G. S. SHELTON.

INCUBATOR.

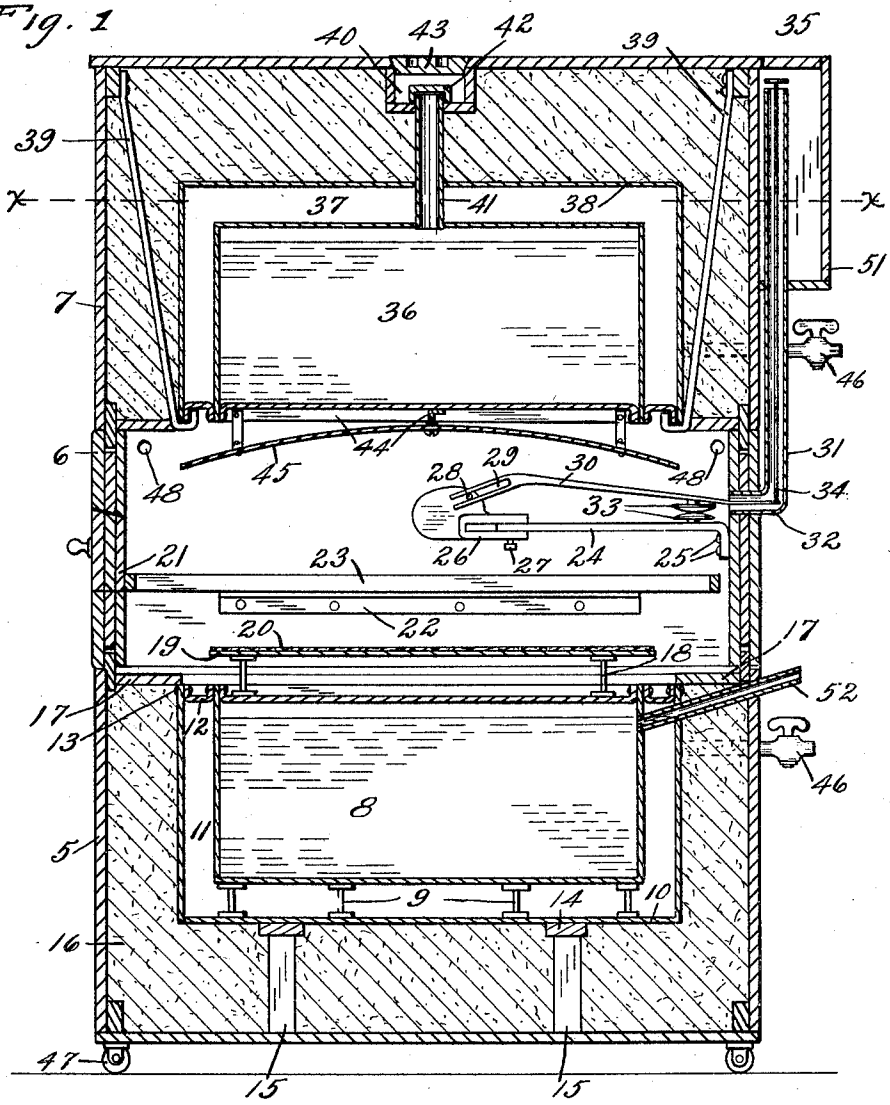
APPLICATION FILED MAY 27, 1912.

1,067,763.

Patented July 15, 1913.

2 SHEETS—SHEET 1.

Fig. 1



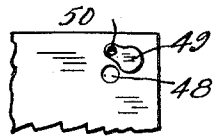


Fig. 4

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2 SHEETS—SHEET 2.

