July 10, 1956 S. J. HEIMAN 2,753,787

REVERSIBLE WINDOW FAN

Filed Feb. 9, 1953

FIG. 1

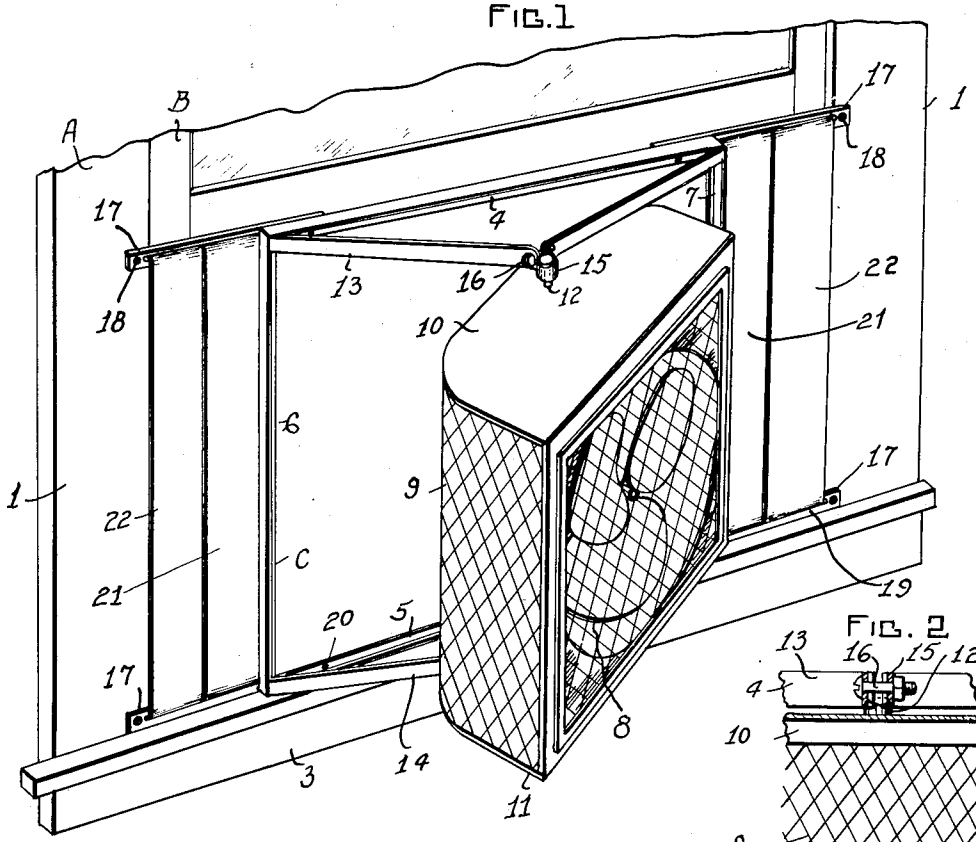


FIG. 2

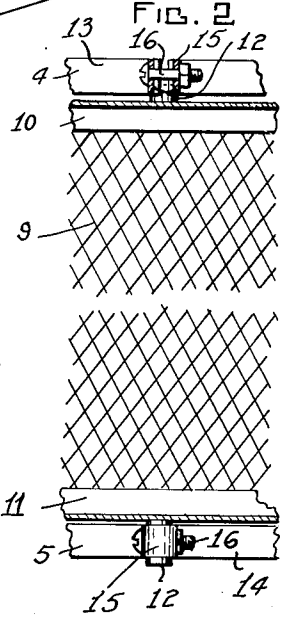


FIG. 3

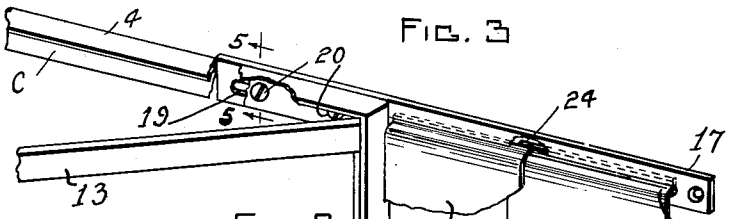


FIG. 6

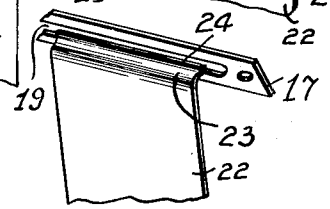


FIG. 5

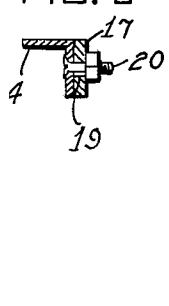


FIG. 4

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United States Patent Office 2,753,787 Patented July 10, 1956

2,753,787

REVERSIBLE WINDOW FAN

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Application February 9, 1953, Serial No. 335,713

6 Claims. (Cl. 98—94)

This invention relates to improvements in ventilating fans of the type especially adapted to move comparatively small volumes of air, as for instance in homes, small offices, etc., and has among its objects the production of such a fan that may be mounted within a window casing, will be neat and compact in construction, economical to make and use, extremely easy to install, and which will be otherwise satisfactory and efficient for use wherever deemed applicable.

