Aug. 16, 1955 F. SE BASTIAN 2,715,495

WINDOW FAN ARRANGEMENT

Filed May 27, 1950 3 Sheets-Sheet 1

Fig. 1.

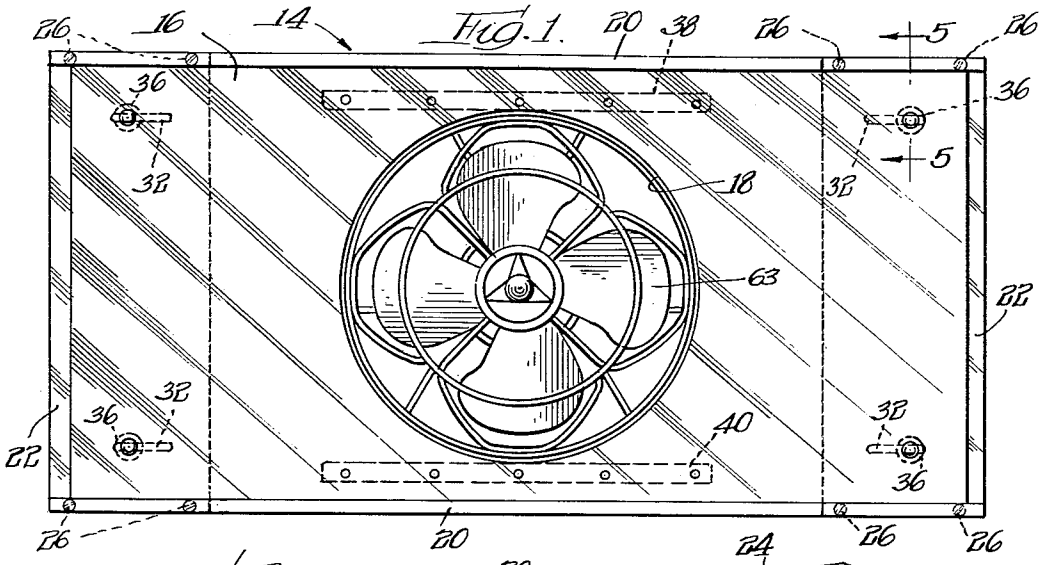
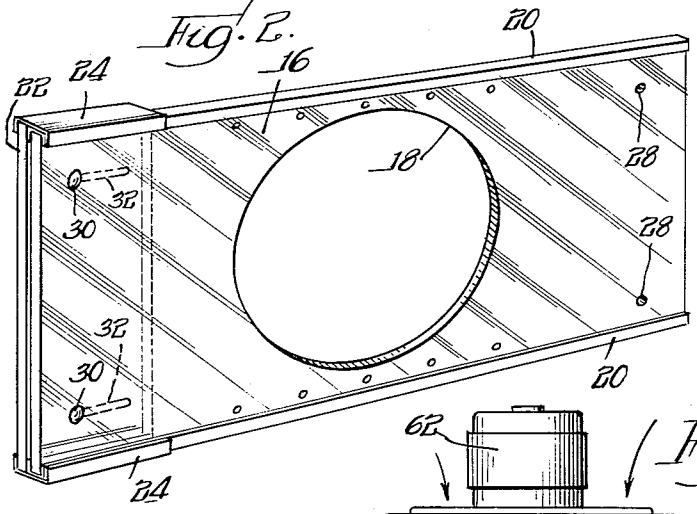


Fig. 2.



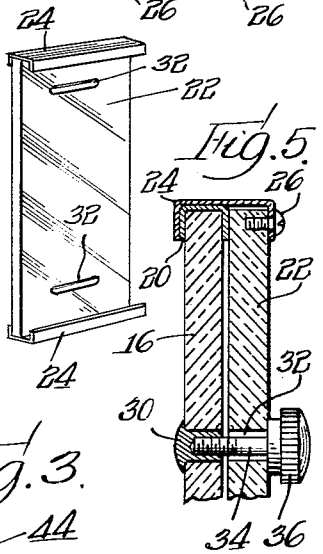


Fig. 5.

Fig. 3.

