United States Patent [19]

Weber et al.

[11] **3,830,147**

[45] **Aug. 20, 1974**

[54] **VENTILATING UNIT**

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[22] Filed: **Mar. 30, 1973**

[21] Appl. No.: **346,281**

[52] **U.S. Cl.** ..... **98/99 R,** 98/99.7, 251/298

[51] **Int. Cl.** **F25f 17/02**

[58] **Field of Search** 98/88, 97–99, 98/99.1–99.8; 251/298, 299

[56] **References Cited**

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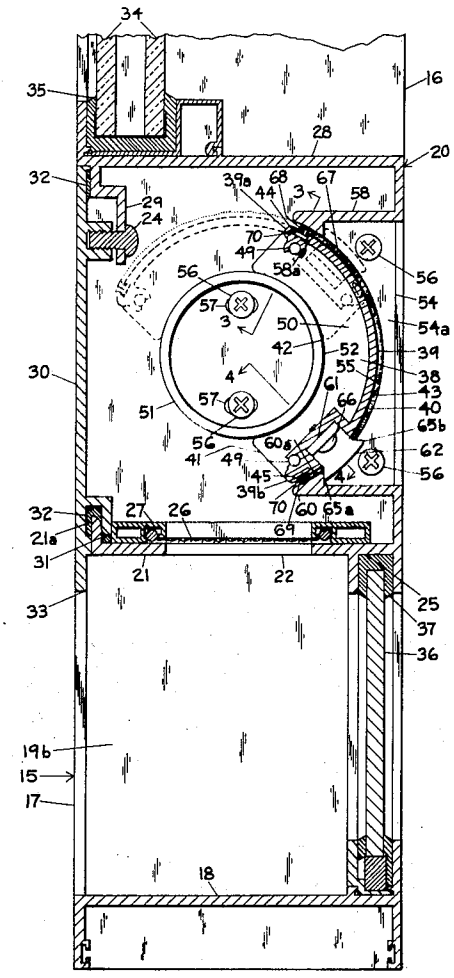
[57] **ABSTRACT**

A ventilating unit within a window frame. The ventilating unit has a base panel and a top panel which extend transversely between the frame end jambs in spaced relation. A vertical exterior closure plate extends from the top panel downwardly to a level below the base panel and engages the two panels to close the exterior side of the unit. The base panel has a fresh air intake opening which communicates with an inner ventilating opening between the base panel and top panel to permit air exchange from one side of the frame to the other through the openings. An arcuate panel is slidably mounted in opposed arcuate raceways to selectively open and close the inner ventilating opening.

