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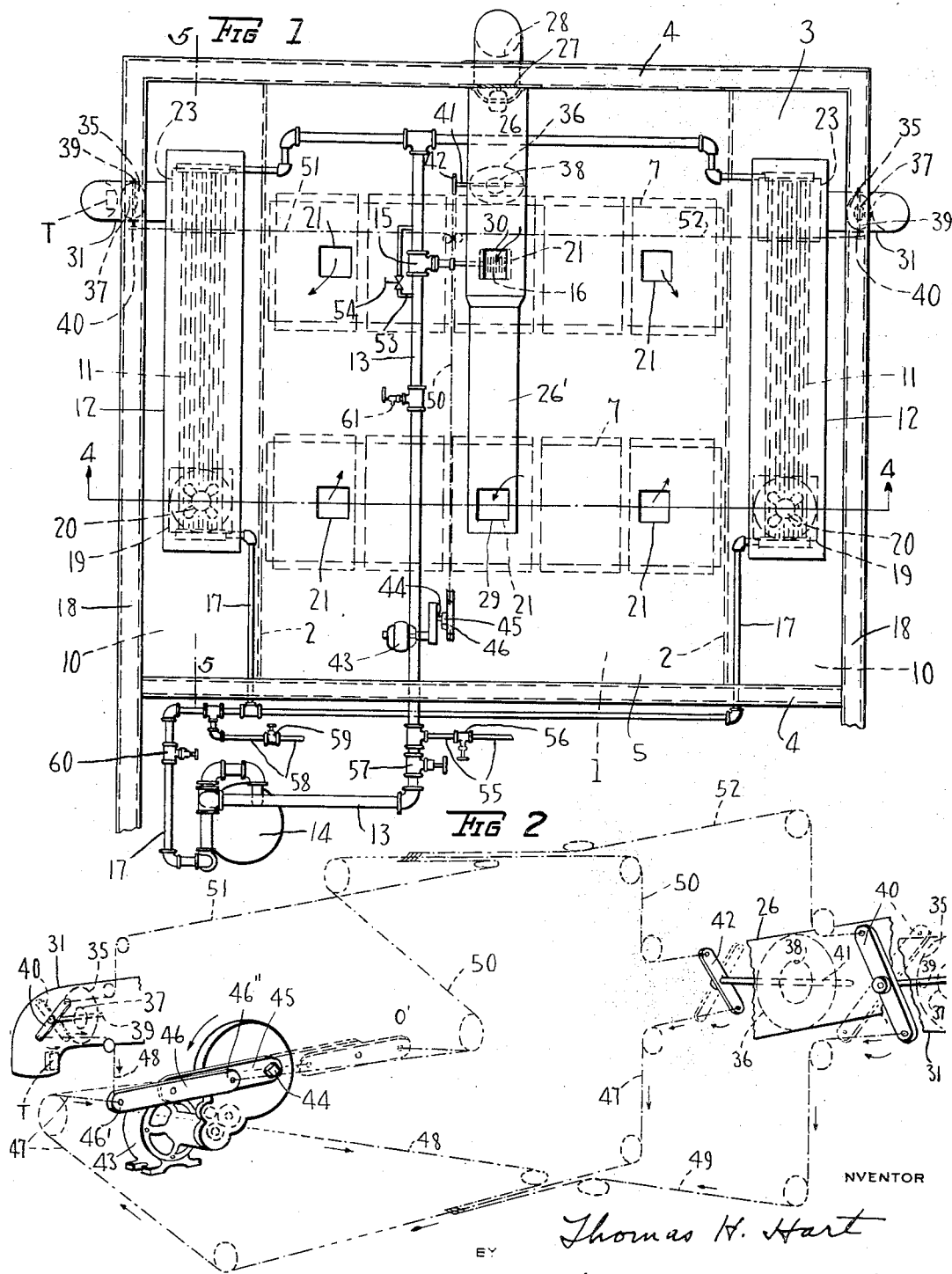
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BROODER

