May 2, 1933. J. L. ROBBINS 1,907,121

INCUBATOR

Filed May 13, 1930

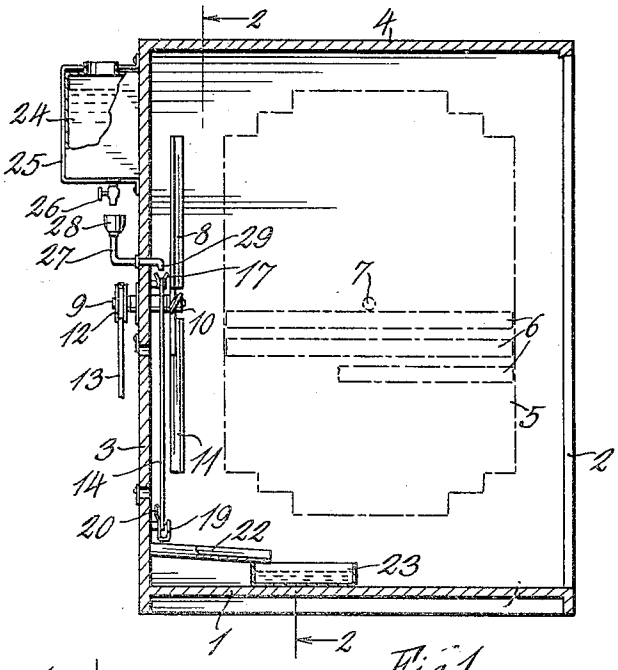


Fig. 1.

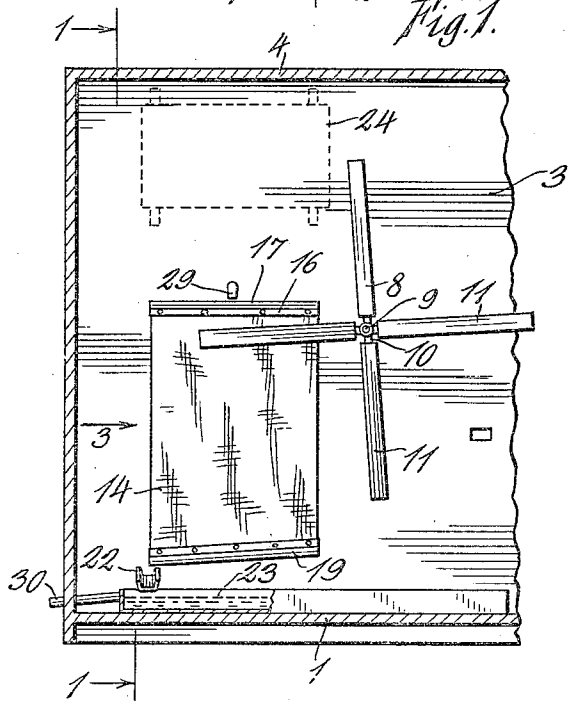


Fig. 2.

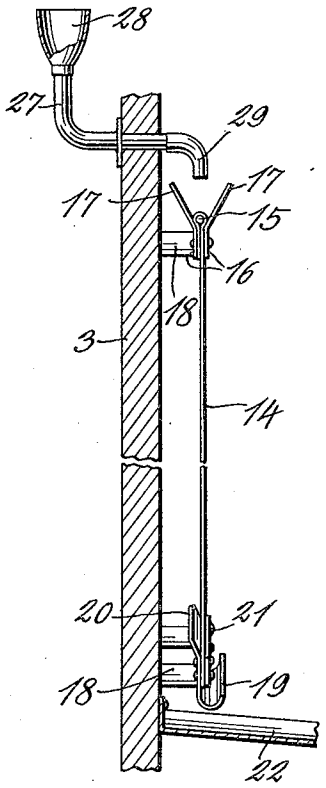


Fig. 3.

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UNITED STATES PATENT OFFICE

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INCUBATOR

Application filed May 13, 1930. Serial No. 451,930.

This invention relates to improvements in incubators of the type described and claimed in United States Letters Patent No. 1,728,980, granted to me on September 24, 1929.

In incubators of the type now in general use where a large number of eggs are incubated at one time, it is customary to provide the incubators with electric heaters for maintaining the temperature at predetermined value, as well as with fans for circulating the air and with means for supplying moisture to the air. The electric heaters are controlled by means of thermostats which automatically cut off the current when the temperature reaches a predetermined value and which will again close the circuit to the electric heater when the temperature falls below this value.

It has been found that in large incubators of the type referred to, the heat generated by the eggs themselves during the incubation period often times raises the temperature to a point higher than that which is necessary for incubation. This occurs, of course, only during hot weather or where the incubators are maintained in a room where the temperature is quite high. In order to prevent the eggs from becoming spoiled, due to excessive temperature, I have found that it is necessary to provide some means for normally maintaining the temperature at a value lower than that necessary for incubation so that the heaters must be periodically employed to maintain the temperature at the desired value.

It is the object of this invention to produce a cooling means that can be applied to incubators of the type described and claimed in the patent above referred to and any other incubators of this general class and which will tend to lower the temperature and to maintain it normally below the temperature needed for incubation.

This invention, briefly described, consists in securing to the inside of the incubator an evaporator comprising a piece of water absorbent fabric which is preferably supported in vertical position between the rear wall of the incubator and one of the fans. Means is provided for maintaining this fabric moist at all times so that when the fan is operating there will be considerable evaporation taking place, which will tend to lower the temperature within the incubator, as it is well known that any liquid evaporating at a high rate absorbs heat and therefore reduces the temperature. In addition to its function of lowering the temperature, this evaporator also serves to impart to the air the necessary moisture.