10 Claims, 4 Drawing Figures



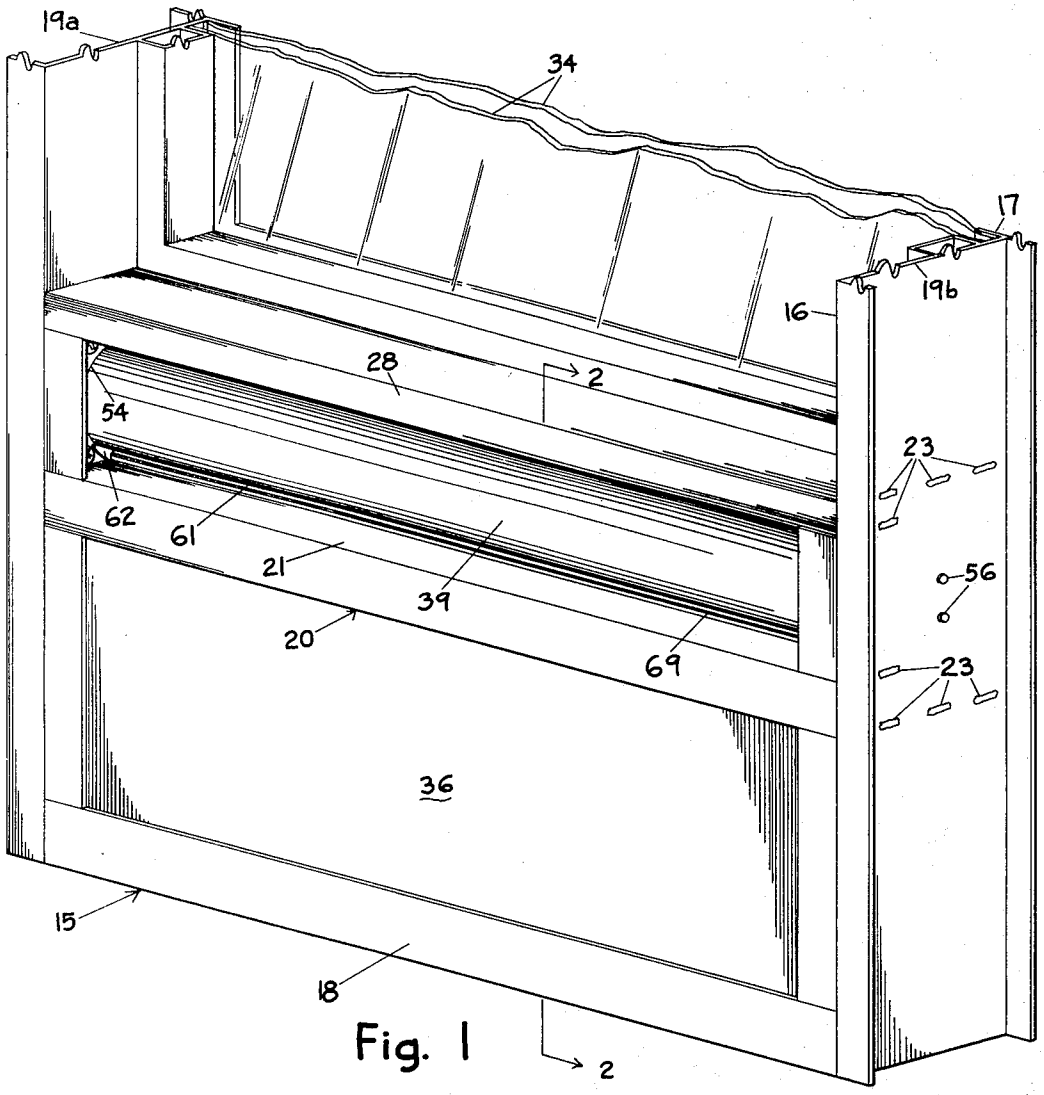


Fig. 1

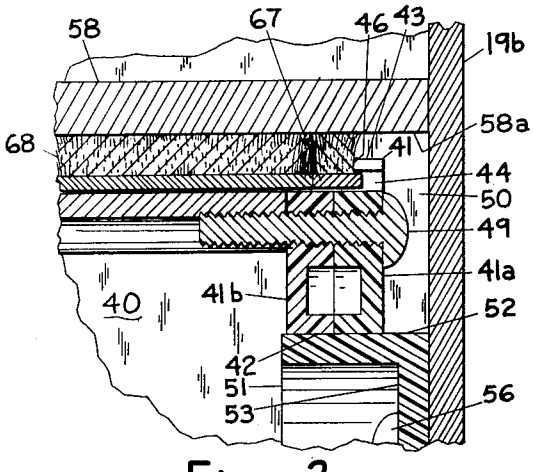


Fig. 3

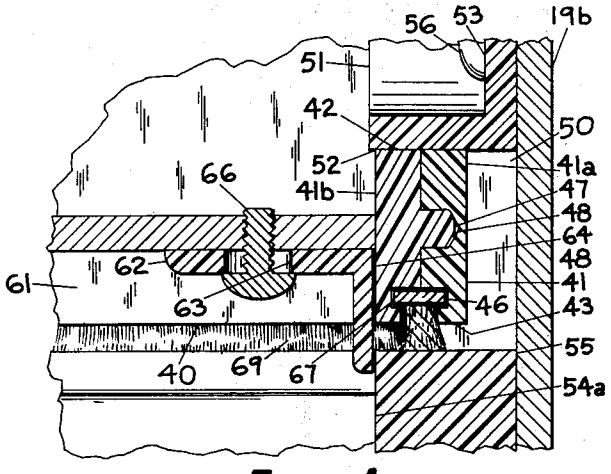


Fig. 4

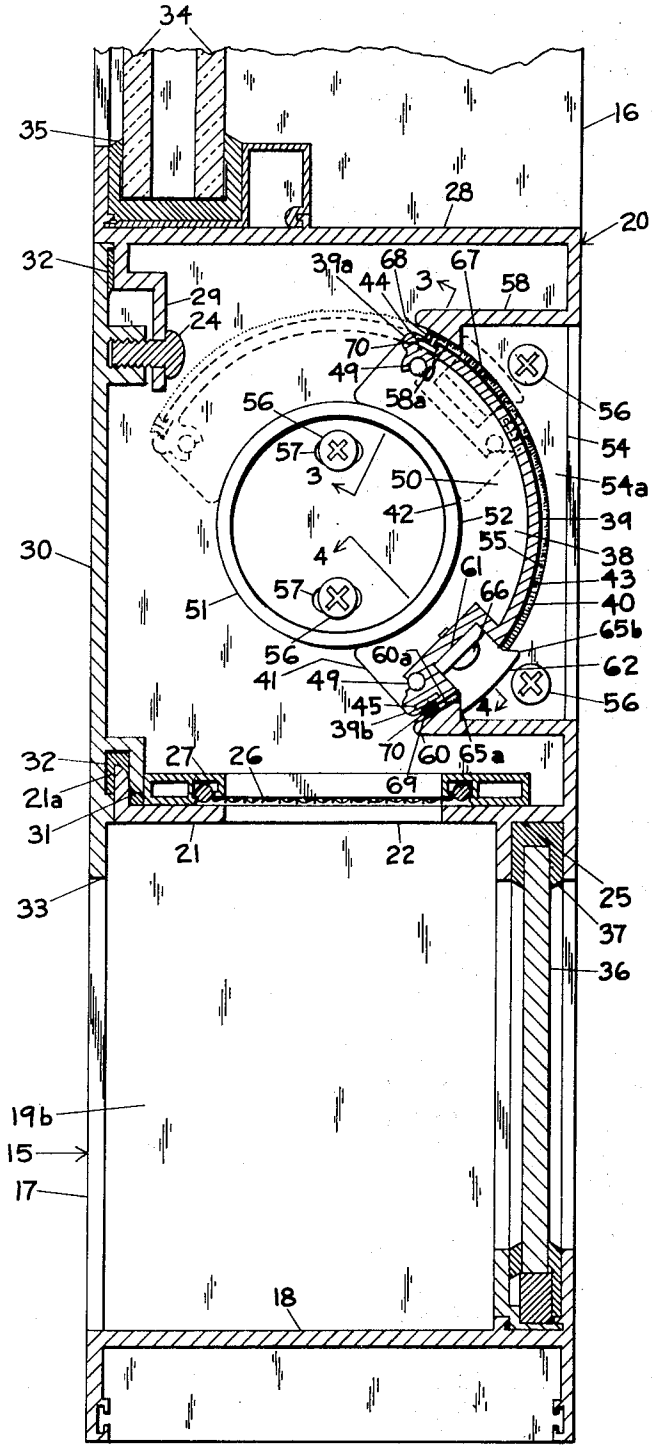

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Fig. 2

VENTILATING UNIT

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to window ventilator units, and more particularly to ventilator units installed within the margins of a window frame.