Filed April 22, 1929

2 Sheets-Sheet 1



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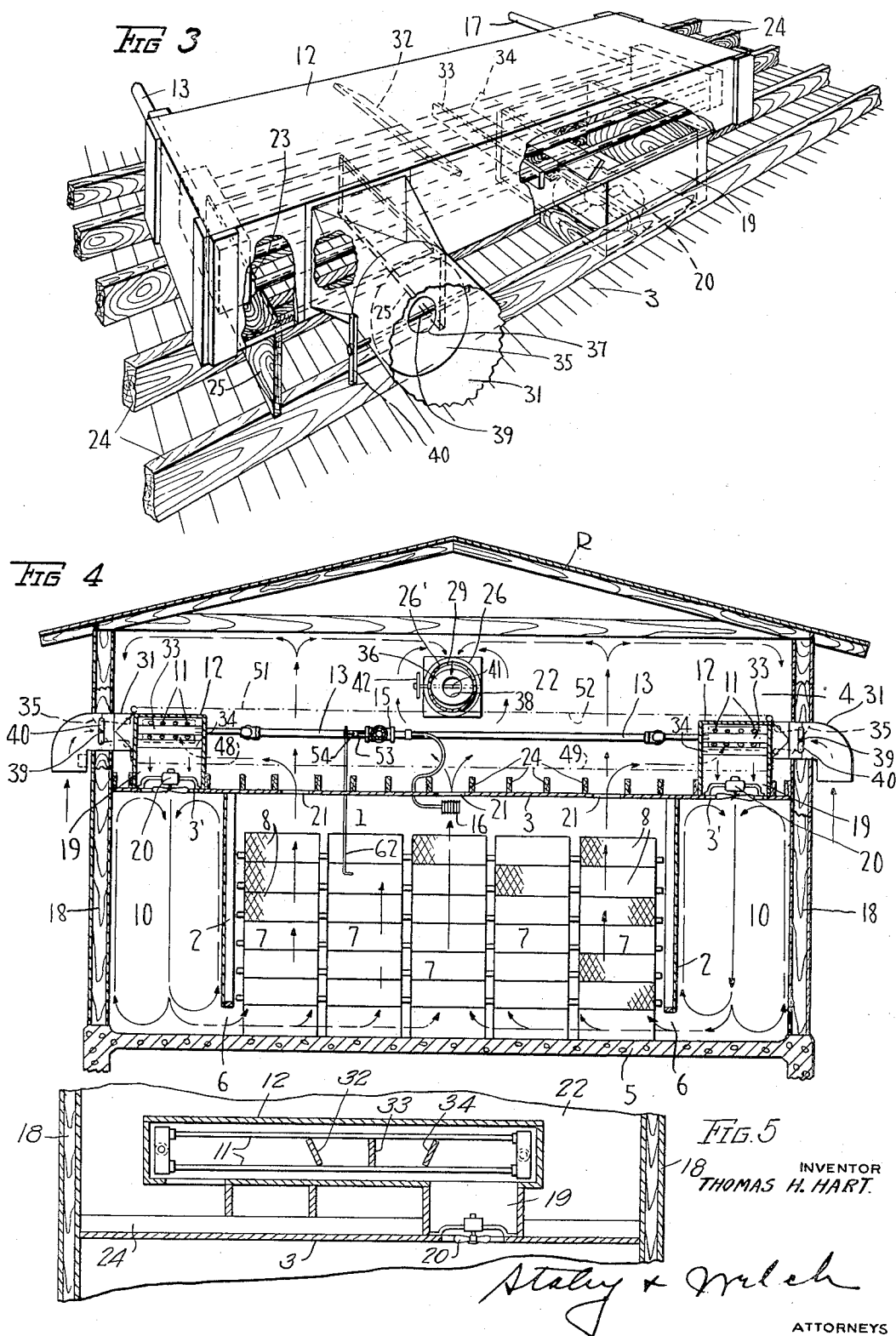
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

1,922,086

BROODER

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26 Claims. (Cl. 119—31)

This invention relates to a method of and apparatus for brooding chicks, it more particularly relating to a brooder of the mammoth type and especially to means for controlling the temperature and ventilation of the brooder chamber.

In brooders of this type it is highly important to maintain a uniform temperature in the brooding chamber and to also renew the air which is circulated therethrough.

One of the objects of my invention is to provide for regulating the temperature of the brooder chamber and to ventilate the same independently of the temperature controlling means in such a way that a continuous supply of fresh air is furnished thereto.

A further object of the invention is to provide for automatically increasing the supply of fresh air as the outside temperature increases by means responsive to outside temperature.

A further object of the invention is to provide improved means for re-circulating through the brooder chamber a portion of the air discharged therefrom and at the same time continuously admitting fresh air and discharging foul air.

A further object of the invention is to provide improved means for more positively and uniformly discharging to outside atmosphere the foul air escaping from the brooder chamber.

A further object of the invention is to provide improved means for securing a uniform distribution of air and temperature throughout the brooding chamber.

A further object of the invention is to provide means for controlling the temperature of the brooding chamber when outside temperature is not sufficiently low to prevent overheating.

A further object of the invention is to provide improved means for humidifying the air that is circulated through the brooding chamber.

In the accompanying drawings:

Fig. 1 is a top plan view of a brooder in which my improvements have been embodied, with the roof of the brooder house removed to show the interior of the auxiliary chamber.

Fig. 2 is an enlarged perspective view of a portion of the mechanisms.

Fig. 3 is also an enlarged perspective view of some of the details.