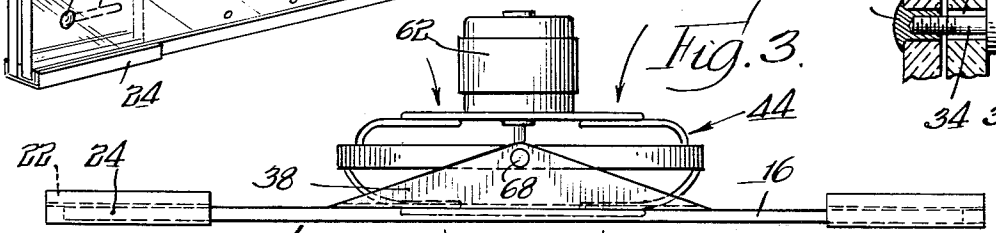
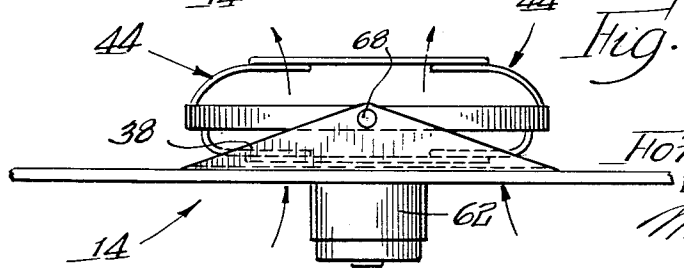


Fig. 4.



INVENTOR.
Ford SeBastian
BY
Moore, Olson & Trexler
Attys.

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Fig. 7.

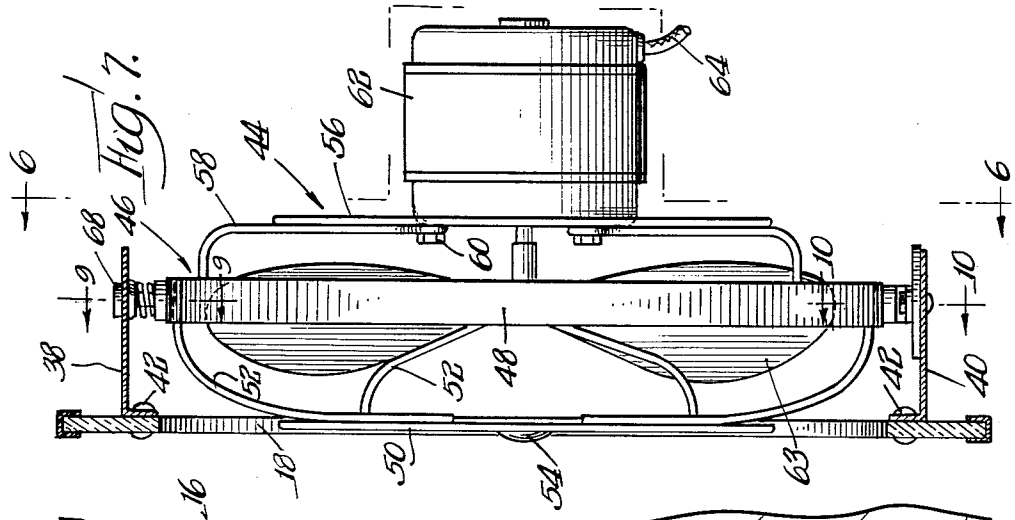
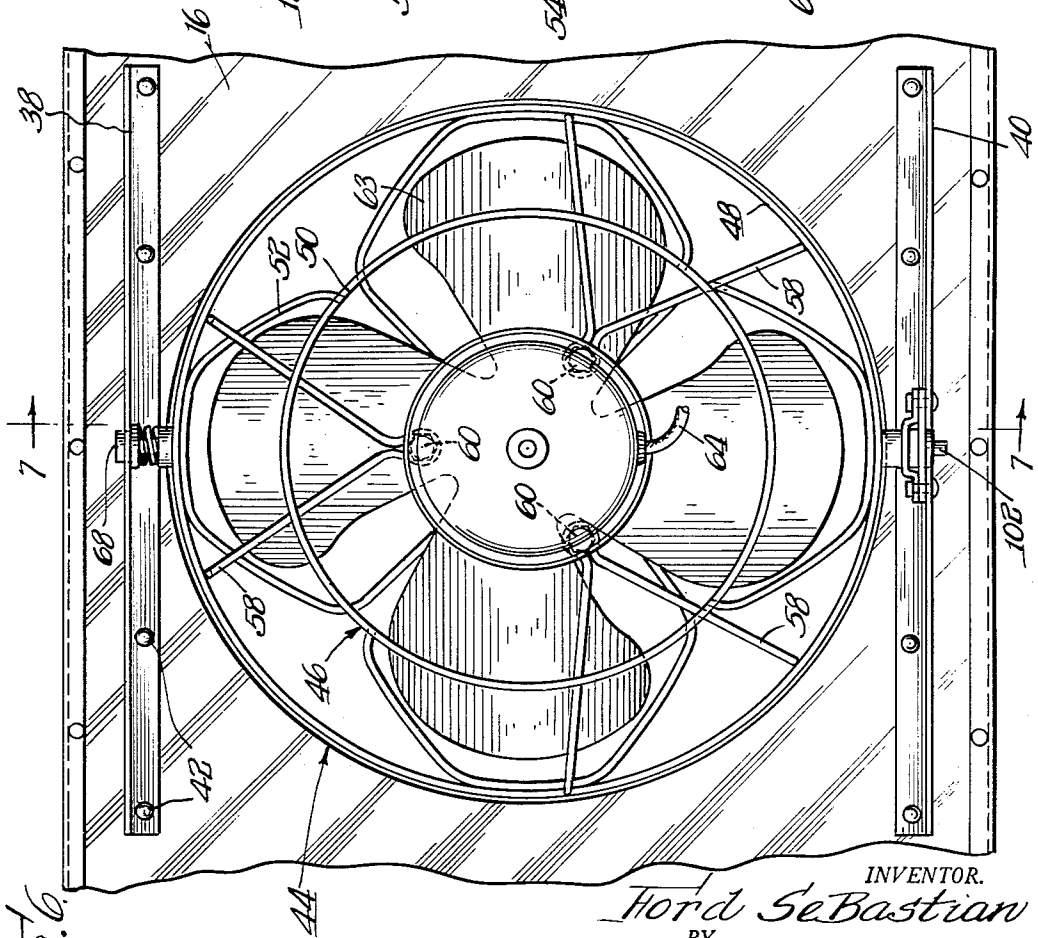


