(No Model.) 2 Sheets—Sheet 1.

S. DUCKERING.

INCUBATOR.

No. 593,203. Patented Nov. 9, 1897.

Fig. 1.

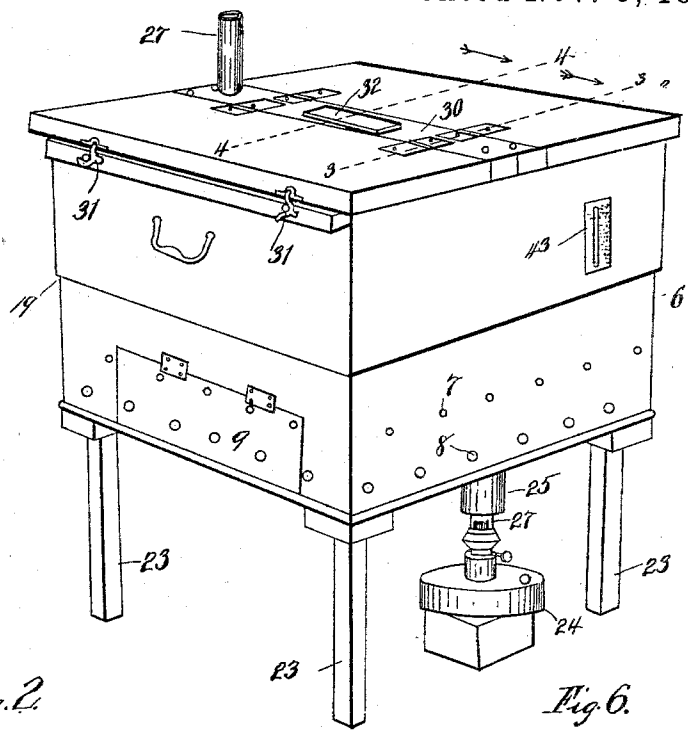
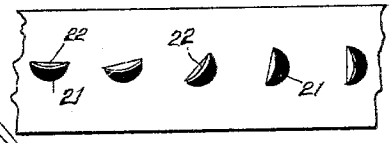


Fig. 2.

Fig. 6.



WITNESSES

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

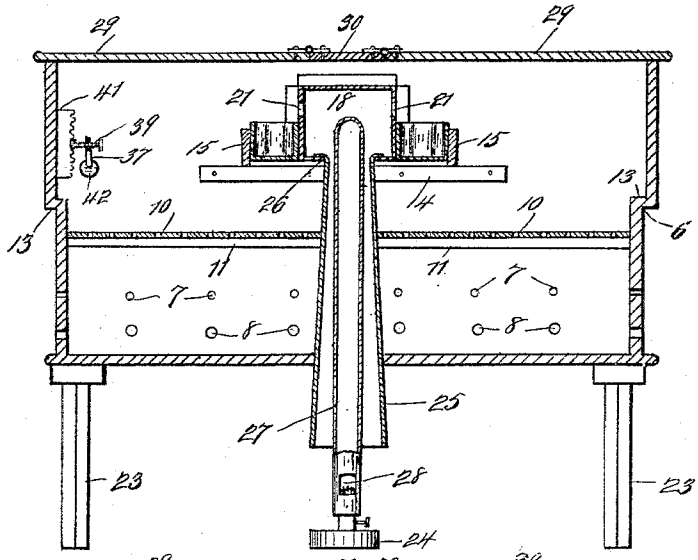


Fig. 4.

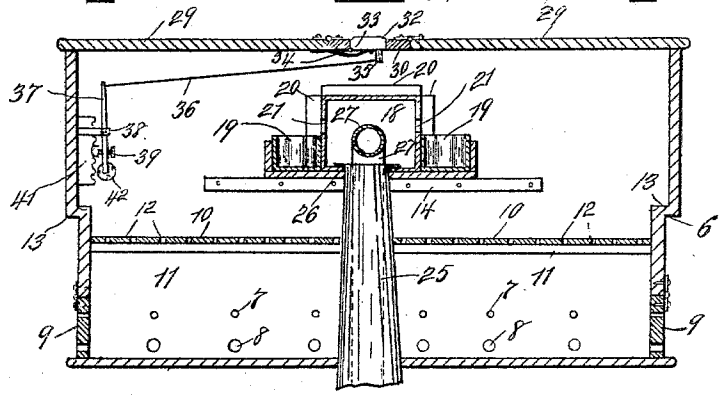
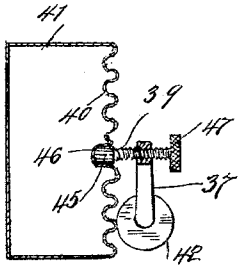


Fig. 5.



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UNITED STATES PATENT OFFICE.

SAMUEL DUCKERING, OF RAMSGATE, ENGLAND.

