Oct. 12, 1954 A. E. NASH 2,691,336

WINDOW VENTILATING DEVICE

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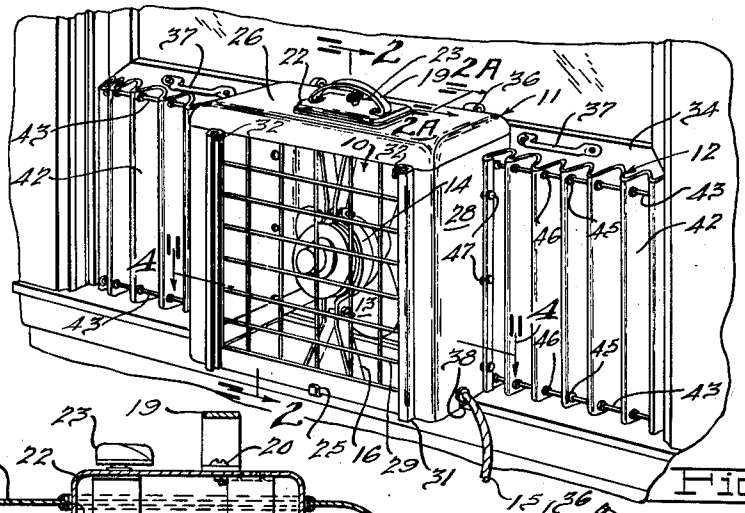


Fig. 1.

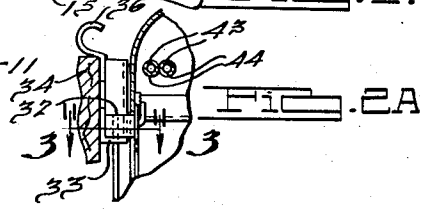
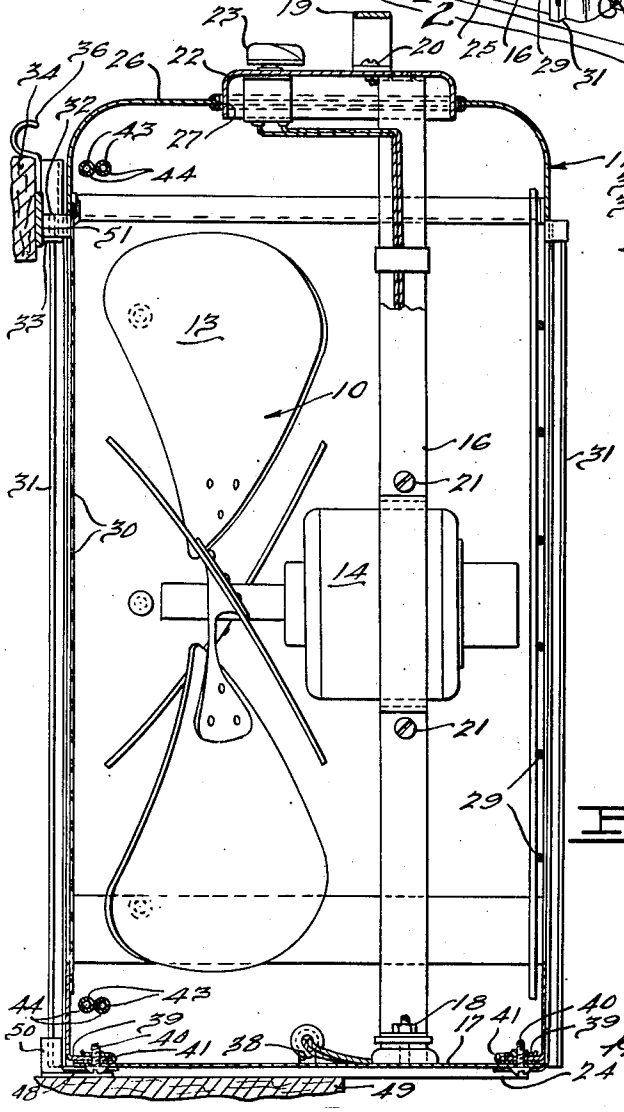


Fig. 2A



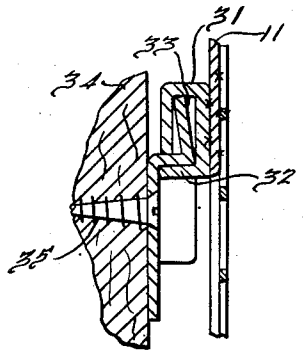


Fig. 3.