2. Description of the Prior Art

The use of ventilators in combination with operable windows has been common. One ventilator commonly used with standard double-hung windows is the hopper-type ventilator which projects from the bottom of the window frame into the building interior. Such units do not generally meet modern esthetic requirements, and the inwardly projecting components present both a safety hazard and an undesirable interference with the operation of draperies and other window accessories.

Another ventilator design employs spaced, parallel overlapping window sashes located entirely within the window frame. Such an arrangement is more suited to modern window design, but problems have been experienced in providing suitable closure mechanisms for controlling or preventing air flow through such ventilator windows. Various swinging and hinged closure arrangements have been employed in an attempt to provide a closure which is simple and convenient to operate, and which will maintain an effective air seal under conditions of both positive and negative exterior air pressure. Generally, it has been found that such swinging or hinged closures require a locking mechanism of some kind to maintain an effective air seal under all such conditions. Such locking mechanisms generally complicate the operation of the ventilator and require special attention to insure that the closure is properly sealed. In addition, locking mechanisms increase costs and usually involve moving parts which may provide maintainence and replacement problems.

SUMMARY OF THE INVENTION

Our ventilating unit provides a slidable arcuate panel for controlling or preventing air flow through the unit. The arcuate panel extends for substantially the full width of the window frame in which the ventilator is located. The ends of the panel are slidably mounted in opposed arcuate raceways. The width of each raceway is adjustable to facilitate assembly and adjustment during the life of the window. The arcuate panel is slidable between a lower position wherein it closes an inner ventilating opening on the interior side of the unit, and an upper position wherein the inner ventilating opening is open to permit air exchange from one side of the window frame to the other. The arcuate panel remains within the ventilating unit in all positions, without requiring any substantial head space within the unit above the inner ventilating opening.

A pile-type weatherstrip around the arcuate panel engages the margins of the inner ventilating opening to provide a continuous air seal when the arcuate panel is in its closed position. The weatherstrip also provides a frictional fit between the arcuate panel and adjacent raceway and sealing surfaces. The width of each raceway is adjustable to provide the amount of friction desired to maintain the panel in any desired position without requiring additional locking mechanisms.

It is a primary object of our invention to provide a ventilating unit within a window frame having a closure panel which effectively controls air flow through the unit, is simple and convenient to operate, and requires no separate locking mechanism. It is a further object of our invention to provide a ventilating unit within a window frame which employs a sliding closure panel and requires a minimum amount of head space above the inner ventilating opening. Other objects and advantages of our invention will be readily apparent from the following detailed description taken in conjunction with the accompanying drawings wherein a preferred embodiment of the invention has been selected for exemplification.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a ventilating unit exemplifying my invention, showing the ventilating unit installed in a window frame which is only partially shown.

FIG. 2 is a section view taken along line 2—2 in FIG. 1.

FIG. 3 is a partial section view taken along line 3—3 in FIG. 2.

FIG. 4 is a partial section view taken along line 4—4 in FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring more particularly to the drawings, wherein like numerals refer to like parts throughout the several views, FIG. 1 illustrates my ventilating unit, shown generally at **20**, installed in a conventional extruded aluminum window frame **15**, having an interior side **16**, an exterior side **17**, a lower sill **18**, opposed end jambs **19***a* and **19***b* which are only partially shown in the drawings, and an upper head member (not shown).

My ventilating unit **20** includes an extruded aluminum base panel **21** which extends transversely between the opposed end jambs **19***a* and **19***b* of the window frame **15** a desired distance above the lower sill **18**. The base panel **21** has a fresh air intake opening **22** to provide for the passage of ventilating air through the base panel. The fresh air opening **22** may be a single opening, or may be formed by a plurality of perforations. If desired, an insect screen **26** mounted in removable frame **27** may be removably positioned on the base panel over the fresh air intake opening **22** to prevent insects from entering the ventilating unit.