Fig. 4 is a cross-section on the line 4—4 of Fig. 1, the scale of the drawings being the same as Fig. 1.

Figure 5 is a section on the line 5—5 of Figure 1.

Referring to the drawings, particularly Fig. 4, there is shown a house-like structure formed by

end walls 4 and side walls 18 and a roof R and a floor 5. Within this structure there is provided a brooding chamber 1 which is formed by the end walls 4, floor 5, a pair of vertically-arranged partitions 2 and ceiling 3. The partitions 2 extend to the ceiling, but are removed from the side walls 18 to an extent to provide corridors or compartments 10 and the lower edges of these partitions terminate at a point above the floor line so as to leave open spaces 6 beneath the same. The partitions are preferably provided with windows of a character to admit light, and the side and end walls of the structure may be provided with windows for the same purpose, such windows not being shown in the present case. The ceiling 3 extends the entire width and length of the structure so as to not only cover the brooding chamber but also the side compartments 10. Within the brooding chamber are tiers 7 of superimposed cages 8 for the chicks, arranged in banks, the cages being of the usual foraminous character. The banks are preferably arranged parallel to each other forming aisles between them, for the convenience of the attendant, and extend between the partitions 2 which are provided with doors (not shown) to give access to the brooding chamber.

During cold weather the air which is circulated through the brooding chamber is heated by steam, vapor or hot water which is circulated through coils of pipe 11, two such coils being shown in the present instance. Each coil is enclosed in a box-like structure or casing 12 and is connected by suitable piping to a common supply pipe 13 which in turn is connected to a boiler 14. Interposed in the pipe 13 between the boiler and coils is a suitable valve 15 controlled by a thermostat element 16 located in the upper portion of the brooder chamber 1, the preferred location of the thermostatic element being in the path of air which escapes through one of the vents 21 hereinafter referred to, in substantially the center of the brooding chamber. This thermostatic controlling means is of any well known construction. Return pipes 17 are connected to the coils 11 and suitably connected to the boiler for the return of the condensate.

The heater boxes 12 are placed in a space above the ceiling 3 known as an auxiliary chamber, indicated at 22, each of the boxes being located directly above one of the side corridors or compartments 10, and, for convenience in assembly in parallel relation to the outer walls 18. Attached to the under side of one end of each box is a downwardly extending duct 19 having its lower

end in communication with the corresponding compartment 10 through an opening 3' in the ceiling, and in this duct is placed a motor driven fan 20 for the purpose of forcing air into said compartment. The direction of the air flow from each of the fans 20 is shown diagrammatically by arrows in Fig. 4, from which it will be noticed that a current of air divides in the compartment 10, a portion turning upwardly and rising along the partition 2 and wall 18, where any air entering by filtration through the wall 18 is mixed with the rising current with the result of maintaining the air in the compartments at a uniform temperature. The pressure exerted by the fans causes the air to eventually find its way beneath the partition 2, thence upwardly through the cages of chicks to the upper portion of the brooder chamber, from thence it escapes into the auxiliary chamber through the discharge openings 21, a plurality of these openings being located above each bank of cages. These openings are so disposed as to secure a substantially uniform upward movement of air from side to side and end to end of each bank.

The air which is supplied to the heater boxes is taken partly from the auxiliary chamber and partly from outside atmosphere. To that end, in the bottom of each box 12 at the end opposite from the duct 19 is placed an opening 23, in the present case a square opening which communicates with the auxiliary chamber. The box 12 is supported at this end on the ceiling rafters 24 by parallel supporting members 25 so placed as to offer the least hindrance to a flow of air from the outlet vents 21 to the opening 23, and is of sufficient height above the ceiling 3 to insure a flow of maximum volume. The air which is received into the auxiliary chamber 22 through the openings 21 is ascending due partially to its acquired heat but it will also be clear that the action of the fans drawing the air through the openings 23 as well as the action of the exhaust fan, will also have the effect of inducing a positive pressure of air in the compartments 10 and brooding chamber and a negative pressure of air in the auxiliary chamber thus inducing an effective circulation of air upwardly throughout the brooding chamber.

The air from outside atmosphere is taken into each box at a point just above the opening 23, being admitted through a duct 31 passing through the wall 18 of the structure with its outer end down-turned as shown so as to exclude rain and to also minimize the influence of wind.

