

Feb. 26, 1963

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3,078,781

VENTILATOR

Filed June 21, 1960

3 Sheets-Sheet 1

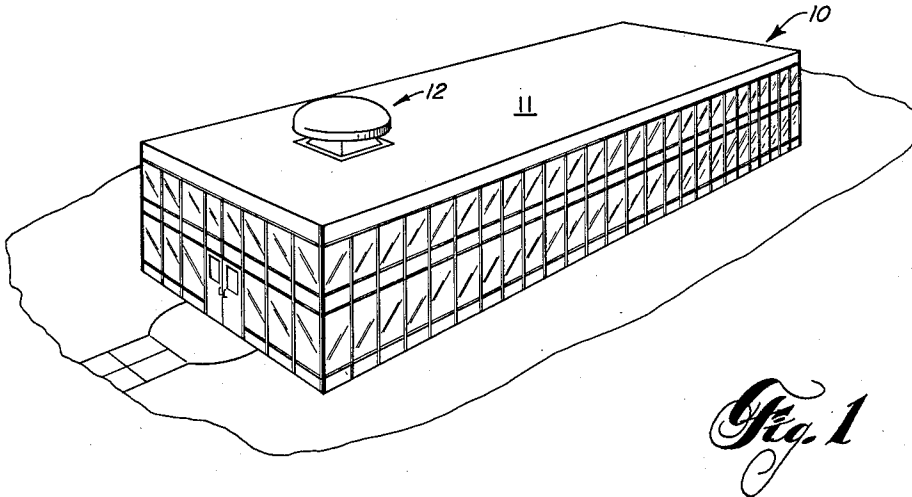


Fig. 1

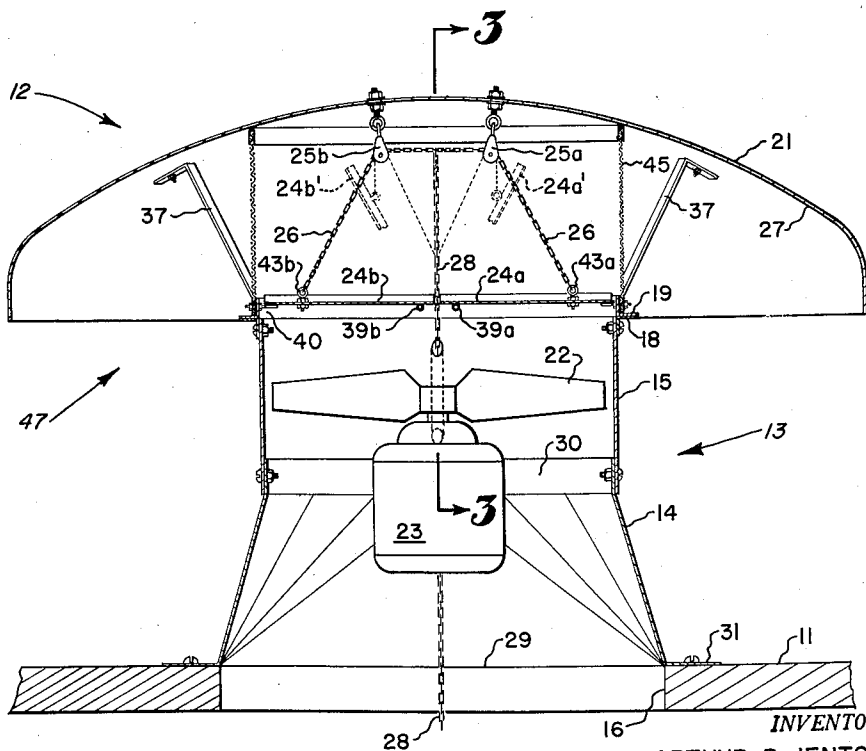


Fig. 2

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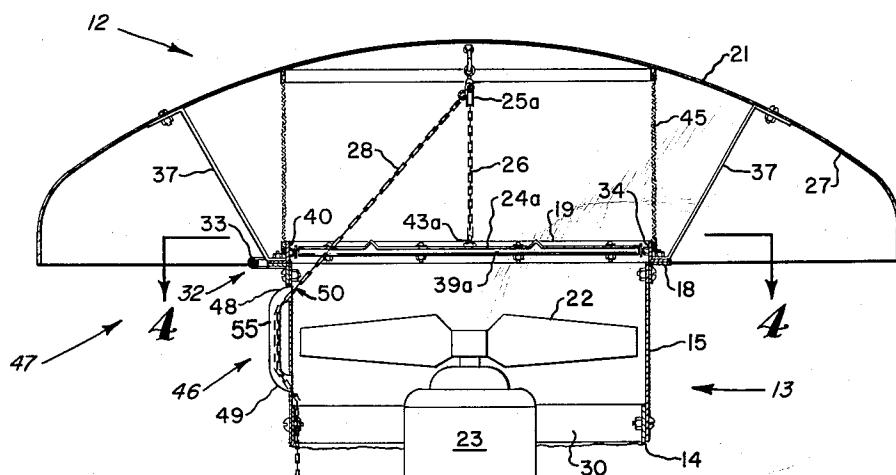