Fig. 2.

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Fig. 4.

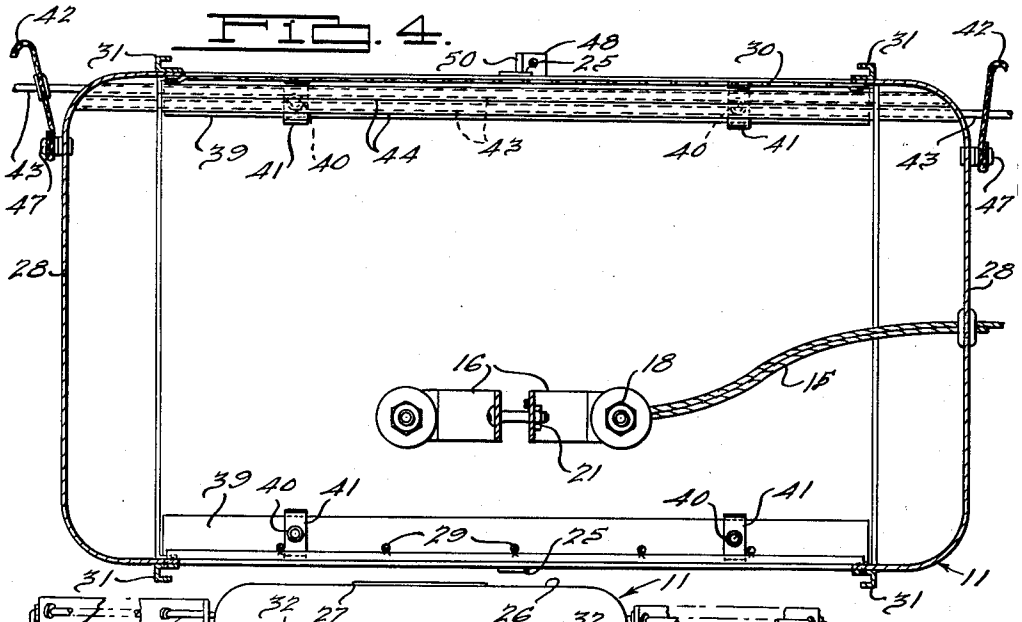


Fig. 5.

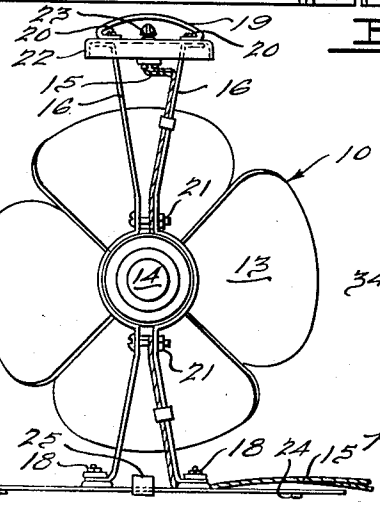


Fig. 7.

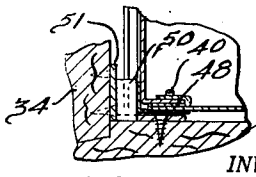


Fig. 6.

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WINDOW VENTILATING DEVICE

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7 Claims. (Cl. 98—94)

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This invention concerns a ventilating device and is directed particularly to a motor-driven fan, a supporting structure and housing therefor, and to extensible wing portions adapted to cooperate with a fan to increase the efficiency of the latter in the movement of air either into or out of an enclosed space.

