

UNITED STATES PATENT OFFICE.

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INCUBATOR.

SPECIFICATION forming part of Letters Patent No. 395,484, dated January 1, 1889.

Application filed April 3, 1888. Serial No. 269,471. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. CARR, of Tiverton, in the county of Newport, State of Rhode Island, have invented a certain new and useful Improvement in Incubators, of which the following is a description sufficiently full, clear, and exact to enable any person skilled in the art or science to which said invention appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical longitudinal section of my improved incubator, taken on line $x x$ in Fig. 2, certain parts being shown in side elevation; Fig. 2, a top plan view, certain parts being shown in section, on line $y y$ in Fig. 1; Fig. 3, a vertical transverse section taken on line $z z$ in Fig. 1, some of the parts being shown in side elevation; Fig. 4, an enlarged vertical section of the moisture-pan, taken on line $v v$ in Fig. 1; Fig. 5 an enlarged vertical section taken on line $w w$ in Fig. 4; Fig. 6, an enlarged vertical section taken on line $t t$ in Fig. 7, showing certain parts of the regulating device; Fig. 7, an enlarged side elevation, partly in section, on line $s s$ in Fig. 6; Fig. 8, an enlarged side elevation of a portion of the lamp-burner; and Fig. 9, an enlarged top plan view of the burner, partly in section, on line $r r$ in Fig. 8.

Like letters and figures of reference indicate corresponding parts in the different figures of the drawings.

My invention relates to that class of incubators in which hot water is employed as a heating medium; and it consists in certain novel features, as hereinafter set forth and claimed, the object being to produce a more effective and otherwise desirable device of this character than is now in ordinary use.

The nature and operation of the improvement will be readily understood by all conversant with such matters from the following explanation:

In the drawings, A represents the body or case, B the boiler or heating device, C the egg-chamber, and J the hot-air or boiler-chamber.

The body consists, essentially, of a bottom, d , sides 40 , ends $i q$, and top 42 , and is pro-

vided at each side with an ordinary dead-air space or insulating-chamber, m , which may be omitted, if desired, or other means for performing the same functions employed. Between the egg-chamber and the end q of the body A there is a transversely-arranged partition-wall, b , having an opening, 46 , at or near its lower end, said wall, in conjunction with the end q of said body, forming a flue, 104 . At the opposite end of the egg chamber there is a corresponding transversely-arranged partition-wall, 49 , having an opening, 45 , at or near its lower end. Adjacent to the partition 49 and between said partition and the end i of the body A there is also a transversely-arranged partition-wall, h , having an opening, 47 , at or near its upper end, the partitions 49 and h separating the egg-chamber C from the hot-air or boiler chamber J and forming a diving-flue, 95 , for the passage of heated air from the boiler-chamber into the egg-chamber. The end i of the body A is provided with a draft-opening near its bottom, which is fitted with a door or register, 19 , for letting air into the hot-water or boiler chamber J, and there is also an opening, 75 , in the top 42 of said body over the flue 104 , through which the heated air and vapors from the egg-chamber may pass out of the incubator. The inner wall of one of the chambers m , opposite the egg-chamber, (see Fig. 2,) is provided with a door which is hinged at 44 , the side 40 of the body A opposite said door being also hinged to constitute the door, as shown at 43 , the object of said doors being to gain access to the egg-chamber. A door hinged at 32 is also provided in the end i of the body A, which opens into the hot-air or boiler chamber J.

The egg-chamber C is provided with a shelf, g , on which a series of trays, f , are disposed for containing the eggs. In the present instance but one shelf is shown; but it will be understood that as many shelves and egg-trays are to be employed as may be required, or in accordance with the size of the incubator. A boiler, B, is disposed in the chamber J between the end i of the body A and partition h , said boiler being provided with a conical flue or pipe, p , which is inserted tightly in its bottom and extends centrally upward

nearly to its top, where it is bent or curved laterally and carried outward through the side of the boiler, as shown at 106.

A smoke-pipe, 4, is connected with the upper end of the pipe *p*, said smoke-pipe passing horizontally, or approximately so, through the partition 49, egg-chamber C, and partition *b* into the flue 104. The lower end of the pipe *p* is extended below the bottom of the boiler and left open to serve as a portion of the lamp-chimney and receive the lamp-chimney proper, as shown in Fig. 1.