Provision is made for discharging foul air from the auxiliary chamber in substantially the same proportions that fresh air is admitted and to that end there is provided a conduit or duct 26 located in the auxiliary chamber which discharges to outside atmosphere. This duct 26, which is termed the exhaust duct, is preferably located in the upper portion of the auxiliary chamber and in preferably transverse relation to the banks of cages 8. Referring more particularly to Fig. 1, the duct has a reduced cylindrical portion 26' at its inner end, the outer end of the main portion 26 being in the present case secured to an end wall 4 of the structure, the duct being otherwise supported in any suitable manner. In an orifice in the end wall 4 and in alignment with the duct 23 is mounted a motor driven fan 27 adapted to force air outwardly against outside atmosphere, the power being sufficient to insure an outward flow against any ordinary pressure set up by wind, and to prevent entrance of rain and to further retard

wind the duct 26 is provided with an extension in the form of a downturned elbow 28 located on the outside of the wall 4. A series of openings 29 and 30 are provided by the upper side of the duct 26 and its reduced extension 26', it being noted that the duct increases in cross-sectional area while the areas of the openings 29 and 30 decrease in the direction of the flow of the escaping air; this proportioning of area being employed for the purpose of offsetting frictional resistance of the air, as it is obvious that the velocity of incoming air at the opening 29 is less than at the opening 30, as it is more remote from the fan 27, while the cross-sectional areas of the duct increase as additional volume of air enters the duct, with the result that a substantially uniform collection and rejection of a portion of the contaminated air received in the auxiliary chamber 22 is effected. There are preferably as many openings 29 and 30 as there are banks 7 of chick cages.

For cold weather operation the amount of fresh air admitted to the heating boxes should be approximately 10% of the air circulated through the boxes, the fresh air and recirculated air being thoroughly mixed in the boxes as it passes over the heating coils, a tortuous passage for the air over the coils being provided by baffles 32, 33 and 34 (Fig. 3). Located in each of the ducts 31 is a damper 35 which is normally closed during cold weather operation of the brooder but which has a central opening 37 of fixed size for the admission of fresh air during the cold weather operation. The discharge duct has a damper 36 which is provided with a fixed opening 38 for the discharge of foul air during cold weather operation, the areas of the openings 37 and 38 being such that an amount of foul air is discharged substantially equal to the amount of fresh air admitted. These dampers are for the purpose of warm weather operation and are designed to be automatically and simultaneously opened when the outside temperature reaches a predetermined point dependent upon the temperature desired in the brooder chamber. To that end, the damper 35 in each fresh air duct 31 is secured to a shaft 39 rotatably mounted in the duct, and on the shaft 39 at one end thereof is a double-armed operating lever 40. The damper 36 is likewise secured to a shaft 41 rotatably mounted in the exhaust duct 26 and to its shaft 41 at one end is secured a double-armed operating lever 42. These dampers operate in unison, all being closed or opened at the same time, since it is obvious that when a quantity of air is expelled, an equal quantity must be admitted. The mechanism best shown diagrammatically in Fig. 2 is employed to effect the simultaneous opening and closing of the dampers. An electric motor 43 is mounted in any convenient position, here shown as being in the auxiliary chamber 22, and connected to said motor by a suitable speed reduction device is a rotatable shaft 44. To the outer end of the shaft 44 is secured a crank-arm 45 and pivotally mounted at the free end of the crank-arm is a beam 46 to one end 46' of which is attached a cable 47 passing over a plurality of pulleys and which is also attached at its further end to the lower end of the operating lever 42. At an intermediate point, cables 48 and 49 are secured to the cable 47, the cables 48 and 49 each being attached, respectively, to the lower ends of the operating levers 40. To the other end 46'' of the beam 46, a similar connection of cables is made, there being a cable 50 attached to the upper end of the

lever 42 and cables 51 and 52 to the upper ends of the levers 40.

With the mechanism in the position as shown in Fig. 2, in which it will be seen that each of the dampers is in its closed position and with the crank-arm 45 in full lines in a horizontal position, the beam 46 is also in a substantially horizontal position, the tension on all the cables being adjusted to permit this. If the motor is energized and the crank arm 45 is rotated in the direction of the arrow, it is seen that a pull on the cable 47 will be exerted, and likewise on the cables 48 and 49, causing the respective dampers 35 and 36 to be opened, this occurring when the crank arm 45 is in the opposite horizontal position O' in dotted lines. While the lower ends of the levers 40 and 42 are being moved to open the dampers, the upper ends are moving in the opposite direction, causing the cables 50, 51 and 52 to follow, the original tension being maintained at all times. When the crank-arm 45 leaves the position O', being rotated in the same direction, the cables 50, 51 and 52 are now put under increased tension, while the slackening occurs in the lower cables 47, 48 and 49 and each of the dampers is returned to the closed position. Electrical contacts are made and broken that cause the motor to operate only to the extent needed to bring the crank arm to either of the two positions.