Fig. 3

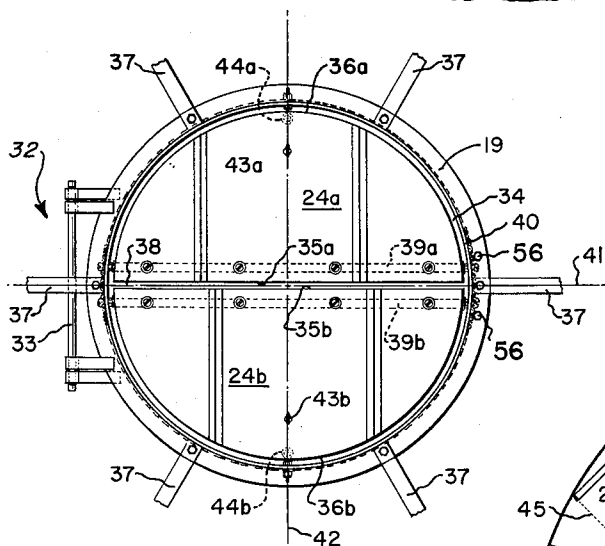


Fig. 4

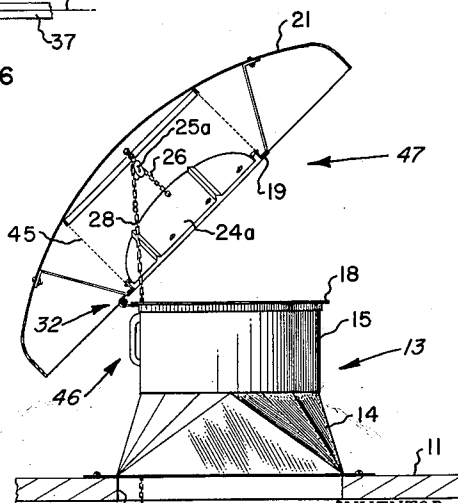


Fig. 5

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3 Sheets-Sheet 3

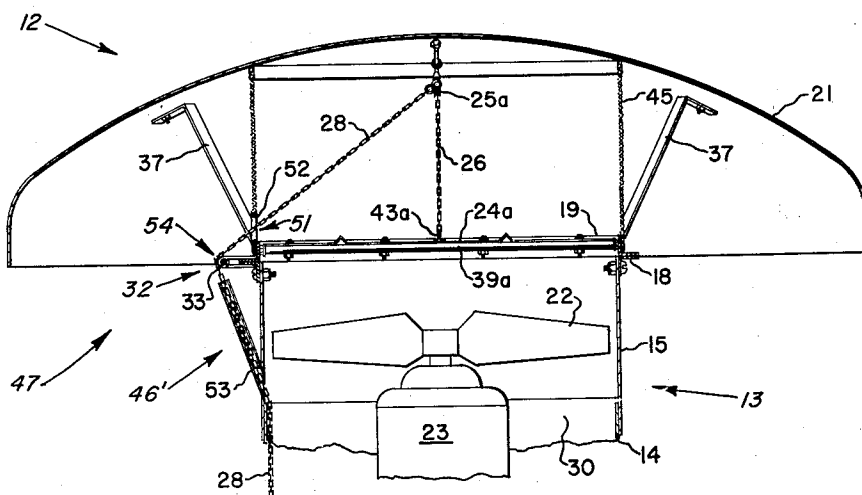


Fig. 6

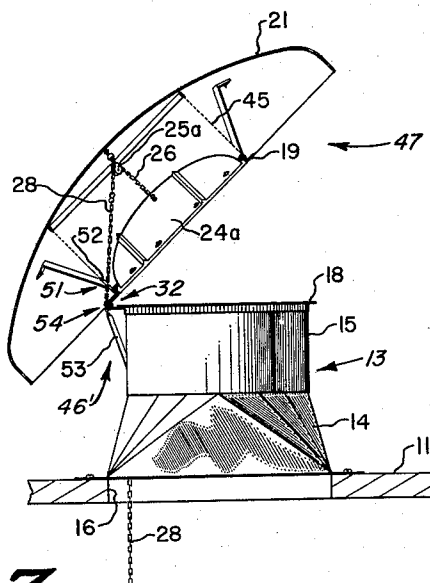


Fig. 7

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7 Claims. (Cl. 93-43)

This invention relates to a ventilator for use on a building roof.

More particularly this invention relates to forced air ventilators which are subjected to intermittent service and hence require provision of dampers to prevent drafts and moisture from entering the building when the ventilator is inactive.

The primary object of this invention is to provide a fan-driven ventilator with a pivotable construction which permits easy access to the fan and to the internal elements of the ventilator for the purpose of maintenance.

Another object of this invention is to provide in a fan-driven ventilator an arrangement of damper operating cables which permits ready access to the fan and dampers regardless of the position of the dampers, i.e., whether open, closed or in an intermediate position.

A further object is to provide a fan-driven ventilator with cable-operated dampers having a relatively low silhouette.

These and other objects and advantages of the present invention will become apparent from the following detailed description by reference to the accompanying drawings in which:

FIGURE 1 is a general view of a typical building incorporating the present roof ventilator;

FIGURE 2 is a cross-sectional view through the present ventilator;

