

(No Model.)

H. A. COFFIN.

HEAT REGULATING DEVICE FOR INCUBATORS.

No. 461,534:

Patented Oct. 20, 1891.

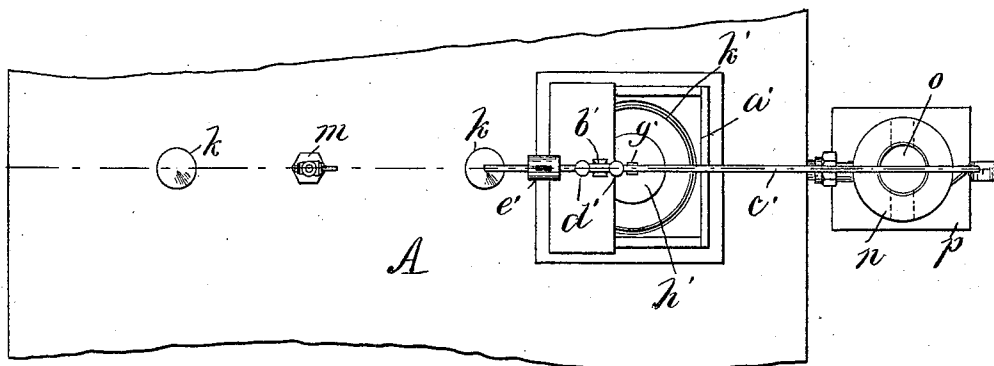
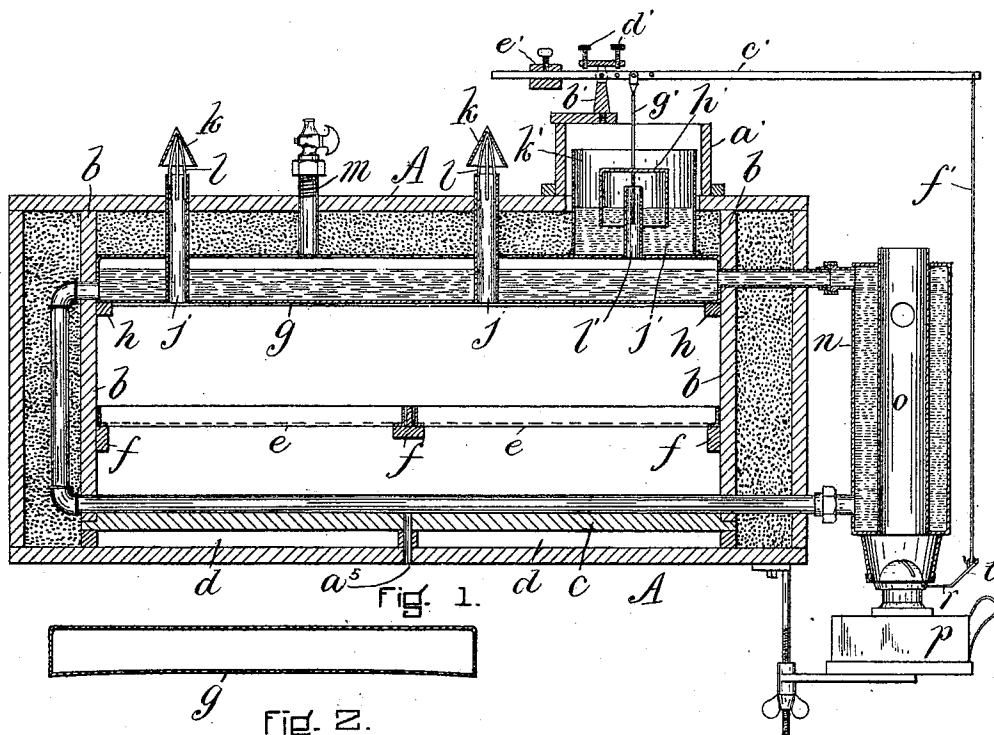


Fig. 5.

