April 29, 1947. K. J. WENDEL 2,419,806

INLET AND OUTLET AIR DISTRIBUTING DUCT FOR BUILDINGS HAVING AUTOMATIC DAMPER MEANS

Filed May 3, 1944 2 Sheets-Sheet 1

Fig. 1.

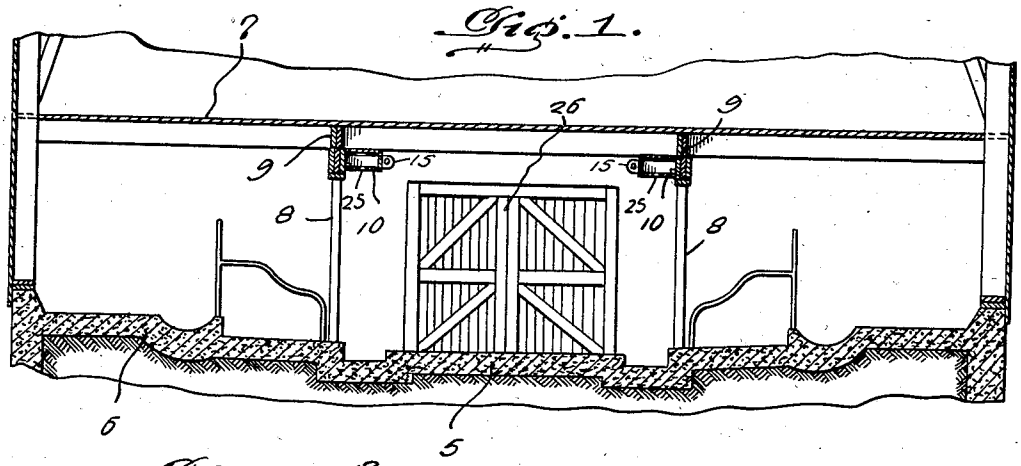
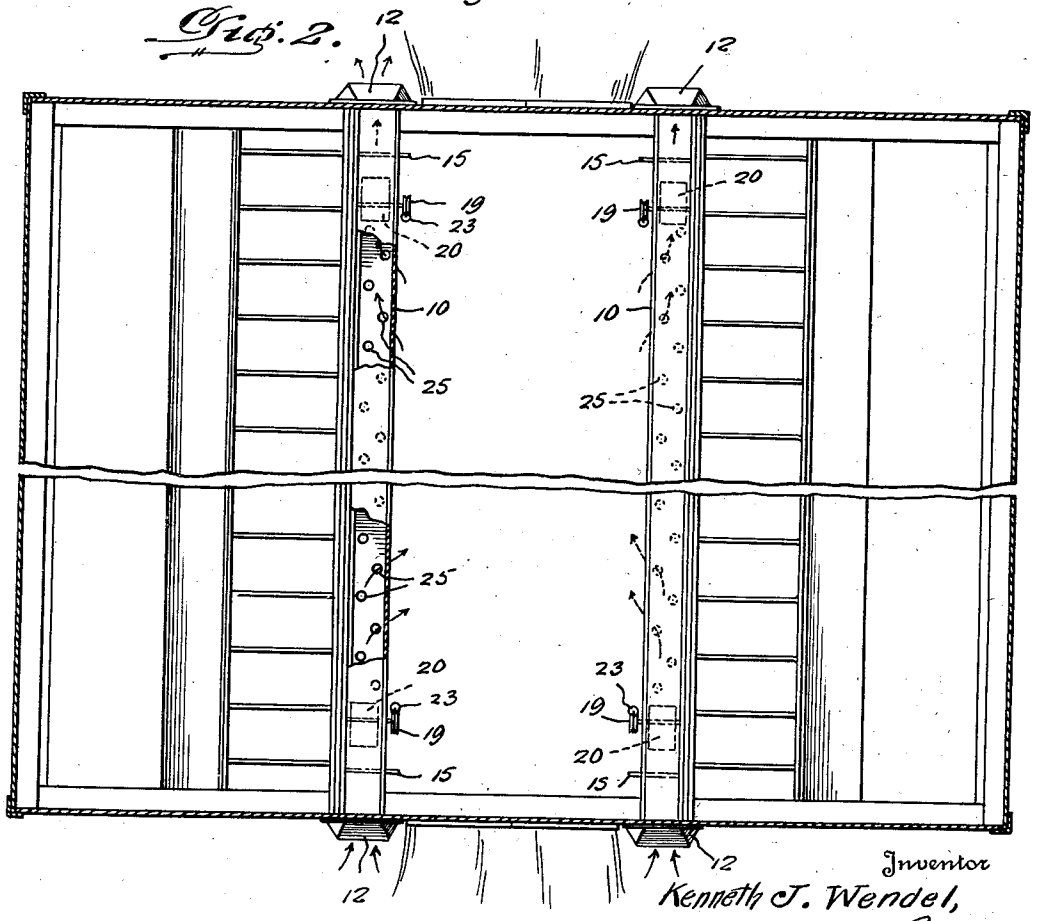