INCUBATOR.

SPECIFICATION forming part of Letters Patent No. 593,203, dated November 9, 1897.

Application filed October 9, 1896. Serial No. 608,356. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL DUCKERING, a subject of the Queen of England, and a resident of Northwood, Ramsgate, in the county of Kent, England, have invented certain new and useful Improvements in Incubators, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof, in which similar numerals of reference indicate corresponding parts.

The object of this invention is to provide an improved incubator which is simple in construction and operation and which is provided with an upper chamber, in which the birds are hatched, and with a lower pure-air chamber, in which they are afterward placed, and in which I employ improved means for supplying the proper degree of heat and for supplying the heated air with a proper degree of moisture or vapor; and with these and other objects in view the invention consists in the construction, combination, and arrangement of parts hereinafter described and claimed.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which—

Figure 1 is a perspective view of my improved incubator; Fig. 2, a similar view of the main part thereof with the cover removed; Fig. 3, a transverse vertical section on the line 3 3 of Fig. 2; Fig. 4, a similar section on the line 4 4; Fig. 5, a central vertical section of a heat-regulating box which I employ; and Fig. 6 is a detail view of the construction which I employ, shown on a scale larger than in the other views.

In the practice of my invention I provide a box or casing 6, which may be of any desired size and which is preferably rectangular in form and the bottom of which is provided on all of its sides with two rows of perforations 7 and 8, the lower row of perforations, which are designated by the reference-numeral 8, being preferably about twice as great in diameter as those in the upper row, and the lower portion of the box or casing is also provided on two of its opposite sides with a hinged door 9, and placed transversely therein are trays 10, which are preferably made removable and supported by strips or cleats 11, and the trays 10 are also perforated or provided with suitable openings, as shown at 12, in order to permit of the free circulation of air therethrough.

The upper portion of the box or casing is preferably larger than the lower portion, all of the side walls being projected, as shown at 13, and secured to the opposite sides thereof are cleats or strips 14, which support transverse strips or boards 15, to the under sides of which are secured plates or boards 17, which support the main heating-chamber 18, which is composed of metal plates or strips of sheet metal and which is preferably rectangular in form, as clearly shown in Figs. 2, 3, and 4, and at each side of the main heating-chamber 18 and supported by the plates or boards 17 are troughs 19, which are also composed of metal and which are designed to receive water.

The top, bottom, and sides of the heating-chamber 18 may be connected to the box 6 in any desired manner, and in the drawings I have shown the same provided with end flanges 20, which abut against the corresponding sides or ends of the box or casing; but my invention is not limited to the exact method of constructing the heating-chamber 18 or to the method of connecting the sides, top, and bottom thereof, and in practice I form in the sides of said chamber semicircular holes 21, which are preferably arranged about two inches apart, and each of which is also preferably about one-half an inch in diameter, and said holes are formed by cutting semicircular slots in the side walls of the heating-chamber and turning the flaps thus formed outwardly, and the middle hole or opening is formed horizontally, as cleary shown in Fig. 2, and the others on each side thereof are gradually turned until the last holes or openings on each side of the heating-chamber are arranged vertically, as is also clearly shown in said figure, and the object of thus forming said holes or openings is to provide for the proper distribution of the heated air, and when said holes or openings are thus formed said heated air will be driven out in cyclonic currents to all parts of the apparatus, and the method of forming these holes or openings 21 is best

shown in Fig. 6, which is a detail view of the construction which I employ on an enlarged scale, the semicircular wings 22 being not shown in the other views.

The box or casing 6 is supported by legs 23, which may be of any desired length, and I also provide a lamp or other heating device 24, which is placed beneath the box or casing at one end thereof, and extending upwardly through the end of the box or casing is a pipe 26, which is larger at its lower end than at its upper end and which passes into the heating-chamber 18 at one end thereof, as shown at 26 in Figs. 3 and 4, and the lamp or other heating device 24 is provided with a metallic tubular flue 27, which passes upwardly through the pipe 25 and into the main heating-chamber 18 and longitudinally therethrough and upwardly through the opposite end thereof, as shown in Figs. 1 and 2.

The flue 27 is preferably of the same size throughout and about the diameter of the base of an ordinary lamp-chimney, and said flue constitutes the chimney of the lamp and is provided adjacent to the lamp with a side opening 28, which is provided with a transparent cover, whereby the flame of the lamp may be seen.

The pipe 26 constitutes a supplemental heating-chamber and acts in connection with the main heating-chamber to properly heat the incubator, and the air which enters the main heating-chamber passes upwardly through said pipe and the impure air from the upper part of the incubator passes downwardly through the perforated trays 10, on which the eggs are placed, and out through the upper row of openings 7, while at the same time pure air passes in through the lower row of openings 8, thus keeping the interior of the apparatus properly supplied with pure air at all times.

