United States Patent [19]

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[11] **3,791,280**

[45] **Feb. 12, 1974**

[54] SCREENED VENTILATOR

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[22] Filed: **Sept. 14, 1972**

[21] Appl. No.: **289,153**

[52] **U.S. Cl.** ..... **98/40 VM,** 98/121 A, 160/236

[51] **Int. Cl.** **F24f 7/02**

[58] **Field of Search** .....98/40 VM, 110, 121 A, 98/121 R; 160/236

[56] **References Cited**

UNITED STATES PATENTS

335,354	2/1886	Hayes	98/121 R
3,353,551	11/1967	Smale	98/110 X
345,689	7/1886	Hayes	98/40 VM
345,690	7/1886	Hayes	98/40 VM

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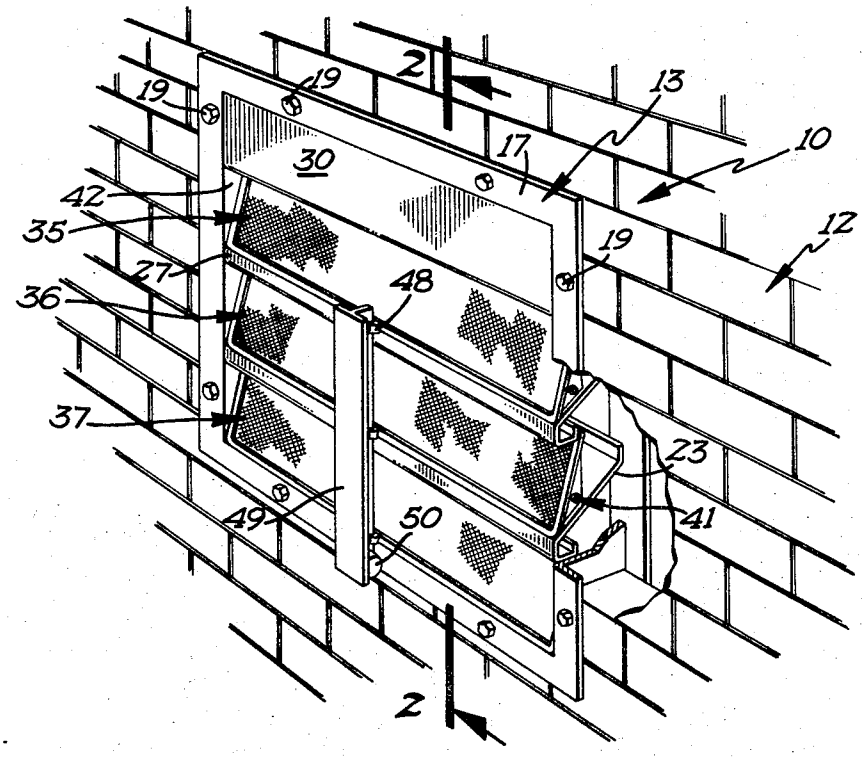
[57] **ABSTRACT**

A ventilator for a building having a plurality of inclined louver blades and a plurality of longitudinally pivoted screen sections normally biased into engagement with portions of the adjacent louver sections to form a screen. If the screens become temporarily clogged as with ice or frost, the differential air pressure on opposite sides of the screen sections causes them to swing open against their bias to enable passage of air through the ventilator.