One of the principal problems encountered in the use of portable fans at an open window for the exchange of air in an enclosed space, such as a bedroom and the like, is the fact that the fan normally does not fit the open space. When it is desired to direct a stream of air into or through a room, there is a tendency for air to circulate in the vicinity of the fan in a manner such that a substantial proportion of the air being directed inwardly is air coming from the room itself and being drawn into the partial vacuum created behind the fan blades. Conversely, when it is desired to direct a stream outwardly from the room there is a tendency for the outside air to be drawn into the partial vacuum behind the fan blades. In this manner, there is a tendency for such a fan to circulate rather than exchange the air.

A second problem is one of privacy. The placing of a fan in an opened window precludes the possibility of drawing a window shade over the window space since cutting off the line of vision through the window will simultaneously block off the fan itself.

A third problem concerns the portability of the fan itself. It is frequently desirable to shift the fan from one window to another to secure the most efficient ventilation while avoiding the necessity of installing a complete fan assembly in several windows of the same room. In addition to the foregoing type of portability, it will be apparent that a high degree of flexibility of general use can be provided in ventilating apparatus where the more expensive and functional parts; that is, fan and motor; are portable.

It is an object of this invention to provide a ventilating apparatus adapted to fit ordinary windows and adapted to operate with a high degree of efficiency in the movement of air either into the room or out of the room via the window space.

Another object of the invention is to provide a housing for a motor-driven fan which is adapted to cooperate with extensible wing portions to block off openings in a window space other than the space immediately surrounding the fan blades and at the same time adapted to be removed from said fan without dismantling either the fan or

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any of the structure for the supporting or carrying of the fan.

It is a further object of the invention to provide means for attaching such a fan assembly to a movable portion of a window in a manner such that the fan assembly is held in position without impairing vertical movement of the window.

It is a still further object to provide a ventilating apparatus for operation in an opened window with no loss of privacy.

Other objects and features of novelty of the invention will be specifically pointed out or will become apparent when referring, for a better understanding of the invention, to the following description taken in conjunction with the accompanying drawings, wherein:

Figure 1 illustrates a ventilating device including embodiments of the present invention.

Figure 2 is a cross-sectional view of the structure of Figure 1 taken through the line 2—2.

Figure 2A is an enlarged fragmentary, vertical sectional view taken on the line 2A—2A of Figure 2.

Figure 3 is a cross-sectional view of the attaching means for the fan housing and is taken through the line 3—3 of Figure 2A.

Figure 4 is a cross-sectional view of the structure of Figure 1 taken through the line 4—4.

Figure 5 is a front elevation of the housing and extensible wing portions of the invention.

Figure 6 is a front elevation of the fan and motor portions of the invention together with their supporting structure and carrying means.

Figure 7 is a fragmentary, vertical sectional view taken substantially medianly through the fan unit and showing the sill which supports the unit and the window sash which is movable up and down behind the unit in fully lowered position, the figure particularly illustrating the sill stop which holds the unit spaced properly from the sash and the scuff plate which prevents the stop from marring the sash.

Referring to the drawings, the particular ventilating apparatus shown by way of illustration comprises generally a fan 10 mounted in a housing 11 provided at opposite sides thereof with extensible wing portions 12.

Referring particularly to Figures 1, 2, and 6, a fan 10 having blades 13 and a motor 14 is supplied with electrical current from any suitable source through the wire 15. A supporting structure for the fan 10 is provided in the form of two one-piece brackets 16 mounted on opposite sides of the motor 14. Each of the brackets 16 is secured at the lower end thereof to a base 17

by a bolt 18 and secured at the upper end thereof to a handle 19 by a bolt 20. Each of the brackets 16 is curved substantially one-half way around the motor 14 and the brackets are joined immediately above and below the motor by bolts 21. A housing plug 22 is secured to the handle 19 by the bolts 20. A switch 23 secured to the housing plug 22 and in electrical connection with the wire 15 controls the current to the motor 14.