FIGURE 3 is a cross-sectional view taken along the line 3-3 of FIGURE 2;

FIGURE 4 is a cross-sectional view taken along the line 4-4 of FIGURE 3;

FIGURE 5 is a side elevation view, partly in cross-section, illustrating the ventilator of FIGURE 3 having the dome shaped unit in a pivoted access position;

FIGURE 6 is a fragmentary cross-sectional view similar to FIGURE 3 illustrating an alternative embodiment of this invention; and

FIGURE 7 is a side elevation view, partly in cross-section and similar to FIGURE 5, showing the ventilator of FIGURE 6 having the dome shaped unit, of the alternative embodiment, in a pivoted access position.

The preferred embodiment of my invention is illustrated in FIGURES 1 to 5 inclusive. FIGURE 1 shows a typical building 10 having a roof 11 with the present ventilator 12 mounted on it. The ventilator 12 includes a stack 13 having a fixed base 14 and a chimney 15. The fixed base 14 is mounted over an opening 16 in the roof 11.

Secured to the top of chimney 15 is a first angle ring 18 forming a first flange member. Resting on angle ring 18 is a second angle ring 19 forming a second flange member. Angle ring 19 is hingedly secured to angle ring 18 to permit pivotal movement of angle ring 19 with respect to angle ring 18. A dome shaped vent cap 21 is supported in spaced relationship from the second angle ring 19.

A fan 22 is mounted within chimney 15 for rotation about a vertical axis. The fan 22 is also rotatably connected to a drive means herein shown as a motor 23.

Pivotally secured within the second angle ring 19 are two semicircular dampers 24a and 24b which serve to control the flow of air through the ventilator 12.