6 Claims, 4 Drawing Figures



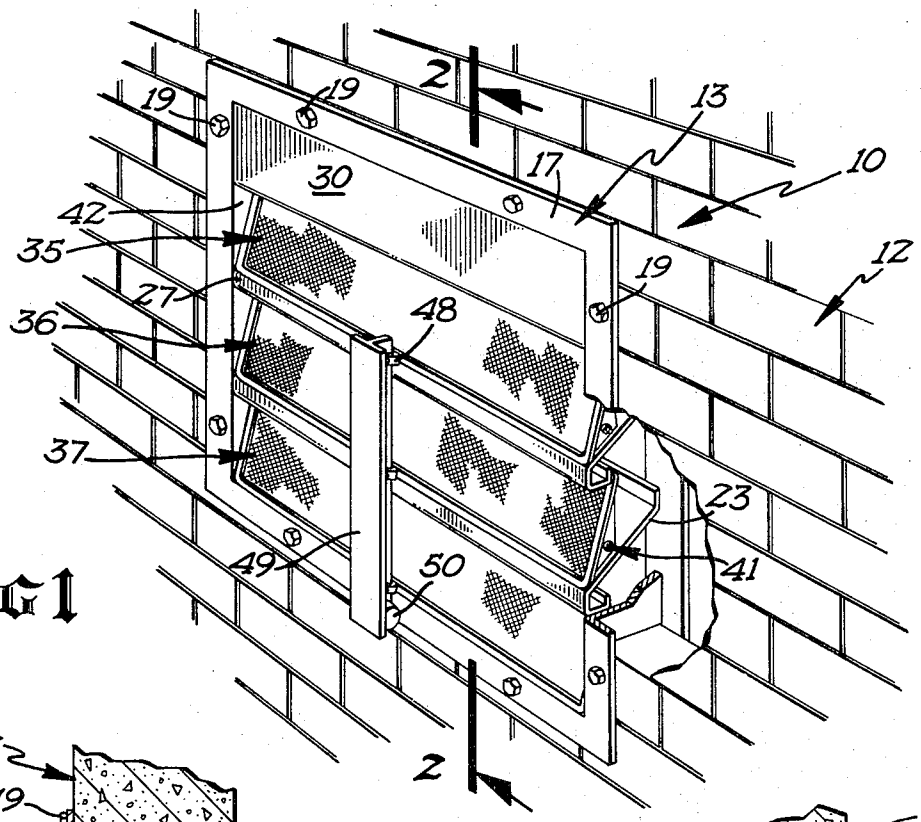


Fig 1

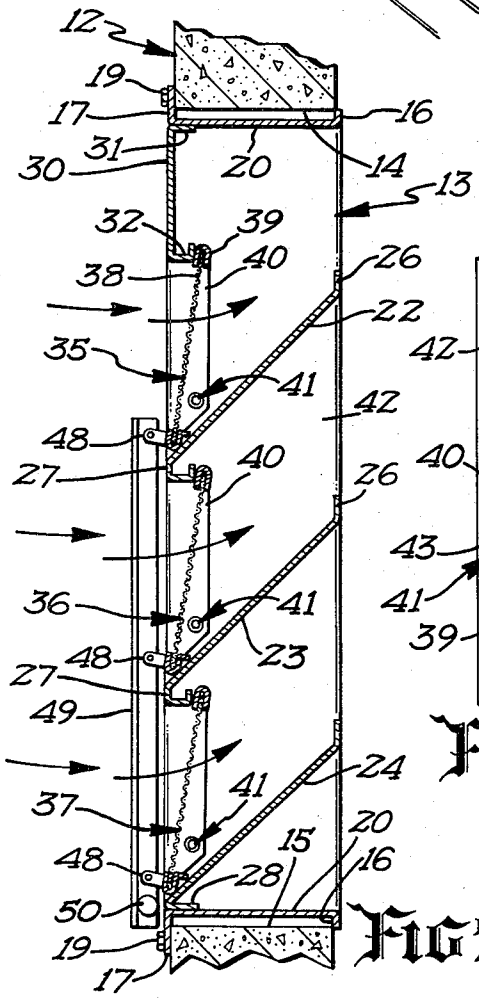


Fig 2

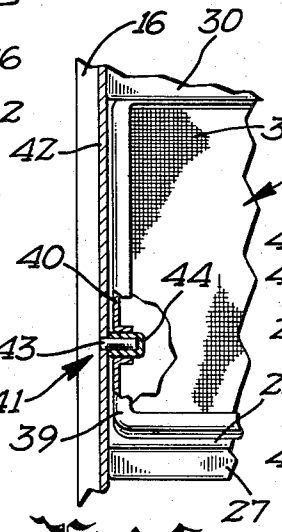


Fig 3

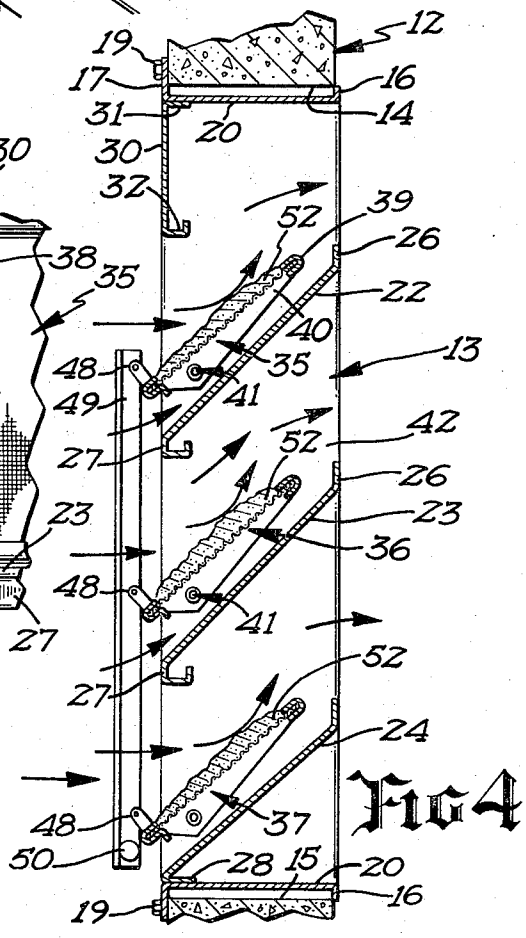


Fig 4

SCREENED VENTILATOR

BACKGROUND OF THE INVENTION

It is very common in connection with buildings to use ventilators which are set into openings of the building. These ventilators normally comprise a plurality of inclined louver blades which limit the access of foreign particles into the building through the ventilator. Such ventilators are commonly employed in connection with the inlets and outlets of air circulating systems. While the louvers tend to limit the introduction of foreign matter into the ventilating system, it is still possible for birds or bugs to fly in between the louver blades. Consequently, it is quite common to provide a screen on either the inlet or outlet side of the ventilator to prevent birds or insects from entering the system. These bird screens, however, present a further problem, particularly in northern climates. The atmospheric conditions in winter are often such that the incoming cold air results in the screen becoming coated with frost, preventing the entrance of further air. In such case, the ventilating system fails to function properly and the motor driving the blower can become damaged. While this condition is less likely to occur with exhaust ventilators, due to the exhausted air being at a much higher temperature than the inlet air, it is still possible with severely cold conditions to have the problem in connection with exhaust ventilators, also.

SUMMARY OF THE PRESENT INVENTION

