May 5, 1942. J. LYON 2,281,776

BROODER

Filed Aug. 2, 1940

Fig. 1.

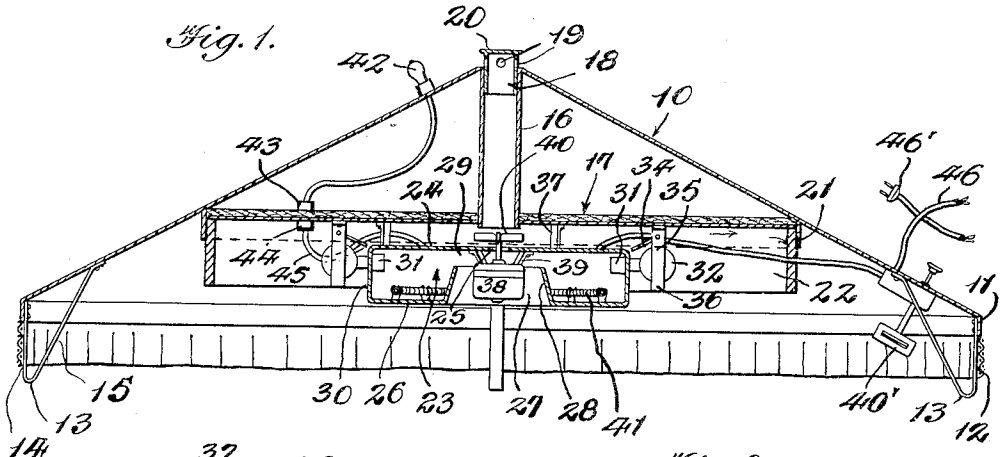


Fig. 2.

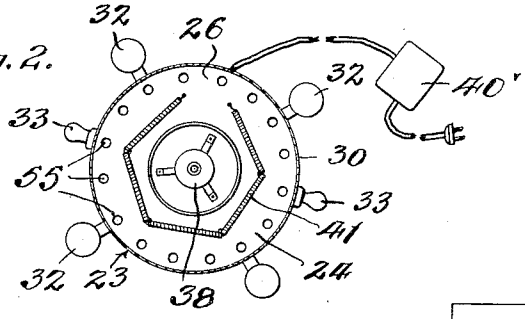


Fig. 3.

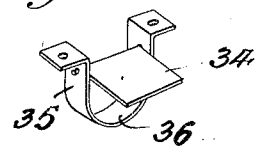
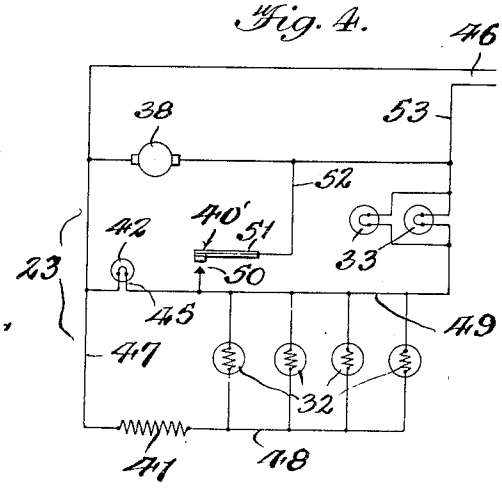


Fig. 4.



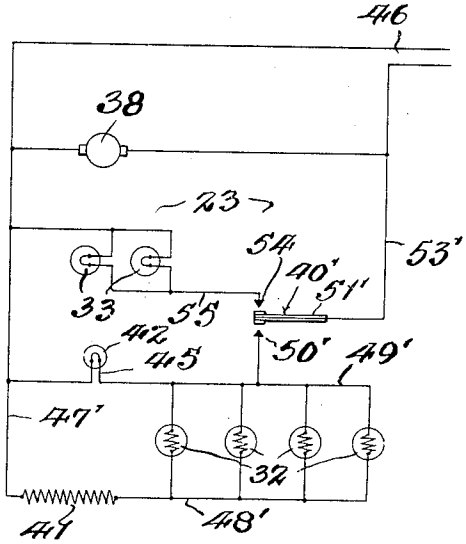


Fig. 5.

