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VENTILATING FAN UNIT

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FIG. 1

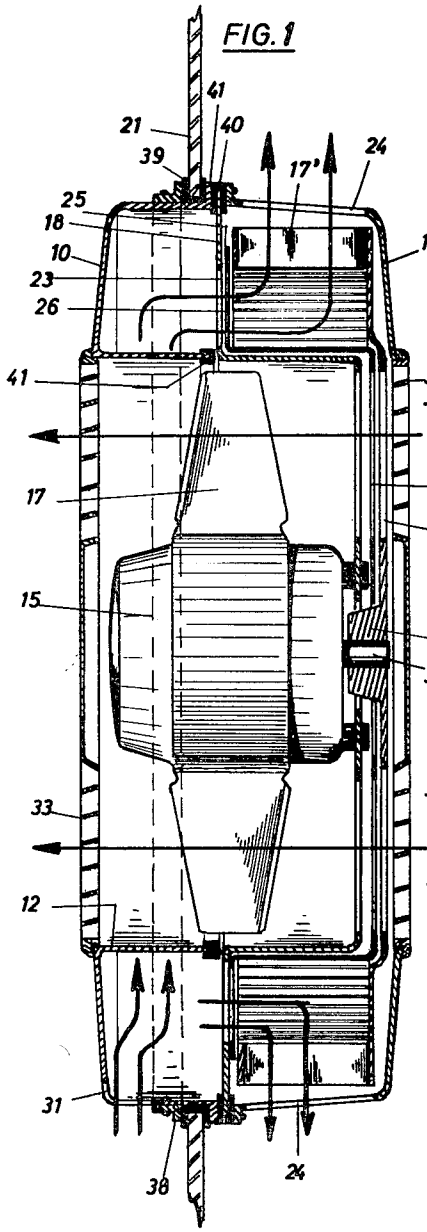
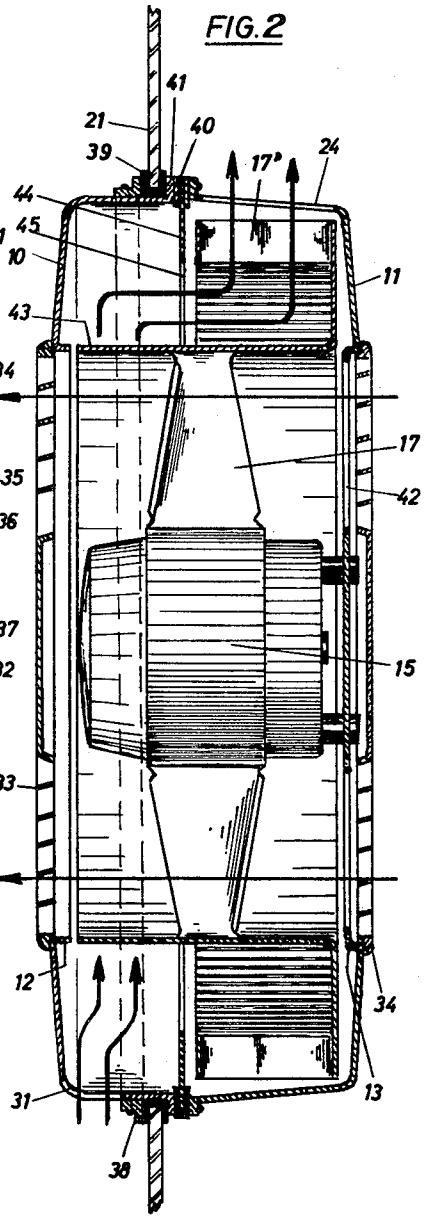


FIG. 2



INVENTORS
LUDWIG BAUMANN +
BENNO SCHÜTZE
By
Lowry & Rinehart
ATTYS.

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VENTILATING FAN UNIT

Ludwig Baumann, Niederhelfenschil, St. Gall, Switzerland, and Benno Schutze, Frankfurt am Main, Germany; said Schutze assignor to said Baumann

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Claims priority, application Switzerland, Jan. 6, 1966, 274/66; Nov. 30, 1966, 17,170/66
Int. Cl. F24f 9/00; F04d 25/12
U.S. Cl. 98—33 10 Claims

ABSTRACT OF THE DISCLOSURE

This disclosure provides a ventilating fan unit insertable into an opening of a building. The fan unit includes a housing having a shell portion located on the inside of the building and a shell portion located on the outside of the building. Each of the shell portions has peripherally and axially located openings to provide means for air inlet and air outlet. The separating means is located within the said housing to form a first passageway along the periphery thereof and a second air passageway axially of the fan unit. A drive means is mounted within the housing to operate a radial fan member within the first passageway and an axial fan member within the second air passageway. Means are provided to direct the air flow through the passageways of the fan unit.