Two pulleys 25a and 25b are pivotally secured in spaced relationship to the inner surface 27 of the dome shaped

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vent cap 21. A flexible cable 26 is attached at one end to damper 24a and passes over pulleys 25a and 25b and is attached at its other end to damper 24b. An operating cable 28 is attached to the flexible cable 26 and extends through the opening 16 into the interior of the building.

The fixed base 14, as shown in FIGURE 2, serves as a transition piece having a rectangular base 29 and a circular top 30. The rectangular base 29 conforms to the shape of the opening 16 in the roof 11. A flanged portion 31 extends outwardly from the rectangular base 29 and is secured to the roof 11 by any suitable means shown here as bolts. The chimney 15 is also circular in cross-section and is securely fastened to the top 30 of fixed base 14.

The angle ring 19 is pivotally secured to angle ring 18 by means of a hinge 32. The hinge 32 has a shaft 33 defining an external horizontal pivotal axis about which the angle ring 19 pivots.

The dome shaped vent cap 21 is supported in spaced relationship from angle ring 19 by a plurality of braces 37. The lower end of each brace 37 is securely fastened to angle ring 19 while the upper end of each brace 37 is securely fastened to the inner surface 27 of the dome shaped vent cap 21. With this construction the dome shaped vent cap 21 and angle ring 19 form a unitary dome shaped unit, identified by the numeral 47, which is pivotal about the hinge 32. In order to secure the angle ring 19 to the angle ring 18 when the ventilator is operating, a locking means is provided and is herein shown as locking bolts 56. The locking bolts 56, as shown, are positioned diametrically opposite the hinge 32. It should be understood that the placement of these locking bolts 56 may be elsewhere along angle ring 19 and that a locking means other than bolts can be used such as latches, hooks or the like.

Angle ring 19 presents a circular opening 34 corresponding to the circular top 30. Within the circular opening 34 semicircular dampers 24a and 24b are pivotally secured. The semicircular damper 24a has a straight edge 35a and an arc edge 36a. Similarly semicircular damper 24b has a straight edge 35b and an arc edge 36b. Arc edges 36a and 36b have a common radius which is smaller than the radius of circular opening 34. The straight edges 35a and 35b are spaced apart defining a slot like opening 38.

It will be observed that a diameter of circular opening 34 is defined by the centerline 41 of the slot like opening 38 and that this diameter is perpendicular to the centerline of shaft 33. With this construction the operating cable 28 is free to pass through the slot like opening 38 between the semicircular dampers 24a and 24b.

Semicircular damper 24a is securely fastened to a hinge pin 39a adjacent its straight edge 35a. Hinge pin 39a is pivotally secured at each of its ends to the upwardly extending portion 40 of angle ring 19 by any suitable means. Similarly semicircular damper 24b is securely fastened to a hinge pin 39b adjacent its straight edge 35b. Hinge pin 39b also is pivotally secured at each of its ends to the upwardly extending portion 40 of angle ring 19 by any suitable means.

The flexible cable 26 is shown here as a chain, but, may comprise instead a wire rope, nylon rope or the like. One end of flexible cable 26 is connected to damper 24a, adjacent its arc edge 36a, by any suitable means herein shown as a cable eye bolt 43a. The other end of flexible cable 26 is similarly connected by a cable eye bolt 43b to damper 24b adjacent its arc edge 36b. In order to prevent the semicircular dampers 24a and 24b from pivoting down into the fan 22 a stop means is provided. The stop means shown here are eye bolts 44a and 44b,

although other suitable stop means may be provided. It will be observed that cable eye bolts 43a and 43b conveniently are located along a second centerline 42 which is perpendicular to centerline 41.

Flexible cable 26 intermediate of its ends passes over pulleys 25a and 25b. Pulley 25a is pivotally secured to the inner surface of the dome shaped vent cap 21 directly over semicircular damper 24a and adjacent its straight edge 35a. Pulley 25b is similarly secured to the inner surface of the dome shaped vent cap 21 directly over semicircular damper 24b and adjacent its straight edge 35b. It will be seen that cable eye bolts 43a and 43b and pulleys 25a and 25b lie in a plane defined by the central axis of chimney 15 and centerline 42. This construction provides a maximum length of travel for dampers 24a and 24b.