A top panel **28** also extends transversely between the opposed end jambs **19***a* and **19***b* of the window frame **15** to provide the top of the ventilating unit **20**. The base panel **21** and top panel **28** are preferably secured to the end jambs **19***a* and **19***b* by conventional mortice and tenon construction. FIG. 1 shows the peened ends **23** of the base panel and top panel tenons protruding from the mortices in the end jamb **19***b*. An exterior closure plate **30** extends transversely between the opposed end jambs **19***a* and **19***b* and is vertically mounted on the base panel **21** and top panel **28**. In the preferred embodiment, the exterior closure plate **30** is secured to the end flange **21***a* of the base panel **21** by means of locking flange **31** extending from the inner surface of the plate. The upper end of the plate **30** is secured to the top panel **28** by means of a plurality of mounting screws **24** which extend through mounting flange **29** depending from the top panel **28** to threadedly engage

the closure plate. Caulking **32** is provided all around the closure plate **30** in a conventional manner to seal the inside of the ventilating unit **20** from moisture. In addition, the lower end **33** of the closure plate terminates at a level below that of the base panel fresh air intake **22** so that the closure plate **30** functions as a rain screen to permit ventilation during inclement weather.

Typically, our ventilator unit **20** is mounted within the window frame **15** with glass closing the opening within the frame above the ventilator unit, and with glass or an opaque panel closing the opening defined by the frame below the ventilating unit. In the illustrated embodiment, a double glass panel **34** is mounted in the frame **15** above the top panel **28** in a conventional manner, with caulking **35** to provide an air and moisture seal. An opaque aluminum panel **36** is mounted between the base panel **21** and the lower sill **18** of the window frame **15** near the interior side **16** of the window frame **15.** The base panel **21** has a glazing channel **25** which receives the panel **36** and caulking **37** in a conventional manner to complete the weather-tight seal between our ventilating unit **20** and the window frame **15.**

The parallel, spaced base panel **21** and top panel **28** define an inner ventilating opening represented generally by reference number **38,** in the ventilating unit **20,** as viewed from the interior side **16** of the window frame **15.** An arcuate panel **39** is slidably mounted within the ventilating unit **20** to permit the inner ventilating opening **38** to be selectively opened or closed as desired. As best shown in FIG. **2,** the preferred arcuate panel **39** includes an extruded metal panel **40** which extends for substantially the width of the inner ventilating opening **38,** and an arcuate end race **41** attached to each end of the metal panel **40** by means of attachment screws **49.** The end race **41** has a concave inner face **42,** and a convex outer face **43** which is substantially continuous with the convex surface of the arcuate metal panel **40.** The metal panel **40** and the end races **41** have a continuous weatherstrip channel **44** which extends for substantially the entire length of the arcuate panel **39** near its upper edge **39***a*, and a continuous lower weatherstrip channel **45** which runs for substantially the entire length of the arcuate panel **39** near its lower edge **39***b*. As best shown in FIGS. **3** and **4,** each end race **41** also has a weatherstrip channel **46** which extends the length of the end race convex outer face **43** and intersects the upper weatherstrip channel **44,** as shown in FIG. **3,** and the lower weatherstrip channel **45.** The end race **41** is preferably formed of molded nylon, and is of two-piece construction as best shown in FIGS. **3** and **4.** The two pieces **41***a* and **41***b* of end race **41** have mating dowels and sockets **47** and **48,** respectively, to insure proper alignment of the parts. As seen in FIG. **3,** the mating parts are held together to form the end race **41** by means of the attachment screws **49** which fasten the end race to the arcuate panel metal **40.**

The end race **41** of the arcuate panel **39** is slidably engaged within an adjustable raceway means indicated generally at **50** which extends between and is defined by a jamb guide **51** and a jamb filler **54,** which are both preferably formed of molded nylon. The jamb guide **51** has a cylindrical external guide surface **52** which is engaged by the concave inner face **42** of the end race **41** in slidable relation. The radius of curvature of the jamb guide cylindrical guide surface **52** is substantially equal to the end race concave inner face **42.** The jamb filler **54** has a concave guide surface **55** which is slidably engaged by the pile-type weatherstrip **67** carried within the end race weatherstrip channel **46** in slidable, substantially air-tight relation, as described in more detail below. The pile-type weatherstrip **67** has wool or synthetic pile which slidably engages the facing surface to provide the desired air seal between the adjacent surfaces.