Fig. 6.



INVENTOR.
Ford SeBastian
BY
Moore, Olson & Tredler
attys.

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WINDOW FAN ARRANGEMENT

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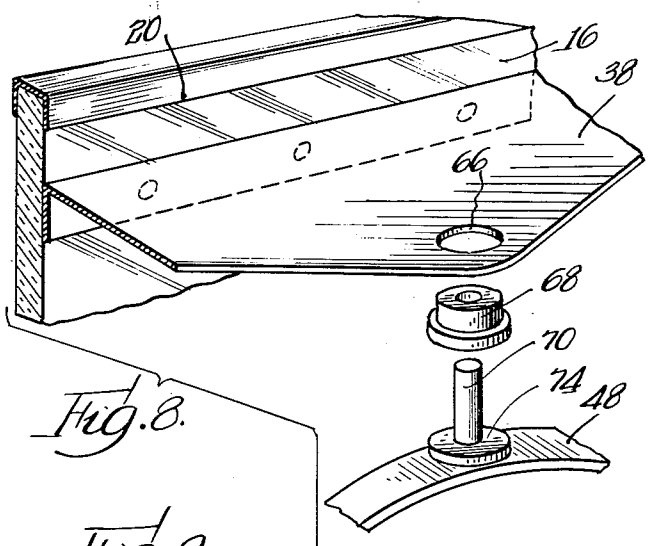


Fig. 8.

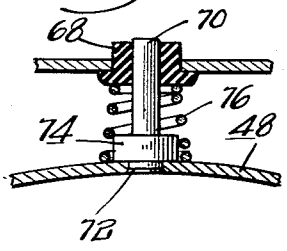


Fig. 9.

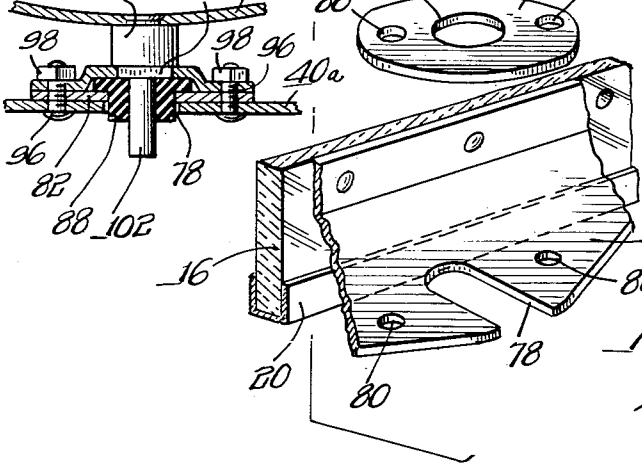


Fig. 10.