BACKGROUND OF THE INVENTION

This is a divisional application of copending application Ser. No. 607,269 filed Jan. 4, 1967, now Patent No. 3,421,428, issued Jan. 4, 1969.

The ventilating fan unit proposed by the present invention is distinguished from known devices of the specified kind by its simplicity of construction, its higher performance and the compactness of its design, characteristics which permit the proposed ventilating fan unit to be used where known forms of construction would not be applicable because of their unavoidable bulk and complicated construction.

SUMMARY OF THE INVENTION

The ventilating fan unit proposed by the present invention comprises two half shells covering the outside and inside respectively of said opening and bearing against opposite sides of the edges thereof, each half shell being preferably provided in its interior with parting webs extending substantially through the full depth of one of the half shells. A centrally located cylindrical section may be either mounted on an axial fan or within the fan housing to form an axial passageway from the axial opening at one of the half shells to the axial opening of the other half shell. The movement of the fan member within the centrally located axial passageway causes air movement to occur therethrough. A second passageway is formed between the housing and the outer surface of the cylindrical section mounted within the housing. A radial fan member is mounted to either rotate separately from the fixedly mounted cylindrical portion or to be mounted directly on the rotating cylindrical portion to effect air movement through the peripheral passageway of the fan unit. The air flow through the fan unit thereby is effectively carried through separate paths existing in the axial passageway and the peripheral passageway of the fan unit.

BRIEF DESCRIPTION OF DRAWINGS

Other features of the invention will be understood as the following particular description of embodiments of the invention shown in the accompanying drawings proceeds.

Several embodiments of the invention will now be described by way of example and with reference to the accompanying drawings, in which:

FIG. 1 is a longitudinal section of another embodiment of the proposed ventilating fan unit comprising a central through-duct containing an axial flow fan and a radial flow fan working in a separate passage, and

FIG. 2 is a longitudinal section of a modification of the ventilating fan unit according to FIG. 1 in which the axial flow fan and the radial flow fan likewise work in separate air streams, but in which the two fans form a structural unit.

DESCRIPTION OF SPECIFIC EMBODIMENTS

More specifically, the embodiment of FIG. 1 includes two half shells **10** and **11** which form the housing contain a fan motor **15** directly or indirectly affixed to one of the half shells. The motor carries firstly an axial flow fan **17** in a central duct through the fan housing and secondly a separately revolving radial flow fan **17'** for generating an air stream contrary in direction through the housing to that generated by the axial flow fan. The radial flow fan **17'** is wholly contained in the half shell **11** which is on the inside of the window and operates in direct proximity with the periphery of this half shell and of the peripheral air outlets **24**.

The recess **12** formed in the half shell **10** on the outside of the window pane **21** may be arranged to extend through to the inside of the window pane **21** into the interior of the half shell on the inside of the window pane **21**, the motor **15** being affixed to the floor of this recess, said floor being perforated where it crosses the central duct.

However, in the embodiment illustrated in FIG. 1 the cylindrical recess **12** onf the half shell **10** located on the outside of the window pane **21** terminates within the opening in the window pane and lacks a floor but it is extended inwardly by a likewise cylindrical flanged insertion **18** with a perforated floor carrying the motor **15** in the interior of the other half shell **11** on the inside of the window pane. The flange of the insertion **18** is provided with openings or windows **23** and extends radially outwardly from the end of the cylindrical part of the insertion. The peripheral edge of this flange extends into the region where the two half shells **10** and **11** are affixed and is clamped at this point.

In order to prevent draughts through the fan housing when the motor is stationary a further cylindrical insertion **25** with a flange is provided (cf. FIG. 1). This additional insertion **25** is rotatable and embraces the cylindrical portion of the insertion **18**, its flange being provided with opening **26** and its floor with openings **35**. By rotation of this further insertion **25** both the central duct for the axial flow fan **17** and the chamber containing the radial flow fan **17'** can thus be simultaneously opened and closed. The butt joint between the cylindrical recess **12** of the outside half shell **10** and the cylindrical flanged insertion **18** may be sealed by the provision of a sealing ring **41**.

