United States Patent

Berg, Sr. et al.

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[54] BARN VENTILATOR

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[52] **U.S. Cl.** **98/33**

[51] **Int. Cl.** **F24f 13/00**

[58] **Field of Search** ..... 98/33 A, 33 R

[56] **References Cited**

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FOREIGN PATENTS OR APPLICATIONS

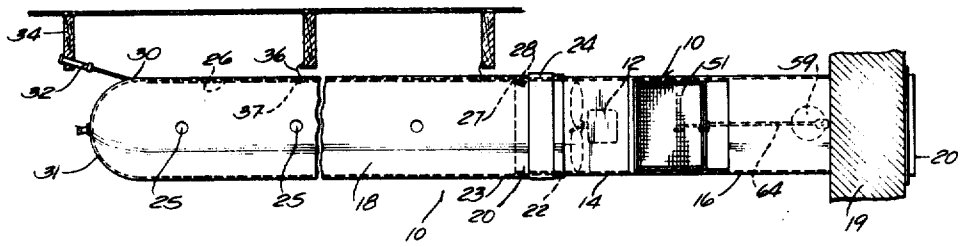
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[57] **ABSTRACT**

Ventilating apparatus for a building includes a flexible duct with perforate side walls which is supported by a wire stringer which extends interiorly and longitudinally of the duct. One end of the stringer is connected to a fan housing located in the rigid duct at the inlet of the flexible duct, and the remote end of the stringer extends through an opening in the flexible duct adjacent the end of the duct for connection to the building frame. The stringer and the flexible tube are conveniently supported at intervals by hangers which have hooks respectively connected with the building and with the stringer. The rigid portion of the ventilation duct has an end extending through an opening in a building wall to provide an exterior air inlet port. The rigid duct also includes opposed side air entry ports for re-circulating inside air and a damper assembly for selectively closing outside air flow or admitting outside air for mixture with inside air.

9 Claims, 3 Drawing Figures



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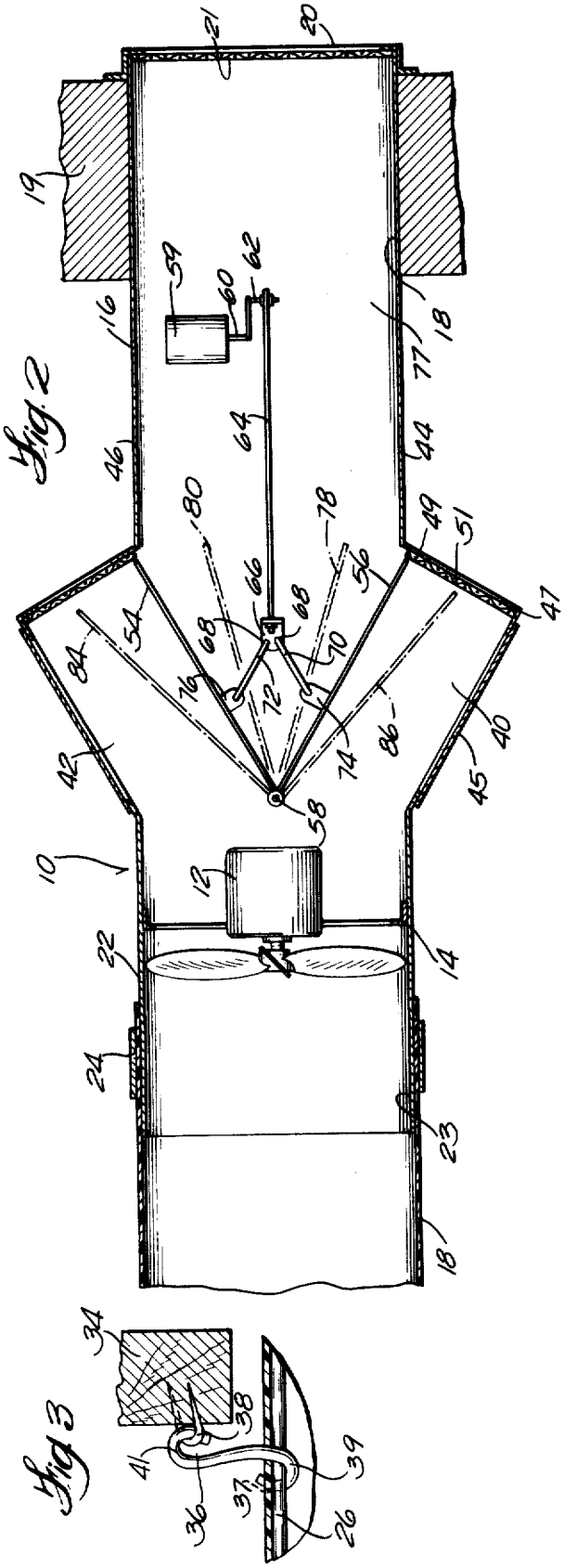


