

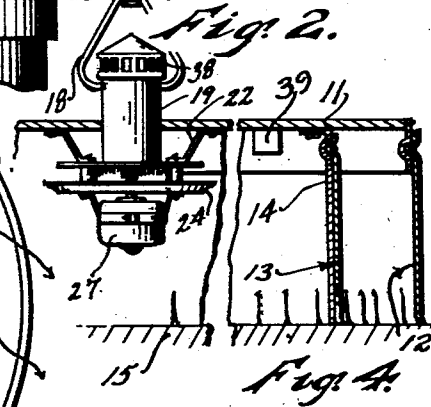
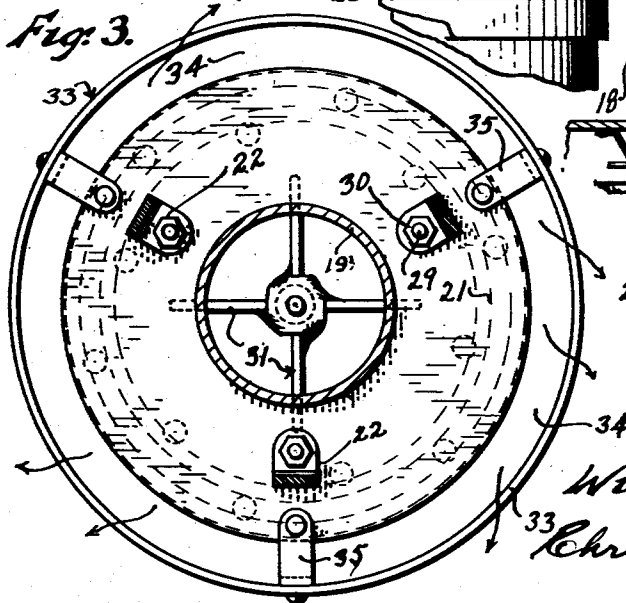
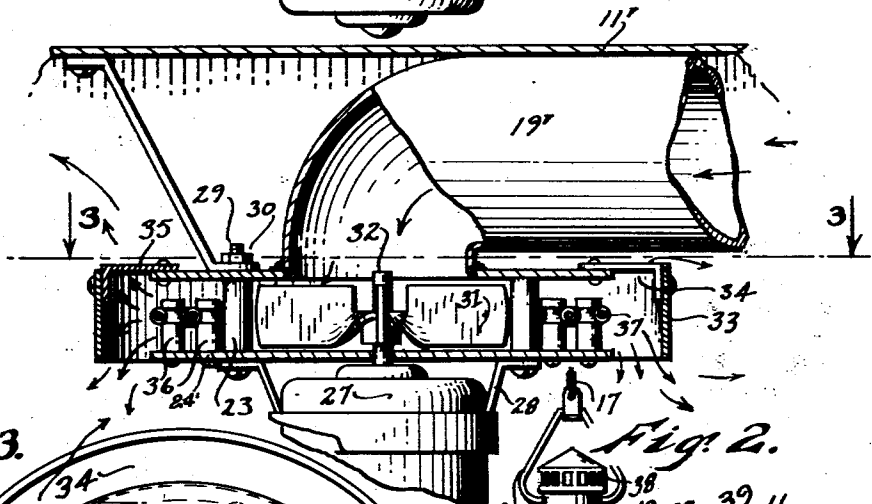
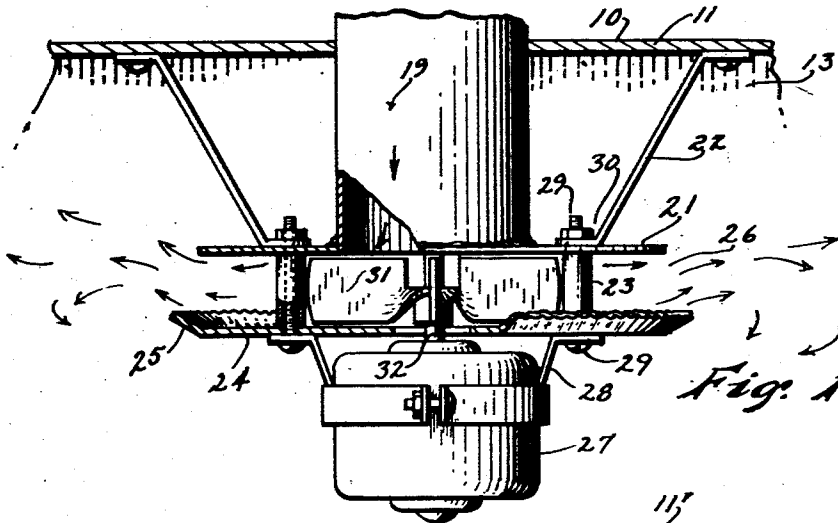
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PORTABLE AIR CONDITIONING MEANS FOR BROODERS AND THE LIKE