One of the principal objects of my invention is to so construct such a fan that it may be mounted in operative position in the window opening, and may be adjusted to exhaust air from the room or to draw air from the outside into said room, to suit the needs and desires of the occupant of the premises.

Another object of the invention is to so construct said device that the fan and motor is encased within a housing to protect persons from injury by contacting the moving fan blades, the entire unit of the fan and motor and said housing being adjustable as a single entity about a vertical axis to have the fan perform either as a suction fan or exhaust fan.

A further object of my invention is to so construct said device that the housing will be frictionally maintained in any position of its adjustment about a full circle, there being trunnions extending vertically from the upper and lower ends of the housing to fit within cooperating engagement with arms carried by the upper and lower ends of a frame secured to the window casing, and with easily adjustable tightening means for adjusting to the desired degree of frictional engagement at said bearings.

An added object of the invention is to so construct said device that it will have a substantially rectangular open frame for securement to the sides of the window casing, preferably to that portion of the casing that is within the room to be ventilated, the width across said frame being less than the horizontal spacing between the sides of said casing, so that there will be a space or opening to one or both sides of said frame, between the latter and the casing.

A still further object of my invention is to provide means to adjustably close said side opening, in a novel and simple way, so as to substantially seal off said opening after the device is installed ready for operation, and to permit unsealing said opening whenever the need therefor arises. This is accomplished by constructing the said frame with upper and lower arms slidably horizontally extensible from and secured to said frame, with horizontally elongated slots in said arms to detachably receive the upper and lower terminal ends respectively, of said side-opening closure means.

Many other objects and advantages of the construction herein shown and described, will be obvious to those skilled in the art to which this invention appertains, and as will be more clearly set forth in the description.

In the drawings, wherein like reference characters represent like or corresponding parts throughout the views,

Figure 1 is a perspective view illustrating the device as mounted in operative position, as seen from inside the room in which it is mounted, showing the fan for blowing air into the room at an angle to the plane of the window;

Figure 2 is fragmentary view of the frame and housing, partly in section, showing the manner of adjusting the frictional engagement between the same;

Figure 3 is a fragmentary perspective view of one corner of the frame member, with portions broken away, to show the curtain plates in adjusted operative position to substantially close off the side opening between that side of the frame and the adjacent side of the casing;

Figure 4 is a fragmentary perspective view, showing the relative positions of the curtain plate and the arm movably carried by the frame, when the said plate is just about to be inserted into or has been removed from the slot through the said arm;

Figure 5 is a cross-sectional detail showing the operating position of the frame and an arm, taken approximately along the line 5—5 of Fig. 3; and

Figure 6 is a fragmentary cross-sectional detail, showing the relationship of the curtain plate and the cooperating arm, in both the tilted and upright positions of the said arm.

Referring more particularly to the drawings, wherein I have illustrated a preferred embodiment of the invention, A is the window casing having the pair of horizontally spaced sides 1—1 and the sill 3 across the lower end. The sash B of the window itself is indicated as being vertically adjustably movable within said casing in the usual manner.

The ventilating device here shown is adapted to be removably mounted for drawing air into or exhausting it from a room, and has a mounting member in the shape of a rectangular open frame composed of the top and bottom elements 4 and 5 respectively, and the upright vertical elements 6 and 7 at the ends of said top and bottom elements to form the substantially continuous or enclosing frame C.

It is to be stressed here that this frame is made to be narrower than most of the window openings into which the frame might be affixed, this being not only for compactness in packaging and storing, and ease in handling, but also minimizing the strength of the material employed in its manufacture.

Thus, there remains an opening to one or both sides of said frame, between it and the adjacent side or sides of the casing, which opening must be closed or sealed in order to secure good operating efficiency for the ventilating unit.

A motor-driven fan 8 is encased within a suitable housing or casing 9 of such a width that it fits neatly between the said opposed sides 6 and 7 of the frame to permit rotational adjustment of the housing through a full circle, on a vertical axis. The top and bottom ends 10, and 11, respectively, of the housing are provided with short axles or trunnions 12 projecting vertically therefrom.