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BROODER

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Application August 2, 1940, Serial No. 349,573

2 Claims. (Cl. 119—33)

The invention has for an object to effect improvements in brooders enabling the use of heat sources which will utilize principally infra-red rays, thereby minimizing the liability of fire, and increasing the efficient application of heat.

It is an especial aim of the invention to present such a device which will function with novel results and special advantages in caring for poultry or birds of various kinds, and particularly to the end that highly efficient ventilation will be secured at all times, and whereby this ventilation is peculiarly coordinated with the source of heat and air admission devices. It is a special aim of the invention to present such a device in which the chicks are supplied with sufficient air for proper development. A further important aim of the invention is to present a device in which a uniform heat may be maintained, utilizing a plurality of lamp elements of low thermal radiation, but so constructed and organized that in case of burning out of one of the units, the remainder will continue to function.

A further object is to provide novel means for insuring a uniform delivery of heat to the air currents introduced by the ventilating means, and to give the advantages of heating the brood chamber by means of both convection currents and radiation from the heater unit.

Another important aim of the invention is to provide a novel means for preventing chicks from crowding into one part of such a device, as may sometimes occur by the action of the chicks themselves under ordinary circumstances. A further aim is to present a novel coordination of this device for preventing crowding, with the heating system.

A further important aim is to present a novel construction in the embodiment of the invention with a view to enabling production at a low cost, and with advantages and novel results, as will be more readily understood from the following disclosure.

Additional objects, advantages and features of invention are also involved in the device, as will be understood from the following description and accompanying drawing, wherein

Figure 1 is a vertical cross sectional view of a brooder constructed in accordance with my invention.

Figure 2 is a horizontal cross section of the electrical unit for the device.

Figure 3 is a detail of one of the combined guards and reflector devices.

Figure 4 is a detail or diagram of one circuit which may be used in the device.

Figure 5 is a similar view of a different form of circuit, adapted to alternative use.

There is illustrated a brooder comprising a substantially conical roof member 10, which may be produced in galvanized sheet iron, having a circular base defined by a downturned, vertical cylindrical flange 11, to which there is attached a dependent curtain 12, arranged to hang in close relation to a floor upon which the brooder is set. At proper intervals legs 13 are provided for supporting the roof, these consisting of short straps of metal having a vertical outer portion 14, the extremity of which is attached to the conical part of the roof, the other end portion of the strap being extended diagonally inwardly and upwardly, from the vertical portion, forming a brace 15 which is attached to the conical portion of the roof a distance inwardly of the point of attachment of the vertical member of the leg.

The roof has a central circular opening therein from which a ventilator tube 16 extends downwardly, stopping at an intermediate level within the space under the roof, and a ceiling partition 17 is secured upon the conical portion of the roof close to the lower end of the tube 16. Set frictionally within the upper end of the tube, and adapted to extend outwardly of the tube and above the roof proper, at times, there is a cylindrical sleeve 18, formed with one or more apertures 19 therein and having a top lateral flange 20 adapted to rest upon the edge of the opening through the apex of the roof at times, when the sleeve is pressed downwardly, this flange being formed as part of a plate which will serve as a closer of the vent-tube when the sleeve is at the lower limit of its movement.

At the boundary of the horizontal ceiling 17, a depending, continuous annular flange 21 is provided, to which an inner wall 22 may be attached, although this may be omitted, if desired.