Horizontally-arranged eduction-pipes *k* lead from the top of the boiler B through the partition-wall 49 into the upper portion of the egg-chamber C, where they are coiled or folded to afford the requisite radiating-surface, and connected by vertical pipes *l*, near the partition-wall *b*, with horizontally-arranged induction or return pipes 7, which lead into the bottom of the boiler.

A pan, H, containing water, is arranged longitudinally on the smoke-pipe 4 within the egg-chamber C, said pan being tightly secured to said pipe by soldering or in any other suitable manner. The upper portion of the smoke-pipe 4 beneath the pan is removed (see Fig. 4) to enable the smoke and products of combustion from the lamp to come directly into contact with the bottom of the pan and thereby utilize the heat to better advantage in evaporating the water. The bottom *r* of the pan is curved upward in cross-section and subserves, as a portion of the pipe 4 or as a cover, to close the opening made by the removal of the upper portion of said pipe beneath said pan, as described. The pan is provided for a portion of its length with a permanent cover, 8, and also with a sliding cover, 15, said sliding cover being held in position on the pan by a band or clamp, 16, attached to the cover and by which it may be moved, the degree of moisture or the humidity of the atmosphere in the egg-chamber being regulated by means of said sliding cover. A plugged feed-tube, 17, passes vertically through the top 42 of the body A into the boiler B, through which the boiler may be supplied with water, the plug of the tube being provided with a vent-hole. (Not shown.) A plugged tube, 18, is also inserted in the top 42 above the open portion of the pan H, through which said pan may be supplied with water.

Secured to the bottom *d* of the body A there is a socket-piece, 27, and fitted to swing laterally in said socket there is a bracket, 26, carrying at its outer end a horizontally-arranged holder or table, 25, on which a lamp, D, is placed. The wick-tube 65 of said lamp (see Figs. 8 and 9) is provided with an ordinary extinguishing-sleeve, 64, which is fitted to slide freely thereon in the usual manner. A bent lever, 60, having a long arm, 10, is pivoted at 61 to the plate 62 of the lamp-burner, said lever passing loosely through eyes 63 on the sleeve 64, thereby enabling said sleeve to be raised or lowered, as desired,

by correspondingly depressing or elevating the long arm of said lever. A horizontally-arranged cone-shaped pipe, 50, having its outer end, 51, closed and its inner end bent, as shown at 98, (see Figs. 3, 6, and 7,) has its curved end firmly secured between clamping-plates 52 by screws 28, said plates being rigidly attached to a short mandrel, 31, which is journaled in the outer end of a horizontally-arranged bracket, 30, projecting from the top of the boiler B. A short tube or nipple, 55, is inserted in the side of the boiler, as shown in Fig. 3, said nipple being connected with the smaller end of the conical tube 50 by a flexible pipe, 56, which permits the conical tube to oscillate on its pivotal support.

A pendent counterbalancing-arm, 57, is secured to the clamping-plate 52, said arm being provided with one or more weights, 58, as required, which are adjustably secured thereon by a nut, 59. A vertically-arranged rod, 67, connects the pivoted conical pipe 50 with the bent lever 60, and when said pipe is elevated or depressed the flame of the lamp will be correspondingly increased or diminished, as the case may be, the sleeve 64, bent lever 60, rod 67, pivoted conical tube 50, counterbalancing-arm 57, and the pipe 56, which connects said conical pipe with the boiler B, constituting the essential features of the flame or heat regulating device of the incubator. The lever 60 and sleeve 64 constitute an extinguisher for the lamp, and their construction may be varied as desired, provided they perform their functions properly in connection with the other parts of the regulator. A vent-hole, 90, is formed in the upper side of the conical pipe 50, near its outer end, for the escape and admission of air as the water is forced into or withdrawn from said pipe.

One object in making the pipe 50 conical is to maintain an air space or chamber at all times near its larger end when the smaller end is filled with water, and thereby enable the pipe to fill rapidly when the water is suddenly heated; also to adapt said pipe to contain a greater amount of water at its outer than at its inner end, and by thus "weighting" it increase its leverage and enable it to exert sufficient force on the lever 60 to raise the sleeve 64 under all circumstances, or in case said sleeve should at any time become accidentally clogged or stuck and require the application of more than ordinary power to move it.

