Feb. 9, 1954 R. A. GERLITZ 2,668,491

POWER ROOF VENTILATOR

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FIG. 1.

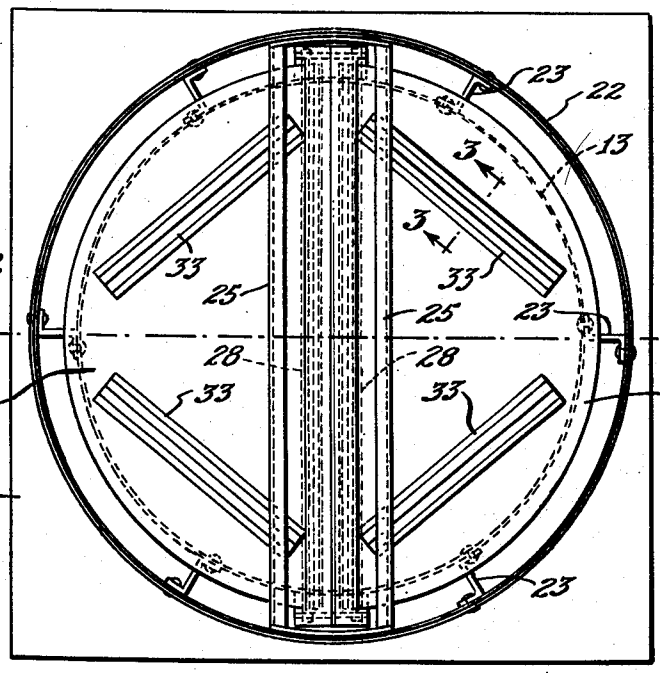


FIG. 2.

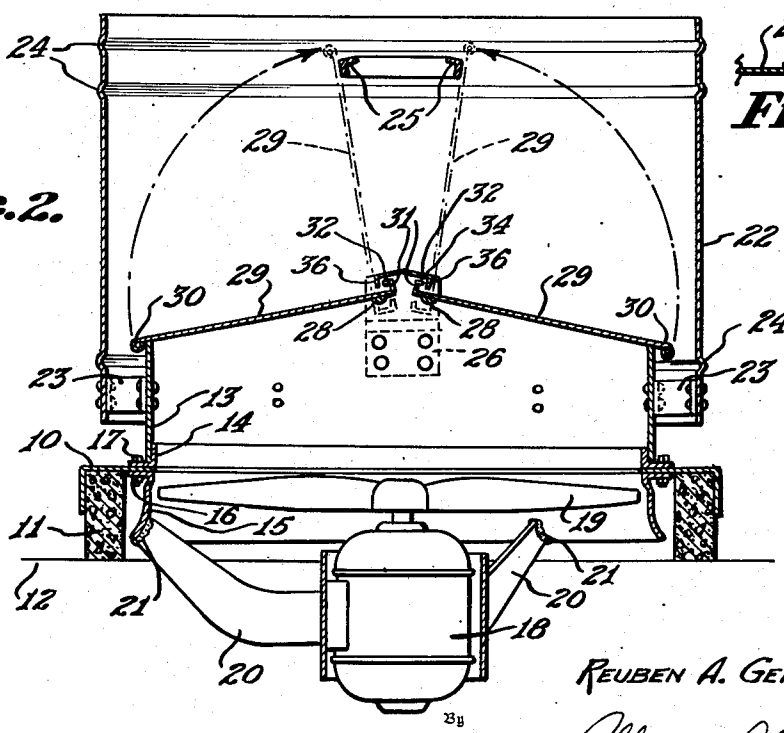
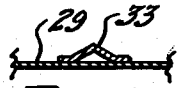


FIG. 3.