The jamb guides and jamb fillers are mounted on the opposed end jambs **19***a* and **19***b* in opposed relation to define opposed arcuate raceways **50** as previously described. Each jamb guide **51** and jamb filler **54** is secured to its associated end jamb **19***a* or **19***b* as the case may be by mounting screws **56** as best shown in FIG. **2.** The cylindrical jamb guide **51** has a mounting end **53** which is preferably closed except for two horizontal mounting slots **57.** The mounting slots **57** permit the jamb guide **51** to be adjusted horizontally to provide a means for adjusting the width of the arcuate raceway **50** to insure that the arcuate panel **39** is slidable in the raceway **50** in the desired manner. Generally, the jamb guide **51** will be mounted so that the space between the end race convex outer face **43** and the jamb filler concave guide surface **55** is slightly less than the normal protrusion of the weatherstrip **67** beyond the end race convex outer face **43,** so that the weatherstrip fits snugly against the jamb filler concave guide surface **55.** In that desired position, the weatherstrip **67** will maintain a substantially air-tight seal between the facing surfaces, and will also provide sufficient friction to maintain the arcuate panel in any position from fully closed to fully open, as desired. In the event the weatherstrip **67** becomes worn or matted after extensive use, the jamb guide **51** can be readjusted to maintain the desired frictional air-tight fit.

When the arcuate panel **39** is in its closed position as illustrated in solid lines in FIG. **2,** the weatherstrip **68** carried in the arcuate panel upper weatherstrip channel **44** is engaged against the upper sealing surface **58***a* carried by the top panel upper sealing flange **58.** The weatherstrip **69** in the lower weatherstrip channel **45** is engaged against the lower sealing surface **60***a* carried by the base panel lower sealing flange **60.** The upper and lower weatherstrips **68** and **69** are substantially the same as the end race weatherstrip **67,** except that the upper and lower weatherstrips include a flexible plastic vane **70** which extends longitudinally through the pile of the weatherstrip to provide an impervious seal between the arcuate panel **39** and the upper and lower sealing surfaces **58***a* and **60***a*. The upper and lower sealing surfaces **58***a* and **60***a* extend transversely between the opposed end jambs **19***a* and **19***b* of the window frame and define the upper and lower margins, respectively, of the inner ventilating opening **38.** The ends of the upper and lower sealing surfaces **58***a* and **60***a* are substantially continuous with the concave inner faces **42** of the opposed end races **41.** Accordingly, the upper and lower sealing surfaces **58***a* and **60***a*, and the concave inner faces **42** of the opposed end races **41** together present a substantially continuous sealing surface against which the weatherstripping all around the arcuate panel **39** bears to provide a continuous air-tight seal between the slidable arcuate panel and the margins defining the inner ventilating opening **38.**

A channel **61** extends the full width of the extruded metal panel **40** which comprises the major portion of

the arcuate panel **39**. The channel **61** provides a finger-hold for moving the panel **39** between its upper and lower positions. A limit stop **62** is secured within the channel **61** at each end of the metal panel **40** by means of adjustment screws **66**, as best shown in FIGS. **2** and **4**. The limit stop **62** has a mounting slot **63** through which the adjustment screw **66** extends to threadedly engage the metal panel **40**. The limit stop **62** is secured to the panel **40** so that the outside end **64** of the limit stop is in abutment with the inwardly facing vertical surface **54***a* of the jamb filler **54**. As these limit stops **62** at each end of the finger-hold channel **61** are so positioned, the arcuate panel **39** is prevented from moving end-wise within the ventilator unit **20**, and clearance is maintained between the end races **41** which form the ends of the arcuate panel **39** and the opposed end jambs **19***a* and **19***b* of the window frame **15**.