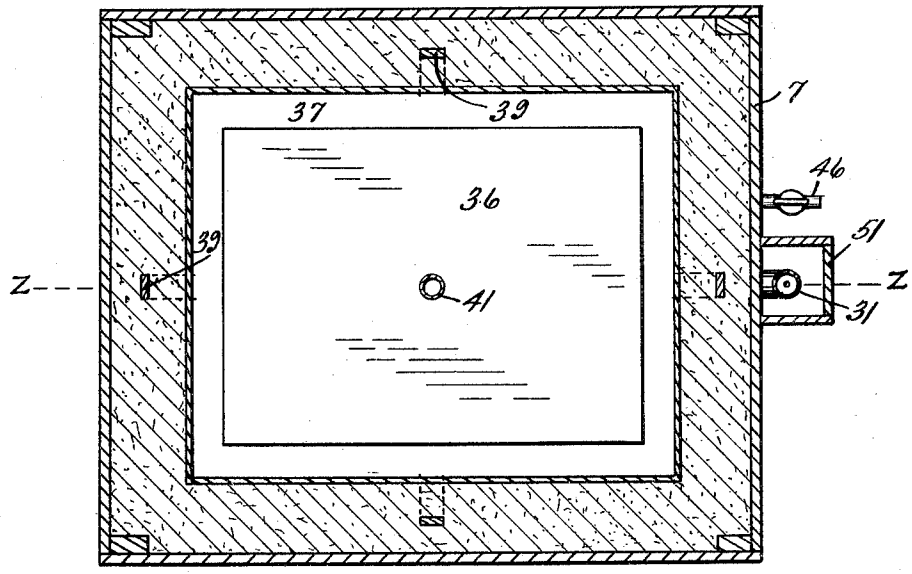


Fig. 2

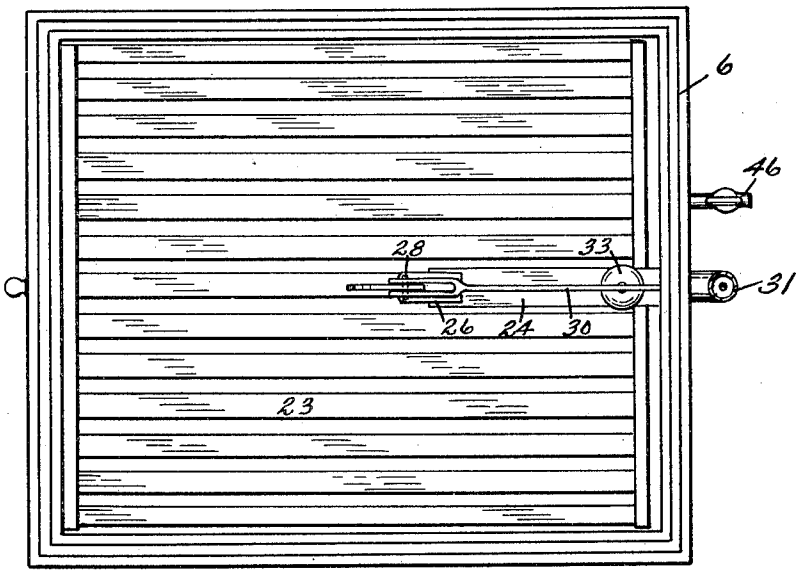


Fig. 3

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1,067,763. Specification of Letters Patent. Patented July 15, 1913.

Application filed May 27, 1912. Serial No. 700,129.

To all whom it may concern:

Be it known that I, GEORGE S. SHELTON, citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented a certain new and useful Improvement in Incubators, of which the following is a specification.

My invention relates to improvements in structures known as incubators such as are commonly employed for hatching eggs of domestic fowl and more particularly it relates to such a structure wherein heat is applied without the direct employment of combustible material thereby avoiding the risk of loss of property by fire; and the object of my invention is to provide an incubator wherein eggs may be subjected to a constant desired degree of heat during the period of incubation while requiring little care and attention and wherein there need not be employed combustible material for generating the required degree of heat, and a further object of my invention is to provide an incubator which shall be simple in its construction, reliable and efficient in its operation. I attain these objects by devices illustrated in the accompanying drawings, wherein—

Figure 1 is a view in vertical section, on broken line *z*—*z* of Fig. 2, wherein are indicated all the essential features of my invention, Fig. 2 is a plan view of the same in horizontal section on broken line *x*—*x* of Fig. 1, Fig. 3 is a plan view of the same with an upper and separable portion of the structure removed, while Fig. 4 is a fragmentary view of a detail of my invention.