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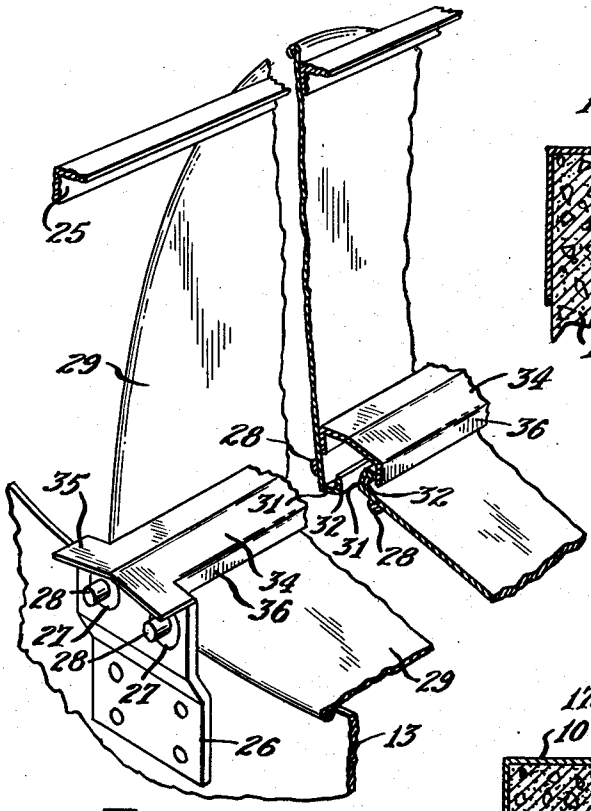


FIG. 4.

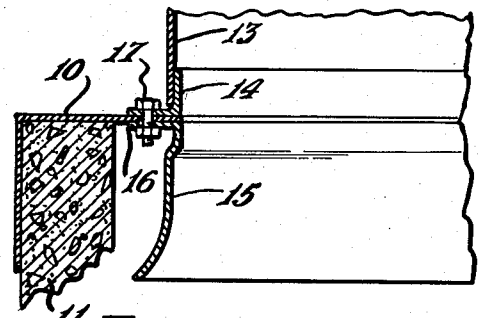


FIG. 5.

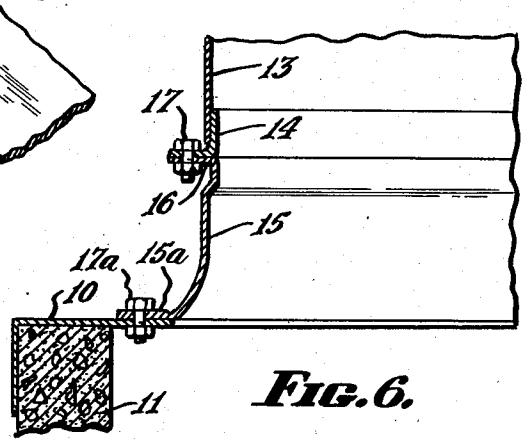


FIG. 6.

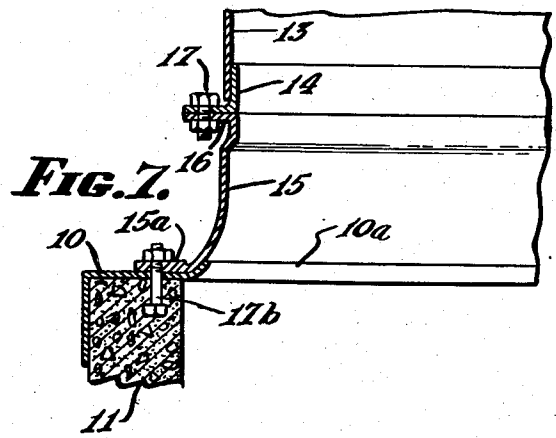


FIG. 7.

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POWER ROOF VENTILATOR

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Application August 16, 1950, Serial No. 179,735

1 Claim. (Cl. 98—43)

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This invention relates to a power roof ventilator having a built-in or attached fan for exhausting air from buildings such as foundries, steel mills, processing plants, grain elevators, convention halls and various other places where it is desirable to remove warm, moist, dust-laden or contaminated air.

Various measures have been taken in the past in connection with ventilators of this type to provide some sort of a rain canopy over the top to prevent access of rain, snow and the like. These measures have resulted in greater complexity and cost and have had the further disadvantage of presenting a tall and unsightly silhouette.