Fig. 2.



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Filed May 3, 1944 2 Sheets-Sheet 2

Fig. 3.

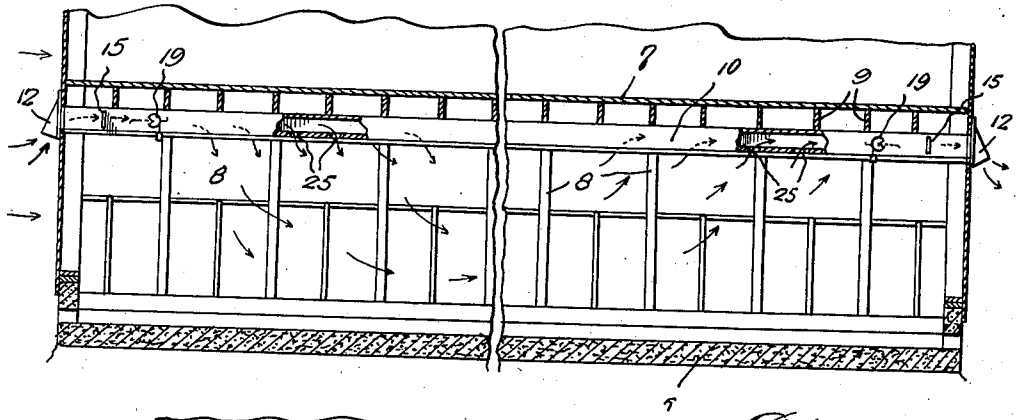


Fig. 4.

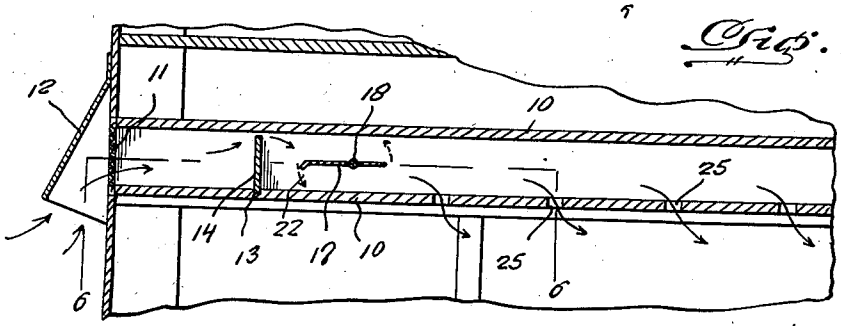
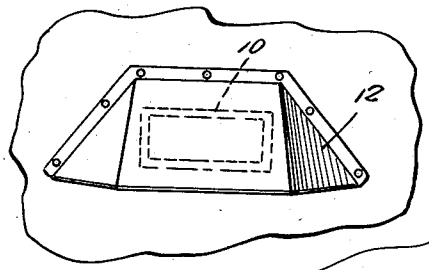


Fig. 5.