Like reference numerals indicate like parts throughout the drawings.

Briefly, my invention comprises a structure of three separable box-like portions disposed one upon another to constitute a lower portion, an intermediate portion and an upper portion. Within such lower portion is disposed a closed metal tank adapted to contain hot water, which tank is surrounded on its vertical sides and bottom with means for preventing the escape of heat therethrough, which means are interposed in a space between such tank and the walls and the bottom of such lower portion, such means consisting of dead air spaces, material that is non-conductor of heat, (like straw or sawdust) or an air tight space from which the air may be exhausted to form a vacuum. Extending outwardly from a side of such tank, near its top, to project outwardly from a side wall of such lower portion, is a pipe through which water of a desired temperature may be conducted into such tank and through which, by means of a suitable flexible pipe, such water may be siphoned to empty or reduce the quantity of water therein. The intermediate box-like portion is adapted securely to rest upon and fit the top edges of the said lower portion and within said intermediate portion is provided a tray which like a bureau drawer, may be drawn outwardly or shoved inwardly as desired, such tray being adapted to receive and hold eggs to be incubated in a required position above the tank of hot water that is disposed in the said lower portion, there being interposed between the top of such tank and the bottom of such tray a suitable deflector whereby heat from such tank may not directly radiate to and against the bottom of said tray. The upper box-like portion is adapted securely to rest upon and fit the edges of the open top of said intermediate box-like portion. Within this upper portion is suspended by suitable means a hot water tank similar to the tank in said lower portion and which in like manner is insulated by non-conductors of heat except that the tank of the said upper portion is insulated around its vertical sides and on its top while its bottom is left exposed to radiate its heat downwardly toward the egg tray of the intermediate portion, there being interposed, however, between the top of said egg tray and the bottom of such upper tank a suitable deflector to prevent direct radiation of heat downwardly on the top of such egg tray. Extending upwardly from the top of such upper tank and through the top of the upper box-like portion is a pipe through which water of a desired temperature may be poured into the tank, or the too cold water may be siphoned out of

such tank by means of suitable flexible hose. Thus the space within the intermediate portion of the structure may be heated to a desired degree by radiation of heat contained in the contents of the upper and lower tanks. To regulate such heat, within the intermediate portion of the structure, whereby it may be maintained constant in degree, I have provided thermostatic means disposed within such intermediate portion, which means may be so adjusted and associated with ventilating devices that the slightest variation from a desired temperature, within such intermediate portion, will act through such thermostatic means to operate the ventilating devices as required to prevent any harmful degree of variation from the desired constant temperature. Thus, by withdrawing the water from the tanks by siphon whenever it approaches too low a degree of temperature and replacing it with hotter water, a desired constant degree of heat may be maintained within the intermediate box-like portion and the eggs therein may be hatched successfully with little attention and without any liability of setting fire to adjacent wood work.

Referring now to the drawings, Fig. 1 shows the essential features of one form of my invention wherein 5 is a lower box-like portion upon the top edges of which rests an intermediate box-like portion 6. An upper box-like portion 7 is adapted securely to rest and fit upon the top edges of the intermediate portion 6. Thus the portions 5—6 and 7 are separable, the portion 7 being readily taken off from and replaced upon the portion 6 while the portion 6 with equal ease may be removed from and replaced upon the portion 5.