The present invention is concerned with providing in connection with a ventilator having a plurality of inclined louver blades a plurality of screen sections which normally bridge the space between louvers and which are mounted for swinging movement so as to enable them to swing away from engagement with the louver blades when the pressure differential exceeds a predetermined value. Where the clogging is due to frost, this condition is temporary since the passage of the air over the screen sections tends to dissipate the frost. Furthermore, any warming of the air also tends to dissipate the frost. As soon as the frost has gone, the screen sections automatically return to their original position in engagement with the louver blades.

The pivotal axis of the screen sections is displaced from the central longitudinal axis of the screen sections so that a pressure differential on opposite sides of the screen sections tends to cause them to swing. This swinging is normally resisted by a biasing means. This biasing means can take the form of a single biasing means acting on all of the screen sections.

Where the ventilator is used as an air intake, the louver blades are mounted so that an increase in pressure differential tends to swing the screen sections inwardly. It will be obvious that where the ventilator is used as an outlet, the screen sections will be mounted so as to tend to swing outwardly.

Various other objects of the invention will be apparent from a consideration of the accompanying specification, claims and drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a perspective view of a portion of the wall of the building showing my improved ventilator in position with a portion of the wall broken away to show more clearly certain details of the ventilator construction;

FIG. 2 is a vertical sectional view of my improved ventilator with the screen sections in the normal position they assume and to which they are biased;

FIG. 3 is a front fragmentary view of a portion of the ventilator frame and of one screen section to show in more detail the pivotal mounting of the screen sections; and