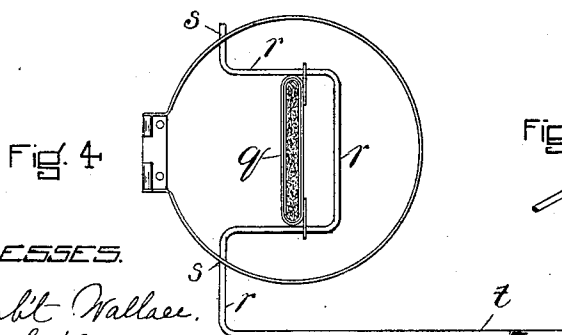


Fig. 4

WITNESSES.

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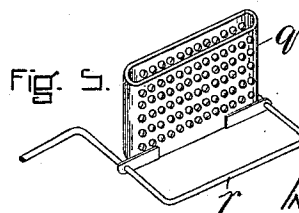


Fig. 5.

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HEAT-REGULATING DEVICE FOR INCUBATORS.

SPECIFICATION forming part of Letters Patent No. 461,534, dated October 20, 1891.

Application filed January 5, 1891. Serial No. 376,692. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. COFFIN, of Burlington, county of Middlesex, State of Massachusetts, have invented certain new and useful Improvements in Heat-Regulating Devices for Incubators, of which the following is a specification, reference being had to the drawings accompanying and forming a part hereof, in which—

Figure 1 is a vertical lengthwise section of an incubator having my invention applied thereto. Fig. 2 is a cross-section of the water-tank. Fig. 3 is a plan view of part of the incubator, showing the regulating apparatus. Figs. 4 and 5 are details of the flame-governor.

As is well known to those skilled in the art, the value of an incubator is largely due to the accuracy and sensitiveness of the heat-regulating device.

My present invention has for its chief object to provide an incubator with means whereby the temperature thereof may be perfectly regulated; and it consists in heat-regulating devices for incubators having the peculiarities of construction and arrangement hereinafter described, and in which a heat-regulating or flame-governing device is automatically operated by the expansion and contraction of the air and water contained in the water-tank of the incubator, all as hereinafter set forth, and the novel features of which are more particularly pointed out in the claims which are appended hereto and made a part hereof.

My invention will be readily understood from the following description, in which reference is made to the accompanying drawings of an incubator which embodies my invention in the best form now known to me.

A is an outer box or case, which may be of wood or other suitable material. At either end of this box are partitions *b*, between which and the ends of the box is placed a packing of cork-dust or other suitable non-conducting material. Above the floor of the box A and between the end partitions *b* is a piece *c*, which forms the floor of the egg-chamber. The piece *c* is raised a sufficient distance from the bottom A of the outer case to allow for a sufficient air-space *d* underneath.

e are egg-cases which rest on suitable supports *f* in the incubator-chamber.

g is the water-tank, which rests on suitable supports *h* in the top of the incubator-chamber, and through this tank project ventilators *j*, which pass up through the packing of cork-dust or other similar material which is placed above the water-tank in the space between said tank and the top of the case A. In the top of the ventilators *j* are placed covers *k*, preferably conical in shape, which are provided with downwardly-projecting spring-prongs *l*, preferably three in number, by means of which the covers may be set at any convenient distance from the top of the ventilator-pipe *j*, thus regulating the escape of air through the ventilator. The friction of the spring-prongs against the interior of the pipe holds the cover in its adjusted position. An inlet-pipe *m* with a proper faucet is provided, by means of which water may be supplied to the tank. The tank is connected in the usual manner by means of pipes with a boiler or water-heater *n*, which is preferably placed outside of one end of the incubator-case A. The boiler *n* is a tubular boiler or heater for holding the water, with a cylindrical aperture *o* passing vertically through it. A lamp *p* is provided, which is mounted on a suitable support in such position that the flame of the lamp will be directly under the vertical tube *o*, which passes through the water-heater. The lamp is of common construction and is provided with a flame-governor. (More clearly shown in Figs. 4 and 5.) This governor consists of a case *q*, of substantially the shape of the wick-case of the lamp, and which is perforated, as shown, Fig. 5. The case *q* is adapted to slide vertically over the wick and is mounted on a wire or rod *r* of the shape shown, Fig. 4, which is pivoted at *s* in the lamp-burner frame. By raising the end *t* of the wire *r* the case *q* will be raised and the flame partially quenched, thus lessening the heat. By reversing the movement of the wire *r* the flame will be increased and the heat strengthened, as will be clear.