The limit stops **62** also limit the arcuate sliding movement of the arcuate panel **39** within the raceway **50** to define the upper and lower limits of its travel. The limit stops **62** each have a lower shoulder **65***a* which extends outwardly beyond the arcuate panel **39** to engage the near edge of the lower sealing flange **60** when the arcuate panel **39** reaches its lower closed position as best illustrated in FIG. **2**. In the lower closed position illustrated, the weatherstrips **68** and **69** in the upper and lower weatherstrip channels **44** and **45** are respectively engaged against the upper and lower sealing surfaces **58***a* and **60***a*. The dotted lines of FIG. **2** in dicate the upper open position of the arcuate panel **39** wherein the limit stop upper shoulder **65***a* is in engagement with the near edge of the upper sealing flange **58** to prevent further upward movement of the arcuate panel **39**.

In use, the arcuate panel **39** of our ventilating unit **20** may be placed in the lower closed position illustrated in FIGS. **1** and **2** to prevent the ingress and egress of air to and from the interior of the building in which the sindow frame **15** is mounted. The pile-type weatherstrip maintains a positive seal against both negative and positive air pressures within the building. Since the sliding movement of the arcuate panel **39** is substantially crosswise to the direction of air flow through the inner ventilating opening **38**, positive and negative air pressures have no tendency to raise the panel from its lower closed position.

If the occupant desires ventilation, he simply grasps the finger-hold channel **61** and slides the arcuate panel **39** upwardly a sufficient distance to provide the desired amount of ventilation. Ventilating air may then pass through the fresh air intake opening **22** and insect screen **26** into the interior of the ventilating unit **20**, and then through the inner ventilating opening **38** into the interior of the building. If the building is subject to positive interior pressure the air flow will be in the opposite direction from that described.

The pile-type weatherstrip **67** in the end race weatherstrip channels **46** provides a frictional contact between the arcuate panel **39** and the jamb filler concave guide surfaces **55** to retain the panel in the open position shown in dotted lines in FIG. **2**, or in any desired intermediate position. The limit stop **62** limits the travel of the arcuate panel **39** in either direction by engaging the upper and lower sealing flanges **58** and **60** as previously described.

It should be noted that almost no "head space" is required within our ventilating unit **20** to accommodate the sliding arcuate panel **39** in its open position. The arcuate raceway **50** of our design allows the arcuate panel to slide within the unit in a circular path toward the exterior side of the window frame **15**. Accordingly, the arcuate panel **39** and all other moving parts of our ventilating unit **20** are enclosed entirely within the confines of the ventilating unit, and within the normal dimensions of the window frame **15** within which the ventilating unit is installed.

It is understood that our invention is not confined to the particular construction and arrangement of parts herein illustrated and described, but embraces all such modified forms thereof as come within the scope of the following claims.

We claim:

1. A ventilating unit within a window frame having opposed end jambs, an interior side and an exterior side, said ventilating unit comprising,

a. a base panel extending transversely between said opposed end jambs, said base panel having at least one fresh air intake opening,

b. a top panel extending transversely between said opposed end jambs in spaced relation above said base panel to define an inner ventilating opening between said base panel and top panel,

c. an exterior closure plate extending between said opposed end jambs from said top panel to a level below said base panel at the exterior side of said window frame,

d. a pair of opposed jamb guides attached to said opposed end jambs between said base panel and said top panel, said jamb guides each having a convex guide surface,

e. a pair of opposed jamb fillers attached to said opposed end jambs, said jamb fillers each having a concave guide surface radially spaced from a said jamb guide convex guide surface to define a pair of opposed arcuate raceways between said spaced guide surfaces,

f. means for adjusting the width of said opposed arcuate raceways, and

g. an arcuate panel slidably engaged within said opposed arcuate raceways, said arcuate panel having a lower closed position wherein said panel closes said inner ventilating opening and an upper open position wherein said ventilating opening is substantially unrestricted by said arcuate panel to permit ventilating air to pass through said ventilating unit between said fresh air intake opening and said inner ventilating opening.