Having thus briefly described the invention, the same will now be described in detail and for this purpose reference will be had to the accompanying drawing in which the preferred embodiment of the invention has been illustrated and in which:

Fig. 1 is a transverse section of an incubator of the type to which this invention refers, the section being taken on line 1—1, Fig. 2;

Fig. 2 is a longitudinal section taken on line 2—2, Fig. 1; and

Fig. 3 is a view looking in the direction of arrow 3, Fig. 2.

In the drawing a portion only of the incubator has been shown, as it is not my intention to describe the incubator which has been fully described and claimed in the patent above identified. The incubator is provided with a bottom 1, a front side 2, which preferably is formed by a plurality of doors, a back wall 3 and a top 4. Located within the incubator is an egg tray support 5 that has been indicated by dot and dash lines and which is adapted to support a plurality of egg trays 6. This support is carried by an axle 7 and can be tilted about this axle for the purpose of turning the eggs. A fan of the propeller type and which has been indicated as a whole by reference numeral

8, is mounted for rotation about an axle 9. This fan has a hub 10 and 4 propeller blades 11 that are inclined to the axis of rotation at an angle of substantially thirty degrees. The outer end of shaft 9 is provided with a pulley 12 and rotation is imparted to the shaft and to the propeller fan by means of a belt 13 that is driven from an electric motor. When the fan rotates, it sets up strong air currents that move forwardly about the edges of the fan and returns to the latter at the center, due to the fact that the propelling action of the fan blades is greater near their peripheries than at their center point, and due to the further fact that the fan is located quite near the rear wall and therefore does not permit air to come to the back of the fan to any appreciable extent. Secured to the inside of the rear wall 3, is an evaporator which consists of a piece of fibrous material, such as cloth, and which has been designated by reference numeral 14. The upper end of this cloth is wrapped around a wire or rod 15 and has secured to opposite sides thereof, sheet metal strips 16. The upper edges of these strips are flared outwardly as indicated at 17 so as to form a trough in the manner shown in Fig. 3. The upper end of the absorbent material is fastened to the rear wall by means of screws or bolts and these pass through spacers 18 that space the parts from the wall surface. Secured to the lower end of the fibrous material is a trough 19 that extends upwardly on the back side of the cloth and has its upper edge flared rearwardly as indicated by numeral 20. This trough is held in place by means of screws or rivets 21 and is secured to the rear wall by means of bolts or screws passing through the spacers 18. Trough 19 is inclined in the manner shown in Fig. 2 and located underneath the lower end of this trough is a short trough 22 that projects over and terminates above the water pan 23. Water may be supplied to the space between the upwardly extending flanges 17 by any suitable means and where city water under pressure is available, a pipe is connected with the water system and provided with a valve that can be slightly opened so as to let water drop into the space between the plate 16 in sufficient quantity to maintain the fibrous material 14 moist. In the embodiment shown, means has been provided for supplying water in the absence of available water under pressure and for this purpose a water tank 24 has been shown. This tank is secured to the outside of the rear wall of the incubator and held thereto by means of straps 25. A small valve 26 is secured to the bottom of the tank and located directly beneath this valve is a pipe 27, whose upper end is provided with a funnel-like extension 28. This pipe extends inwardly through the wall of the incubator and terminates in a downwardly extending portion 29, which terminates directly above the upper edge of absorbent fibrous material in the manner shown in Fig. 3. Valve 26 is opened slightly so as to permit water to drip into the funnel and this water will then pass through pipe 27 and be deposited in the space between flanges 17 and if more water is supplied than can be evaporated the surplus will flow through the trough 19 into the pan 23. The water pan 23 may be provided with an overflow pipe 30 and therefore if water is supplied in excessive amounts, there will be no danger of overflowing into the incubator.

When the incubator is operating and the fan is in motion, there will be a constant movement of air through and past the fabric 14, which is maintained moist at all times and this air will cause the water to be evaporated at a high rate, thereby absorbing a large amount of heat which, in turn, serves to reduce the temperature of the air in the incubator. If the temperature falls below that required for incubation the thermostats to which reference has been made, closes the electric circuits to the heaters and in this manner the temperature is always maintained at the right value, regardless of the temperature of the building in which the incubator is located.

Although the invention has been described in connection with the incubator that forms the subject matter of the patent above identified, it can be applied to incubators of any other specific construction and I therefore do not limit myself to the exact construction shown as it is believed that this means is broadly new in incubators of this type.

From the above description it will be seen that by the simple means described above, it is possible to maintain the temperature of an incubator at the proper value, regardless of the fact that the incubator may be located in an atmosphere of a higher temperature than that required for incubation and regardless of the fact that a greater amount of heat is given off by the eggs than is necessary to maintain the air at the required temperature.

Having described the invention what is claimed as new is:

A moistener for use with incubators having a closed incubating compartment, a fan of the propeller type located within the compartment and mounted for rotation in a vertical plane spaced a short distance from the inside of one compartment wall, the wall having openings through which air may enter the compartment when the fan is rotating, a piece of fabric located within the compartment, in the space between the wall and the fan, means for supporting the

fabric comprising two parallel strips attached to the upper edge of the fabric, the upper edge of the strips being flared outwardly so as to form a trough, means for delivering water to the trough and a trough attached to the lower end of the fabric for receiving the water that is in excess of the evaporation, the trough being inclined to permit the water to flow.

In testimony whereof I affix my signature.

JOHN L. ROBBINS.