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PORTABLE AIR CONDITIONING MEANS FOR
BROODERS AND THE LIKE

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4 Claims. (Cl. 98-39)

The invention relates to means for heating and ventilating poultry brooders, and is peculiarly valuable in portable brooders of a general form now known. In this respect it has for an important object to enable the mounting of a rotary impeller fan in such manner that housings such as are ordinarily required for centrifugal fans are obviated. Another aim peculiarly related to such type of brooder is to present the entire motor-fan unit in such assembly with the brooder that the motor and impeller are accessible without requiring the removal of cover plates or opening of casings or housings of any kind.

Another aim is to enable the utilization of space in the brooder in a novel way to the end of enabling embodiment of the brooder without requiring enlargement of its usual housing parts. Particularly it is a purpose to at the same time obviate need for any exterior additions to a portable brooder device in order to incorporate therewith an electrical air circulator.

It is also a purpose to effect a novel circulation of air within a brooder; and to provide effective circulation within the brooder, regardless of the degree to which the air admission valve or shutter is opened. In many such devices, when the admission of air is restricted, the circulation within the brooder is correspondingly damped. This is an important consideration since at the times when brooding is required, and a portable brooder is employed, the floor on which it is mounted will usually be cold, and in the litter customarily provided, moisture from the chicks or from the heated air within the brooder will condense more or less and dampen litter, creating a serious threat to the health of the chicks well understood by poultrymen. My invention also attains highly effective ventilation at all times, retaining the advantage of avoiding an excessively heated central zone, while yet distributing warmth effectively and with graduated temperature from the central part of the brooder outward throughout the brooder chamber.

It is an important aim to present a novel and peculiarly effective mounting of an electrical heating unit in this device.

It is an advantage of the invention that a minimum of labor and expense for materials is involved in providing the necessary air duct means, and the length of duct is reduced to a minimum. It is also an advantage that the deflection of the ventilating current from an external source to distribute it uniformly throughout the brooder is accomplished with a minimum

of air friction and tendency to block the flow of air when moved by weak forces, as, for instance, a fan consuming fifteen (15) watts of current per hour, or less, as contemplated in the present embodiment of the invention.

Additional objects, advantages and features of invention reside in the construction, arrangement and combination of parts, involved in the embodiment of the invention, as will be understood from the following description and accompanying drawing, in which,

Figure 1 is an elevation of a unit embodying my invention, partly in section.

Figure 2 is a similar view of a modified device.

Figure 3 is a cross section of the unit on the line 3-3 of Figure 2.

Figure 4 is a fragmentary sectional view of a brooder showing the installation of the unit illustrated in Figure 1.

There is illustrated in Figure 4 a brooder 10, including a top 11 of circular form supporting an outer peripheral curtain 12 and an inner curtain 13 spaced therefrom suitably to provide an outer brooder space between the two curtains, and an inner brooder space within the inner curtain.

From the top at suitable intervals, legs 14 are extended downward, to engage the floor 15 or other flat surface upon which the brooder may be set, so as to support the brooder with the top 11 at the proper height. Various temperature responsive regulating means may be employed to control an electrical circuit to a motor to be described, and other accessories used as desired, the specific details of these comprising no essential part of the present invention and not being illustrated. If desired, any other top form may be employed, the invention being not limited to the specific form shown and described. Customarily, means is provided to lift the brooder and suspend it, such means being formally indicated at 17, engaged with the upper part of a ball 18 engaged with the intake duct or tube 19 of my ventilator unit.