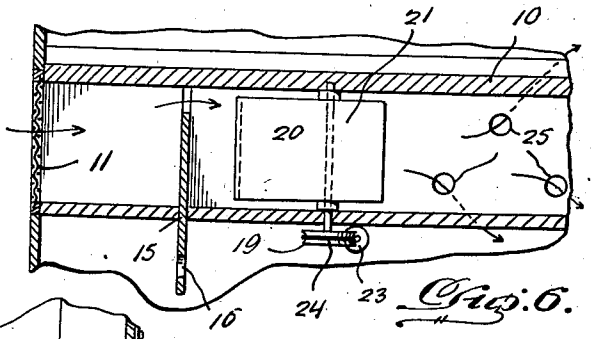


Fig. 6.

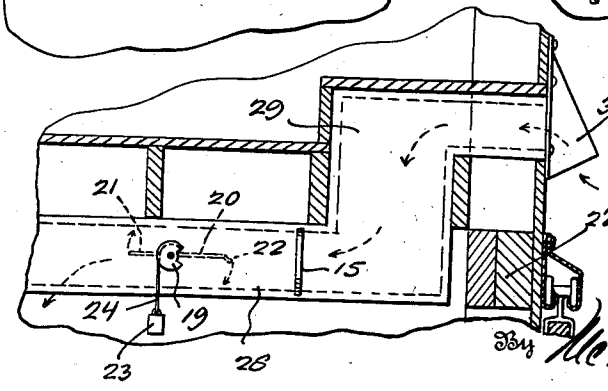


Fig. 7.

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INLET AND OUTLET AIR DISTRIBUTING DUCT FOR BUILDINGS HAVING AUTOMATIC DAMPER MEANS

Kenneth J. Wendel, Park Rapids, Minn.

Application May 3, 1944, Serial No. 533,870

1 Claim. (Cl. 98—32)

1

The present invention relates to new and useful improvements in ventilating systems for buildings, and is designed primarily for use in dairy barns and other livestock, poultry and farm buildings, and has for its primary object to provide means for supplying fresh air to the building and removing the foul air therefrom without the aid of fans or other devices for artificially circulating the air.

More specifically, the invention comprises the use of air conduits extending from one side of the building to the other and having communication with the atmosphere at each end of the conduit for admitting fresh air into one end thereof and discharging the foul air from the other end thereof, depending on the direction of the wind.

A still further object is to provide manual and automatic control means for the air conduits to regulate the volume of air entering the building in accordance with wind pressure.

Another object is to provide a ventilating system of this character of simple and practical construction, which is efficient and reliable in performance, relatively inexpensive to manufacture, and prefabricate in 4, 6, 8 and 10 foot sections, and install in operative position in a building, and otherwise well adapted for the purposes for which the same is intended.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a fragmentary transverse sectional view through a dairy barn showing my invention installed in position therein.

Figure 2 is a top plan view of the air conduit with parts broken away and shown in section.

Figure 3 is a longitudinal sectional view through the barn and showing one of the air conduits in side elevation and with parts broken away and shown in section.

Figure 4 is an enlarged fragmentary longitudinal sectional view through one end of the air conduit.

Figure 5 is a view in elevation of one of the hoods covering the end of the conduit.

Figure 6 is a sectional view taken substantially on a line 6—6 of Figure 4.

Figure 7 is a fragmentary longitudinal sectional view of a portion of the barn showing a modified conduit construction.

Referring now to the drawings in detail, and first with respect to the form of the invention illustrated in Figures 1 to 6, inclusive, the numeral 5 designates the floor of a dairy barn having the cattle stalls 6 at each side thereof and including a ceiling or loft floor 7 supported on the posts 8 and beams 9, a row of the posts 8 and beams 9 being arranged at each side of the center of the barn, as shown to advantage in Figure 1 of the drawings.

2

An air conduit 10 is secured to one side of each of the beams 9, the conduits being of identical construction and accordingly a detailed explanation of one will suffice for both. The conduit may be constructed of light weight metal, wood or other suitable material, the conduit extending entirely through the barn from one side thereof to the other and communicating with the atmosphere at each of said sides of the barn by means of screened openings 11.

Secured to the outer side of the wall of the barn is a hood structure 12 which is open at its bottom and covers the screen opening 11 to permit air currents to enter the conduit by way of the open lower edge of the hood through the screen 11, as shown by the arrows in Figure 4.

