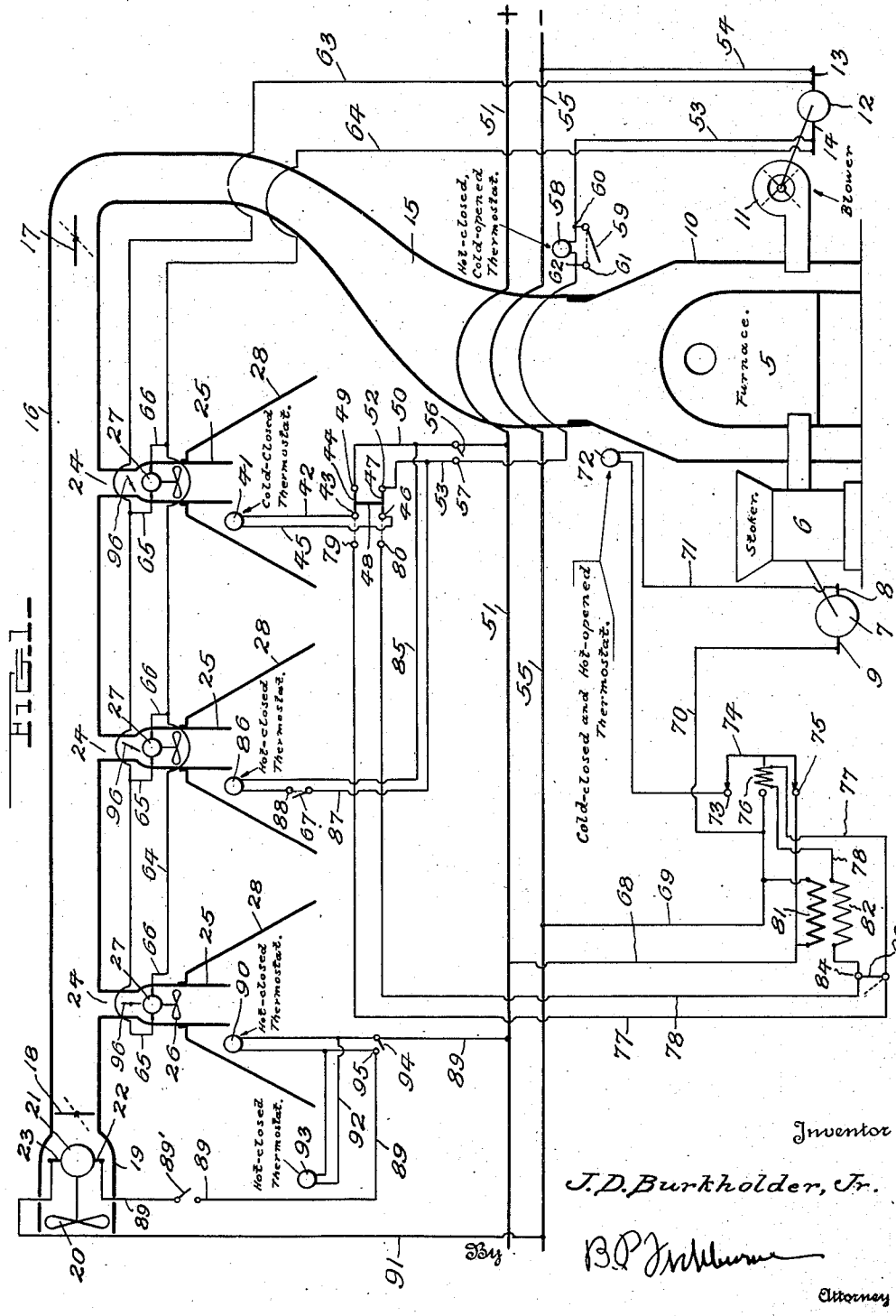
Sept. 25, 1945. J. D. BURKHOLDER, JR 2,385,682

BROODER

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BROODER

Filed Aug. 7, 1943 3 Sheets-Sheet 2

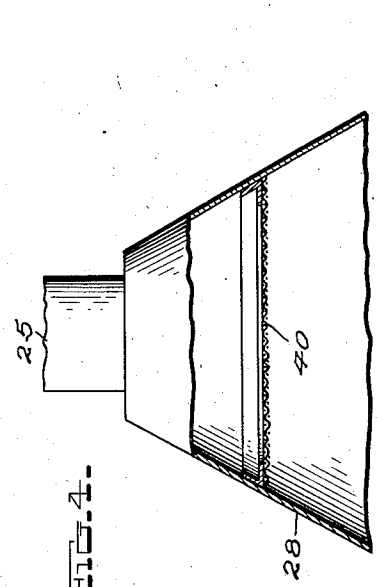


FIG. 4.

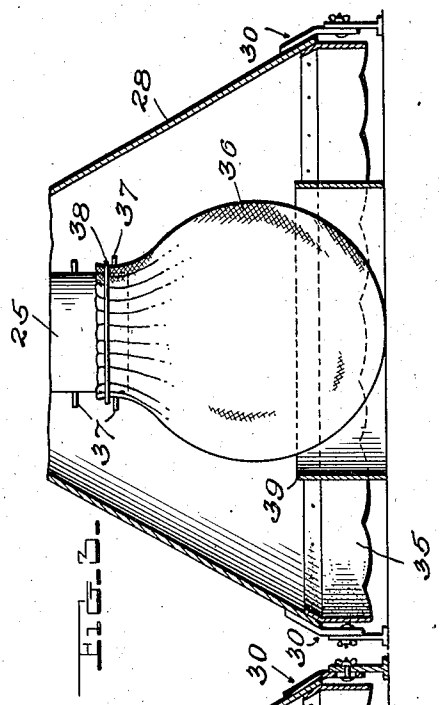


FIG. 3.