The base 17 of the fan supporting structure is provided with lugs 24, which are made of rubber, felt, or the like in order to protect surfaces on which the ventilating apparatus is placed. Flanged tabs 25 secured to the base 17 fit outside the grills 29, 30, and contribute to the rigidity of the apparatus.

The housing 11 comprises a top wall 26 provided with an opening 27 to accommodate the housing plug 22, side walls 28, a grill 29 across the front of the housing 11, and a grill 30 or screening across the back of the housing. The housing itself is not provided with a bottom wall; however, the base portion 17 closes the open bottom of the housing and is bolted or otherwise secured thereto. For the purpose of detachably securing the housing 11 in the window opening, there is provided on both the front and rear walls of housing 11 a pair of vertically disposed channel members 31 positioned adjacent the side edges of the front grill 29 and the rear grill 30. Each of the four channel members 31 has an outwardly projecting flange portion adapted to receive an interlocking, outwardly projecting flange 33 carried by the lower transverse frame 34 of the window and rigidly secured thereto by a suitable means such as screw 35. The upper extremities of channel members 31 are closed by or terminate in closure members 32 which, as illustrated, are in the form of horizontally disposed lugs extending outwardly from the front and rear panel portions of housing 11 to which they are rigidly attached. It will be understood that the frame 34 is preferably provided with a pair of flanges 33 suitably spaced to correspond to and interlock with vertically disposed guiding channels 31. It will furthermore be understood that channels 31 are provided on both the front and rear panels of housing 11 to readily enable the reversal of the entire assembly including the housing 11, the fan 10, and the fan-supporting structure 16, 17. By this procedure the draft of air flow may be reversed without the necessity for disconnecting the housing 11 from the fan and the fan-supporting structure 16, 17. Lugs 32 serve the secondary function of preventing the disconnection of the frame 34 from the guiding channels 31 upon raising the window frame 34 in the window opening. The inherent weight of the component parts of the assembly resting on the ledge or sill 49 together with the sliding connection between the vertically movable horizontal frame 34 constitutes the securing means for the fan and housing assembly. It will therefore be appreciated that the removal of, reversal of, or repositioning of the housing 11 and its attendant fan 10 and fan-supporting structure 16, 17 requires merely the repositioning of flanges 33 on the frame 34.

A recess 38 is provided at the lower end of one of the side walls 28 of the housing 11 to permit entry of the wire 15. Flanged portions 39 of the housing walls are provided to permit attachment of said housing to the base 17 of the fan supporting structure by means of bolts 40, and U-shaped clips or washers 41.

A flexible sheet 42, preferably relatively impervious to the movement of air, is supported on an extensible U-shaped rod 43, the legs of the "U" being adapted to move horizontally to and fro in the pipes 44 supported in the side walls 28. In this manner, the degree of lateral extension of the rod 43 may be adjusted quite readily. In the embodiment illustrated, the sheet 42 of the wing portion is supported on the extensible rod 43 by bearing rings 45, which are positioned in openings 46 in the sheet at alternate fold lines. The inner edge of the sheet 42 is secured to the housing 11 by the fasteners 47. Although many of the advantages of the invention can be secured by providing one extensible wing and positioning the housing at an end of the window ledge, it is preferred that extensible wings be provided on both sides to give an increased flexibility of use.

In positioning the ventilating apparatus of the invention in the window space, it is most convenient to close the window, positioning the housing such that the interlocking flange 33 engages the lower end of the channels 31. The window may then be raised any degree desired up to the point where the flange engages the lug 32 at the top of the channels 31. The extensible wings can then be adjusted to close the open space at the sides of the housing. Privacy is secured by merely lowering a window shade (not shown) to the top of the housing. Proper spacing is maintained between the horizontal sash frame 34 and the lower inner edge of the rearward panel of housing 11 by means of a bracket 48 fastened to the ledge or sill 49. Bracket 48 is provided with an upstanding tab portion 50 which is adapted to engage the rear surface of the housing 11 and to maintain the same in position relative to the frame 34. For the purpose of avoiding scuffing, scratching or otherwise marring the outer surface of frame 34, a scuff plate 51 has been provided approximately centrally of frame 34 and the outer surface thereof is adapted to abut the inner surface of upstanding tab 50 when frame 34 is in its lowered position. Attached centrally to the bottom member of sash 34 is a scuff plate 51 which seats the edges of tab 50 when the window is closed and prevents the tab from scratching or otherwise marring the window.