Upper and lower arms 13 and 14 respectively, are fastened at their ends to the upper and lower ends of said frame, to project therefrom at an angle inwardly into the room, somewhat as shown, there being a bight 15 formed intermediate the ends of each of said arms to provide openings to receive the trunnions therethrough and provide bearings for the latter. An adjusting bolt 16 is threaded through each of said bight portions so that the frictional engagement between said bights and trunnions may be adjusted to the degree desired. It might be mentioned that this friction should be made sufficient to enable the housing with its fan to remain at any adjusted rotational position after said adjustment,

regardless of the vibrational movement of the housing in operation.

As previously mentioned, the frame is preferably narrower than the width of the opening of the window, so that it is necessary to seal or close said opening to the side or sides of the frame before operating the fan. In the instant construction, this has been accomplished with a minimum of effort and material, as will now be set out.

To the upper and lower ends of the frame there are adjustably secured arms 17, one such arm extending horizontally outwardly to either side of said frame and adapted to be detachably secured by screws 18 to the casing, as seen in Fig. 1. Each of said arms 17 is provided with a longitudinally extending slot 19 for nearly its full length. Bolts or fastening screws 20 interconnect the frame and the arm, passing loosely through the slot, as indicated in Fig. 5, which illustrates the relative position of the arm and said frame after said fastening means 20 has been tightened, and in which position of assembly, said arm will lie substantially co-planar with the adjacent face of said frame.

However, when it is desired to adjust said arms, the fastening means 20, and the means 18 if the outermost ends of said arms have been attached, are loosened, thus permitting tilting or partial rotation of said arms about their horizontal axes, to a position somewhat as indicated in dottled lines in Fig. 6 and in full lines in Fig. 4.

A plurality of curtain plates 21—22 are used as a set sufficient to close off each side opening, such plates being of suitably stiff but flexible material, as of a light gauge sheet metal, each plate having a main portion or body that is approximately planar, and each end of which is first bent or offset at an angle to said plane, as at 23, and is thence bent and directed to extend approximately co-planar with said main planar portion of the sheet to provide a relatively short terminal lip 24 substantially co-extensive with the width of the sheet.

To set up the device, the frame is placed on the sill, between the sides of the window casing, and as the frame is narrower than the width across said casing, or the window opening formed by the latter, there will be a side opening to one or both sides between the side of the frame and the adjacent side of the window casing. The set of curtain plates for each such side opening is then interconnected and side-overlapped to approximately close such opening. Then one of such arms, say the lower arm, is tightened against the frame, the lower lips of the set of overlapped curtain plates then inserted through the slots of the lower arm to drop slightly until the lips are covered by the rear face of the said arm that is below the respective slot, and the fastening means 18 then tightened.

The upper lips of said set of curtain plates are then inserted through the slot of the upper arm, while in side-overlapped relation, and while said arm is loosened and partially rotated to approximately the positions shown in fill lines in Fig. 4 and in dotted lines in Fig. 6, whereupon said lips of the overlapped plates may be snapped past the upper edge of the slot to be partially covered by that portion of the rear of the upper arm that is above said slot. Now, the fastening screws 20 may be tightened to bring the arm against and co-planar with the adjacent face of the frame, to thereby increase the width of said lip that is covered by said arm, whereupon said plates will appear as indicated in Figs. 1, 3 and in full lines in Fig. 6. The screw 18 may then be tightened, and the curtain plates are thus held in operating position to effectively seal off the opening aforesaid. Although in most instances, the curtain plates will retain their adjusted sealing position through normal operation of the device, the overlapped portions of said plates may be additionally interconnected, if so desired, by any preferred means, as by a screw (not shown) through such overlapped portions.

If, for any reason, it is desired to remove said curtain plates, say, at the end of the season of use, the fastening means 18 and 20 are loosened, the upper arm rotated partially about its horizontal elongated axis, and the adjacent upper lip sprung outwardly through said slot.

What I claim as new and desire to secure by Letters Patent is:

1. A ventilating unit comprising a rectangular open frame adapted to be secured between the sides of a window casing and being narrower than the latter so as to leave a side opening between the casing and the adjacent side of said frame, a fan and housing unit mounted in said frame, upper and lower arms horizontally slidably adjustably movably carried by said frame to be in a vertical plane when they are tightened into their operative position and to be movable about their longitudinal horizontal axes when loosened, said arms having horizontally elongated slots therethrough and being extendible outwardly beyond a side edge of said frame for securement to the adjacent side of said casing, and a plurality of curtain plates adapted to be mounted in side-overlapping arrangement between said upper and lower arms to adjustably close said side opening, each of said plates having upper and lower end lips that are offset from the main body of the plate and extend vertically therebeyond and which lips are insertible through slots in said arms, whereby said lips are normally covered by said arms when the latter are vertical, but when said arms have been adjusted rotationally relatively of said frame after loosening said lips may be withdrawn from said slots to remove the plates from the arms.