Fig. 2

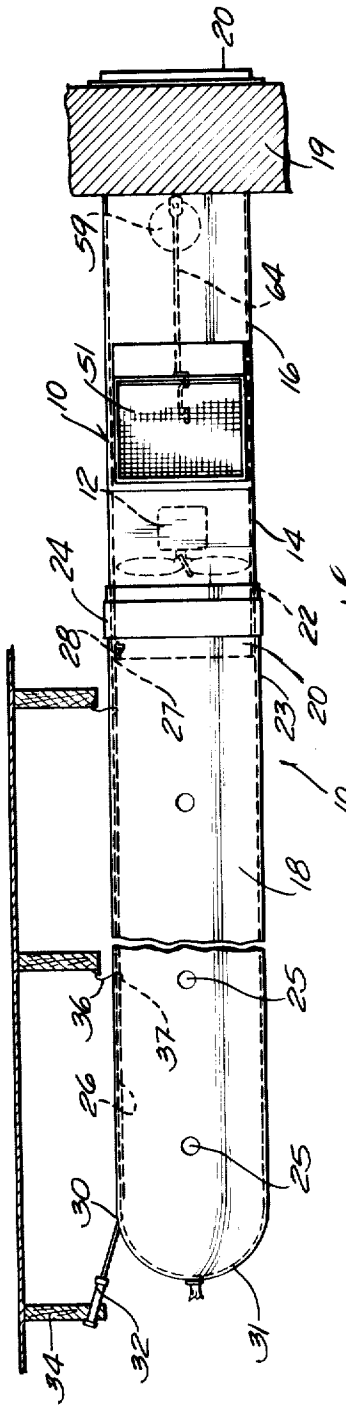


Fig. 1

Fig. 3

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BARN VENTILATOR

BACKGROUND OF INVENTION

Flexible plastic tubes or ducts with spaced air outlets are commonly used for ventilating large outbuildings such as greenhouses and barns. The spaced outlets provide a plurality of air jets for efficient circulation without excessive drafts. Various arrangements have been employed for supporting the flexible tubes. The U.S. Pat. to Bohamon, No. 3,318,224, discloses an arrangement with an exteriorly located wire which is fastened to the duct with clip assemblies. Other patents disclose the use of grommets in the plastic tube.

SUMMARY OF INVENTION

The invention provides an inexpensive and convenient arrangement for supporting a flexible duct which greatly facilitates installation. A wire stringer supported at both ends extends interiorly and longitudinally of the duct and supports the upper surface of the flexible duct. The stringer and the duct are supported at intervals by an arrangement which employs hangers extending through apertures in the duct or otherwise hooked to the stringer. The other ends of the hangers are connected to staples inserted in the building ceiling or frame members. The hangers can be connected to the stringer at appropriate locations adjacent building rafters by piercing the duct adjacent the rafters to enable connection of the hangers with the stringer.