A transverse groove 13 is formed in the bottom of the air conduit 10 adjacent each end thereof and in which a gate-type valve 14 is slidably positioned, one end of the valve 14 extending outwardly through an opening 15 in one side of the conduit. The valve 14 is adapted to be moved inwardly transversely of the conduit from one side thereof to the other, and the upper edge of the valve is spaced from the top of the conduit, as shown in Figure 4 of the drawings, so as not to completely obstruct the passage of air therethrough. The outer end of the valve 14 is formed with an opening 16 within which a suitable tool may be engaged for slidably actuating the valve into its open or closed position.

Positioned immediately inwardly of the valve 14, adjacent each end of the conduit 10, is an automatic damper or valve 17 and comprises a sheet metal plate secured on a shaft 18 journaled in the opposite sides of the conduit with one end of the shaft projecting outwardly thereof and to which the segment of a pulley 19 is secured.

The valve 17 is off balanced on the shaft 18 to provide a relatively large end 20 and a relatively small end 21, the large end of the valve having a downturned flange 22 formed thereon. A counterbalancing weight 23 is secured to the pulley 19 by means of a rope or cable 24, the weight normally holding the valve 17 in a horizontal position, as shown in Figure 4.

The bottom of the air conduit **10** is formed with ventilating openings **25** formed at spaced intervals between the valve **17** at the respective ends of the conduit.

In the form of the invention illustrated in Figures 1 to 6, inclusive, the air conduits **10** are installed in a barn equipped with hinged doors **26** which swing outwardly below the hood at the ends of the conduits. However, when the barn is equipped with sliding doors, as shown at **27** in Figure 7, it may be necessary to offset the ends of the conduits **28** upwardly, as shown at **29**, in order to position the hood **30** above the door to avoid interference therewith. Otherwise, the construction of the air conduits is identical to that heretofore explained.

In the operation of the device, air will enter one end of the air conduit **10**, depending on the direction in which the wind is blowing, the volume of air being controlled by the manually operated slide valve **14** or the automatic valve or damper **17**.

The air inside the barn is usually warmer than the atmosphere, due to the body heat of the animals therein and thus the fresh air entering the barn at one end of the conduit being cooler and heavier will tend to drop through the openings **25** in the bottom of the conduit adjacent the intake end thereof and will then circulate through the barn. As this air is slowly moving, it becomes warmed and at the same time gathers moisture from the air within the barn and becoming lighter rises again and as it nears the ceiling of the barn is drawn into the openings adjacent the discharge end of the conduit, as shown by the arrows in Figure 3 of the drawings, and then escapes through the discharge end of the conduit.

In bringing in the fresh air, as above described, the dewpoint or condition of saturation is made considerably more remote as the moisture is thus carried out of the building before the air reaches the saturation point, thus keeping the building dry and supplied with fresh air at the same time.

When the wind is blowing from an opposite direction, the above-described discharge end of the conduit then becomes the intake end and the intake end serves as the discharge end for the air.

When the force of air entering the intake end of the conduit increases, the pressure or force of air striking the flange **22** of the automatic damper or valve **17** will force the large end **20** of the valve downwardly to move the same into a closed position in accordance with pressure of air subjected thereto.

It is believed the details of construction, operation and advantages of the device will be readily understood from the foregoing without further detailed explanation.

Having thus described the invention, what I claim is:

A ventilating system for buildings comprising an air conduit mounted adjacent the ceiling of the building and extending horizontally through the building from one side thereof to the other, each end of the conduit being open and having communication with the atmosphere through the walls of the building, said conduit having openings in its bottom to provide communication with the interior of the building, a damper pivotally mounted in the conduit adjacent each end thereof and having off balance ends to provide relatively large and small ends on the damper, a downturned flange on the large end of the damper facing towards the inlet opening of the conduit and adapted to respond to predetermined air pressure entering the conduit to swing the damper vertically into a closed position, a counterbalance weight secured to the damper to normally maintain the latter in a horizontal position, a gate valve slidably mounted transversely of the conduit adjacent each end thereof and between said dampers and the conduit ends for manually controlling the supply of air to said conduit, and the discharge of supply therefrom, a screened inlet and a screened outlet for said conduit, and a hood adapted for attaching to the outside of the building and covering the top and sides of the ends of the conduits.

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