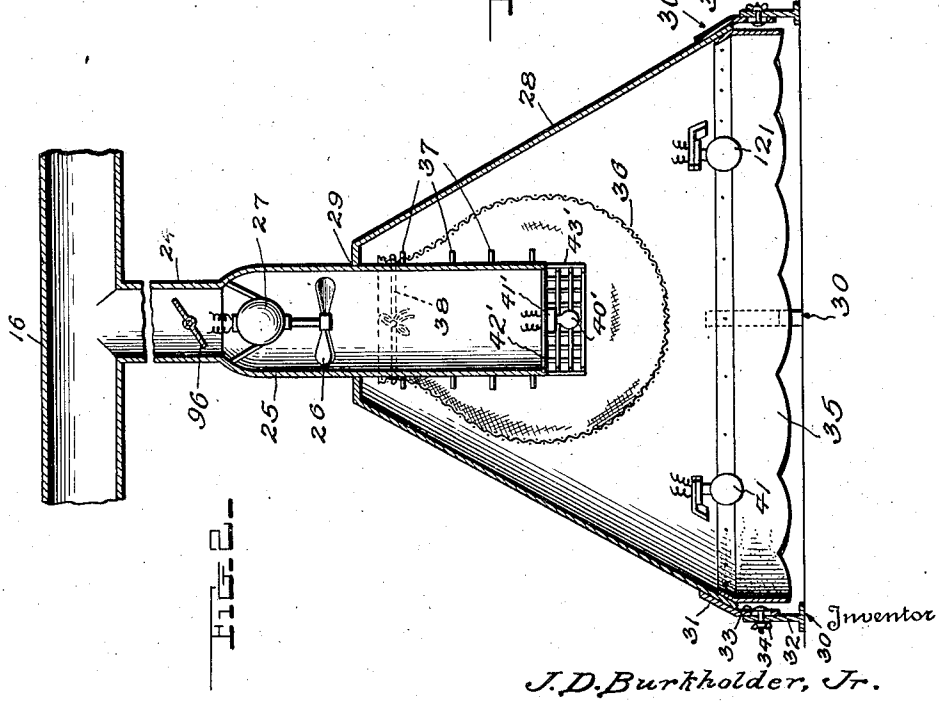


FIG. 2.

Inventor

J. D. Burkholder, Jr.

By B. P. Thompson

Attorney

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BROODER

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FIG. 7

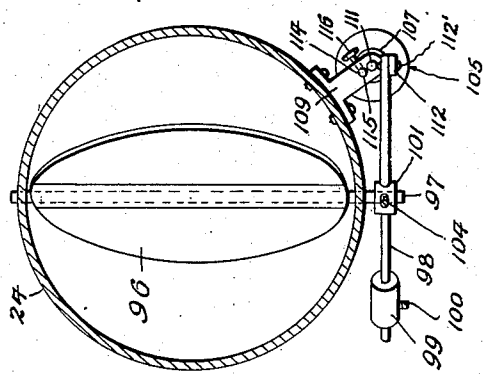


FIG. 8

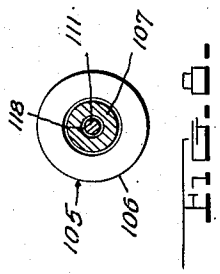


FIG. 6

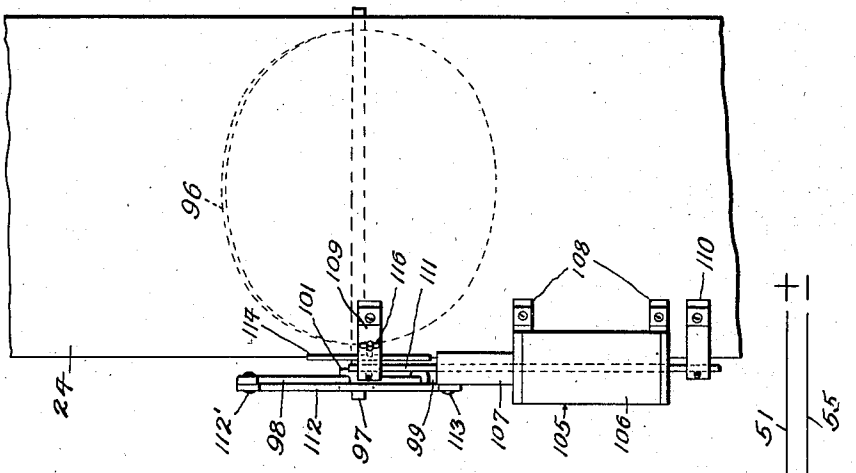
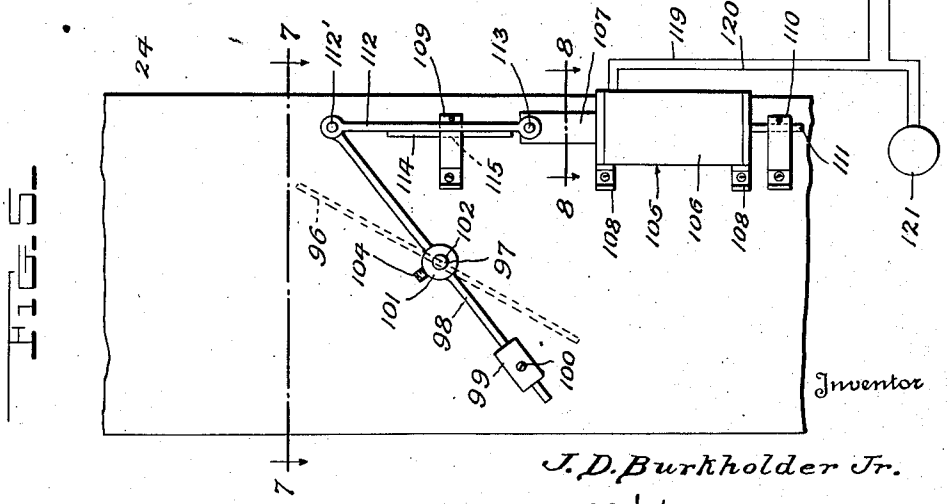