A short sheet-metal chimney, 5, having a glazed opening, 20, through which the flame may be seen, is provided for the lamp D, said chimney being preferably in the shape of an inverted truncated cone and of sufficient length to enter the lower end of the pipe *p* a short distance when in position on the lamp.

The partition *h* serves as a deflector or guard to prevent the cold air admitted to the hot-air or boiler chamber J through the draft-opening covered by the door or register 19 from passing directly into the egg-chamber

C through the opening 45 before becoming properly heated by the boiler, said partition turning it upward around the boiler and causing it to pass through the diving-flue 95.

5 The heavy or noxious vapors given off by the eggs during the process of incubation and the moisture from the pan H fall to the bottom of the egg-chamber C, where they are absorbed and carried away by the current of
10 heated air from the boiler-chamber J as it passes down the flue 95 between the partitions *h* and 49, across the bottom of the egg-chamber, up the flue 104, between the partition *b* and end *g*, and out of the aperture 75, formed
15 in the top 42, which may be connected with a chimney, 107, if desired, to increase the draft.

It will be obvious that the partition-walls 49 and *b* may be extended downward to the
20 bottom *d* or floor of the egg-chamber and respectively provided with one or more holes at or near their lower ends and perform their functions properly; also, that the partition-wall *h* may be extended upward to the top
25 42 and provided with one or more holes at or near its upper end and perform its functions properly.

The insulating-chambers *m* may be omitted and any other suitable boiler or lamp employed, if desired, without entirely departing
30 from the spirit of my invention. The upper portion of the smoke-pipe 4 may also be left intact or not removed, if preferred.

In the use of my improvement, the boiler and moisture-pan being first properly filled
35 with water, the upper portion of the chimney 5 is inserted in the lower portion of the flue or pipe *p*, after which the holder 25 is moved into position to support the lamp, and the rod
40 67 connected with the bent lever 60, the lamp having been previously lighted and the wick adjusted at the proper height in the usual manner. When the temperature of the water in the boiler becomes greater than is required
45 to properly heat the egg-chamber, water will be forced through the nipple 55 and flexible pipe 56 into the conical pipe 50, causing said conical pipe to fall and force down the long arm 10 of the lever 60, thereby raising the
50 sleeve 64, diminishing the size of the flame, and reducing the temperature of the water, and as the temperature of the water in the boiler falls the water in the conical tube 50 will run back into the boiler again, permit-

ting the counterbalancing-arm 57 to elevate 55 said tube and actuate the lever 60 to lower the sleeve 64, and thereby increase the flame of the lamp and temperature of the water in a manner that will be readily understood by
60 all conversant with such matters without a more explicit description. When the water becomes sufficiently heated in the boiler, it will pass outward through the eduction-pipes
65 *k* and be returned through the connecting-pipes *t* and induction-pipes 7, thus maintaining a constant circulation through said pipes and heating the egg-chamber to any desired degree, or, in accordance with the temperature of the water in the boiler, an even temperature of the water, and hence of the atmosphere in said chamber, being maintained
70 by the regulating device already described. By bending the flue or pipe *p* laterally and carrying it through the side wall of the boiler B, near its top, as described, the smoke and
75 hot air passing up said flue from the lamp are caused to impinge on the bent portion 106 of said pipe, and thereby heat the water in the boiler with much greater rapidity and to better advantage than would be the case if
80 said pipe passed through the top of the boiler instead of its side. I connect the induction, and also the eduction, pipes with opposite sides of the boiler, as this enables them to be arranged to the best advantage in the egg-
85 chamber.

As I have made the heat regulator or thermostat herein described the subject-matter of another application for Letters Patent, filed July 2, 1888, Serial No. 278,814, I do not
90 herein claim the same, broadly, when in and of itself considered.

Having thus explained my invention, what I claim is—

In an incubator, a pan for containing water, said pan being disposed in the egg-chamber, in combination with a smoke-pipe leading from the boiler through said chamber, a portion of said pipe being removed and the opening thus formed covered or closed by the
95 pan, whereby the smoke and heated air from the lamp are brought into direct contact with the pan on their passage through said pipe, substantially as and for the purpose set forth.
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Witnesses:

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E. M. SPINNEY.