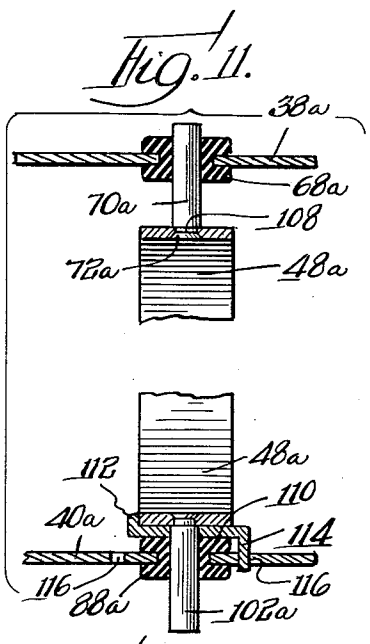


Fig. 11.

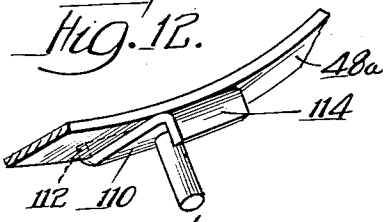


Fig. 12.

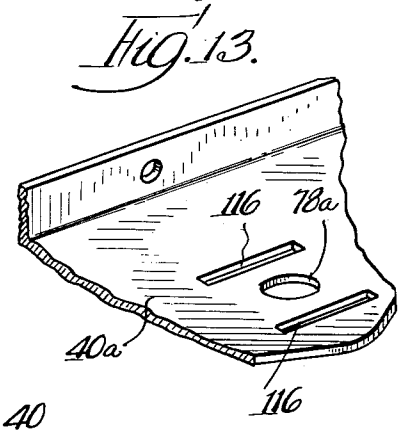


Fig. 13.

INVENTOR.
Ford SeBastian
BY
Moore, Olsen & Treyler
attys.

United States Patent Office 2,715,495
Patented Aug. 16, 1955

2,715,495

WINDOW FAN ARRANGEMENT

Ford SeBastian, Elmhurst, Ill., assignor, by mesne assignments, to The Silex Company, Hartford, Conn., a corporation of Connecticut

Application May 27, 1950, Serial No. 164,638

12 Claims. (Cl. 230—259)

This invention is concerned generally with ventilating apparatus for insertion in a window and particularly with such apparatus adapted to blow fresh air into a building or to blow stale air out of the building.

Window fans or ventilators comprising a shield to be inserted in a partly open window and having a fan located in an aperture in the shield are in common use. Such ventilators generally have shields of sheet metal which cut off a considerable amount of light and such ventilators generally are adapted to blow air only in one direction. It has been proposed heretofore to provide a reversible fan in a window ventilator so that stale air may be exhausted from a building or fresh air may be blown into a building. Many such ventilators have relied upon reversible motors to drive the fan in reverse directions. Reversible motors are quite expensive and generally are somewhat larger than unidirectional motors of the same power and thus interfere to a greater extent with the air stream. It is proposed herein to provide a window ventilator having a reversible fan driven by a unidirectional motor and requiring no reversing gears or other clumsy or expensive structure.

An object of this invention is the provision of an improved window ventilator for insertion in a partially open window.

A further object of this invention is an improved window ventilator having a transparent shield.

Another object of this invention is a window ventilator having a fan structure adapted to direct an air stream in any of a plurality of directions by mechanically altering the orientation of the fan structure without moving the fan structure materially away from the accompanying shield during the orientation.

A specific object of this invention is the provision of a window ventilator having a reversible fan structure for drawing an air stream into or out of a room, said structure being reversible without moving it substantially from the plane of the accompanying shield during the reversing operation.

A further object of this invention is the provision in a window ventilator as set forth in either of the two last foregoing objects of improved structure for maintaining the fan structure in oriented position.

Yet another object of this invention is the provision of a window ventilator having a fan structure carried by mounting means arranged transversely of the axis of the propellor with said fan structure being pivotally adjustable about said mounting means and lockable in any predetermined position.