FIG. 5



Inventor

J. D. Burkholder Jr.

By B. O. Burkholder

Attorney

Patented Sept. 25, 1945 2,385,682

UNITED STATES PATENT OFFICE

2,385,682

BROODER

John D. Burkholder, Jr., Harrisonburg, Va.

Application August 7, 1943, Serial No. 497,820

8 Claims. (Cl. 119—34)

My invention relates to a brooder apparatus for poultry, such as chickens or the like.

An important object of the invention is to provide means for introducing air, heated or otherwise, into a hover, in a diffusing manner, to avoid as much as practicable drafts upon the chicks or the like.

A further object of the invention is to provide means for supplying and diffusing the air into the hover at the central portion of the hover so that such air will be supplied to the center of the groups of chicks or the like, thus providing ample air for the chicks, preventing smothering due to crowding.

A further object of the invention is to provide a porous air diffusing element which is vertically adjustably mounted within the hover so that it may be arranged at an elevation above the chicks so that they cannot engage the same, thus preventing soiling, or may be lowered to an elevation at or near the floor of the brooder room, so that the chicks may come close to the same.

A further object of the invention is to provide means to close a blower motor circuit for forcing air into the brooders and to simultaneously close circuits for booster fan motors, arranged within the branch pipes which discharge the air into the hovers.

A further object of the invention is to provide means whereby a thermostat arranged within or near a hover may be employed to regulate the temperature within the hovers by controlling the action of the blower motor or the action of the stoker motor.

A further object of the invention is to provide means whereby a thermostat arranged within or near one of the hovers may be employed to control the action of the blower motor for supplying fresh or cool air to the hovers when the furnace is inactive and no combustion of fuel takes place therein.

A further object of the invention is to provide means to exhaust air from the brooder room through the hovers, when the air becomes stuffy or over-heated, while all other parts of the apparatus are inactive.

A further object of the invention is to provide means associated with the branch pipe leading into each individual hover, for regulating the supply of heated air to the same, thereby preventing over-heating within the individual hover.

A further object of the invention is to provide elements for controlling the passage of heated air into the hovers, which elements are individually adjustable with respect to their extent of opening movement, for regulating the volume of heated air passing into the individual hover in a given time.

A further object of the invention is to provide automatic means to close the element or damper for each individual hover, in the event that the adjusted open position of the damper should fail to prevent over-heating within the hover.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this application and in which like numerals are employed to designate like parts throughout the same,

Figure 1 is a diagrammatic view of a brooder apparatus embodying my invention,

Figure 2 is a central vertical section through a hover and associated elements,

Figure 3 is a similar view, parts broken away, showing the porous sack in elevation and lowered,

Figure 4 is a similar view, parts broken away, showing a modified form of porous air diffusing means,

Figure 5 is a side elevation of means for operating the heated air controlled damper of each hover,

Figure 6 is a similar view, taken at a right angle to Figure 5,

Figure 7 is a horizontal section taken on line 7—7 of Figure 5,

Figure 8 is a horizontal section taken on line 8—8 of Figure 5.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 5 designates a coal burning furnace of any well known preferred type. This furnace is equipped with a stoker 6, driven by a motor 7 having terminals 8 and 9.

Surrounding the furnace 5 is an air jacket or casing 10, receiving air from a rotary blower 11, driven by a motor 12, having terminals 13 and 14. The air jacket 10 discharges into a pipe 15 having a horizontal portion 16, arranged at a suitable elevation in the brooder room. Arranged within the horizontal portion 16, at one end thereof is a damper 17 and arranged within the same, near its opposite end is a damper 18, and these dampers are adapted to be opened and closed.

At its free end the pipe portion 16 is provided with an enlargement 19, discharging to the atmosphere, and a rotary fan 20 is arranged within the enlarged portion 19 to draw air out of the enlarged portion 19 and from the pipe portion 16, such air preferably discharging exteriorly of

the brooder room. The rotary fan 20 is driven by a motor 21, preferably arranged within the enlarged portion 19 and having terminals 22 and 23.