The purpose of the dampers is, as has been mentioned, for assisting in temperature control in a wide range of outside temperature conditions. However, it should be explained that cold weather operation of the brooder is better and more economically accomplished with the dampers closed, all fresh air being drawn into the heating coil boxes 12 through the damper apertures 37 and the equivalent amount of foul air expelled through the corresponding aperture 38 in the exhaust damper 36. A thermostatic element T is placed in one of the fresh air ducts, this thermostat being preferably connected electrically with the damper operating motor 43, to the end that when the temperature of the outside air falls below the pre-determined point, the motor will be energized to close the dampers, and vice versa.

When the temperature of the outside air rises above the pre-determined point, the dampers will be opened, and while this will change the proportions of fresh air as compared to the re-circulated air the change in proportion does not affect the temperature in the interior of the brooder space, as all air, re-circulated or fresh, must first pass through the heating coil boxes, the supply of heat to which is under the control of the thermostat 16 located in the central upper portion of the brooder space and preferably directly under a centrally located outlet vent 21.

The circulating fans 20 are operated continuously at constant speed, as is also the exhaust fan 27, regardless of weather or temperature conditions, a convenient method being to connect all fans to a common circuit and switch (not shown). The circulating fans operate at full capacity, the proportion of fresh air to recirculated air merely undergoing changes according to the position of the dampers in the fresh air ducts and exhaust duct, while the exhaust fan 27 delivers its full capacity when the exhaust duct damper and fresh air damper are fully opened.

For warm weather operation, a cooling medium may be circulated through the pipe coils 11, the cooling medium being conducted around the valve 15 in a by-passing system comprising piping 53 and valve 54. The cooling medium, which

is preferably cool water, is supplied to the pipe through a pipe 55, having a valve 56, and the pipe 13 has a valve 57 between its connection with the pipe 55 and the boiler. The water after circulating through the system is discharged through the pipe 58, having a valve 59, and a valve 60 is provided in the pipe 17 between the boiler and the water discharge pipe.

For humidifying purposes, a discharge valve 61 is placed in that portion of the pipe 13 which passes through the auxiliary chamber so that a jet of steam may be discharged in the auxiliary chamber, the valve being closed when cool water is being circulated. This valve is operated by a rod 62 which passes through the ceiling 3 and into the brooding chamber in convenient reach of the attendant.

By the apparatus described it will be seen that provision is made for maintaining a continuous circulation of air through the brooder chamber and also for controlling the temperature of that air; that the temperature control system is quite independent of the ventilating apparatus in that the temperature control does not depend upon the admission of an increased amount of fresh air in cool weather operation.

In this connection it should be stated that in my arrangement the fresh air and re-circulated air is admitted to the coil boxes through permanent openings, discharged through permanent openings into the brooder chamber, discharged from the brooder chamber into the auxiliary chamber likewise through permanent openings, and foul air discharged from the auxiliary chamber through permanent openings.

The arrangement is such that when operating under usual cold weather conditions, substantially 10% of the air delivered by the circulating fans is drawn in through the fresh air intakes at the intake ends of the boxes, the balance of the air being taken from the auxiliary chamber for re-circulation, the fresh air and re-circulated air being thoroughly mixed in the box before being discharged in the compartments 10, and also by reason of its passage over the coils of pipe being brought to the proper temperature. The mixture of fresh and re-circulated air is discharged into the compartments 10, and while in these compartments the air gives up enough heat to counteract the cold wall and glass and also builds up a slight pressure in the compartment. From the compartments 10 the air passes beneath the partitions into the brooding chamber, up through the brooder sections and through the aisles between the brooder sections and out through the ceiling vents into the auxiliary chamber. Air in the auxiliary chamber is exhausted through the exhaust duct to an amount equal to that drawn into the coil boxes from outside atmosphere.

Another advantage in my apparatus is that for warm weather operation provision is made for automatically admitting into the coil box a greatly increased amount of fresh air and for exhausting a substantially equal amount of air from the auxiliary chamber, this being accomplished by opening the dampers with the fixed openings in the fresh air intakes and also in the exhaust ducts by thermostatic control devices. This plan of increasing the rate of fresh air change in the brooder allows dissipation of the animal heat developed by the chicks to a larger extent and also permits operation of the brooder at the correct brooding temperature when the outside temperature rises to a predetermined degree. In the event that the outside temperature rises to a prede-

terminated point, the valves are operated to permit circulation of a cooling medium such as cool water.

Another advantage in my arrangement resides in the manner of exhausting foul air from the auxiliary chamber by means of a duct which extends well within the auxiliary chamber in connection with a pressure fan in the duct and the downturned discharge member on the outside of the structure. The arrangement of the duct allows the foul air to be exhausted in a substantially uniform manner throughout the auxiliary chamber, while the outside hood member serves to protect the exhaust fan from the effect of wind and rain and insure a positive exhaust for the foul air at all times.