Other and further objects and advantages of the present invention will be apparent from the following description taken in connection with the accompanying drawings in which:

Fig. 1 is a front view of a window ventilator embodying the principles of my invention;

Fig. 2 is a perspective view of the shield used in my ventilator;

Fig. 3 is a top view of the ventilator with the fan structure in one position;

Fig. 4 is a view similar to Fig. 3 showing the fan structure in reversed position;

Fig. 5 is a fragmentary cross sectional view taken substantially along the line **5—5** of Fig. 1;

Fig. 6 is a fragmentary rear view of the ventilator showing the fan structure mounting arrangement taken substantially along the line **6—6** of Fig. 7;

Fig. 7 is a side view partially in section taken along the line **7—7** of Fig. 6;

Fig. 8 is an exploded perspective view showing the mounting structure for the fan structure;

Fig. 9 is a sectional view taken substantially along the line **9—9** of Fig. 7;

Fig. 10 is a sectional view taken substantially along the line **10—10** of Fig. 7;

Fig. 11 is a view similar to Figs. 9 and 10 showing a modified mounting structure;

Fig. 12 is a fragmentary perspective view of the locking or position determining structure of the modification of the structure shown in Fig. 11 and

Fig. 13 is a fragmentary perspective view of the structure cooperating with the structure of Fig. 12.

Generally my invention comprises a transparent shield to be set on the window sill of a partially opened window. Extensible wings are provided at each end of the shield so that the ventilator may fit a window of any width and the wings may fit in the guiding track for the raised window to help maintain the ventilator in proper position. The raised window section is lowered against the top of the shield and wings positively to secure the ventilator in position. A wing is provided at each end of the shield in order that a central fan accommodating aperture may be maintained in its central position and in order that the structure may maintain an attractive symmetrical appearance.

A fan structure comprising propeller, guard, and motor is mounted substantially in alignment with the central aperture by flanges secured to the shield and studs extending vertically outwardly from the propeller guard and received in apertures in the flanges. The flanges are spaced further apart than the diameter of the guard so that the fan structure may be raised or lowered relative to the flanges and is generally held in its lowest position by gravity or by gravity aided by some spring means. In one form of the invention the lower mounting stud is provided with a noncircular portion and the lower mounting flange is provided with a cooperating aperture so that the fan structure may be located in adjusted position by the noncircular cooperating portions and may be oriented by raising the fan structure slightly to disengage the noncircular portions. In another form of the invention a detent is provided adjacent the lower stud and a plurality of cooperating apertures are provided in the lower flange in appropriate position to receive the detent and secure the fan structure in any predetermined position, orientation of the fan structure being accomplished in the same manner as in the first form.

Referring now more particularly to the figures and especially to Figures 1–5 there is shown a window ventilator generally designated **14** comprising a transparent shield **16** provided with a central aperture **18**. The shield is provided with channel shaped metal strips **20** along the top and bottom edges to protect the edges against damage and to provide slideways for extensible shields or wings. The strips **20** may be secured over the edges of the shield in any desirable manner such as by cementing them in place. Extensible shields or wings **22** of transparent material similar to the shield **16** are mounted at each end of the shield by runners **24** fitting over the top and bottom of the metal strips **20**. As may

be seen in Fig. 5 each runner 24 is of sufficient transverse extent to embrace the strip 20 and extensible wing 22 between depending flanges. The depending flange adjacent the wing 22 is secured to the wing as by screws 26. A pair of apertures 28 is provided adjacent each end of the shield 16 and a nut 30 is fitted within the aperture. The nut is knurled or splined on its outer surface so that it may grip the shield 16. Each wing 22 is provided with a pair of slots 32 in horizontal alignment with the pair of apertures 28 and a stud 34 having a knurled head 36 fits through each such slot and is threaded into one of the nuts 30. When the studs 34 are loosened the wings may be slid back and forth to adjust the ventilator to any desired width of window with the wings of runners 24 preferably fitting within the guide ways for the raised window sections. When the wings are properly adjusted the knobs 36 are turned to lock the wings in adjusted position and the raised window section is lowered to secure the ventilator in place.