Attached to the under side of the ceiling 17, there is a combined heater and ventilator unit 23, which may be termed the electrical unit, since it is utilized principally for the mounting of the heater unit, resistance devices and motor. This comprises a circular case of slight altitude, including a top wall 24, having a central air outlet opening 25 therein, and a lower wall 26 of coextensive radius but having a large opening 27 formed by having its edges turned upwardly in the form of a truncated cone, as at 28, the upper edge of the flange thus formed stopping short of the top wall, so that a circumferential slot 29 is formed thereover and under the wall

24. The top wall and lower wall are joined at their outermost parts by a vertical cylindrical wall 30. This is apertured at suitable intervals and provided with receptacles 31 in which therapeutic lamps 32 are engaged, of that type used in thermal treatments of human beings or for other uses where moderate heat radiation is desired; and at suitable intervals attraction lamps 33 are similarly mounted, but arranged in by-pass circuits, as will be explained. Over each of the lamps 32 a reflector 34 is provided, carried between the arms of U-shaped bracket 35, the extremities of which arms are laterally turned and secured against the ceiling 17 in any suitable manner. The reflectors consist of simple planiform highly polished plate mirrors of suitable material, disposed at such angle as to reflect the rays from the respective lamps outwardly and downwardly. The lamps are disposed within the bights of the U-shaped brackets, and the lower parts of the bights of these brackets are broadened to form deflectors 36, by which the rays from the lamp are prevented from passing too directly downwardly where they might strike with too great a concentration upon chicks close under the lamps.

The electrical unit 23 is suspended from the ceiling 17 by means of hanger brackets 37, attached conventionally to the ceiling, preferably in a manner to permit removal of the unit 23 with a minimum of difficulty.

A motor 38 is mounted within the opening 27, arranged on a vertical axis with its shaft extended upwardly through the opening or air outlet 25 in the top wall of the unit 23. The motor is held in this position by means of legs 39 fixed thereon and attached to the under side of the top wall 24. An impeller 40 is attached to the shaft of the motor above the top wall 24 and beneath the ceiling 17, so constructed that it will by radial action impel air radially outward therefrom, so as to draw air thereto upwardly through the opening 25, and also downwardly through the tube 16 when the ventilator sleeve 18 is raised so as to expose one of the openings therethrough above the end of the tube 16. A thermostat device 40' is provided at a suitable point in the chamber, or more than one may be used if desired, this being of a conventional construction, the details of which are well understood and so will not be described. It may include any usual means for enabling the setting of the device to vary its functions so that it will respond to selected temperatures, and it is incorporated in circuits with the lamps 32 in accordance with the instruction given in the diagrams of Figures 4 and 5, as may be found preferable. Mounted upon the lower wall 26 of the unit 23, there is a resistor 41, which may be incorporated in the line to one side of the lamp 32, as also indicated in the diagrams of Figures 4 and 5, and at some suitable point on the device, convenient for observation, a pilot light 42 is mounted, permanently wired to a coupling receptacle 43 fixed in the ceiling 17, from which the circuit may be continued by means of a detachable plug 44 and wire 45 to the electrical unit 23.

The boundary flanges 21 extend downwardly a sufficient distance to serve as baffles for the radial current of air propelled outwardly by the impeller 40 so that the device will function in a manner to be subsequently explained, without requiring the use of the wall 22 corresponding to the curtain b^3 of Patent No. 1,484,894, except under special conditions, and ordinarily, my invention may be used without the inner wall, as will appear. As shown in Figures 1 and 2, the main lead wires 46 may terminate in a plug 46', which may be engaged in any usual service outlet where a source of electrical current is available. In the system of Figures 4 and 5, alike, provision is made so that the attraction lights 33 are turned off or made dim (when heater is turned on by thermostat) so that the illumination under the hover is not greatly increased by the heater lamps 32. Conversely, the lights 33 become bright to compensate for the decrease of illumination caused by the lights 32 being turned off by the thermostat. The motor 38 is connected across the line, so that whenever the plug 46' is engaged with the electrical source, the motor will operate. One wire 47 is continued past the motor, as shown in Figure 4, and connected to one end of a resistance 41, the other end of which is connected to a wire 48 forming one side of the heating circuit, a parallel wire 49 being provided, and between these last named two wires the lamps 32 are connected in multiple. The wire 49 leads to one terminal contact 50 of the thermostat, the active element 51 of which is connected by wire 52 to the lead-in wire 53, forming one side of the line, the other side of which is formed with the wire 47. Connected in multiple between the wire 49 and wire 53, are the two or more attraction lamps 33. The wire 49 is continued past the thermostat to one side of the pilot lamp 42, the other side of which is connected directly to the wire 47. The resistance 41 with the lamps 32 connecting it to the wire 49, together with the lamp 42 connected to the wires 47 and 49, serve as one side of the attraction lamp circuit, while the wire 53 forms the other side thereof, the combined conductivity of the lamp 42 and resistance 41 serving with the lamps 32 to transmit sufficient current to energize the lamps 33, as long as the thermostat 40 is in open position, as shown in Figure 4. Under this major circuit, the resistance of the lamps 32 is sufficient to prevent material energization of the lamps 32, so that a minimum of heat is generated, which is not sufficient to raise the temperature in the brooder objectionably, even though the external temperature of the air should be relatively high. When the thermostat is energized so as to close the circuit to the contact 50, the current from the lead-in wire 53 will by-pass the lamps 33, due to the lower resistance in the circuit through the thermostat, energizing the lamps 32, and the lamps 33 will then become dim.