Having thus described my invention, I claim:

1. In a brooder, a structure having a brooding chamber, an auxiliary chamber above said brooding chamber in communication therewith through restricted openings, a separate temperature modulating compartment in said auxiliary chamber, one portion of which is in communication with the space containing said brooding chamber through a fixed opening, another portion of said compartment being in communication through permanent openings with said auxiliary chamber and also with outside atmosphere, said compartment being otherwise closed to said auxiliary chamber, means for forcibly circulating the air, and means for exhausting air from the auxiliary chamber in an amount substantially equal to the fresh air supplied to said temperature modulating compartment.

2. In a brooder, a structure having a brooding chamber, an auxiliary chamber above said brooding chamber in communication therewith through restricted openings, a separate box in said auxiliary chamber having a pipe coil therein, one end of said box having an invariable discharge duct discharging into the space containing said brooding chamber, a fan located at the point of discharge, the other end of said box being in communication through permanent openings with said auxiliary chamber and also with outside atmosphere, said box being otherwise closed to said auxiliary chamber and outside atmosphere, means for exhausting foul air from said auxiliary chamber through a permanent opening leading therefrom in an amount substantially equal to the fresh air supplied to said box, and automatic means for varying the size of the fresh air supply and foul air exhaust openings.

3. In a brooder, a structure having a brooding chamber, an auxiliary chamber above said brooding chamber in communication therewith through restricted openings, a separate compartment in said auxiliary chamber in communication with the space containing said brooding chamber and also in communication with outside atmosphere and said auxiliary chamber through permanent air passageways, said box being otherwise closed to said auxiliary chamber and outside atmosphere, a temperature modulating means for the air in said compartment over which the air passes, a fan for forcing air from said compartment into the space occupied by said brooding chamber, the openings leading to the brooding chamber space and to the auxiliary chamber being of an invariable character and the opening leading to outside atmosphere being of a variable character, a foul air discharge duct leading from said auxiliary chamber to outside atmosphere having a permanent discharge opening of a variable character, and means for varying the size of the

fresh air supply and foul air discharge openings.

4. In a brooder, a structure having a brooding chamber, an auxiliary chamber above said brooding chamber in communication therewith through restricted openings, a separate compartment in said auxiliary chamber in communication with the space containing said brooding chamber and also in communication with outside atmosphere and said auxiliary chamber through permanent air passage-ways but otherwise closed thereto, a temperature modulating means for the air in said compartment over which the air passes, a fan for forcing air from said compartment into the space occupied by said brooding chamber, the openings leading to the brooding chamber space and to the auxiliary chamber being of an invariable character and the opening leading to outside atmosphere being of a variable character, a foul air discharge duct leading from said auxiliary chamber to outside atmosphere having a permanent discharge opening of a variable character, and means for varying the size of the fresh air supply and foul air discharge openings, said means including a thermostat responsive to outside temperature.

5. In a brooder, a closed chamber having a brooding space, partitions forming with the chamber said brooding space and extending to the ceiling thereof but terminating at a point above the floor, said partitions forming corridors between the brooding space and the side walls of the chamber, an auxiliary chamber above said closed chamber communicating therewith through fixed openings in the ceiling, means for re-circulating the air through said brooding space, auxiliary chamber and corridors and means for discharging foul air from said auxiliary chamber and supplying fresh air directly to the air circulation in substantially equal proportions to the foul air discharged.

6. In a brooder, a closed chamber having a central brooding space, partitions forming with the chamber said brooding space and extending entirely to the ceiling of said chamber but terminating above the floor thereof, said partitions forming side corridors between the brooding space and the side walls of the chamber, an auxiliary chamber above said closed chamber and communicating with the brooder space through fixed openings in the ceiling thereof, separate temperature modulating compartments in said auxiliary chamber each having a communication with one of the corridors, said compartments also communicating with outside atmosphere and with said auxiliary chamber but being otherwise closed, means for circulating the air through said brooding space, auxiliary chamber, compartments and corridors so that the air will pass through the corridors beneath said partitions and upwardly through said brooding space, and means for discharging foul air from said auxiliary chamber.

7. In a brooder, a brooding compartment, a chamber above said compartment communicating therewith through restricted openings, means for re-circulating air through said compartment and chamber, means for admitting fresh air to said brooding compartment solely through a passage located in said upper chamber; and means for exhausting air from said chamber in substantially equal proportions, said exhaust means consisting of a duct extending into said chamber and communicating with outside atmosphere, said duct being provided with a plurality of open-

ings located at different points in its length, communicating with the interior of the chamber.

8. In a brooder, a brooding compartment, a chamber above said compartment communicating therewith through restricted openings, means for re-circulating air through said compartment and chamber, means for admitting fresh air to said brooding compartment solely through a passage located in said upper chamber; and means for exhausting air from said chamber in substantially equal proportions, said exhaust means consisting of a duct extending into said chamber and communicating with outside atmosphere, said duct being provided with a plurality of openings located at different points in its length communicating with the interior of the chamber, said openings decreasing in area in the direction of the flow of the air.