A closed tank 8, preferably of sheet metal, is disposed in the lowest portion 5 wherein it rests upon girders 9, which girders 9 extend cross-wise upon the bottom of a casing 10 whose vertical walls and bottom are of such distance from the walls and bottom of the tank 8 as to create a space 11 therebetween, which space 11 is made air tight by a metal strip 12 which is formed so that it may be riveted by rivets 13 to unite the upper edges of the tank 8 with the upper edges of the casing 10, which casing 10 is supported by wooden cross-strips 14 disposed on wooden standards 15 extending upwardly from the floor of the said lowest portion 5.

The space between the vertical walls and the bottom of the casing 10 and the walls and the bottom of the portion 5 may be filled with straw, sawdust or other non-heat-conducting material 16 which material 16 is covered by strips 17 extending from the top edges of the casing 10 to the walls of the portion 5.

Upon the top surface of the tank 8 are disposed standards 18 which serve to support a plate 19 which may serve as a deflector of the heat that may arise from the tank 8 and upon the top surface of said plate 19 there may be disposed an asbestos covering 20 or a covering of other material that is a non-conductor of heat.

The plate 19 may be of such area and disposed at such height above the top of the tank 8 as will permit hot air to pass from the space beneath it upwardly around its outer edges as indicated in Fig. 1.

The intermediate box-like portion 6, when disposed in its normal position upon the top of the portion 5, is provided with a tray-like drawer 21 adapted to slide in and out from the said portion 6 it being supported to slide upon cleats 22 one of which is fastened upon each of opposite inner sides of the portion 6 at a desirable height above the deflecting plate 19.

The drawer 21 has its bottom constructed of slats 23 disposed at a suitable distance one from another whereby warm air may find passage through the space between such slats 23.

In practice it is sometimes advantageous to lay a cover of coarse woven material like a gunny-sack upon the top of the slats 23 to afford a suitable flooring whereon a chicken may catch its toe nails as it is struggling to free itself from its shell, but I have not shown such covering in the drawing.

I have shown attached to the inner side of the wall of the portion 6 one form of thermostatic mechanism adapted to respond to variations in the temperature of the air within said portion 6 wherein a bracket 24, secured to said wall by screws 25, extends toward the center of the portion 6 where upon its end portion is mounted an adjustable sliding member 26 that may be fastened to the bracket 24 by a set screw 27 at any desired point. Disposed upon said sliding member 26 is a pin 28 adapted to fit within a slot 29 which is formed in the end portion of an arm 30 which extends from said sliding member 26 into a vertical pipe 31, through the elbow 32 of such pipe 31, which elbow 32 is secured in a hole through the wall of the portion 6 at a point just above the bracket 24 and between such arm 30 and said bracket 24 are disposed two thermostatic wafers 33, of well known form, which wafers 33 as thus disposed may serve, when they expand in response to an increasing temperature, to raise the arm 30 which arm 30 in turn may raise a rod 34 which rests on the end of said arm 30 within the vertical pipe 31. The rod 34 extends upwardly to and above the top of the pipe 31 and upon its end is secured a disk 35 which is adapted to cover the opening in the top of the said pipe 31 whereby in response to a vertical movement of the arm 30, due to

an expansion or contraction of the wafers 33, the disk 35 may close or open, to a desired degree, the passageway for air through the opening at the top of the pipe 31; thus the slightest increase in the temperature of the air within the portion 6 may cause the wafers 33 to expand to raise the arm 30 and with it the rod 34 to lift the disk 35 higher to permit a larger volume of hot air to escape from the opening in the top of the pipe 31, while a decrease in such temperature would serve to contract the wafers 33 and in an obvious manner lower the disk 35 to lessen the escape of hot air.

It will be observed that the longitudinal position of the sliding member 26 on the bracket 24 may determine the normal temperature of the air in portion 6, since, by reason of the incline of the slot 29, the position of the pin 28 within such slot 29 determines the normal height of the disk 35 above the top of the pipe 31.