Any suitable number of vertical depending branch pipes 24 are connected with the horizontal pipe portion 16 and have lower enlarged portions 25. The enlarged portions 25 terminate at a suitable elevation above the floor of the brooder room. Mounted within each enlarged portion 25 is a booster fan 26, to force air downwardly and out of the enlarged portion 25 and this booster fan is driven by a motor 27, suitably mounted within the enlarged portion 25.

Surrounding the enlarged portion 25 of each branch pipe is a hover 28, which is imperforate and may be formed of sheet metal or the like. The top of the hover is provided with an opening 29 and the top is vertically slidable upon the enlarged portion 25. Each hover is preferably frusto-conical and increases in diameter downwardly. The bottom of the hover is supported at a suitable elevation above the bottom of the brooder room by vertically adjustable legs 30. Each leg 30 includes an upper section 31 and a lower section 32. The upper section 31 has a vertical slot 33 to receive a clamping bolt 34. Attached to the bottom of the hover 28 is a flexible curtain 35, preferably having its bottom edge scalloped. This bottom edge may be spaced about two inches from the floor, or any suitable distance therefrom which will permit the baby chicks or the like to pass thereunder. As the baby chicks grow, the bottom edge of the curtain is raised by vertically adjusting the legs 30, for elevating the hover 28, and when the poultry is sufficiently large these curtains are removed. If desired, the curtains may be dispensed with throughout the entire operation of the apparatus.

Arranged within the hover 28 is a sack 36, receiving the enlarged portion 25 of the branch pipe. This sack is vertically adjustable upon the enlarged portion 25 by any suitable means, and for this purpose, the branch pipe may be equipped with vertically spaced pins 37. These pins project through the top of the sack and hold it against vertical displacement while the top of the sack is tied to the enlarged portion 25 by a cord 38 or the like. The sack 36 is porous and is preferably formed of a woven fabric. I have found that satisfactory results are obtained by using the ordinary cotton feed sack for the sack 36. This feed sack holds 100 lbs. of feed. The porous sack 36 may be arranged in the upper portion of the hover 28, and in this position it will be out of contact with the chicks. This porous sack diffuses the incoming air, heated or not, discharged through it, causing an even distribution of the air within the hover, without creating an appreciable or undesirable draft. The sack 36 is spaced laterally from the hover and the air discharged through it passes in all directions. I also contemplate moving the sack downwardly upon the enlarged portion 25 so that its bottom may be arranged adjacent to the floor of the brooder room, Figure 3. This will enable the chicks to come close to the sack which would constantly supply fresh air to the center of the group of chicks, thereby eliminating the possibility of the chicks smothering due to crowding and lack of air. When air is exhausted from the hover through the pipe 16, as will be explained, the sack will serve as a filter to prevent the dust or the like in the brooder room passing into the pipe and associated elements. After this, the sack may be removed so that it may be cleaned. Ordinarily, the sack would be held in the lowered position a sufficient distance from the floor so that the chicks could pass under it and would not soil it to any considerable extent. The sack 36 may be in the elevated position shown in Figure 2, whereby it would be out of the reach of the chicks, or at an intermediate elevation between the elevation shown in Figure 2 and the lowermost elevation shown in Figure 3. If the sack is moved downwardly to substantially contact with the floor, Figure 3, I then surround the sack with a guard 39, to prevent the chicks from contacting with the sack, and I may also use this guard for the sack when it is arranged at a slightly higher elevation.

The numeral 40' designates an electric bulb, mounted in a socket 41', carried by a rod 42'. This rod extends diametrically of the enlarged pipe portion 25 and is attached to its lower end. A guard 43' is also attached to the pipe portion 25 and surrounds the bulb. This guard is of open construction to permit of the passage of light and may be a one half inch mesh hardware cloth. Any suitable circuit is employed to supply current to the bulb. It is thus seen that the bulb is arranged within the sack 36, and this sack is translucent, and the sack will diffuse the light passing through the same. This diffused light will attract the young chicks into the hover but will not be sufficiently strong to disturb their rest. The feed sack that I contemplate using for the sack 36 is a white or unbleached cotton sack. Since this sack is also used to diffuse light, it must be translucent, and I may dye the white sack green, yellow, or any other color which will produce a restful effect.

While I prefer to use the sack 36, I also contemplate using a horizontal porous diaphragm 40, Figure 4, preferably made of the same material as the sack. This horizontal porous diaphragm is arranged within the hover 28 and suitably attached thereto at its marginal edge. Ample space must be left beneath the diaphragm 40 so that the chicks will have sufficient air. The surface of the sack 36 is much greater than that of the diaphragm 40 and hence the sack may be arranged at a lower elevation.

The material used for the sack 36 or diaphragm 40 should be a fabric of about the weave of the cotton feed sack, but this fabric may be formed of cotton or other fibers or even metal.