The fan, motor, and their supporting structure may be removed from the complete assembly by removing the bolts 40, where such fastening devices are used, and, for example, by raising the window beyond the point where the rider engages the stop. In the latter manner, the housing and wing portions are raised, leaving the fan, motor, handle, housing plug, base, and fan supporting structure free to be removed at will. In this manner, the latter portions which are usually the most expensive can be used to cooperate with any one of a number of housings, each of which can remain attached to a window.

It is preferred that a flexible plastic sheet be used for the sheet material of the extensible wing, but any foldable, relatively impervious material is suitable. Similarly, it is preferred that the material of the sheet have suitable resistance to adverse influences which might be encountered in specific uses. For example, normally, it would be required that the sheet be resistant to water since under normal use it will occasionally be exposed to rain. It will be apparent that other extensible devices equivalent to the one shown may be constructed by those

skilled in the art. For example, the sheet material can be suspended on an extensible rod by hooks in "shower curtain" style. Similarly, the supporting rod can be moved inwardly and outwardly from a pipe supported in the housing as is shown or may be extended telescope fashion.

The housing of the invention can be constructed of any suitable material, such as plywood or plastic laminates and the like. An important feature of the invention is in making the base member 17 of the assembly a part of the support structure for the fan rather than making it an inherent part of the housing. Similarly, it is an important feature that the housing plug 22 is provided and that its dimensions exceed those of the handle 19. In this manner, the housing can be lifted from the fan and its supporting structure with a minimum of effort, thus giving a flexibility of use of the fan itself, while permitting the housing and wing portions to remain in their positions in the window. For example, if the base portion is freed from the housing by the removal of any fastening device which may be used, it is simply necessary to raise the window in order to remove the housing from the fan; that is, the window rises until the rider hits the stop at which point the further motion of the window upwardly will carry the housing therewith.

It will be apparent that the housing need not be rectangular in shape in order to perform its functions. Where, however, it is desired to include the feature of separating the housing from the fan it is necessary that the open end at the bottom of the housing be sufficiently wide to clear the fan structure as it is elevated. Where this latter feature is not to be used; that is, in substantially permanent installations; substantially circular housings can be used in order that a minimum of open space be permitted beyond the path described by the tips of fan blades. It will be apparent, however, that extensible wing portions can be used with circular housings, or in fact any shaped housing, it being necessary only to accommodate the inner edge of the sheet of the wing to the shape of the housing in order that the inner edge of the material fits snugly against the housing.

I claim:

1. A ventilating apparatus comprising a motor-driven fan; a housing for said fan adapted to fit into the space provided by an open window; an extensible, flexible wing portion secured to said housing and adapted to block off the open portion of the window space not occupied by said housing; outwardly projecting, vertically disposed channel guide members attached to said housing, outwardly projecting flanges carried by the lower horizontally disposed sash interlocking with said channel members securing said housing to said sash.

2. A ventilating apparatus comprising a motor-driven fan; a housing for said fan adapted to fit into the space provided by an open window; an extensible, flexible wing portion secured to said housing and adapted to block off the open portion of the window space not occupied by said housing; a pair of outwardly projecting, vertically disposed channel guide members attached to the front and rear panels of said housing, outwardly projecting flanges carried by the lower horizontally disposed sash interlocking with said channel members securing said housing to said sash, lugs disposed in said channels at the upper extremity thereof closing said channels.