9. In a brooder, a brooding compartment, a chamber above said compartment communicating therewith through restricted openings, means for re-circulating air through said compartment and chamber, means for admitting fresh air to said brooding compartment solely through a passage located in said upper chamber; and means for exhausting air from said chamber in substantially equal proportions, said exhaust means consisting of a duct extending into said chamber and communicating with outside atmosphere, said duct being provided with a plurality of openings located at different points in its length communicating with the interior of the chamber, the cross-sectional area of said duct increasing and the areas of said openings decreasing in the direction of the flow of the air.

10. In a brooder having a brooding chamber, an auxiliary chamber above said brooding chamber communicating therewith through restricted openings, a separate compartment having air modulating and moving means and having openings forming communications with the brooder chamber and also with the auxiliary chamber and also having an inlet for fresh air communicating with outside atmosphere, said separate compartment being otherwise closed, a foul air discharge duct leading from said auxiliary chamber to outside atmosphere, a damper in said fresh air inlet and a damper in said discharge duct, each of said dampers having a fixed permanent opening, and means responsive to outside temperature for simultaneously controlling said dampers.

11. In a brooder, a closed structure having an enclosed brooding chamber with brooding cages therein, an auxiliary chamber above said brooding chamber in communication therewith through a plurality of restricted openings arranged at different points in the division wall between the chambers, a separate temperature modulating compartment, one part of which is in communication with the space containing said brooding chamber through a restricted opening and another portion thereof in communication through restricted openings with said auxiliary chamber and with outside atmosphere, said compartment being otherwise closed to said auxiliary chamber, means for forcibly circulating the air from said modulating compartment into said brooding chamber, and means for exhausting air from the auxiliary chamber in an amount substantially equal to the fresh air supplied to said temperature modulating compartment.

12. In a brooder, a closed structure having a brooding chamber with brooding cages therein, an auxiliary chamber above said brooding cham-

ber in communication therewith through restricted openings arranged at different points in the division wall between the chambers, a separate box having temperature modulating means therein, one part of said box having a discharge opening leading into the space containing said brooding chamber, a fan located at the point of discharge, another portion of said box being in communication through a restricted opening with said auxiliary chamber and also with outside atmosphere, said box being otherwise closed to said auxiliary chamber and outside atmosphere, and means for exhausting foul air from said auxiliary chamber through an opening leading therefrom in an amount substantially equal to the fresh air supplied to said box from outside atmosphere.

13. In a brooder, a closed chamber having a brooding space with brooding cages therein, partitions forming with the chamber said brooding space terminating at a point above the floor, said partitions forming corridors between the brooding space and the side walls of the chamber, an auxiliary chamber above said closed chamber communicating therewith through restricted openings arranged at different points in the ceiling of said brooding space, temperature modulating compartments in communication through restricted openings with said corridors, auxiliary chamber and outside atmosphere, means for re-circulating the air through said brooding space, auxiliary chamber, modulating compartments and corridors, and means for discharging foul air from said auxiliary chamber and supplying fresh air directly to the modulating compartments in substantially equal proportions to the foul air discharged.

14. In a brooder, a closed chamber having a central brooding space and brooding cages therein, partitions forming with the chamber said brooding space terminating above the floor thereof, said partitions forming side corridors between the brooding space and the side walls of the chamber, an auxiliary chamber above said closed chamber and communicating with the brooder space through restricted openings in the ceiling thereof arranged at different points therein, separate temperature modulating compartments each having a communication with one of the corridors through a restricted opening, said compartments also communicating with outside atmosphere and with said auxiliary chamber but being otherwise closed, means for circulating the air through said brooding space, auxiliary chamber, compartments and corridors so that the air will pass through the corridors beneath said partitions and upwardly through said brooding space, and means for discharging foul air from said auxiliary chamber.

15. In a brooder, a closed chamber having a central brooding space and brooding cages therein, partitions forming with the chamber said brooding space terminating above the floor thereof but extending to the ceiling, said partitions forming side corridors between the brooding space and the side walls of the chamber, a separate upper air moving chamber having openings communicating with the upper portion of said brooding space, members forming air passages leading from said air chamber and discharging air into the upper portions of said corridors, means for modulating the temperature of the air before it is discharged into said corridors, and restricted means for discharging foul air from said air chamber and admitting fresh air to said air con-

ducting members in substantially equal proportions.