Arranged within one of the hovers 28 is a cold closed thermostat 41. This thermostat 41 may be employed to start the blower motor 12 or the stoker motor 7. The circuit associated with the thermostat 41 for starting the blower motor 12 will now be described. A wire 42 is connected with one terminal of the thermostat 41 and this wire is connected with a terminal 43, pivotally connected with a switch blade 44. Connected with the opposite terminal of the thermostat 41 is a wire 45 connected with a terminal 46, pivotally connected with a switch blade 47. The switch blades 44 and 47 are connected by an insulating bridge 48, whereby the switch blades move in unison. The switch blade 44 is adapted to be moved into engagement with a stationary terminal 49, connected with a wire 50, connected with a positive lead wire 51. The switch blade 47 is adapted to be moved into engagement with a stationary terminal 52, connected with a wire 53 and this wire 53 is connected with the terminal 14 of the motor 12, as shown. The opposite terminal 13 of the motor 12 is connected with a wire 54 connected with the negative lead wire 55. Con-

nected with the wire 50 is a switch blade 56 adapted to be moved into engagement with a stationary terminal 57 connected in the wire 53. Connected in series with the wire 53 is a hot closed and cold opened thermostat 58, arranged near the jacket 10, interiorly or exteriorly of the same, to be heated thereby. A switch blade 59 is connected with the wire 53 at 60 and is adapted to engage a stationary terminal 61, connected with the wire 53 at 62. When the switch blade 59 engages the terminal 61 the switch blade will be connected across the terminals of the thermostat and the circuit will be made through the switch blade 59, the thermostat being then cut out of circuit. Connected with the terminal 13 of the motor 12 is a wire 63 and a wire 64 is connected with the terminal 14, and the motors 27 of the booster fans are connected in parallel across the wires 63 and 64 by wires 65 and 66, respectively.

The operation of the circuit to drive the motor 12 is as follows:

The switch blade 44 engages the terminal 49 and the switch blade 47 engages the terminal 52 and switch blade 56 disengages terminal 57 and switch blade 59 disengages terminal 61. Assuming that the furnace 5 is heating the air within the jacket 10 above 200° F., then the hot closed thermostat 58 is closed. When the thermostat 41 closes by lack of heat under the hover 28, a circuit will then be closed to drive the motor 12. In this closed circuit current passes through the wire 51, wire 50, closed switch blade 44, wire 42, thermostat 41, wire 45, closed switch blade 47, wire 53, and thermostat 58, terminal 14, motor 12, terminal 13 and wire 54 to the lead wire 55. At this time switch blade 67 is opened.

When the circuit was closed to drive the motor 12, as explained, a parallel circuit was also closed to drive all of the motors 27 of the booster fans 26. The wires 64 and 63 are connected with the motor 12 at the terminals 14 and 13, respectively, and the motors 27 are connected across the wires 63 and 64.

A circuit is provided to drive the stoker motor 7, and this circuit will now be described. A wire 68 is connected with the positive lead wire 51 and the wire 69 is connected with the negative lead wire 55. Connected with the wire 69 is a wire 70 connected with the terminal 9 of the stoker motor 7. The terminal 8 of the stoker motor 7 is connected with a wire 71 having a cold closed and hot opened thermostat 72 connected in series therewith. The wire 71 is connected with a stationary terminal 73, to be engaged by one end of a bridge contact 74, the opposite end of which engages a stationary terminal 75, connected with the wire 68. The bridge contact 74 is moved inwardly to contact with terminals 73 and 75 by a solenoid including a winding 76, one end of which is connected with a wire 77 and the opposite end of which is connected with a wire 78. The wire 77 is connected with a stationary terminal 79 and the wire 78 with a stationary terminal 80. The terminal 79 is arranged to be engaged by the switch blade 44 and the terminal 80 to be engaged by the switch blade 47. Connected across the wires 68 and 69 is a primary coil 81 of a transformer, having a secondary coil 82, connected in the wire 78. A switch blade 83 is connected in the wire 78 and is adapted to be moved into engagement with a stationary terminal 84, connected in the wire 78.

While the circuit was closed for the blower motor 12, a circuit was also closed for the stoker motor 7, provided the air within the jacket 10 was not heated over 300° F., to open the thermostat 72. The switch blade 83 is now closed and current is induced in the secondary winding 82, the lead wires 51 and 55 being connected with an alternating source of current, and the solenoid winding 76 is energized and the bridge contact 74 engages terminals 73 and 75 and connects the same. A circuit is now closed to drive the stoker motor 7 and in this closed circuit current flows from the lead wire 51 through wire 68, terminal 75, bridge contact 74, terminal 73, wire 71 and thermostat 72, motor 7, wire 70, and through the wire 69 back to the lead wire 55. The thermostat 72 closes at 200° F. and remains closed up to 300° F. and then opens and remains open down to 200° F. and again closes at 200° F. and remains closed beneath 200° F. When the circuit for the motor 7 is closed, the motor is operating and the stoker is then operating the furnace to cause the same to heat the air passing through the jacket 10. The thermostat 72 is heated by the air within the jacket 10, and may be disposed interiorly or exteriorly of the jacket.

Operating in conjunction with the bridge contact 74 is the usual timer which will close the circuit of the stoker motor at intervals, if the switch 83 is opened, to keep the fire alive, provided thermostat 72 is closed.

It is thus seen that the thermostat 41 will open and close the circuit for the blower motor 12 as the temperature varies beneath the hovers. This is important when the chicks are young, as the temperature should be kept as constant as practically possible. However, this may cause the unnecessary operation of the stoker motor 7 and the burning of an excessive amount of fuel when the chickens are larger or the weather is mild. It is not then necessary to maintain the temperature under the hover at such a high temperature or at such an even reduced temperature. To meet this condition means are provided whereby the thermostat 41 may be closed to control the operation of the stoker motor 7 instead of the operation of the blower motor 12.