It has also been attempted to protect the fan and motor from rain by the provision of a trough under the dampers. Such measures have however proved ineffective because the rain introduced into the trough leaves dust and other particles which are present in the air and which eventually clogs up the drain holes at the ends of the gutter whereupon water would work its way over the edge of the gutter and fall onto and through the fan and in some cases cause an accumulation of water on the floor below.

With the foregoing difficulties in mind, it is an object of the present invention to provide a simple and efficient power roof ventilator which is not subject to the disadvantages of prior constructions. It is another object of the invention to provide a ventilator of the type discussed above which is positively protected against rainfall, even under cloudburst conditions. Yet another object of the invention is to provide rain protection for the damper blade bearings. Another object of the invention is to increase the life of the damper blades by reducing bending fatigue and surface contact wear.

Still another object of the invention involves the provision of a simple rain trough integral with the damper blade which will be effective to prevent entrance of rain in the open and shut position of the damper blade. A still further object of the invention is to provide for a stronger mounting for the fan and to provide a gravity air vent to protect the fan motor from the condensation of moisture thereon during periods when the fan is shut down.

These and other objects of the invention which will be described in more detail hereinafter or which will be apparent to one skilled in the art upon reading these specifications I accomplish by that certain construction and arrangement of parts of which I shall now disclose certain exemplary embodiments.

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Reference is made to the drawings forming a part hereof and in which:

Figure 1 is a plan view of a ventilator according to the invention.

Figure 2 is a cross sectional view of the same taken on the line 2—2 of Figure 1.

Figure 3 is a fragmentary cross sectional view taken on the line 3—3 of Figure 1.

Figure 4 is an enlarged fragmentary perspective view with parts in section of the inner member and the damper blade.

Figure 5 is an enlarged fragmentary cross sectional view showing a preferred mounting construction for the fan ring to the inner ventilator member and to the ventilator base.

Figure 6 is a view similar to Figure 5 showing another method of mounting.

Figure 7 is a view similar to Figures 5 and 6 showing still another method of mounting.

Briefly, in the practice of my invention I provide a sheet metal assembly consisting of a base, an inner cylindrical member and an outer cylindrical member or windguard. The base member is constructed and designed to fit on the roof of the building to be ventilated. The fan and the inner member are mounted on the base with the inner member secured to the outlet face of the fan ring and being approximately the same inside diameter as the fan ring so as to provide for a smooth aerodynamically efficient air flow. Two damper blades are pivoted near the center at the top of the inner member and rest against the top of the inner member by gravity. These damper blades open automatically as the fan starts operating and close again as it stops. The outer member or windguard surrounds the inner member and is of sufficient size to protect the damper action from the forces of wind velocity, and it is provided with a circumferential opening at the bottom providing a space between it and the inner cylinder to prevent any aspirating effects which would cause the dampers to open and shut alternatively.

Referring now more in detail to the drawings, the base is indicated at 10, which is seated upon a curb 11 on the roof 12 of the building to be ventilated. The inner cylinder is indicated at 13, and in the construction of Figures 1, 2 and 5 it is provided with a base flange 14 by means of which it maye be secured to the base 10. The flange ring 14 may be riveted or otherwise suitably secured to the cylinder 13. The fan ring is indicated at 15, and it is provided with an annular flange 16. As best seen in Figure 5, the flanges 14 and 16 are bolted to the base 10 by means of bolts 17. The fan itself includes a

motor 18 and blades 19, and the motor is mounted on the fan ring 15 by brackets 20 which may be spaced 120 degrees apart and suitably welded or otherwise secured as at 21 to the fan ring.

The outer cylinder or windguard is indicated at 22, and it is secured to the inner cylinder 13 by means of a plurality of Z-shaped brackets 23 suitably spaced around the periphery of the inner cylinder 13. The outer cylinder will preferably be provided with beads or corrugations 24 for stiffening purposes and a pair of damper stops 25 are secured across the outer cylinder 22 near the top thereof as best seen in Figure 2. The damper stops 25 further cooperate in bracing and rigidifying the structure of the windguard member 22.