The top or cover of the apparatus is preferably composed of two similar plates 29, which are hinged to the central transverse plate 30, as shown in Figs. 1, 2, and 3, and I also provide suitable latches or locks, as shown at 31 in Fig. 1, and arranged centrally and longitudinally of the transverse plate 30, which is firmly secured to the box or casing, is a small door 32, which is hinged at one side, as shown at 33 in Fig. 3, and adapted to open inwardly and which is held in the closed position by a spring 34, and said door is provided with a depending arm 35, with which is connected a rod, cord, or similar device 36, one end of which is connected with the long arm of a lever 37, which is pivotally supported at 38, as shown in Figs. 2 and 4, and the short arm of said lever is connected with a screw or bolt 39, as shown in detail in Fig. 5, and said screw or bolt 39 is pivotally connected with the central portion of the corrugated head 40 of a circular receptacle 41, which is secured to one side of the box or casing, said receptacle being preferably charged with ether, and the end of the short arm of the lever 37 is provided with a weight 42, which acts to keep said lever in its proper relative position under normal conditions.

The operation of this part of the device will be readily understood when taken in connection with the accompanying drawings and the following statement thereof. When the temperature of the box or casing or the upper portion thereof within which the eggs are placed reaches a certain degree or becomes too great, the corrugated head 40 of the receptacle 41 will be forced outwardly and the longer arm of the lever 37 will be forced in the direction of the side of the box or casing adjacent thereto and the door 32 will be opened and thus allow the escape of the heated air, and when the temperature within the box or casing has been reduced to the required degree this operation will be reversed and the spring 34 will close the door 32.

In practice the trays 10 may be covered with any suitable material, on which the eggs may be placed, but this material should be such as to allow for the free circulation of air therethrough, and the top or cover or the separate portions 29 thereof may also be provided on their inner sides or surfaces with felt, paper, or other packing, as may also the sides of the box or casing, and especially the sides of the upper portion thereof or that part above the trays 10.

The upper portion of the box or casing, as shown in Fig. 1, is also provided with a thermometer 43, which is set in a proper slot or opening made in the box or casing and which is designed to register the exact temperature within said box or casing at all times, and the heat-regulating apparatus of which the receptacle 41 forms a part is so constructed that whenever the temperature rises above the necessary degree of heat required the door 32 will be opened, as hereinbefore described, and the heated air allowed to escape, while the pure air is admitted through the bottom of the box or casing through the openings 8, as hereinbefore described. The troughs 19 are also kept filed with water, and the heated air is thus supplied with a proper degree of moisture at all times.

In the operation of the apparatus the birds when hatched are placed in the chamber below the trays 10, the temperature of which is also maintained by the operation of the apparatus at the required degree.

The screw 39, which supports the lever 37, is provided with a head 45, which enters a corresponding socket or cup 46, formed in the central portion of the head 40 of the receptacle 41, and this arrangement permits of the proper movement of the lever 37, and the pivotal support of said lever at 38 is such as to hold the screw 39 in connection with the head 40 of the receptacle at all times, and by turning said screw by means of its milled head 47 the short arm of the lever may be adjusted toward or from said receptacle and the position of the longer arm thereof thus regulated.

My improved incubator is perfectly adapted to accomplish the result for which it is intended, and it is evident that changes in and modifications of the construction herein described may be made without departing from the spirit of my invention or sacrificing its advantages.

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

1. An incubator constructed as herein described, and provided with a main transverse heating-chamber which is rectangular in cross-section and composed of sheet metal or similar material, the side walls of said heating-chamber being provided with semicircular openings, part of which are arranged horizontally and others in an inclined and vertical position, and said openings being provided with wings or projecting blades of the same shape as said openings, substantially as shown and described.

2. An incubator having a casing, a perforated tray therein, a heating-chamber suitably supported above said tray, and being provided with semicircular openings therein, said semicircular openings being provided with tongues which project outwardly, part of said openings being formed horizontally, part vertically and the rest at different angles thereto, a pipe in connection with said heating-chamber, a flue passing therethrough, and also through said chamber, and means for automatically equalizing the degree of temperature in said casing, all of said parts being combined substantially as described.

3. An incubator, having a casing, a perforated tray therein, a heating-chamber secured above said tray, means for passing heat therethrough, a door hinged to the top of said casing and adapted to open inwardly, a spring operating on said door to keep the same closed, a depending arm on said door, a circular receptacle secured to one side of said casing, a corrugated head secured therein, a lever pivotally secured to said head, a weight on the under side of said lever and a cord in connection with the upper end of said lever and said depending arm, said parts being combined substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of the subscribing witnesses, this 23d day of July, 1896.

SAMUEL DUCKERING.

Witnesses:
GEORGE TAYLOR,
GEORGE HENRY DOWNS.