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VENT STRUCTURE FOR INCUBATORS

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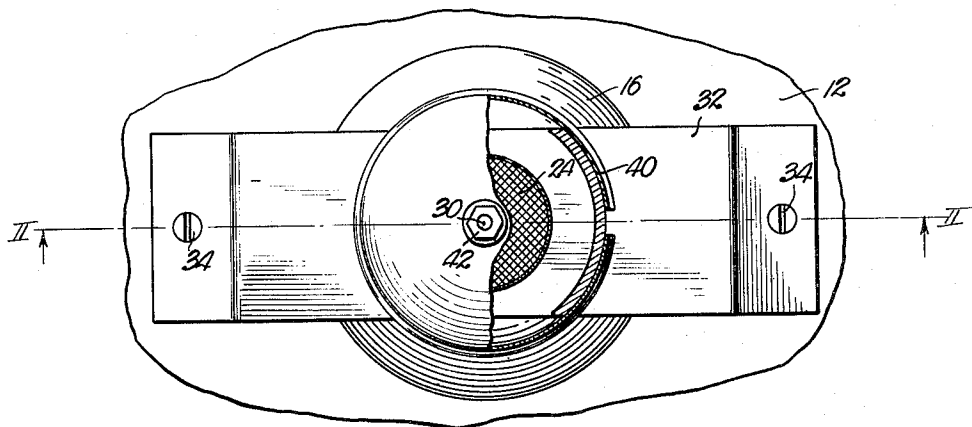


Fig. 1.

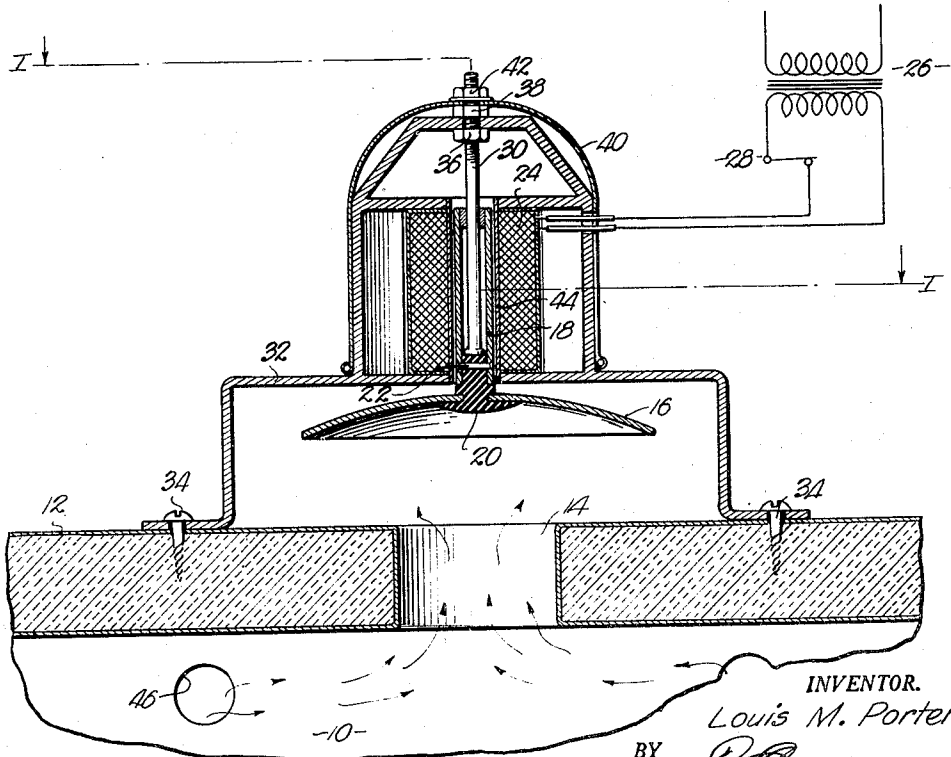


Fig. 2.

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# UNITED STATES PATENT OFFICE

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## VENT STRUCTURE FOR INCUBATORS

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2 Claims. (Cl. 137—139)

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This invention relates to electrically operated air circulating control means and principally to such structure as may be employed in the venting of incubators or kindred chambers where the fluctuation of temperatures must actuate the apparatus with accurate promptness.

One of the important aims of the invention is to provide a vent structure for incubators having an aperture closure that is directly connected to an electrically actuated element such as an armature which closure is constructed and designed to conform to the contour of the surface against which it is moved when the aperture is closed and to completely dampen any vibration that may be set up in the parts of the vent structure as the same is shifted to and from the closed condition.

A further aim of this invention is the provision of vent structure of the character above set down, that is devoid of all objectionable mechanical elements that have heretofore conventionally been employed and which establish undesirable noises when the structure is shifted to and from a given position.

