding-post, *g'*, in which is secured one end of a wire, *h*, that extends to and connects at its opposite end with the other electrode of the battery F.

I designate an electro-magnet that is suspended from the supporting frame or bracket,

and the poles of this magnet are connected by wires *i* with the binding-posts *g g'*, whereby when the circuit is completed by the mercury rising in the thermometer-tube an electric current passes through the wires and the magnet, which latter attracts an armature, *j*, that is rigidly attached to one end of a lever, *J*. This lever is pivoted in a standard, *j'*, and connected to one end of a similar lever, *K*, through an intermediate link, *k*, and the lever *K* is pivoted in a standard, *l*, and connects to the valves *L*, which open or close the escape pipe or tube *M* of the incubator. The side walls of the escape-pipe *M* are cut away in inclined lines from the side and upper edges toward the center, to provide the ledges *m*, and on these ledges are fitted the shoulders *i* of the valves. The shoulders of the valves are formed by cutting away the side edges of the lower half thereof, and these shoulders rest on the ledges and serve as pivots to the valves. The valves lie in inclined lines, and meet or abut together at their lower edges, when closed, and their upper edges rest on the inclined edges of the cut-away portions of the escape-pipe *M*, to effectually prevent the escape of air from the incubator, and when the electric current passes through the circuit the valves are oscillated to separate the lower edges and permit the escape of air, all as will be more fully described presently.

To assist in closing the dampers or valves and render their operation more certain and effective, they are provided at or near their outer edges with integral weighted flanges, *i*, and the free end of the lever *J* has a counterweight, *o*, depending therefrom.

The regulator shown herein is especially adapted for use in connection with the incubator shown in a prior application filed by me on the 19th day of February, 1886, and bearing Serial No. 192,553; but I do not confine myself to the use of my present invention in the incubator shown in the said application, as I am aware that it can be used in incubators of other constructions.

The operation of my invention is as follows: When the temperature is at or below its normal condition, the valves in the escape-pipe are closed, and the mercury in the thermometer falls below the extremity of the wire *E'*, so as to break or leave the circuit open. When the temperature rises in the chamber, the increasing heat will affect the mercury in the tube, which will be correspondingly elevated; and when the mercury rises to indicate that the temperature has reached its predetermined height it will come in contact with the wire *E'*, having previously passed the wire *E*,

and will close the circuit, thereby causing a current to travel through the same and influence the electro-magnet to attract the armature *j*. The rear end of the lever *J* will thus be elevated, and its front end will draw down upon the rear end of the lever *K* to raise the front end thereof and open the valves *L*, whereby the hot air from the incubator-chamber can readily escape through the exit-pipe. As soon as sufficient or the superfluous heated air escapes, its place is supplied by colder air, which lowers the temperature of the chamber and correspondingly lowers the mercury in the thermometer-tube to break the circuit, and thus release the armature to permit the valves to close.

The apparatus is thoroughly effective and automatic in operation, and very sensitive to slight changes in the temperature.

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

1. In a regulator for incubators, the combination of an escape pipe or flue having the ledges, the swinging shouldered valves resting on the ledges, a thermometer, an electro-magnet connected in circuit with the thermometer and an electric battery, and the armature to be influenced by the magnet and connected to the valves, substantially as described.

2. In a regulator for incubators, the combination of the escape-pipe having the ledges *m*, the pivoted shouldered valves *L*, a thermometer located in the chamber, an electro-magnet connected in circuit with the thermometer, and a battery, a counterweighted lever carrying armature, and a lever connected with the valves and the counterweighted lever, substantially as described.

3. In a regulator for incubators, the combination of the escape-pipe having the ledge *m*, the dampers or valves located in the pipe, and having the shoulders resting on the ledges, and provided near their free edges with the flanges *i*, the thermometer located in the incubator-chamber, an electro-magnet connected in circuit with the thermometer and an electric battery, the counterweighted pivoted lever carrying an armature adapted to be influenced by the magnet, and a pivoted lever intermediate of the valves and the counterweighted lever, substantially as described.

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

GUSTAVE A. MUENCHINGER.

Witnesses:

J. A. TURNER,  
CHAS. B. MARSH.