For the purpose of automatically shifting the flame-governor case *q* upon the slightest change in the temperature of the incubator-

chamber, I have provided the following device: On top of the case A (see Fig. 1) is placed a frame a' , and on said frame or on a partial cover placed thereon is an upright b' .
 5 In the top of the upright is pivoted a lever c' , the swing of which is governed by the thumb-screws d' , one of which is placed on either side of the pivot of the lever c' , as shown. The short end of the lever c' is provided with a balance-weight e' , which may
 10 be shifted on the lever and set by means of a thumb-screw in any position desired. For the purpose of enabling lever c' to regulate the flame of the lamp, to the other end of the lever c' is secured a connecting-rod f' ,
 15 which projects downward and is hooked at its lower end to an eye on the end t of the wire r of the flame-regulator. Near to the pivot of the lever c' is pivoted a downwardly-projecting rod g' , near the lower end of which
 20 is secured an inverted-cup-shaped vessel h' , the mouth of which projects below the surface of the liquid j' . The liquid j' is contained in a chamber formed by a cylindrical vessel k' , which rests on top of the tank g
 25 and which projects upward through an opening in the top of the incubator-case A inside the case a' . In the center of the cylindrical vessel k' and projecting vertically from the bottom of said vessel is a tube l' , which opens
 30 into the top of the tank g , so as to connect the air-space which is above the water in the tank with the air-space in the inverted cup or bell-shaped vessel h' . The liquid j' is used to seal
 35 the bell-shaped vessel and is preferably of thick consistency, like glycerine or water, with oil on top of it to prevent evaporation. By this arrangement a very slight degree of expansion or contraction of the air and water
 40 in the tank g will perceptibly affect the position of the lever c' , and consequently the flame-regulator.

The bottom of the water-tank g is slightly arched, as will be seen by reference to Fig. 2,
 45 which shows a cross-section of the tank. This arching of the bottom of the tank not only increases its strength, but also insures the greatest body of water being at the edges, where the cold is most apt to affect the in-

cubator-chamber. Cool air is let into the egg-chamber through the hole a^5 to keep the chamber well ventilated. The space d is filled with air, which acts as a non-conductor.

What I claim is—

1. In combination, a water-tank, a heater, 55 and suitable connecting-pipes between the heater and the tank, a heat-regulating device comprising a flame-governor for the lamp, a lever connected with said governor, and a bell-shaped vessel connected with said lever 60 and having its mouth sealed, and a tube connecting the air-space in said bell-shaped vessel with the air-space in the tank, substantially as shown and described.

2. The combination, with the water-tank, of 65 a heat-regulating device therefor, consisting of a balanced lever and suitable means for actuating said lever from the expansion or contraction of the air and water in the water-tank, and a flame-regulator connected with 70 said lever, substantially as shown and described.

3. The combination, with the water-tank, of a heat-regulator consisting of a pivoted lever, means whereby said lever is actuated from 75 the expansion or contraction of the air and water in the tank, and a flame-governor connected with said lever, said governor consisting of a perforated case surrounding the wick and adapted to be moved vertically relatively 80 thereto by means of a pivoted rod, to which the case is secured and with which the said lever of the regulator is also connected, substantially as shown and described.

4. The combination, with the water-tank, of 85 a heat-regulating device therefor, comprising a flame-governor, a pivoted balanced lever connected therewith, a vessel k' , containing a sealing-fluid, a tube l' , opening into the air-space of the tank, a bell-shaped vessel h' , 90 sealed by said fluid and covering the upper end of said tube l' , said bell-shaped vessel being suspended from the pivoted lever, substantially as shown and described.

HENRY A. COFFIN.

Witnesses:

WM. A. MACLEOD,
 ROBERT WALLACE.