Further objects of the invention will appear during the course of the following specification, referring to the accompanying drawing, wherein:

Fig. 1 is a sectional view of a vent structure for incubators taken on line I—I of Fig. 2 and looking in the direction of the arrows, and

Fig. 2 is a vertical cross sectional view through the vent structure taken on line II—II of Fig. 1.

Because of the necessity of maintaining a constant temperature within the hatching compartment of incubators, positively acting vents must be employed that are responsive to a change in temperature due to the progressive hatching of live chicks which have a temperature of substantially 103° F. The temperature required for incubation of the eggs is a fraction of a degree under 100° F. and therefore, as the eggs approach the hatching period and as the chicks are newly hatched, their 103° of temperature has a direct effect upon maintaining a hatching temperature of substantially 100 degrees.

It is common practice in artificial incubation to maintain a temperature within the hatching compartment at slightly below 100° F. so that utilization of the 103 degree temperature of the hatched chicks may be effected. The incubators are all provided with heaters to supply warm air and as the air within the incubator compartment rises above 100°, ventilators are brought into play to dissipate the hot air which is usually saturated or highly humid. The fluctuation of humidity has a direct bearing on temperature con-

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trol and further necessitates the employment of accurately operating vents to maintain a predetermined temperature.

The vent structure about to be specifically defined is capable of use with incubators where the critical temperature of substantially 100° F. is to be maintained. The operation of the vent structure is effective and desirable, all as will appear hereinafter and become apparent to one skilled in the art as the preferred form of the invention is specified.

In the drawing, the numeral 10 designates the interior of a conventional incubator 12 through the ceiling whereof is provided an exhaust aperture 14. A closure 16 is disposed above aperture 14 for movement toward and from a position where air cannot pass outwardly from the interior of the incubator, is dished to cause the edges at the annular periphery thereof to come into direct contact with the outer surface of wall 12 around aperture 14. This closure 16 is mounted directly upon armature 18 through the medium of an interconnecting element 20 that must be formed of resilient material such as rubber.

A cross pin 22 extending through armature 18 and the neck of element 20, as illustrated in Fig. 2, insures that no metal to metal contact will occur between closure 16 and the metal armature 18. This armature 18 is a part of a solenoid having a coil 24 energized by a source of electrical current 26 when temperature responsive switch 28 is closed. The circuit is but diagrammatically illustrated in Fig. 2 and it will be obvious to those skilled in the art that this switch 28 is normally within the interior or chamber 10 of the incubator.

A guide rod 30 is in telescoped relation with hollow armature 18 and this rod depends from a frame 32 that is carried by the ceiling 12 of the incubator. Mounting screws 34 serve to center closure 16 above aperture 14 and when rod 30 is assembled with frame 32, its screw-threaded length receives nuts 36 and 38 between which a portion of frame 32 is confined. A dust cap 40 should be used to protect the coil 24 and other parts of the solenoid and when so equipped, the frame 32 is used to hold this dust cap 40 in place by the application of an additional nut 42 on the screw-threaded portion of rod 30. Coil 24 has a tubular core 44 that confines armature 18 and as the armature reaches the position shown in Fig. 2, the inner end of resilient element 20 will strike the depending or lower end of rod 30. This position is assumed when coil 24 is energized. When switch 28 is opened to de-energize coil 24, closure

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16 and the parts assembled therewith, will drop through the action of gravity to a position over aperture 14. Any vibration that may be set up in the body of closure 16 will be completely dampened by element 20 and a silent, smoothly operating closure will result. When closure 16 is open air will escape from the interior 10 of the incubator in the direction of the arrows shown in Fig. 2 and an intake port 46 formed in a side wall of the incubator will allow the ingress of fresh air.

The employment of the hollow armature 18 and guide rod 30 positively minimizes the possibility of any binding between these parts and between hollow armature 18 and core 44. Any electrical over-load which would result if binding occurred, is thereby obviated and a safety factor is injected into the vent structure and its component parts.

But one form of the invention has been illustrated and described and it will be apparent to those skilled in the art that alterations may be made without departing from the spirit of the invention or scope of the appended claims.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent is:

1. In vent structure of the character described, a vertically shiftable closure; and a solenoid operated armature supporting the closure to hold the same in an elevated position when the coil of the solenoid is energized, said armature being tubular and having a stationary guide rod in telescoped relation with the armature, said closure having a coupling element of resilient material securing the same to the armature, said coupling serving as a stop to strike the end of said guide rod when the closure is elevated by the energization of the solenoid.

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2. In a container having a top wall provided with an opening, closure structure including a support on the top wall; a core member above said opening; a vertical tube reciprocably guided by said core member in substantially coaxial alignment therewith; a dome-shaped closure having an annular periphery greater than the circumference of said opening, said closure being adapted to rest upon said top wall in covering relationship to said opening; and a rubber-like coupling member joining said closure with the lowermost end of said tube; one end of the coupling member extending into the tube, said coupling member extending through the closure and being provided with an out-turned flange on the opposite end thereof underlying the lowermost face of the closure.

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