In the circuit shown in Figure 5, the wire 47', corresponding to the one 47 in the first circuit, is extended past the motor to one terminal of the lamp 42 and one end of the resistance 41, as before, and from the resistance 41 through a wire 48', to which one side of each lamp 32 is connected, as in the first diagram, and from the opposite terminals of the lamps 32 a wire 49' corresponding to the one side of the pilot lamp 42, the other side of which is connected to the wire 47'. The wire 49' is connected to a contact 50' at the thermostat, the circuit to the lamps 32 thus being the same as in the first diagram. The bimetallic switch member 51' of the thermostat, however, while connected to the wire 53' of the lead-in circuit, as in the first diagram, is arranged to engage a second contact 54, from which the wire 55 leads to one side of the attraction light 33, while the other side of the attraction light is

connected directly to the line wire 47'. Thus, at high temperatures, the switch 51' will engage the contact 54, keeping the attraction light connected across the line, but at a lower temperature the switch will swing to the contact 60', breaking the circuit to the attraction light, and energizing the lamps 32 and pilot light 42.

It will thus be seen that the attraction lamps 33 and the heating lamps 32 are energized alternately, by the thermostatic device, so that the lamps 32 will be energized when the thermostat responds to low temperature-thermal conditions in the brooder, but these will be kept out and the attraction lamps energized when the thermostat responds to high temperature conditions. In the circuit of Figure 4, the pilot light will operate dimly if wattage of 33 is high enough to offer little resistance, or if 42 is of the neon type, as long as the line 45 is plugged into the service pilot light 42 outlet, while in the circuit of Figure 5, the pilot light be energized only when the heater lamps are in operation. Should it be desired to have the pilot light in the circuit of Figure 5, operated at all times as long as current is supplied to the electrical unit, it may be otherwise located for this purpose, as discretion may dictate.