This intake terminates at its lower part at a horizontal planiform flange or annular plate 21, suspended from the top 11 by suitable brackets 22. Below the plate 21 and held in fixed spaced relation thereto by spacers 23, there is a horizontal planiform circular plate 24 of greater diameter than the plate 21, having upwardly inclined extreme circumferential edge portions 25 projected radially beyond the edge of the plate 21, but stopping a good distance below the level of the latter (in the present instance nearly $\frac{3}{4}$

of the distance between the plates), so as to afford an air distributing slot 26 between the two, nearly or quite as wide as the space between the plates, to function as will be described. A motor 27 is suspended from the bottom of the plate 24 by brackets 28. These brackets are attached, and the plates 21 and 24 held in assembly as well as the upper brackets 22 secured to the plate 21, by means of screws 29 engaged through the brackets, plates, spacers, and nuts 30, forming three continuously connected series of bracket members.

The tube 19 may be inserted in the vent opening of the average brooder and the unit secured as described.

Between the plates 21 and 24, an impeller 31 is secured on the shaft 32 of the motor, which projects revolvably through the plate 24. This impeller consists of blades of approved form, operating in close relation to the lower end of the tube 19 and plates 21 and 24, and projecting slightly beyond this opening of the tube. The blades are substantially planiform in their major part with a slight rearward inclination toward their extremities in the specific form illustrated.

In Figure 2 the device is illustrated as having a lower plate 24' corresponding to the plate 24 first described, but of substantially the same diameter as the plate 21 and aligned therewith. Outwardly of the plates 21 and 24' a baffle ring 33 is mounted in concentric relation to the plates and spaced sufficiently from the edges of the plates to afford good clearance or slots 34 for passage of air upwardly and downwardly between the ring and the plate 21 and 24'. This ring is supported by brackets 35 secured to the edge of the plate 21.

In Figure 2 also a series of insulator knobs 36 are mounted on the plate 24' on which one or more coils 37 of resistance wire may be mounted to serve as a heater for air forced outward from the impeller. These may be connected in an electrical circuit in any approved manner, not illustrated. They are located midway between the plates 21' and 24' and adjacent the periphery of the latter, so that air from the impeller will impinge upon them and become heated.

Figure 2 also illustrates the possibility of utilizing a lateral air intake by a tube 19' making a proper turn under the top 11', so that it may be led to any desired intake device.

There is formally indicated in Figure 4 an adjustable air inlet device 38, although any other means for the purpose may be employed. It will be apparent that if the inlet is moved nearly to closed position, the action of the impeller will cause a greater suction of air up through the motor shaft hole in plate 24 and a resultant movement of air between the plates 21 and 24, which will be communicated to that in the chamber, and produce a re-circulation of air and uniform distribution of whatever freshly admitted air there may be, as well as minimizing the liability of accumulation of dampness in the litter.

In the operation of the device of Figure 1, the motor being in operation, the impeller will by centrifugal action and by impingement of its blades upon incident air force air radially although slowly therefrom, and so drawing in fresh air through the tube 19. As the air passes from the impeller the lower air body thereof encounters the upturned part 25 of the plate 24, resulting in a slight impedance and deflection upward and production of gentle, slow gyratory eddy currents which cause the air to become slowed still further in its translative motion and to move

downwardly throughout the area of the inner brooder space, from which air escapes through and under the curtain 13. More and more of the air body is gradually drawn downward by these eddies, to the outer part of the space within the inner curtain 13, and with displaced air from the central part of the chamber passes through or under the curtain. Outward movement of air is also induced by being displaced by air being continually drawn into the chamber at the central part.

Owing to the fact that the area of the slot 26 is many times greater than the cross sectional area of the tube 19, the air passing radially from the impeller moves at a speed much reduced from that of entrant air in the tube and this movement proceeds uniformly throughout the circumference of the slot. With the gradual slowing of the slow eddy currents and other effects above noted, there is no draft or localized current of sustained direction and speed different from that in other parts of the chamber or fast enough to be disturbing or injurious to chicks, and so no "draft" will be produced, such as might tend to affect chicks by excessive air movement. It is contemplated to use regulatory devices 39 with the motor such that its speed will be quite moderate and with the tendency of the warm air in the brooder to move upward opposing the suction of the impeller, this type of impeller and its operation will produce very uniform and gentle air movements.