2. The ventilating unit specified in claim **1** wherein the raceway adjusting means includes at least one horizontally extending mounting slot in each jamb guide, and a mounting screw extending through each said slot and threadedly engaged in each end jamb for tightening said jamb guide against said end jamb a desired distance from the spaced jamb filler.

3. The ventilating unit specified in claim **1** wherein the arcuate panel includes an arcuate end race secured to each end thereof, each said end race having a concave inner face slidably engaged on the convex guide surface of the guide jamb and a convex outer face, said convex outer face supporting a weatherstrip in substantially air-tight slidable frictional engagement with the jamb filler concave guide surface.

4. The ventilating unit specified in claim **1** wherein an inner panel extends between the opposed end jambs from the base panel downwardly at the interior side of

the window frame to close that portion of the frame beneath the ventilating unit, and wherein an outer panel extends between the opposed end jambs from the top panel upwardly at the exterior side of the window frame to close that portion of the frame above the ventilating unit.

5. The ventilating unit specified in claim **1** wherein a weatherstrip extends around the periphery of the convex surface of the arcuate panel to engage the base panel, top panel and jamb fillers in a continuous manner when the arcuate panel is in its lower closed position to provide a substantially air-tight closure of the inner ventilating opening.

6. The ventilating unit specified in claim **5** wherein the base panel and the top panel each have a sealing surface which extends between the opposed end jambs to respectively define the lower and upper margins of the inner ventilating opening, and wherein the ends of the base panel and top panel sealing surfaces respectively are approximately flush with the lower and upper ends of the concave guide surfaces of the opposed jamb fillers whereby the arcuate panel weatherstrip will engage the said sealing surfaces and concave guide surfaces in a continuous, substantially air-tight manner when the arcuate panel is in its lower closed position.

7. The ventilating unit specified in claim **6** wherein the jamb fillers have inwardly facing vertical surfaces which define the ends of the inner ventilating opening, and wherein a limit stop is attached to the arcuate panel, near each end thereof in slidable engagement with the adjacent jamb filler inwardly facing vertical surface to prevent substantial end-to-end movement of said arcuate panel, said limit stop having a lower shoulder which engages the base panel when said arcuate panel reaches its lower closed position to prevent further downward movement thereof, and an upper shoulder which engages the top panel when said arcuate panel reaches its upper open position to prevent further upward movement thereof.

8 A ventilating unit for a window frame having opposed end jambs, an interior side and an exterior side, comprising,

a. a base panel extending transversely between said opposed end jambs, said base panel having at least one fresh air intake opening,

b. a top panel extending transversely between said opposed end jambs in spaced relation above said base panel to define an inner ventilating opening between said base panel and top panel,

c. an exterior closure plate extending between said opposed end jambs from said top panel to a level below said base panel at the exterior side of said window frame,

d. adjustable raceway means attached to said opposed end jambs for providing opposed arcuate raceways of adjustable width within said ventilating unit, and

e. an arcuate panel slideably engaged within said opposed raceways, said arcuate panel having a lower closed position wherein said panel closes said inner ventilating opening and an upper open position within said ventilating unit wherein ventilating air may pass from one side of said window frame to the other through said fresh air intake opening and said inner ventilating opening.

9. The ventilating unit specified in claim **8** wherein each raceway means includes a guide jamb element having a convex guide surface and a jamb filler element having a concave guide surface radially spaced from said convex surface to define the arcuate raceway between said guide surfaces, at least one of said elements being adjustably mounted on said end jamb to permit adjustment of the distance between said guide surfaces.

10. The ventilating unit specified in claim **9** wherein the jamb guide convex guide surface is a cylindrical external surface, and wherein each jamb guide has a closed end with at least one mounting slot for adjustably attaching said jamb guide to the end jamb.

* * * * *