2. A ventilating unit comprising a restangular open frame that is adapted to be adjustably mounted between the sides of a window casing and which is narrower than the distance between the said sides so as to leave a side opening between said casing and frame thereat, a fan and housing unit mounted on said frame, upper and lower arms slidably adjustably mounted on said frame for extension beyond the sides of the latter for securement to a side of said casing and having an elongated slot lengthwise therethrough, fastening means securing said arms to said frame and which may be loosened for subsequent rotation of said arms about their longitudinal axes, and a plurality of relatively rigid flexible substantially imperforate curtain plates mounted adjacent one another in adjustably overlapped relation between said upper and lower arms to adjustably close said side opening, each end of each plate having a relatively short lip offset from the main plane of the plate and which lip is insertible through the adjacent arm slot when said last-mentioned arm is loosened and partially rotated about its horizontal axis, and whereupon tightening of said arm onto said frame will cause the rear of the arm to cover its cooperating lip to limit withdrawal through said slot.

3. A ventilating unit comprising an open frame adapted to be mounted between the sides of a window casing so as to leave an opening to one side between said frame and casing, a fan and its housing mounted together as a unit in said frame, upper and lower arms movably mounted to the upper and lower portions respectively of said frame so as to be extensible therebeyond and to have their outermost ends secured to the side of said casing, each of said arms provided with a horizontally elongated slot therethrough, the rear surface of each of said arms lying substantially in a vertical plane when said arms are tightened into their operative assembled position, fastening means for securing said arms to said frame and which may be loosened so as to permit tilting of said arms about their horizontal axes when said arms are not in their said operative assembled position, a plurality of planar curtain plates mounted adjacent one another in side-overlapped relation to and extending between said arms to adjustably close said side opening, each end of said plate having an end lip first directed at an angle to the plane of said plate and thence directed outwardly of the plate substantially parallel to the plane

of said plate so as to define the over-all size of said plate, said lips being co-extensive with the width of the plate and adapted to be insertible and removable through said slots when said arms are in tilted position, the lips lying substantially coplanar with the rear of said arms to be sufficiently covered by the latter to prevent withdrawal of the plates except when said arms are in tilted position.

4. A frame adapted to have a fan mounted thereon and also adapted to be mounted between the sides of a window casing so as to leave a side opening between the latter and said frame, upper and lower arms extensibly secured to the upper and lower ends respectively of said frame to be projected to said casing side for securement to the latter, said arms provided with slots therethrough extending length-wise, fastening means for securing the inner ends of said arms to said frame and to be tightened to hold said arms in their adjusted extended position, and which may be loosened to permit partial rotation of said arms relatively of said frame so as to bring the upper edge of the slot downwardly and forwardly along its length, and curtain plates mounted adjacent one another to extend between said upper and lower arms to adjustably close the side opening between the frame and casing, each plate having a main portion with a lip at each end substantially coextensive in width therewith and first directed at each end at an angle thereto and thence directed lengthwise beyond the periphery of said main portion, so that when said arms are tilted subsequently to the loosening of the fastening means the lips may be insertibly removable from or insertible into said slots, and when said fastening means are in tightened position the lips will be sufficiently covered by said arms in the region vertically of said slots to prevent withdrawal of the plates.

5. A ventilating unit comprising a rectangular open frame adapted to be mounted in a window opening and to be secured to the sides of the window casing and narrower than the width of the latter so as to leave a side opening between the adjacent sides of said window casing and frame, a fan with an enclosing housing unit carried by said frame, upper and lower arms movably carried by said frame for adjustable extension outwardly beyond the side edges of the latter and across said side opening for securement to said adjacent side of said casing, said arms having elongated slots therethrough, and a plurality of substantially imperforate plates having lips at their upper and lower edges, said lips being offset from the main body portion of the plates and whose terminal free edges define the over-all height of said plates, whereby said lips are removably insertible through said slots in said arms to close said side opening.

6. A ventilating unit comprising an open frame adapted to be mounted in a window casing and to be secured to the sides of the window casing and being narrower than the width of the latter so as to leave a side opening between the adjacent sides of said casing and frame, a fan and enclosing housing carried as a unit by said frame, upper and lower arms adjustably carried by said frame for horizontal extension beyond the latter for securement to the adjacent side of said casing and having horizontally elongated slots through each of said arms, and a substantially imperforate plate of substantially planar main body portion having its upper and lower edges offset and directed at an angle to said main body portion to provide lips extending beyond the height of said main body portion of the plate so as to define the over-all height of the plate, said lips being substantially coextensive in width with that of said main body portion and detachably insertible through said slots to provide detachable connections for mounting said plate on said arms.

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