Upper and lower mounting flanges 38 and 40 respectively are secured in horizontal position near the top and bottom of the shield 16 by means such as rivets 42 (Figs. 6 and 7) riveted through depending and upstanding flanges on the mounting flanges 38 and 40 and through the shield 16. The fan structure 44 is supported from the flanges 38 and 40 in a manner later to be discussed in detail. The fan structure comprises a propeller guard or cage 46 comprising generally a peripheral band 48 of lesser diameter than the aperture 18, a front wire ring 50 spaced forwardly and inwardly from the band 48 by a plurality of symmetrically disposed wire spacers 52. These spacers extend inwardly of the ring 50 to support a central button 54 which may carry the name or emblem of the manufacturer. A rear wire ring 56 is carried to the rear of the band 48 by a plurality of symmetrically disposed V-shaped spacers 58 welded to the band and ring. Each of the spacers 56 is formed with an eyelet at its inner extremity or apex and bolts or screws 60 are placed through these eyelets and threaded into the casing of a motor 62 to support the motor. A four bladed propeller 63 is carried by the motor shaft extending from the front of the motor 62 and a lead wire or drop cord 64 extends from the rear of the motor and may be connected to any conventional electrical outlet to supply power to the motor. A conventional on-off switch may be provided in the drop cord or on the motor itself.

The mounting structure for the fan structure may be seen best in Figs. 6 and 7 and particularly in Figs. 8–10. The upper mounting flange 38 is provided near its outer extremity with an aperture 66 within which is received a grommet 68 of rubber or the like. An upstanding stud 70 is secured to the peripheral band 48 as by a force fit with the end peened over in a bevelled portion of an aperture in the band 48 as at 72 (Fig. 9). A collar or sleeve 74 is secured to the stud 70 or is integral therewith and bears against the outer surface of the band 48 to aid in securing the stud to the band. A coil spring 76 encircles the sleeve 74 and stud 70 so that when the fan structure is inserted in operative position with the stud 70 extending upwardly through the central aperture in the grommet 68, the spring aids gravity in maintaining the fan structure in its lowest position.

The lower flange 40 as seen in Fig. 8 is provided at its extremity with a slot 78 transverse to the shield 16, the slot being provided rather than an aperture to facilitate mounting of the fan structure. A pair of apertures 80 is spaced about the slot 78. A washer 82 having a central aperture 84 fits atop the flange 40 with its central aperture aligned with the slot 78 and has a pair of diametrically disposed apertures 86 alignable with the apertures 80 in the flange 40. A rubber grommet 88 similar to the grommet 68 fits through the central aperture of the washer 82 and through the slot 78 of the flange 40. A strap 90 having a raised central portion 92 is provided near its extremities with apertures 94. The strap 90 is placed over the washer 82 and grommet 88 and screws 96 are placed through the apertures 80, 86 and 94 in the flange, washer, and strap respectively, and are held in place by nuts 98. The raised central portion 92 of the strap 90 is provided with a noncircular aperture 100 which is shown as substantially a rectangle having arcuate ends. It is to be understood that it is within the contemplation of the invention that the aperture 100 could have some other noncircular symmetric shape such as a hexagon or a star or could be splined as will be explained later. A depending stud 102 similar to the stud 70 is secured to the bottom of the band 48 diametrically opposite to the stud 70 and in the same manner. A sleeve or collar 104 formed integral with or secured with the stud 102 and impinging against the band 48 is provided with a pair of flats 106 so that the cross section of the sleeve 104 adjacent the bottom thereof is substantially a rectangle having curved ends and complementary to the aperture 100 in the raised portion of the strap 90. It is contemplated that this collar portion of the sleeve 104 might be provided with some other noncircular symmetrical shape including the shapes suggested for the aperture 100 and complementary thereto.

When the bottom portion of the sleeve 104 fits within the aperture 100 the fan structure is locked in position such as that shown in Fig. 3 where the motor 62 is spaced away from the shield 16 and the propeller provides an air stream directed out of the building as indicated by the arrows to exhaust stale air from the building. If it is desired to blow fresh air into the room, the fan structure may be lifted slightly against the force of gravity and the action of the spring 76 and rotated with part of the propeller and guard passing through the aperture 18 through 180° about the studs 70, 102 in whereat the lower portion of the sleeve 104 again interfits with the aperture 100. Gravity and the spring 76 automatically causes these parts to interfit when they are properly aligned and the fan structure is positioned to direct air into the building as indicated by the arrows in Fig. 4. Under some circumstances such as when the window is located close to the corner of the room or a wing of the building extends outwardly adjacent the window, it may be desirable that the air stream should not be directed inwardly or outwardly perpendicularly to the shield and wall. It is within the contemplation of the invention that the aperture 100 and cooperating lower portion of the sleeve 104 should be of any symmetrical noncircular configuration such as hexagonal, star, or splined shapes suggested heretofore so that the fan structure may be oriented in any desired position to direct air into or out of a room obliquely to the wall thereof.