As best seen in Figures 2 and 4, bearing plates 26 are suitably riveted, bolted or otherwise secured to the inner cylinder 13 at diametrically opposed positions. These plates are provided with bearings 27 for the pivot rods of the damper blades. The pivot rods are indicated at 28 which are welded or otherwise suitably secured to the under side of the damper blades 29. The upper edge of the inner cylinder 13 is sloped in diametrically opposite directions, as best seen in Figure 2, so that when the damper blades 29 which are semi-circular in shape are seated against the top of the cylinder 13 they slope outwardly and downwardly as best seen in Figure 2. It will be clear that the damper blades are of sufficient length to overhang the upper edge of the cylinder 13 and they may be provided along their semi-circular edges with a bead or rolled edge as indicated at 30 to provide for additional strength. At their inner ends, which correspond substantially to the diameters of the semi-circular damper blades, they are provided with upstanding flanges 31 and return bent flanges 32 for a purpose which will shortly be made clear. In order to strengthen the damper blades still further they may be provided with reinforcing members 33 which are preferably of a cross sectional shape as seen in Figure 3 and which are preferably disposed as shown in Figure 1. When disposed in this manner they provide a triangular bracing structure which makes the damper blades extremely rigid.

A roof member 34 is welded or otherwise suitably secured to the opposite bearing brackets 26 and extends over the inner edges of the damper blades, as best seen in Figures 2 and 4. The member 34 is long enough to extend endwise beyond the bearing brackets, as best seen in Figure 4 at 35, to protect the pivot rod bearings from the weather. Between the bearing brackets 26 the lateral edges of the roof member 34 are turned down as indicated at 36 beyond the upwardly extending flanges 31 and reversely bent flanges 32 of the damper blade. From the foregoing description it will be clear that when the damper blades are in their closed position, as shown in solid lines in Figure 2, a complete roof is provided to prevent access of rain to the inside of the inner cylinder 13. The flanges 31 and 32 cooperate with the roof 34 and flanges 36 to prevent access of rain while still permitting a slight circulation of air through the inner cylinder so as to minimize condensation on the fan or motor.

When the damper blades are in their open position as indicated in broken lines in Figure 2 the flanges 31 and 32 provide gutters to catch any rain which may enter by dripping down the outer faces of the damper blades 29.

From the foregoing it will be clear that I have provided a thoroughly rain-proof structure which is inexpensive and simple, while being thoroughly effective.

In Figures 6 and 7 I have shown alternative mounting arrangements which may be used. In both of these figures the fan ring and the flange 14 of the inner cylinder 13 are bolted together by means of the bolts 17, but instead of using these fastening means to secure the assembly to the base 10, a flange 15a is provided on the fan ring which in the embodiment of Figure 6 is bolted to the base 10 by means of bolts 17a and which in the structure of Figure 7 is bolted not only to the base 10 but also to the curb 11 by means of bolts set into the material of the curb and indicated at 17b. The base 10 in this case will preferably be provided with an upturned annular flange 10a to provide a water-tight mounting without the necessity of using roofing compounds.

It will be clear from what has been said above that various modifications may be made without departing from the spirit of my invention, and I therefore do not intend to limit myself in any way other than as set forth in the claims which follow.

Having now fully described my invention, what I claim as new and desire to secure by Letters Patent is:

A ventilator comprising a cylindrical casing substantially vertically disposed, a base flange on the lower end of said casing, a fan ring having an annular flange, means engaging said base flange and said annular flange whereby said casing and said ring are secured together, a motor driven fan secured to said ring, the upper edge of said casing lying in two planes sloping downwardly and outwardly from a diameter of said casing, bearing brackets secured to said casing at each end of said diameter, a pair of damper blades of semi-circular shape adapted in their closed position to rest on the upper edge of said casing in said two planes, pivot rods secured to said blades adjacent their diametral edges, and having bearings in said bearing brackets, the diametral edge of each of said blades being provided with an upwardly directed flange terminating in an outwardly directed flange, and a roof element secured to said bearing brackets and having portions extending over said bearings to protect them from rain and the like, said roof element between said brackets having flanges depending downwardly outside the flanges on said blades and slightly spaced therefrom, to prevent access of rain while permitting slight air circulation when said blades are closed.

REUBEN A. GERLITZ.

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