16. In a brooder, a closed chamber having a central brooding space and brooding cages therein, partitions forming with the chamber said brooding space terminating above the floor thereof but extending to the ceiling, said partitions forming side corridors between the brooding space and the side walls of the chamber, a separate upper air chamber having openings communicating with the upper portion of said brooding space, members forming air passages leading from said air chamber and discharging air into the upper portions of said corridors, means for modulating the temperature of the air before it is discharged into said corridors, means for forcibly circulating the air through said corridors, brooding space, air chamber and members, and restricted means for discharging foul air from said air chamber and admitting fresh air to said air conducting members in substantially equal proportions.

17. In a brooder, a closed chamber having a central brooding space and brooding cages therein, partitions forming with said chamber said brooding space terminating above the floor thereof but extending to the ceiling, said partitions forming side corridors between the brooding space and the walls of the chamber, a separate upper air moving chamber having openings communicating with the upper portion of said brooding space, said air chamber forming the sole means of conducting air from the upper portion of said brooding space, air conduits leading from said air chamber for discharging air into the upper portions of said corridors, and means for modulating the temperature of the air before it is discharged into said corridors.

18. In a brooder, a closed chamber having a central brooding space and brooding cages therein, partitions forming with said chamber said brooding space terminating above the floor thereof but extending to the ceiling, said partitions forming side corridors between the brooding space, and the walls of the chamber, a separate upper air moving chamber having openings communicating with the upper portion of said brooding space, said air chamber forming the sole means of conducting air from the upper portion of said brooding space, air conduits leading from said air chamber for discharging air into the upper portions of said corridors, means for modulating the temperature of the air before it is discharged into said corridors, and restricted means for discharging foul air from said air chamber and admitting fresh air to said conduits in substantially equal proportions.

19. In a brooder, a brooding chamber having on each side a corridor communicating with the lower part of the chamber and an auxiliary chamber above the brooding chamber and the corridors having openings leading to the brooding chamber, and means in the auxiliary chamber to take air from the auxiliary chamber and outside air and mix them and force the mixture into the corridors.

20. In a brooder, a housing having therein a brooding chamber, a corridor on each side of the brooding chamber communicating with the lower part of the chamber and an auxiliary chamber above the brooding chamber and the corridors and connected to the brooding chamber by openings, and means to take air from the auxiliary chamber and from the outside of the

housing and mix them and conduct the mixture to each corridor.

21. In a brooder, a housing having therein a brooding chamber, a corridor on each side of the brooding chamber separated from the brooding chamber by a partition extending nearly to the bottom of the chamber, an auxiliary chamber above the brooding chamber and the corridors and connected to the brooding chamber by openings, and means including a casing in the auxiliary chamber to take air from the auxiliary chamber and from the outside of the housing and mix them and conduct the mixture into each corridor.

22. In a brooder, a housing having therein a brooding chamber, a corridor on each side of the brooding chamber separated from the brooding chamber by a partition extending nearly to the bottom of the chamber, an auxiliary chamber over the brooding chamber and the corridors and connected to the brooding chamber by openings, means including a casing in the auxiliary chamber to take air from the auxiliary chamber and from the outside of the housing and mix them and conduct the mixture into each corridor, and an outlet from the auxiliary chamber.

23. In a brooder, a housing having therein a brooding chamber, a corridor on each side of the brooding chamber having communication with the brooding chamber and an auxiliary chamber over the brooding chamber and the corridors and connected to the brooding chamber by openings, a casing in the auxiliary chamber for each corridor, said casing having an outlet to the corridor, an inlet from the auxiliary chamber and an inlet from the outside of the housing, and air moving means in each casing.

24. In a brooder, a housing having therein a brooding chamber, a corridor on each side of the brooding chamber having communication with the brooding chamber and an auxiliary chamber over the brooding chamber and the corridors and connected to the brooding chamber by openings, a casing in the auxiliary chamber for each corridor, said casing having an outlet to the corridor, an inlet from the auxiliary chamber and an inlet from the outside of the housing, air moving means in each casing, and means to remove air from the auxiliary chamber to the outside of the housing.

25. In a brooder, a housing having therein a brooding chamber and an auxiliary chamber communicating with each other by restricted openings, a casing in the auxiliary chamber, said casing having an outlet connected to the brooding chamber, an inlet from the auxiliary chamber and an inlet from the outside of the housing, a damper in the last-named inlet, an outlet from the auxiliary chamber, a damper in the last-named outlet, means for simultaneously operating said dampers, and air moving means in said casing.

26. In a brooder, a housing having therein a brooding chamber and an auxiliary chamber communicating with each other by restricted openings, an outlet from the auxiliary chamber to the outside of the housing, means in the auxiliary chamber to take air from inside the auxiliary chamber and from the outside of the housing and mix them and deliver the mixture into opposite sides of the brooding chamber, and means coordinating the amount of air escaping through the outlet with the amount of air taken in from the outside of the housing.