A modification of the invention is shown in Figs. 11–13. In this modification the upper flange 38*a* is provided with a grommet 68*a* placed through an aperture. This grommet overlies both surfaces of the flange 38*a* as no spring is provided beneath it and there is some tendency for it to leave the aperture in which it is inserted. A stud 70*a* is secured in the band 48*a* of the propeller guard and is provided with a narrow neck portion 108 to prevent downward movement of the stud. The lower end of the stud is peened over as at 72*a* in a bevelled portion of the aperture through the band 48*a*. As may be seen the stud 70*a* extends upwardly through the central aperture of the grommet 68*a*.

A depending stud 102*a* is secured to the band 48*a* diametrically opposite from the stud 70*a* and is secured in the same manner. The stud 102*a* fits through the central aperture of a grommet 88*a* similar to the grommet 68*a* and secured within an aperture 78*a* in the lower flange 40*a*. An angle member 110 is welded or otherwise secured across the bottom of the band 48*a* about the stud 102*a* and has an upstanding flange 112 lying along the edge of the band 48*a* and has a depending

flange or detent **114** extending downwardly and spaced from the other edge of the band **48***a*. A pair of slots **116** is provided in the flange **40***a* for cooperation with the detent **114** to secure the fan structure in oriented position. Gravity normally maintains the fan structure in its lowest position with the angle member **110** bearing against the grommet **88***a* and the detent **114** fitting in one of the slots **116**. Adjustment of the direction of the air stream of the fan is accomplished in the same way as with the first modification. The fan structure is raised so that the detent **114** leaves the slot which it is in and the fan structure then may be rotated until the detent **114** engages the other slot **116**. It is within the contemplation of the invention that the angle member **110** and detent **114** might be much narrower than shown and that a plurality of slots **116** or other similar apertures should be provided so that the fan structure may be oriented to direct an air stream other than perpendicularly to the shield **16**. In both this and the first form of the invention, the rubber grommets damp vibrations which would otherwise be transmitted from the fan structure to the shield. The shield would act as a sounding board for undamped vibrations and the ventilator would be much noisier in operation without the grommets or other resilient mounting.

It is apparent that there has been herein disclosed an improved window ventilating structure adjustable to fit any window and transparent so as to cut off no light. Improved structure has been disclosed whereby the fan structure may be oriented in any of a plurality of directions to direct air into or out of a building either perpendicularly to the wall or obliquely thereto as may be desired. The orientation is accomplished readily without removing the fan structure and without any clumsy structure requiring the fan structure to be moved away from the plane of the ventilator shield.

Although two particular forms of this invention have been shown and described it is apparent that this is for illustrative purposes only and that my invention is to be understood as comprising all that which falls within the spirit and scope of the appended claims.

I claim:

1. A window ventilator comprising a substantially transparent shield having an aperture therein, a fan structure including a propeller guard, a fan motor secured to said guard, and a propeller carried within said guard and rotatable by said motor, said fan structure being positioned substantially in line with said aperture, means on and supported by said transparent shield providing rotary bearing means, and cooperating rotary bearing means on said fan structure for pivotally mounting said fan structure at a predetermined distance from said shield, said fan structure being pivotal about said pivotal mounting means to direct an air stream in any of a plurality of predetermined directions.

2. A window ventilator comprising an upright shield having an aperture therein, supporting structure extending outwardly from said shield below said aperture, a fan structure including a propeller guard, a unidirectional fan motor secured to said guard, and a propeller carried within said guard and rotatable by said motor, a pivotal connection on said supporting structure, a cooperating pivotal connection on said fan structure, cooperating interfitting means on said fan structure and said support means for positively locking said fan structure in any of a plurality of predetermined positions, said interfitting means being unlockable by raising said fan structure whereby said fan structure may be rotated to any other of said predetermined positions to direct an air stream in any of a plurality of predetermined directions.

3. A window ventilator as set forth in claim 2 in which the cooperating interfitting means comprise polygonal symmetric members.

4. A window ventilator as set forth in claim 2 in which the cooperating interfitting means comprise a detent on said fan structure and a plurality of arcuately spaced apertures defined by said supporting means.