FIG. 4 is a view similar to FIG. 2 but showing the screen sections moved to open position as a result of the screens becoming clogged with frost.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to FIG. 1, I have shown my improved ventilator, designated in its entirety by the reference numeral **10**, mounted within a wall **12** of a building. The wall **12** is provided with an opening for the reception of the frame **13** of the ventilator **10**. As best shown in FIGS. **2** and **4**, the building wall **12** has an opening founded on its upper side by a wall **14** and its lower side by a wall **15**. The ventilator **10** has a rectangular frame **13** which, as shown in FIGS. **2** and **4**, is channel shaped in form, having a base **20** and an inner flange **16** of a size to fit through the opening in wall **12** between the walls of the opening, including upper and lower walls **14** and **15**. It is also provided with an outer flange **17** which projects beyond the walls of the opening and which is fastened to the wall **12** by any suitable fastening means such as lag screws **19**. The manner in which the frame **13** is secured in the opening of wall **12** does not form part of my present invention and various means may be employed for fastening this frame in position. In some cases, base **20** of the channel shaped frame may fit snugly into the opening of the wall and the inner flange **16** may be detachably secured to the frame **13** so that it can be fastened to the frame after the same is in position in the wall opening.

Extending longitudinally across the frame **13** and secured thereto are a plurality of louver blades **22, 23** and **24**. These blades are inclined upwardly and each terminates at its inner end in a vertical flange designated by the reference numeral **26**. At the outer lower end of each of louver blades **22** and **23**, the blade is formed into a U-shaped flange **27** which acts to reinforce the outer lower end of the blade. The lowermost louver blade **24** is simply bent back as at **28** to form a horizontal flange which is secured to the base **20** of the channel member of the frame **13**. At the upper end of the frame, in lieu of a louver blade, there is a vertical panel member **30** having an upper horizontal flange **31** secured to the base **20** of the frame **13** and a lower U-shaped flange **32** which, like flange **27** of louver blades **22** and **23** acts to reinforce the panel.

In connection with a ventilator such as described so far, it is customary to provide a single screen which extends over the entire area of the ventilator. This screen may be mounted either inside or outside of the window. As pointed out previously, such a screen has the drawback that frost builds up on it and eventually blocks the flow of air through the screen. As pointed out above, the present invention is concerned with a plurality of screen sections which bridge the gaps between the louver blades and which are swingably mounted to permit automatic opening of the screens if the frost builds up to the point where it impedes the flow of air there through.

Referring specifically to FIGS. 2 and 4, the screen sections are designated by the reference numerals 35, 36 and 37. Referring first to screen section 35, it will be noted that this includes a screen member 38 mounted in a frame 39. As is apparent from FIG. 1, these screen sections are generally rectangular in configuration. Secured to each end of the frame 39 is a triangular sheet metal bracket 40 which is pivotally secured to the side wall of the frame member 13 by pivot structure 41. This pivot structure, as is best shown in FIG. 3, may consist of a nylon sleeve 44 which fits over a nylon stud 43 secured in the side wall 42 of the frame 13. The two opposed bearing structures 41, of screen section 35 only one of which is shown in FIGS. 3 and 4, are longitudinally aligned and serve to pivotally support the screen section 35 for rotation about an axis extending through the two pivot members 41. As will be noted, the frame 39 of the screen section 35 abuts the inner surface of the U-shaped flange 32 at its upper end and abuts the inclined wall of the louver blade 22 at its lower end. It will be further noted that the pivotal axis defined by pivot structures 41 is substantially below the longitudinal center line of screen section 35. Thus, any pressure differential existing on opposite sides of the screen 38 of screen section 35 results in a turning force tending to rotate the screen section 35 in a clockwise direction about the pivot axis defined by pivot structures 41.

Turning now to screen section 36, it will be noted that it is similarly provided with a flange 40 secured to the side wall 42 by pivot structures 41. The upper end of screen section 36 normally abuts against the inner end of the U-shaped flange member 27 of louver blade 22 and the lower end normally abuts against the inclined upper wall of louver blade 23. The lower screen section 37 similarly has its upper end abutting against the inner wall of the U-shaped flange 27 and its lower wall abutting against the inclined upper surface of louver blade 24.

Each of the three screen sections, 35, 36, and 37 has a bracket 48 pivotally connected to a vertical T-shaped bar 49 to which is secured a weight 50. The bar 49 and the weight 50 attached thereto act to bias the screen sections, 35, 36, and 37 in a counter-clockwise direction, thus tending to hold them in the position shown in FIG. 2. In this position, the screen sections 35, 36, and 37 cooperate with the louver blades 22, 23, and 24 and panel member 30 to close off the ventilator to the passage of birds or insects. Normally, air passes freely through the screens 38 of screen sections 35, 36, and 37 and these screen sections remain in the position shown in FIG. 2.