In the operation of this device, it will be noted that with the fan device 40 in operation, a current of air will be drawn upwardly around the motor and through the top wall 24 of the electrical unit, and if the sleeve 18 is in open position, more air will be drawn downwardly through the tube 16 at the same time. The air thus supplied will be radiated outwardly by the impeller in all directions, moving close beneath the ceiling 17 until it engages the boundary flange 21, by which the air will be deflected downwardly toward the floor upon which the brooder is set. This will prevent the air from moving downwardly adjacent the roof 10 and against the curtain 12, beneath which some of the air might pass in considerable quantity directly to the exterior of the brooder, which would result in considerable loss of heat, since this is warmed air including an increment of fresh air through the sleeve 18. The air leaving the impeller passes over the lamps 32 and the reflectors 34, by which it is substantially warmed, and it is also mixed with convection air currents which rise from the lamps and from the brackets 35 and reflectors, as will be appreciated. The walls of the unit at 30 will also be heated somewhat by the lamps and will aid additionally in warming air within the electrical unit, which may rise and pass through the opening 25 to the impeller of the fan. Additional air will be drawn upwardly through the large opening 27 around the motor to supply the fan device. In addition, a multiplicity of apertures 55 may be formed in the bottom wall 26 of the electrical unit, through which air may rise, which will be substantially warmed by the heated wall portions 30, as well as being heated to some degree by the resistance element 41, which is arranged in a coil mounted on the lower wall 26 of the electrical unit, and extending a distance around the upwardly extended edge portions 28 of the wall 26, around the opening 27. With chickens in the brooder, the chicks themselves will generate some heat, and without the action of the fan, there would be localized areas of warmth beneath the lamps 32 with outer parts and inner members of the chicken group receiving less warmth, and tending to become chilled by drafts sweeping in under the curtain 12 against the chicks in the outer part of the hover. There would also be a lack of access for the chicks in the center of the mass, which tend to crowd inwardly by the pressure of those at the outer sides. Thus with the operation of my fan device in the arrangement shown, and as above explained, warmed air is directed outwardly until it engages the flange 21, when it is deflected downwardly upon the outermost in the hover, and by reason of the ventilating sleeve 18 being so used that the only air taken in by the fan from the exterior of the brooder comes through the tube 16, instead of cold air being drawn inwardly under the curtain 12, air is being constantly forced outwardly, so that no chilling air reaches in any part of the brooder.

In addition, the brooder has peculiar advantages in those cases where periods of warm weather are experienced, and after chicks have attained some size, the heat generated by them would endanger those in the center of the device, if it were without the attraction lamps and ventilator system which is provided. While the ventilator system alone and without the lamps 33 would function to minimize liability of asphyxiation of chicks, there might still remain danger from the close packing of chicks in the center of the device which would occur by reason of the combined efforts of the chicks at the outer part of the device pressing inwardly. By provision of the attraction lights 33, a corresponding number of centers toward which the chicks will be attracted are formed, so that the force exerted by all is not concentrated upon one center, and thereby pressure upon chicks in the respective groups under the attraction lights is much less than they could develop where all press toward one center. It will of course be understood that the number of attraction lights may be increased and their location varied to suit conditions as discretion may dictate, without modifying the essential invention involved.

While I have described a specific embodiment of the invention with great particularity, it will be understood that various modifications in the construction, arrangement and form of parts, as well as substitution of equivalents may be made without departing from the spirit of the invention, as more particularly set forth in the appended claims, the disclosure being intended as exemplary and not an arbitrary embodiment of the invention.

I claim:

1. An electrical unit for mounting upon the ceiling element of brooders of the character described, comprising a case having a top wall and hanger arms whereby the device may be suspended in close spaced relation to a ceiling of the brooder, a plurality of heater lamps mounted on the periphery thereof, and a plurality of spaced apart attraction lamps mounted on the periphery thereof, an opening being formed through the unit from top to bottom, to admit air therethrough for projection horizontally outward of the unit, a motor mounted in the unit on a vertical axis and having an impeller operatively connected thereto to rotate closely over the unit, for the purposes described, means to operate the motor constantly, and means to operate the heater lamps and attraction lamps, alternately, for the purposes described.

2. In a brooder of the character described, a brood chamber having a circumscribing curtain wall and a ceiling, an electrical unit mounted on

the ceiling, comprising a casing having a top wall spaced from the ceiling, a plurality of heater lamps mounted on the periphery thereof, and a plurality of spaced apart attraction lamps mounted on the periphery of the casing, an opening being formed through the unit from top to bottom, to admit air therethrough for projection horizontally outward between the ceiling and the top wall of the casing into engagement with said lamps, a motor mounted in the electrical unit on a vertical axis and having an impeller operatively connected thereto to rotate closely over the unit, for the purposes described, means to operate the motor constantly, and means to operate the heater lamps and attraction lamps, alternately.

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