The device of Figures 2 and 3 will, either with or without the energization of the coils, develop more extensive eddies in the air passing outwardly across the edges of the ring 33, the top and bottom of which are at the same levels as the plates 21 and 24', although this may be varied. This air is caused to move downwardly and radially through displacement by entering air, as well as the downward dispersion being accomplished by the slow eddy currents as before described.

With the coils 37 energized, the heated air passing from these coils and encountering the ring 33 will thereby be deflected in two parts, upward and downward respectively, into the top and bottom strata of the radial flow from the impeller, and by the eddies occurring subsequently as it moves outward and downward throughout the brood chamber, it becomes completely diffused throughout the chamber in a body of fresh air, reaching between the bodies of the chicks and into the litter as well, so that the latter is maintained in a thoroughly dry condition, and the chicks warmed without possibility of concentration of excessively heated air in any direction or area.

It is customary to suspend such brooders by a hoisting rope 17, so that they may be raised at proper times to facilitate cleaning, and having consideration for this manner of use and the usual size of such devices, it will be readily apparent that by inverting the brooder the unit is completely exposed for servicing of the motor and the replacement of the coils 37 or repair of the impeller or removal of the motor may be effected by removal of the screws 29 in any event.

The device of Figure 2 with the ring 33 has the advantage of providing a central zone in which the air will be slightly warmer than that at the extreme outer part of the brooder, so that the weaker chicks requiring more warmth may be accommodated properly while the stronger chicks are hovered in the cooler outer parts.

It will be appreciated that the same force ap-

plied through the impeller which serves to draw air in through the tube 19, also at the same time directs it outward radially, so that no impedance is developed in diverting the air properly. For
 5 oiling and examination it is unnecessary to detach any of the mountings or brooder housing or other parts of the brooder proper.

It will also be seen that expensive fan housing parts are obviated, and the plates 21 and 24 may
 10 be simple sheet metal blanks. The legs 14 being customarily of such length as to support the motor above the heads of the chicks, the heating coils are at a safe distance out of their reach, yet require no enclosure for their protection, spe-
 15 cially. The motor being well enclosed, as is common, may be close over the heads of the chicks without liability of injury.

I claim:

1. A ventilator unit for brooders and the like
 20 consisting of a vertical axis inlet, a rotary impeller mounted on said axis for horizontal rotation and so located as to lie in the upper part of a brood chamber, means to operate the im-
 25 peller, a plate close over the impeller, and a plate close below the impeller parallel to the first plate and having an outer circumscribing edge portion outwardly of the first plate and inclined upwardly, stopping short of the level of the first plate more
 30 than half the distance between the plates.

2. A ventilator unit for brooders and the like
 35 consisting of a vertical axis inlet member having a terminal circumscribing plate, a second concentric circular plate spaced therebelow, an electric motor having its main shaft on said axis, the second plate having an opening of a size to receive the shaft therethrough and to provide an air inlet passage, an impeller on the shaft be-
 40 tween the plates, said second concentric plate

having a circumscribing upwardly inclined edge outwardly of the first named plate, but stopping short thereof sufficiently to form a wide annular slot having a clearway which is a multiple of the
 5 cross sectional area of the inlet member, and a mounting for the unit including a series of members each having a terminal upper member constructed for attachment to the under side of the top of a brooder and the like.

3. A ventilator unit for brooders and the like
 10 consisting of a vertical axis inlet member, having a terminal circumscribing plate, a second concentric plate spaced therebelow, an electric motor having its main shaft on said axis, an impeller on the shaft between the plates, said second con-
 15 centric plate having a circumscribing upwardly inclined edge outwardly of the first named plate, but stopping short thereof sufficiently to form a wide annular slot having a clearway which is a multiple of the cross sectional area of the inlet member, and means for mounting the unit upon
 20 the under side of the top of a brooder and the like.

4. A ventilator unit for brooders and the like,
 25 consisting of a vertical axis inlet member, having a terminal circumscribing plate, a second concentric plate spaced therebelow, an electric motor having its main shaft on said axis, the second plate having an aperture of a size to receive the motor shaft therethrough and to provide an air inlet passage, an impeller on the shaft between
 30 the plates, said second concentric plate further having a circumscribing upwardly inclined edge outwardly of the first named plate, but stopping short thereof sufficiently to form a wide annular slot having a clearway which is a multiple of the
 35 cross sectional area of the inlet member.

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