The ventilating apparatus of the invention also includes a rigid duct which projects through and is supported by an opening in a building wall to form an exterior air inlet. A fan is supported within the duct at a point remote from the exterior air inlet. Ports are provided in opposed duct walls upstream of the fan for recirculating inside air. Air flow into the ports is controlled by a pair of damper plates having adjoining ends pivoted to a common axis. A motor and linkage assembly controls the position of both damper plates to close the duct if desired and prevent intake of outside air and inside air.

Further objects and advantages of the present invention will become apparent from the following disclosure.

DRAWINGS

FIG. 1 is a side elevational view in fragmentary section of ventilating apparatus in accordance with the invention.

FIG. 2 is an enlarged fragmentary plan view of the apparatus shown in FIG. 1.

FIG. 3 is an enlarged fragmentary view of the stringer and a hanger for supporting the flexible duct.

DETAILED DESCRIPTION

FIG. 1 shows ventilating apparatus **10** which includes a fan **12** mounted within a fan housing **14** which is connected to a rigid duct **16** which extends through an aperture **18** in an outside building wall **19** to provide a fresh air or outside air inlet **20** which has a filter **21**. The ventilating apparatus **10** includes a flexible tube or duct **18** of synthetic resin which has an open end **23** clamped to a cylindrical portion **22** of the fan housing by a clamp or band **24**. A plurality of outlet ports **25** are arranged along the tube.

To support the flexible duct, the invention provides a wire stringer **26** which is located inside the tube **18** and extends substantially the length of the tube with one end **27** of the stringer **26** connected at **28** to the fan housing and the other end extending through an opening **30** in the tube **18** adjacent the closed tube end **31** for connection to an eye bolt **32** which is secured to a building frame member **34**. Hangers **36** are employed for supporting the tube **18** at intervals along its length. The hangers **36** (FIG. 3) can be in the form of double hooks or S-hooks and are easily connected to the stringer **26** during installation. For example the tube **18** may be pierced adjacent rafters or joists to from openings **37** for inserting the hook to connect the lower hooks **39** with the stringer **26**. However the thinness and flexibility of the resin film from which tube **18** is constructed makes it possible to engage the hook with the stringer without piercing the tube. The upper hooks **41** of the hangers **36** connect with staples **38** anchored to building frame members **34**.

The ventilating apparatus of the invention also includes side air entry ports **40** and **42** in opposed side walls **44** and **46** of the rigid duct **16** for admitting inside air for recirculation and mixing with outside air. The ducts **40** and **42** can be provided with removable panels **45** for access. The panels extend at an oblique angle from the duct side walls **44** and **46** to form converging interior air inlet ports **40** and **42**. Flanges **47** on the panels **45** and flanges **49** on the side walls **44**, **46** support filters **51**.

To prevent entry of outside air and to provide a range of mixtures of outside air with inside air the ventilating apparatus **10** includes a pair of damper plates **54** and **56** which have adjacent ends pivoted to a rod **58**. Means are provided for simultaneously controlling the position of both damper plates **54** and **56**. As disclosed, the means includes a motor **59** which can be thermostatically controlled and which has an output shaft **60** connected to a crank **62**. The crank **62** is connected to a link **64** which is fixed to a bracket **66**. The bracket has apertures **68** which receive the ends of links **70** and **72** which have opposite ends pivotally connected to tabs **74** and **76** on the damper plates **54** and **56**. The range of positions of the damper plates is shown by the broken lines in FIG. 2. When the damper plates are in the full line position shown in FIG. 2, the side entry ports **40**, **42** are completely open and the outside air passage **77** is closed. When the damper plates are moved to the position shown by the broken lines **78** and **80**, the outside air is mixed with inside air. When the damper plates are in the position shown by the broken lines **84** and **86**, the outside air passage **77** remains closed and the intake of inside air is partially restricted.