In operation whereby the thermostat 41 controls the operation of the stoker motor 7, the switch blade 56 is closed and switch blade 83 is opened. Blade 44 is now swung into engagement with terminal 79 and blade 47 into engagement with terminal 80, switch blade 67 remaining open. When the thermostat 41 cold-closes the circuit for energizing the solenoid winding 76 is now closed at the thermostat 41 instead of at the switch blade 83, and the circuit for the stoker motor 7 is closed as previously explained, and the stoker motor 7 is driven. This stoker motor circuit will remain closed until the thermostat 72 reaches 300° F., or until the thermostat 41 opens, upon the heat within the hover rising to the selected degree, at which time the stoker motor circuit will open.

The thermostat 58 is a hot closing thermostat, and when the furnace 5 reaches 200° F. the thermostat 58 closes, by radiation from the jacket 10, and then the circuit for the blower motor 12 is closed. In this circuit current passes from the wire 51, through switch blade 56, terminal 57, wire 53, thermostat 58, motor 12, and wire 54 to the lead wire 55. The circuits for the booster fan motors 27 are also closed. The motor 12 and booster fan motors will continue to run as long as the thermostat 58 is heated to at least 150° F. and thereby remains closed. It is thus seen that the thermostat 41 controls the temperature in

the hover by controlling the operation of the stoker motor 7.

The thermostat 58 is cold opened when it reaches approximately 150° F., and should the stoker motor 7 fail to work and the furnace 5 not heat the thermostat 58 to 200° F. the circuit would not be closed at the thermostat 58 to drive the blower motor 12 and cold air would not be forced into the hover. The thermostat 58 opens at 150° F. and stays open until 200° F. is reached, and when it closes it remains closed until it returns to 150° F.

Connecting with the wire 50 is a wire 85, connected with one terminal of a hot closed thermostat 86 arranged within one of the hovers 28. Connected with the opposite terminal of the thermostat 86 is a wire 87, connected with the wire 53. The switch blade 67 is connected in the wire 87 to engage a stationary terminal 88, as shown.

In hot weather, or when it is otherwise desired to force cool air into the hover, the furnace being inactive and no combustion of fuel taking place therein, the switch blade 56 is opened, the switch blade 59 is closed and switch blades 44 and 47 are moved to the intermediate or neutral position, not engaging with the terminals 49, 79; 52, 80; respectively, and switch blade 67 is closed. The hot closing thermostat 86 may now close and the circuit is closed to drive the blower motor 12. In this closed circuit current passes from wire 51, through wire 50, wire 85, thermostat 86, switch 67 and wire 87, wire 53 and switch blade 59, terminal 14, blower motor 12, terminal 13, and wire 54 to wire 55. The circuits for the booster fan motors are also closed. The motor 12 is therefore driven and the air at atmospheric temperature or suitably cooled is forced into the hovers.

Means are also provided to withdraw air from the brooder room and from under the hovers when such air is overheated or becomes stuffy, or to withdraw air to prevent this condition. This means comprises the motor 21 and a wire 89 is connected with the terminal 22 and has a hot closed thermostat 90 connected therein. The wire 89 is connected with the wire 51. Connected with the wire 55 is a wire 91 connected with the terminal 23 of the motor 21. A wire 92 is connected across wires 89 and 91 and has a hot closed thermostat 93 connected therein. The thermostat 93 is arranged in any suitable position in the brooder room exteriorly of the hover. A switch blade 94 is connected in the wire 89 and is adapted to engage a terminal 95, connected in the adjacent arm of this wire. When the switch blade 94 engages the terminal 95, thermostats 90 and 93 are cut out of circuit.

When the motor 21 is operated to withdraw air from the room through the hovers, all of the system hereinbefore described is inactive and the damper 17 is closed and the damper 18 is opened. When the temperature rises sufficiently and either or both thermostats 90 and 93 are closed the circuit for driving the motor 21 is closed and this motor drives the fan 20 which exhausts the air from the pipe 16, in turn exhausting the air from the room through the hovers, causing fresh air to enter and take the place of the exhausted air. When the circuit is closed for driving the motor 21 by the thermostat 90, current will pass from wire 51, through wire 89, motor 21, and through wire 91 back to the wire 55. Instead of starting the motor 21 by the thermostat or thermostats I may start the same by closing the switch blade 94, thus cutting the thermostats out of circuit. The switch blade 94 may be closed and opened manually or may be closed and opened by time controlled means when it is desired to drive the motor 21 at selected intervals.

The fire is started in the furnace 5 and the stoker motor 7 is set into action, and the furnace is thereby heated to at least 200° F., while the fuel is burning therein.

The time controlled means automatically operates the bridge contact 74 so that the furnace will not go out and will maintain a temperature of at least 200° F.

It is thus seen that by closing the switch blade 83 and moving switch blade 44 into engagement with the terminal 49 and switch blade 47 into engagement with terminal 52, that the circuit for driving the stoker motor 7 will be closed and remain closed, subject to the action of the thermostat 72, while the circuit for the blower motor 12 will be opened and closed by the thermostat 41 subject to the action of the thermostat 58. By opening the switch blade 83, moving contact blade 44 into engagement with terminal 79, and contact blade 47 into engagement with terminal 80, and closing contact blade 56, the circuit for the blower motor 12 will be closed and controlled by the thermostat 58, while the circuit for the stoker motor 7 will be closed and controlled by the thermostat 41 subject to the action of the thermostat 72.