The uppermost box-like portion 7 as shown in Fig. 1, resting in its normal position on the top of the intermediate portion 6, to serve as a cover therefor, contains a tank 36 surrounded by an air space 37 formed by an outer casing 38 whereby the top surface and vertical walls of said tank 36 may be insulated with non-heat-conducting material 16 in a manner like that employed for the lower tank 8; thus the structure embodied in the portion 7 resembles in some respects the structure comprising the portion 5 inverted, the tank 36 and casing 38 being suspended from the top portion 7 by the arm hooks 39 which engage with the bottom edges of the casing 38.

Between the walls and top of the casing 38 and the walls and top of the portion 7 the space is filled with non-heat-conducting material 16 like that used in the lowest portion 5.

Extending upwardly from the center of tank 36 into a recess 40 formed in the top of the portion 7 is a pipe 41 through which water may pass into said tank 36 or through which a flexible hose may extend to siphon water from such tank 36. A cover 42 is adapted to cover the top of the pipe 41 while another cover 43 may cover the recess 40.

The bottom of the tank 36 may be strengthened and braced with pieces 44 of angle iron disposed cross-wise on the bottom and from such pieces 44 may be suspended a heat deflecting plate 45 whereby heat from the contents of the tank 36 may not radiate directly on to the top of the drawer 21.

In case it be desired to exhaust the air from the air space 11, of the lowest portion 5 or from the air space 37 of the portion 7, I have provided air cocks 46, one for the portion 5 and one for the portion 7, which connect respectively with air spaces 11 and 37 through pipes indicated by dotted lines. Such air cocks 46 may be connected with suitable exhaust pumps, not shown, whereby the air in spaces 11 and 37 may be exhausted to reduce the heat conductivity through such spaces.

In some cases one may dispense with the inclosed casing 10 and 38 and the air tight spaces created by them and in place thereof fill with a non-heat-conducting material the spaces between the tanks 8 and 36 and the sides of the respective portions within which such tanks are disposed; and further, under some conditions it may be desirable to dispense with the heat deflectors 19 and 45.

I have provided ventilating holes 48 in the sides of the portion 6 near its top, which ventilating holes 48 may be wholly or partially covered to any degree by a metal plate 49 as shown in Fig. 4 which is pivoted by a screw 50, said plate 49 being adapted to swing about screw 50 to any desired position with respect to the hole 48 in an obvious manner.

To exclude drafts of air from contact with the upper open portion of the pipe 31 I have provided a removable inclosing case 51.

In order to fill and empty the tank 8 I have provided a pipe 52 which extends outwardly from one side of said tank 8, at a point near its top, to and through the side of the portion 6, through which pipe 52 hot water may be poured into said tank 8 or a flexible hose may be inserted therethrough with its end projecting to the bottom of said tank 8 and through such flexible hose any portion of the water may be siphoned from the lower portion of such tank 8.

In order that the entire structure comprising the three portions may be easily moved on the floor of a room I have provided casters or rollers 47 of well known construction.

In operating my invention I find it a good plan, first, to lay a gunny-sack or other loosely woven fabric on the top of the slats 23 of the drawer 21 and thereon place the eggs to be hatched and then push the drawer into its normal position within the portion 6. I then fill the tanks 36 and 8 with hot water, then by placing a thermometer on the eggs within the compartment of portion 6 I am enabled by observing it for awhile to adjust the thermostatic mechanism whereby it will operate the ventilating mechanism to govern the position of the disk 35. Thus after attention for a short time the desired normal constant temperature for successfully hatching eggs may be attained and no further attention will be required for a number of hours, when the lower portion of the water in the lower tank 8 will be found to be much cooler than the

upper portion thereof whereupon I insert a rubber tube through the pipe 52 so that the end of such tube may extend to or near the bottom of the tank 8 whereupon I may siphon the colder lower portion of the water from the tank 8. I then insert my rubber tube into the tank 36 through the pipe 41 and siphon therefrom the colder lower portion of the water therein contained and let it flow into the lower tank 8 which portion of water will be much warmer than the water already in the lower tank 8. After thus removing the colder portion of water from tank 8 and refilling it with the lower portion of the water of tank 36 I then completely fill the tank 36 with a new supply of boiling water whereupon the covers 42 and 43 are replaced and no further attention will be required for another period of time, whereupon the same operation may be repeated; thus with my invention eggs to be incubated may be subjected to a desired constant temperature for the required number of days with very little trouble and attention.