What is claimed is:

1. Ventilating apparatus for a building comprising an elongated flexible duct with an inside surface, a stringer extending longitudinally and interiorly of said duct for contacting and continuously supporting the inside surface of said duct, said stringer having ends connected to supports, hangers connected to said stringer, and means for securing said hangers to a support.

2. Apparatus in accordance with claim 1 wherein said stringer is a wire.

3. Ventilating apparatus for a building comprising an elongated flexible duct, a stringer extending longitu-

dinally and interiorly of said duct for supporting said duct, said stringer having ends connected to supports, hangers connected to said stringer, said hangers having upper and lower hooks with said lower hooks connected to said stringer and means for securing said hangers to a support comprising staples fastened to building frame members and connected to said upper hooks.

4. Apparatus in accordance with claim 2 wherein one of said supports comprises a rigid duct connected to said flexible duct and to which said stringer is connected.

5. Ventilating apparatus for a building comprising an elongated flexible duct, a stringer extending longitudinally and interiorly of said duct for supporting said duct, said stringer having ends connected to supports, hangers connected to said stringer, means for securing said hangers to a support and wherein said stringer extends through an opening adjacent a closed end of said duct, and an eye bolt is connected to said stringer and anchored in a building frame member.

6. Ventilating apparatus for a building including a rigid duct portion having one end adapted to extend through an exterior wall and to form an exterior fresh air inlet and another end located remote from the building wall, said duct including opposed side walls, opposed openings in said side walls, panels supported on said side walls and extending at an oblique angle from said side walls, flanges extending from said side walls and connected with said panels to form inwardly converging interior air entry ports intermediate the ends of said duct, a ported flexible duct portion connected to the rigid duct portion on the said end remote from said wall, and damper means in said duct and movable with respect to said side entry ports to control air entry through said side entry ports, means for remotely controlling said damper means to provide a range of mixture of exterior and interior air, and a fan located in said rigid duct downstream of said side air entry ports.

7. Ventilating apparatus for a building including a rigid duct portion having one end adapted to extend through an exterior wall and to form an exterior fresh air inlet and another end located remote from the building wall, said duct including opposed side walls having interior air entry ports intermediate the ends of said duct, a ported flexible duct portion connected to the rigid duct portion on the said end remote from said wall, and damper means in said duct and movable with respect to said side entry ports to control air entry through said side entry ports, means for remotely controlling said damper means to provide a range of mixture of exterior and interior air, and a fan located in said rigid duct downstream of said side air entry ports and wherein said damper means includes a pair of damper plates having apertured tabs on adjacent surfaces, said damper plates having ends pivoted about a common axis within said duct, and means connected to said damper plates intermediate their ends for moving said damper plates through a range of positions.

8. Ventilating apparatus for a building including a rigid duct portion having one end adapted to extend through an exterior wall and to form an exterior fresh air inlet and another end located remote from the building wall, said duct including opposed side walls having interior air entry ports intermediate the ends of said duct, a ported flexible duct portion connected to the rigid duct portion on the said end remote from said wall, and damper plates in said duct having apertured tabs and movable with respect to said side entry ports to control air entry through said side entry ports, means for remotely controlling said damper plates to provide a range of mixture of exterior and interior air, and a fan located in said rigid duct downstream of said side entry ports and wherein said means for remotely controlling said damper plates comprises a motor having a crank, a link leaving one end connected to a bracket, and second and third links each having one end connected to said bracket and an other end being connected to one of said apertured tabs on said damper plates.

9. Apparatus in accordance with claim 7 including a stringer having one end connected to said rigid duct and the other end extending through said flexible duct portion to an opening therefrom and connected to a support.

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Disclaimer

3,691,928.—*Vernon R. Berg, Sr.*, and *Vernon R. Berg, Jr.*, Marshfield, Wis. BARN VENTILATOR. Patent dated Sept. 19, 1972. Disclaimer filed Sept. 28, 1973, by the inventors.

Hereby enter this disclaimer to claims 1, 2 and 5 of said patent.

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