3. A ventilating apparatus comprising a motor-driven fan; a supporting structure for said fan and motor; handle means carried by said supporting structure, a housing for said fan adapted to fit into the space provided by an open window, said housing comprising substantially solid pieces for its top and side walls, said housing being substantially open at its front, rear, and bottom sides, and the top wall of said housing being provided with an opening sufficient to provide access therethrough for said handle means; an extensible, flexible wing portion on said housing adapted to block off the open portion of the window space not occupied by said housing and fan; a pair of outwardly projecting, vertically disposed channel guide members attached to the front and rear panels of said housing, outwardly projecting flanges carried by the lower horizontally disposed sash interlocking with said channel members securing said housing to said sash, lugs disposed in said channels at the upper extremity thereof closing said channels.

4. A ventilating apparatus comprising in combination a motor-driven fan; a supporting structure for said fan and motor; a housing for said fan adapted to fit into the space provided by an open window, said housing comprising substantially solid pieces for its top and side walls, said housing being substantially open at its front, rear, and bottom sides, and the top wall of said housing being provided with an opening sufficient to provide access therethrough for a structure secured to said supporting structure; outwardly projecting vertically disposed channel guide members attached to said housing, outwardly projecting flanges carried by the lower horizontally disposed sash interlocking with said channel members securing said housing to said sash, and an extensible wing portion secured to said housing and adapted to block off the open portion of the window space not occupied by said housing and fan, said wing portion comprising a laterally adjustable support member and a flexible sheet secured to the support member, said sheet forming a plurality of folds as the degree of lateral extension of said wing portion is reduced.

5. A ventilating apparatus comprising in combination a fan assembly and a housing for said fan assembly having substantially solid top and side panels and substantially open front, rear and bottom portions, an aperture in said top panel, said fan assembly comprising a motor-driven fan and means supporting said fan and fan motor comprising brackets encircling said motor and secured therearound, said brackets having portions extending upwardly and downwardly from the portion encircling said motor, the portion of said brackets extending upwardly carrying a closure member having a horizontally disposed portion having downwardly turned edges adapted to engage the sides of said aperture in said top panel of said housing, a handle mounted on the horizontally disposed portion of said closure member, the portion of said brackets extending downwardly being secured to a plate-like member forming the bottom panel of said housing, and disconnectible means connecting the said plate-like member and the bottom of the side walls of said housing enabling said fan and supporting means therefor to be easily separated.

6. A ventilating apparatus comprising in combination a fan assembly and a housing for said fan assembly having substantially solid top and

side panels and substantially open front, rear and bottom portions, an aperture in said top panel, said fan assembly comprising a motor-driven fan and means supporting said fan and fan motor comprising brackets encircling said motor and secured therearound, said brackets having portions extending upwardly and downwardly from said motor encircling portion, the portion of said brackets extending upwardly carrying a closure member having a horizontally disposed portion having downwardly turned edges adapted to engage the sides of said aperture in said top panel of said housing, a handle mounted on the horizontally disposed portion of said closure member, the portion of said brackets extending downwardly being secured to a platelike member forming the bottom panel of said housing, disconnectible means connecting the said plate-like member and the bottom of the side walls of said housing, and an extensible wing portion secured to said housing and adapted to block off the open portion of the window space not occupied by said housing and fan assembly, said wing portion comprising a laterally adjustable support member and a flexible sheet secured to the support member, said sheet forming a plurality of folds as the degree of lateral extension of said wing portion is reduced.

7. A ventilating apparatus comprising a motor-driven fan, a housing for said fan adapted to fit into the space provided by an open window and to be supported on the window sill, said housing having channel guide means attached thereto, a window sash in said window having flange means on the lower horizontal frame of said sash interlocking with said channel means thereby slidably connecting said housing and said sash, extensible flexible wing portions attached to said housing on at least one side thereof adapted to block off the open portion of the window space not occupied by said housing, bracket means carried by said window sill for locating the rearward surface of said housing inwardly from the inner surface of said horizontal frame.

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