If frost tends to accumulate on the screen sections, air can no longer pass freely through the screen sections. The result is that a pressure differential builds up on opposite sides of these screen sections, tending to cause them to rotate in a clockwise direction. This condition is indicated in FIG. 4 in which said layer of frost is indicated by the reference numeral 52. As will be noted from FIG. 4, each of the screen sections 35, 36, and 37 has been rotated in a clockwise direction about the pivot structures 41 thereof. Air is thus permitted to enter as shown by the arrows in that figure, the air passing between the screen sections and the lower ends of the louver sections immediately above them. Due to the fact that all three screen sections are pivotally connected to bar 49, all three screen sections move an equal amount. Thus, I avoid the situation in which one of the screen sections is blown completely open and the remaining sections are substantially closed. By equalizing the movement of the various screen sections, I not only provide a simpler biasing means, but I also insure that the openings between the screen sections and the adjacent louver sections are all equal. It is obviously desirable that these openings be kept as small as possible to avoid birds or insects entering while the screen sections are open. It will be noted that air can pass both above and below the screen sections when they are open. This further reduces the cross-sectional area of any one passageway, although the total cross-sectional area between any two adjacent louver sections remains approximately the same.

Normally, the screen sections remain in the position shown in FIG. 4 for only a limited time. The air flow over the surface of the screen sections will, as soon as there is any increase in the temperature of the outside air, cause the frost to be evaporated. As the frost disappears, the screen sections will move back towards the position shown in FIG. 2, to which they are biased. As soon as the frost has completely disappeared, they will completely return to the position shown in FIG. 2.

It will be seen that I have provided a simple way for automatically insuring the emission of air through a louver ventilator despite the formation of frost on the screen. While the screen sections of my ventilator are temporarily open, the openings around these screen sections are kept at a minimum and as soon as the undesirable frost condition has been relieved, the windows automatically return to their normal position.

While I have shown a specific embodiment of my invention, it is to be understood that this is for purposes of illustration only, and that my invention is to be limited solely by the scope of the appended claims.

I claim as my invention:

1. A ventilator for a building comprising:

a frame designed for installation within a wall opening of a building,

a plurality of generally parallel louver blades fixedly disposed in said frame, the longitudinal axis of each blade extending generally horizontally and with each blade being inclined so that the inner edge of the blade is substantially higher than the outer edge,

a plurality of screen sections, each of a width somewhat greater than the width of the space between adjacent louvers,

means for mounting each of said screen sections in said frame member for swinging about a longitudinal axis, said axis being located intermediate adjacent louvers in such a position that the upper and lower edges of each screen section normally abut opposite louver blades, and

means for yieldably biasing said screen sections into such abutment with adjacent louver blades,

said longitudinal axes of rotation of said screen sections being displaced transversely from the longitudinal center of said screen sections so that if said screens become temporarily clogged, a pressure differential on opposite sides of said screen sections will cause said screen sections to swing away from engagement with said louver blades to permit passage of air between said screen sections and said louver blades.

2. The ventilator of claim 1 in which said biasing means is a single biasing means connected to each of said screen sections at a point transversely spaced from the longitudinal axis of rotation of the screen section.

3. The ventilator of claim 1 in which the ventilator is mounted so as to constitute an air inlet and in which the screen sections swing inwardly.

4. The ventilator of claim 1 in which the longitudinal axis of rotation of the screen sections is not only displaced transversely from the longitudinal center of the screens, but also from both the upper and lower edges of the screen sections so that when said screen sections swing away from the louver blades they are spaced from both of the adjacent louver blades.

5. The ventilator of claim 1 in which the upper edge of each of said screen section engages an inner surface of the louver blade above it and the lower edge engages an outer surface of the louver blade below it.

6. The ventilator of claim 3 in which the longitudinal axes of rotation of said screen sections are beneath the longitudinal centers of said screen sections and in which when said sections are in engagement with the louver blades, the plane of each screen section slopes inwardly from bottom to top so that the weight of any matter clogging the screen tends to urge the screen sections away from the louver blades against the action of the biasing means.

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