In the embodiment of the fan unit illustrated in FIG. 2 the cylindrical recesses **12** and **13** of the two half shells **10** and **11** are very shallow and their respective floors are absent or partly cut away. In axial alignment with these recesses the axial flow fan **17** carries a shroud **43** which extends into close proximity with the inner ends of the two recesses and thus forms a central duct for the air propelled by the axial flow fan.

The outside periphery of the shroud **43** concentrically carries a radial flow fan directly inside the air outlets **24** in the inside half shell **11**, the shroud itself being firmly

affixed to the tips of the blades of the axial flow fan **17**.

In these specific embodiments, the proposed ventilating fan includes recessed cavities **12** and **13** in the two half shells **10** and **11** which have different depths. The floors where existing in these embodiments are partially or completely open.

It will be readily understood from FIGS. 1 and 2 that the described fan unit can be easily mounted in the window pane **21**. This can be done by inserting the completely assembled fan housing comprising the two half shells **10** and **11**, ready for use, into an appropriately cut out circular hole in the window pane **21** until the joint between the two shell halves **10** and **11** abuts the edge of the hole. In this position the entire unit is then located by a retaining girth ring **38** pushed from the outside over the half shell that has been passed through the hole. This retaining ring is secured to abut the outside of the window pane **21**.

The construction of the proposed ventilating fan unit permits of another useful modification which consists in that only one of the two chambers or ducts for carrying air in opposite directions actually contains axial or radial flow fan blading. In such a case the stream of air propelled in one direction will automatically induce a current of air to flow in the other direction either by the displacement of air from the ventilated interior or by the creation of a vacuum pressure therein.

While the ventilating fan unit has been shown and described in detail, it is obvious that this invention is not to be considered as being limited to the exact form disclosed, and that changes in detail and construction may be made therein within the scope of the invention, without departing from the spirit thereof.

We claim:

1. A ventilating fan unit insertable into an opening of a building comprising:

(a) means mounting a housing within said building opening,

(b) said housing having a shell portion located on the inside of the building and a shell portion located on the outside of the building,

(c) each said shell portion having peripherally and axially located openings to provide means for air inlet and air outlet,

(d) separating means located within said housing to form a first air passageway along the periphery thereof and a second air passageway axially of said fan unit,

(e) means mounting a drive means within said housing to operate a radial fan member within said first air passageway and an axial fan member within said second air passageway.

2. A fan unit as defined in claim **1** wherein:

said separating means includes a cylindrical portion having at least one cylindrical section substantially surrounding the area located between the axially located openings in each said shell portion.

3. A fan unit as defined in claim **2** wherein:

said cylindrical section is fixedly mounted to said axial fan member and rotates around the said second air passageway.

4. A fan unit as defined in claim **3** wherein:

said radial fan member is fixedly mounted on said rotatable cylindrical section to effect a flow of air through said first air passageway.

5. A fan unit as defined in claim **4** wherein:

said drive means includes a fixedly mounted motor having its axis located substantially coextensively with the axis of said fan unit, and

said fan members rotate around said motor.

6. A fan unit as defined in claim **5** wherein:

said fan unit includes an annular flange member fixedly mounted between said shell portions and located within said first passageway,

said annular flange member having openings to establish a path of movement for the air flow from the peripheral openings of one said shell portion to the peripheral openings of the other said shell portion.

7. A fan unit as defined in claim **2** wherein:

said cylindrical portion is fixedly mounted to the inside of said housing,

said drive means includes a fixedly mounted motor having its axis located substantially coextensively with the axis of said fan unit,

said axial fan member is rotatably mounted on said motor within said cylindrical portion, and

said radial fan member is rotatably mounted on said motor outside said cylindrical portion within said first passageway.

8. A fan unit as defined in claim **7** wherein:

said fan unit includes an annular flange member fixedly mounted between said shell portions and located within said first passageway,

said annular flange member having openings to establish a path of movement for the air flow from the peripheral openings of one said shell portion to the peripheral openings of the other said shell portion.

9. A fan unit as defined in claim **8** wherein:

said cylindrical portion includes a floor member extending across said second air passageway,

said floor member including openings to establish the air flow around said motor between said axially located openings of said shell portions,

said motor being fixedly attached to said floor member.

10. A fan unit as defined in claim **9** wherein:

said fan unit includes means movably mounted within said housing to stop the movement of air flow through said flange member openings and said floor member openings as desired.

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WILLIAM E. WAYNER, Primary Examiner

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