While I have shown but one form of ventilating mechanism and one form of thermostatic means for controlling such ventilating mechanism, it is obvious that any one of many well known devices may be substituted therefor.

It is manifest that a structure embodying my invention may be employed for other purposes than hatching eggs; for instance, such structure may advantageously be used for drying fruit or vegetables like apples, berries and pumpkin and when so used a plurality of tray-like drawers might be employed instead of a single drawer 21, and other uses may suggest themselves as in cases where it is desired to subject things to a desired constant degree of heat for a long time.

Of course many parts of my invention may be modified in form and dimension without departing from the spirit thereof.

What I claim is:

1. In an incubator, the combination with a structure having three separable portions comprising a lowermost box-like portion, an intermediate box-like portion and an uppermost box-like portion, said intermediate portion being adapted to rest removably upon the top of said lowermost portion while said uppermost portion is adapted to rest removably upon the top of said intermediate portion, of a tank adapted to contain hot water, said tank being provided with an air tight inclosing case constructed to create an air tight space between the bottom of said tank and the bottom of said inclosing case and between the vertical sides of said tank and the vertical sides of said inclosing case, said inclosing case with said tank therein being disposed within said lowermost portion, heat insulating means interposed between the vertical sides of said inclosing case and the vertical sides of said lowermost portion and between the bottom of said inclosing case and the bottom of said lowermost portion, another tank which is also adapted to contain hot water and which is provided with an air tight inclosing case constructed to create an air tight space adjacent to its top and vertical sides, said inclosing case with said other tank therein being disposed and suitably supported within said uppermost portion, heat insulating means interposed between said last named air tight space and the walls and top of said uppermost portion, ventilating mechanism associated with said intermediate portion and thermostatic means connected with, and adapted automatically to operate, said ventilating mechanism.

2. In an incubator of the class described, the combination with a structure having three separable box-like portions comprising a lowest portion an intermediate portion and a highest portion, of a tank of suitable material suspended within said highest portion by suitable suspension supports said tank being adapted to be filled with fluid of a required temperature, an egg tray disposed within said intermediate portion and adapted to be withdrawn therefrom, ventilating means associated with said intermediate portion, thermostatic means adapted to operate to control ventilating means in response to changes in the temperature of the air within said intermediate portion and a tank of suitable material disposed and supported within said lowest portion and adapted to be filled with fluid of a required temperature.

3. In an incubator of the class described, the combination with a box-like structure comprising three separable sections disposed so that the highest section shall rest upon and be supported by the intermediate section while such intermediate section shall rest upon and be supported by the lowest section, of a tank of suitable material and adapted to be filled with liquid said tank being disposed and suspended by suitable supports within said highest section, non-heat-conducting means disposed within a space between the top of said tank and the top of said highest section and between the vertical walls of said highest section, a second and similar tank disposed on said suitable supports within said lowest section, non-heat-conducting means disposed within the space between the bottom of said second tank and the bottom of said lowest section and between the vertical walls of said second tank and the vertical walls of said lowest section, a removable egg tray disposed on suitable supports within said in-

termediate section, deflector plates disposed to shield said egg tray from heat rays directly radiating from the bottom of said first named tank, and from the top of said second named tank and ventilating means associated with said intermediate section.

In witness whereof, I, hereunto subscribe my name this eighth day of May, A. D. 1912.

GEORGE S. SHELTON.

Witnesses:
GEORGE BLAIR,
ANNA HASKINS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."