5. A window ventilator as set forth in claim 2 wherein the cooperating interfitting means comprise a protuberance on said fan structure and a plurality of arcuately spaced protuberance receiving means on said supporting means.

6. A window ventilator comprising an upright shield having an aperture therein, upper and lower supporting members extending horizontally outwardly from said shield adjacent said aperture, an apertured rubber grommet in each of said supporting members, a propeller guard, an upper and lower stud on said propeller guard extending through said rubber grommets, a fan motor carried by said guard, a propeller carried within said guard and rotatable by said motor, a member extending above the lower of said grommets and having a polygonal symmetrical aperture therein surrounding the lower of said studs, a complementary polygonal portion on said guard about said lower stud, said guard, propeller, and motor being rotatable about said two studs and lockable in any predetermined position by lowering said guard to interfit the complementary polygonal portions to direct an air stream from said propeller in any of a plurality of predetermined directions.

7. A window ventilator as set forth in claim 6 in which the complementary polygonal portions are substantially rectangular in order to position the guard, propeller, and motor to direct an air stream substantially perpendicular to said shield in either direction therefrom.

8. A window ventilator comprising an upright shield having an aperture therein, a pair of upper and lower supporting members extending horizontally outwardly from said shield from substantially opposite sides of said aperture, at least one of said members having a plurality of arcuately spaced apertures, a propeller guard, pivotal connectors on said propeller guard cooperable with said supporting members, a unidirectional fan motor secured to said guard, a propeller carried within said guard and rotatable by said motor, and a depending detent on said fan guard and cooperable with said arcuately spaced apertures to lock said fan guard to direct an air stream in any of a plurality of predetermined directions, said detent being removable from said apertures by raising of said fan guard relative to said lower support member.

9. A window ventilator comprising a transparent upright shield having a substantially central aperture therein, a pair of flanges extending horizontally outwardly from said shield above and below said aperture and having substantially aligned apertures therein, a propeller guard of smaller diameter than said aperture, a unidirectional fan motor secured to said guard, a propeller carried within said guard and rotatable by said motor, a pair of rubber grommets having central openings, one of said grommets being in the aperture in each flange, diametrically opposite studs on said propeller guard received in the central apertures of said grommets pivotally to support said guard, propeller, and fan motor from said flanges substantially without transmitting vibration to said shield, and cooperating structure on said guard and said lower flange to lock said guard positively in any of a plurality of predetermined positions, said cooperating structure being unlockable by raising said guard relative to said flanges whereby to direct an air stream in any of a plurality of predetermined directions, a part of said guard swinging through said aperture when pivoted.

10. A window ventilator comprising an upright shield adapted to fit in a window and having an aperture therein, a propeller guard of smaller diameter than said aperture, a unidirectional fan motor secured to said guard, a propeller carried within said guard and rotatable by said motor, and horizontally disposed support means on said shield, vertically disposed pivotal connecting means between said guard and said support means for pivotally mounting said propeller guard at a predeter-

mined fixed distance from said shield substantially in alignment with said aperture, said guard, propeller, and motor being horizontally pivotal about said pivotal connecting means to direct an air stream in any of a plurality of predetermined directions, said connecting means including means for positively locking said guard, propeller, and motor in any of said directions.

11. A window ventilator comprising an upright shield having an aperture therein, upper and lower supporting members extending horizontally outwardly from said shield above and below said aperture, a propeller guard, cooperating rotary bearing means on said supporting members and said propeller guard rotatably mounting said propeller guard, said bearing means including resilient means for substantially preventing the transmission of vibrations from said guard to said supporting members, a fan motor carried by said guard, a propeller carried within said guard and rotatable by said motor, locking structure on said fan guard and said supporting members interfitting in any of a plurality of positions to lock said guard, propeller, and motor in any of a plurality of positions to direct an air stream from said propeller in any of a plurality of directions.

12. A window ventilator comprising an upright shield having an aperture therein, upper and lower supporting

means extending outwardly from said shield adjacent said aperture, a propeller guard, one of said guard and said supporting means having a pair of diametrically arranged studs and the other having frictional means rotatably receiving said studs rotatably to mount said guard and frictionally to control rotation thereof, a fan motor carried by said guard, a propeller mounted within said guard and rotatable by said motor, and locking means on said supporting means and said guard cooperable in any of a plurality of predetermined positions to lock said guard, propeller, and motor in any of a plurality of predetermined positions to direct an air stream from said propeller in any of a plurality of predetermined directions.

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