When the switch blade 83 is in the opened position and switch blades 44 and 47 in the neutral position, and switch blade 56 opened and switch blade 59 closed, the furnace 5 is inactive and cool air may be supplied to the hovers. This is accomplished by closing the switch blade 67, the circuit for the blower motor 12 being controlled by the thermostat 86.

When all other parts of the apparatus are inactive, air may be withdrawn from the brooder room through the hovers by opening damper 18 and closing damper 17 and the circuit for the motor 21 will be controlled by either thermostat 90 or 93 or by the closing of the switch blade 94.

When the system is operating to supply air, heated or cooled, into the hovers, the damper 18 is closed and damper 17 opened, and the motor 21 is inactive, which is effected by opening a switch blade 89' connected in the wire 89.

While I prefer to use the booster fans, yet they may be dispensed with, particularly where the blower 11 alone will deliver air under sufficient pressure to the hovers.

Means are provided to maintain the temperature within the several hovers 28 at substantially the same degree, when the furnace and blower are operating to supply heated air to the same. To accomplish this, I arrange a damper 96, in each branch pipe 24, preferably above the fan motor 27. This damper is rigidly mounted upon a rock shaft 97, journaled in openings formed in the branch pipe and extending to the exterior of the branch pipe. A vertically swinging lever 98 is mounted upon one end of the rock shaft 97 and carries a counterweight 99, at one end, which is preferably longitudinally adjustable upon the lever 98 and is held in the selected adjusted position by a set screw 103. The lever 98 is provided between its ends with a head 101, having an opening 102 to slidably receive the rock shaft 97, so that the lever may be angularly adjusted with respect to the rock shaft and the damper. After the selected adjustment is obtained, the lever 98 is clamped to the rock shaft 97 by a set screw 104.

Automatic means are provided to move the lever 98 in opposition to the weight 99, including a solenoid 105, having a winding 106 and a vertically movable core 107. The winding 106 is held stationary by brackets 108, mounted upon the exterior of the branch pipe 25. Arranged above and below the winding 106 and core 107 are stationary guide brackets 109 and 110, attached to the branch pipe 24, as shown. A vertical diamagnetic guide rod 111 is rigidly secured to the brackets 109 and 110 and is slidably mounted within a central opening 118 formed in the core 107 and passes through the bore of the winding 106. Attached to the free end of the lever 98, at 112', is a connecting element 112, which may be a link, cord or the like, having its lower end attached to the core 107, at 113. The numeral 114 designates an adjustable stop rod, slidably mounted in an opening 115 in the upper bracket 109, and clamped in the selected adjusted position by a set screw, 116. The lower end of this stop rod is arranged in the path of travel of the upper end of the core 107. It is thus seen that the stop rod will limit the opening movement of the damper 96, which opening movement may accordingly be regulated or adjusted.

Connected with one end of the solenoid winding 106 is a wire 119, connected with the wire 51, and a wire 120 is connected with the opposite end of the winding 106 and is connected with the wire 55. A hot closing thermostat 121 is connected in the wire 120 and is arranged within the hover near its bottom or the floor. The thermostat 121 closes at a selected temperature, such as from between 75° F. to 95° F., and remains closed above the selected degree and opens when the temperature falls below the selected degree and remains open until the temperature again reaches the selected degree.

It is thus seen that when the temperature within each hover rises to the selected degree, the thermostat 121 will close and remain closed while the temperature is at or above the selected degree, and this action will energize the solenoid which in turn will close the damper 96. The closing of the damper cuts off the further supply of heated air and prevents over-heating of the chicks in the hover. It is important to have individual control means for the heat, for each hover, where a plurality of hovers are used with one source of heat, for it is otherwise difficult to properly regulate the heat within the hovers, since the hovers are arranged different distances from the source of heat.

When the temperature drops below the selected degree in each hover, the thermostat 21 opens and the solenoid is deenergized, and the weight 99 will swing the damper 96 to the open position, thus permitting the further supply of heated air to the hover. The extent of opening movement of the damper 96 is regulated by the adjustment of the stop rod 115. The damper may therefore be opened, to a selected degree, to properly control the volume of heated air which will enter the hover in a given time.

While I prefer to operate the damper 96 automatically, yet some degree of success may be had by manually operating the same.

In the operation of the apparatus, the stop rods 114 for the several hovers are adjusted to regulate the extent of opening movement of the several dampers 96. By limiting the opening movement of the dampers 96, the temperatures within the hovers may be fairly well regulated. For instance, the hover which is nearest the furnace, has its damper open for the least extent, while the extent of opening increases with each damper more remote from the furnace. Thus by retarding the flow of heated air into the hover, where the hover is nearer to the source of heat, over-heating may be prevented in some instances. However, the automatic means to close the damper cooperates with, and serves as a check against, the action of the stop means, to prevent over-heating. This is desirable, because over-heating may be caused by unusual factors, such as the chicks in the hover unduly crowding, thereby raising the temperature within the hover. The temperature within the hover may also be varied by air currents in the brooder room.

It is to be understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of my invention or the scope of the subjoined claims.

Having thus described by invention, what I claim is:

1. In a brooder, a generally vertical hover provided at its top with an opening, a generally vertical pipe extending into the hover through the opening and having its outlet end at an elevation considerably above the floor of the brooder room, means for supporting the hover so that its bottom is arranged near and spaced from the floor, and a porous air diffusing sack mounted upon the air supply pipe within the hover and shiftable to a raised position above the reach of the chicks and to a lowered position in contact with or adjacent to the floor.