The operating cable 28 is shown here as a chain but may comprise instead a wire rope, nylon rope or the like. The operating cable 28 is fastened at one end to flexible cable 26 intermediate of the pulleys 25a and 25b. The other end of the operating cable 28 extends into the interior of the building 10. By pulling operating cable 28, the dampers 24a, 24b may be adjusted to any position from fully closed to the maximum open position 24a', 24b' illustrated in fragmentary phantom in FIGURE 2.

A cylindrical screen 45 is mounted within the dome shaped unit 47 and has its base secured to the upwardly extending portion 40 of angle ring 19. The cylindrical screen 45 extends upwardly to contact the inner surface 27 thus forming a cage like structure to prevent the ingress of birds or other foreign matter such as leaves, paper debris and the like.

Referring now to FIGURE 3 a guide means indicated by the numeral 46 is mounted exteriorly of chimney 15. Guide means 46 comprises a U-shaped tubular member 55 having an upper elbow portion 48 and a lower elbow portion 49. The upper elbow portion 48 communicates with the interior of chimney 15 at a point above the fan 22. Lower elbow portion 49 communicates with the interior of chimney 15 at a point below the fan 22. In this manner guide means 46 directs operating cable 28 around the fan 22.

The placement of guide means 46 should be especially noted. Firstly, guide means 46 is mounted vertically and lies in a plane defined by the central axis of chimney 15 and the centerline 41. Secondly, the upper elbow portion 48 must be placed as close to the top of chimney 15 as possible. Positioned in this manner the upper elbow portion 48 provides a pivot point 50 for operating cable 28, that is close to the horizontal axis of shaft 33.

Accordingly the dome shaped unit 47 is free to pivot about the hinge 32 without interference from operating cable 28, as can be seen in FIGURE 5 which shows the present ventilator with the dome shaped unit 47 in its pivoted access position. The operating cable 28 remains in a relatively fixed position with respect to the other elements of the dome shaped unit 47 regardless of whether it is slack or in tension. Thus a worker can gain access to the interior of chimney 15 and to all the elements of the dome shaped unit 47, regardless of whether the dampers 24a, 24b are opened or closed. The dampers 24a, 24b are exposed for maintenance from the dome shaped unit 47 and the fan 22 and motor 23 are exposed within the stack 15.

An alternative embodiment of the present invention is illustrated in FIGURES 6 and 7: Corresponding numerals are employed to identify corresponding elements already described. In this embodiment, an aperture 51 with a grommet 52 is positioned near the base of the screen 45 adjacent to the hinge 32. The guide means, indicated by the numeral 46', comprises a guide tube 53 mounted exteriorly of chimney 15. The guide tube 53 communicates with the interior of chimney 15 at a point below the fan 22 and is inclined towards the hinge 32.

Operating cable 28 extends downwardly through the grommet 52 and passes over and in contact with the shaft 33. Operating cable 28 continues through the guide tube 53 and into the interior of building. It should be noted that the vertical centerline of grommet 52 and guide tube 53 lie in a plane defined by the central axis of chimney 15 and the centerline 41 (shown in FIGURE 4). Hence the grommet 52 and the guide tube 53 co-act to align the operating cable 28 in a single plane. Shaft 33 provides a pivot point 54 about which operating cable 28 turns when the angle ring 19 pivots about hinge 32.

Accordingly the dome shaped unit 47 is free to pivot about the hinge 32 without interference from operating cable 28, as can be seen in FIGURE 7 which shows the present ventilator with the dome shaped unit 47 in its pivoted access position. The operating cable 28 remains in a fixed position with respect to the other elements of the dome shaped unit 47 regardless of whether it is slack or in tension. Thus a worker can gain access to the interior of chimney 15 and to all the elements of the dome shaped unit 47, regardless of whether the dampers 24a, 24b are opened or closed. The dampers 24a, 24b are exposed for maintenance from the dome shaped unit 47 and the fan 22 and motor 23 are exposed within the stack 15.