2. In a brooder apparatus, a furnace, a stoker for the furnace, a stoker motor to drive the stoker, an air jacket surrounding the furnace, a blower discharging into the air jacket, a blower motor to drive the blower, a pipe connected with the air jacket, a group of branch pipes connected with said pipe, hovers receiving the branch pipes, an exhaust fan arranged adjacent to the outlet end of said pipe, an exhaust motor to drive the exhaust fan, a circuit connected with the exhaust fan motor, a hot closed thermostat connected in the exhaust fan motor circuit, a damper mounted within said pipe outwardly of one end of the group of branch pipes, and a second damper mounted within said pipe outwardly of the other end of the group of branch pipes and disposed inwardly of the exhaust fan.

3. In a brooder, a hover, an air supply pipe leading into the hover, and a porous air diffusing sack within the hover, said sack having a considerably larger diameter than the pipe and having one end closed and its opposite end open to receive the pipe, the open end being contracted and secured to the pipe, the sack extending radially beyond the pipe for a considerable distance.

4. In a brooder, a hover, a generally vertical air supply pipe within the hover, and a porous air diffusing sack arranged within the hover and having a considerably larger diameter than the pipe, the forward end of the sack being closed and its rear end open, the rear open end receiving the pipe and being vertically adjustably mounted upon the pipe, the sack extending radially beyond the pipe for a considerable distance, the arrangement being such that the outlet end of the pipe may be positioned near the center of the sack.

5. In a brooder, an upwardly tapered hover provided at its top with an opening, a generally vertical air supply pipe extending through the opening into the hover and having its outlet end at an elevation above the floor of the brooder room, a means for supporting the hover so that its bottom is arranged near and spaced from the floor, and a porous air diffusing sack mounted within the hover, said sack having a diameter considerably larger than the pipe and having its lower end closed and its upper end open, the upper open end of the sack receiving the air supply pipe, the sack extending radially beyond the pipe for a considerable distance and extending above and below the outlet end of the pipe.

6. In a brooder apparatus, a furnace, an air jacket surrounding the furnace, a stoker for the furnace, a stoker motor to drive the stoker, a blower discharging into the jacket, a blower motor to drive the blower, a pipe connected with the air jacket, hovers connected with the pipe, a circuit connected with the blower motor and permanently free from connection with the stoker motor, a circuit connected with the stoker motor and permanently free from connection with the blower motor, a cold closed thermostat arranged within one hover, means to connect the thermostat with the blower motor circuit while disconnecting the thermostat with the stoker motor circuit and to subsequently connect the thermostat with the stoker motor circuit while disconnecting the thermostat with the blower motor circuit, a switch separate from the thermostat for closing the blower motor circuit when the thermostat is disconnected from the blower motor circuit, and a switch separate from the thermostat to close the stoker motor circuit when the thermostat is disconnected from the stoker motor circuit, the arrangement being such that the temperature may be regulated by the thermostat automatically closing and opening one circuit while the other circuit is continuously closed independently of the thermostat.

7. In a brooder apparatus, a furnace, an air jacket surrounding the furnace, a stoker for the furnace, a stoker motor to drive the stoker, a blower discharging into the jacket, a blower motor to drive the blower, a pipe connected with the air jacket, hovers connected with the pipe, a circuit connected with the terminals of the blower motor and adapted when closed to drive the blower motor and permanently incapable of driving the stoker motor, booster fans for the hovers, a circuit having the booster fans connected therewith and connected with the terminals of the blower motor, a circuit for the stoker motor and adapted to drive the same when such circuit is closed and permanently incapable of driving the blower motor, a cold closed thermostat arranged within one hover, a switch to alternately connect the cold closed thermostat with the blower motor circuit or the stoker motor circuit, a manually operated switch to close the blower motor circuit when the thermostat is connected with the stoker motor circuit, and a manually operated switch to close the stoker motor circuit when the thermostat is connected with the blower motor circuit, the arrangement being such that the cold closed thermostat may automatically control the operation of the blower motor while the stoker motor is continuously operating or automatically control the operation of the stoker motor while the blower motor is continuously operated.

8. In a brooder apparatus, a furnace, an air jacket surrounding the furnace, a stoker for the furnace, a stoker motor to drive the stoker, a blower discharging into the jacket, a blower motor to drive the blower, a pipe connected with the air jacket, hovers connected with the pipe, a circuit connected with the blower motor and adapted to drive the blower motor when closed and permanently incapable of driving the stoker motor, a circuit for the stoker motor and adapted to drive the same when such circuit is closed and permanently incapable of driving the blower motor, a thermostat arranged within one hover and cold closed only, a switch to alternately connect the thermostat with the blower motor circuit or the stoker motor circuit, a manually operated switch to close the blower motor circuit when the thermostat is connected with the stoker motor circuit, a hot closed and cold opened thermostat connected in the blower motor circuit, a manually operated switch to close the stoker motor circuit when the thermostat is connected with the blower motor circuit, and a cold closed and hot opened thermostat connected in the stoker motor circuit, the arrangement being such that the first-named thermostat may automatically control the operation of the blower motor while the stoker motor is continuously operated or automatically control the operation of the stoker motor while the blower motor is continuously operated.

JOHN D. BURKHOLDER, JR.