According to the provisions of the patent statutes, I have explained the principle, preferred embodiment and mode of operation of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. In a ventilator for use on a roof of a building, the combination comprising a stack surrounding an opening in the said roof; a fan mounted in the said stack for rotation about a vertical axis; a first rim member secured to the upper edge of the said stack and having an outwardly extending flange; a second rim member having an outwardly extending flange normally resting on said first rim member; hinge means secured to the peripheral edges of said outwardly extending flanges, said hinge means defining a pivotal axis; a dome shaped vent cap; mounting means for maintaining the said dome shaped vent cap in overlying fixed relation with the said second rim member and spaced therefrom; a pair of semicircular dampers mounted on the said second rim member for pivotal movement about parallel axes adjacent their straight edges, said parallel axes being substantially perpendicular to the said pivotal axis; said dome shaped vent cap and the said second rim member and the said pair of dampers comprising a unitary structure which is pivotable about the said pivotal axis; damper operating means for controlling the pivotal position of the said pair of dampers comprising a connecting cable having ends secured to the said dampers and an operating cable secured to the said connecting cable; and guide means for directing the said operating cable externally of the said stack in the region above the said fan and substantially perpendicular to the said pivotal axis and internally of the said stack in the region below the said fan to a damper control location within the said building.

2. The combination of claim 1 wherein the said damper operating means includes a pair of pulleys pivotally secured to the inner surface of the said dome shaped vent cap, one of the said pulleys being above each of the said dampers, said connecting cable having an end secured adjacent to the arc edge of each of the said dampers and extending intermediate of its ends over the said pair of pulleys, the said operating cable being connected to the said connecting cable at a point intermediate of the said pair of pulleys.

3. The combination of claim 1 wherein the said guide means comprises an inclined tubular member mounted

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exteriorly of the said stack, the said tubular member having one end in communicating relation with the interior of the said stack at a point below the said fan and its other end terminating adjacent the said pivotal axis of the said flanges, the said operating cable extending over and in contact with the said pivotal axis and through the said tubular member to a damper control location within the said building, the said guide means being so constructed and arranged whereby the said second platform is pivotal without regard to the position of the said dampers.

4. The combination of claim 3 wherein the said operating cable regardless of the position of the said dampers lies in a plane that (a) includes the central vertical axis of the said stack and (b) is perpendicular to the said pivotal axis of the said platforms.

5. The combination of claim 1 wherein the said guide means comprises a U-shaped tubular member mounted exteriorly of the said stack including an upper elbow portion and lower elbow portion, said upper elbow portion being in communicating relation with the interior of the said stack in the region above the said fan, said lower elbow portion being in communicating relation with the interior of the said stack in the region below the said fan, said operating cable being extended downwardly between the said pair of dampers and through the said U-shaped tubular member to a damper control point within the building, said guide means being so constructed and arranged whereby the said unitary structure is pivotal without regard to the position of the said dampers substantially over the entire range of movement of the said dampers.

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6. The combination of claim 5 wherein the said operating cable regardless of the position of the said dampers lies in a plane that (a) includes the central vertical axis of the said stack and (b) is perpendicular to the said pivotal axis of the said platforms.

7. In a roof ventilator having a stack surrounding an opening in a roof of a building, said stack having an upper rim, a first rim member secured to the said upper rim and having an outwardly extending flange, a fan mounted within the said stack beneath the level of said rim for rotation about a vertical axis, and a dome shaped vent cap above said upper rim, the improvement comprising:

a second rim member having an outwardly extending flange normally resting upon said first rim member, hinge means secured to the peripheral edges of said outwardly extending flanges, mounting means for maintaining the said dome shaped vent cap in overlying fixed relation with the said second rim member and spaced therefrom, and damper means carried by said second rim member above the said rim for controlling the gas flow through said stack.

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