

Sept. 20, 1955

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2,718,187

CLOSURE FOR VENTILATORS

Filed June 22, 1953

FIG. 1.

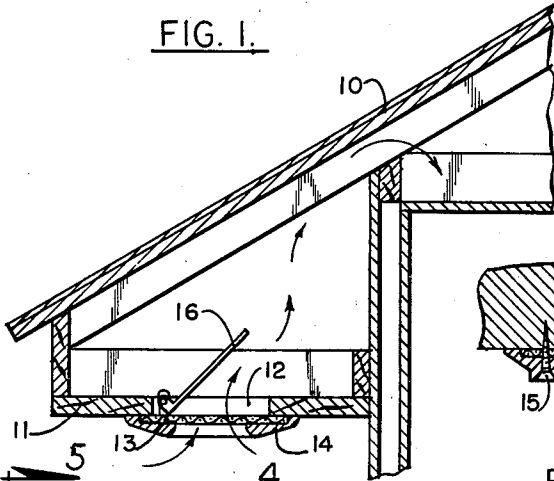


FIG. 4.

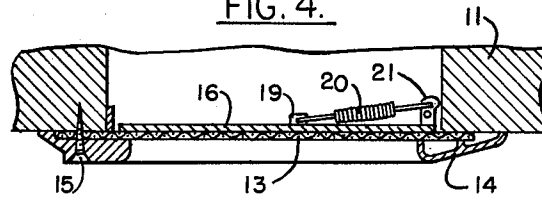


FIG. 2.

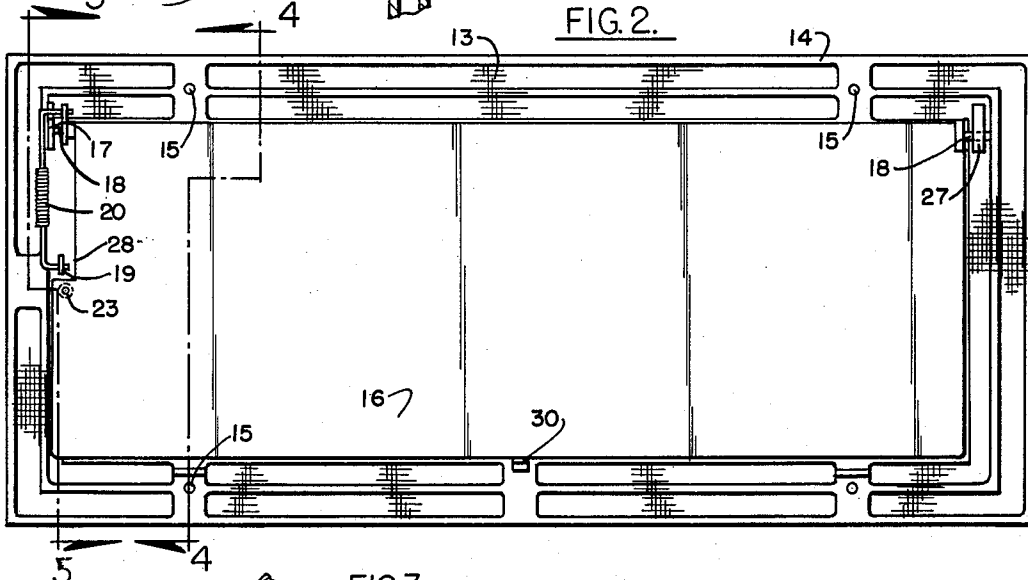


FIG. 3.

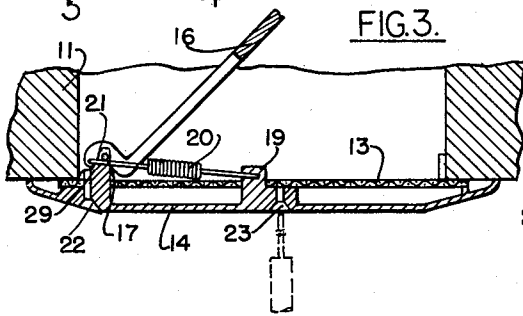


FIG. 5.

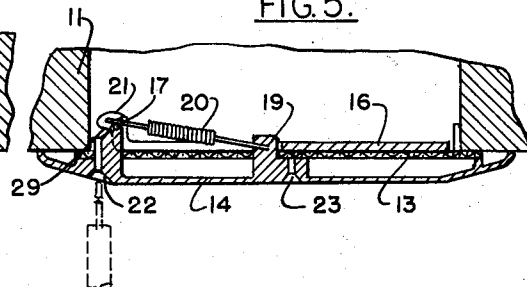
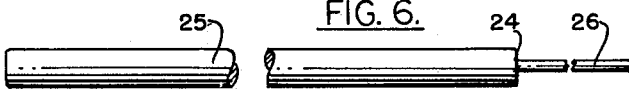


FIG. 6.



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1

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CLOSURE FOR VENTILATORS

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Application June 22, 1953, Serial No. 363,257

8 Claims. (Cl. 98—37)

The present invention relates to building or house ventilators, and more particularly relates to a vent or ventilator closure which may be readily and positively opened or closed.

Many houses have ventilators in the eaves, in the gables, in the wall of the basement, and elsewhere, designed to admit small quantities of air flow, and it is frequently desirable to open or close these ventilator openings with a minimum of effort. A house located in an area subject to severe windstorms, for instance, must have ventilators, which can be quickly and securely closed during such storms. Similarly, in houses in the northern parts of this country, air vents should be provided with closure means for use during cold periods. In the absence of such means for closing the ventilator, strong winds will carry great quantities of water and/or cold air into the attic (or basement) of the house.

It is, of course, highly desirable that the means for closing the ventilator be simple, inexpensive and capable of being operated to close the air vents within a few seconds, and a primary object of the instant invention is the provision of a ventilator meeting these qualifications.

Another object of this invention is the provision of a vent closure which is spring biased in both the open and closed positions so that once the closure is made to assume a given position with respect to the vent, it will retain that position until purposely changed.

A further object resides in providing structure for such vent closures which may utilize only one spring to maintain such open and closed positions.

Still another object is the provision of such a selectively closeable vent which may be mounted out of arm's reach, for instance, but which may still be readily operated.

In carrying out the present invention, I provide a rectangular frame having a screen, covering the opening in the frame, attached to and supported by one side of the said frame near the outer edges thereof. A plate structure, preferably of metal construction, is pivotally mounted on the frame adjacent the screen so that, in closed position, the said plate is parallel to the screen and covers the opening in the said frame. The plate structure, in turn, has a spring attached thereto in off-center relation to the plate pivots, and openings are provided in the frame so that an actuator tool may be utilized in causing the said spring to urge the plate to either an open or closed position with respect to said frame opening.

The foregoing objects, advantages, and structure of my invention will become more readily apparent from a consideration of the following description and accompanying drawings, wherein:

Figure 1 is a cross-section of an eave of a house showing the invention applied thereto,

Figure 2 illustrates the screen frame with the screen and cover plate attached thereto,

Figure 3 is a side view of my closure device taken on line 5—5 of Figure 2, but with the cover plate in an open position,

2

Figure 4 is a sectional view of the device taken along the line 4—4 of Figure 2,

Figure 5 is a sectional view of the device taken along the line 5—5 of Figure 2, and

Figure 6 is a detail view showing a portion of an actuator device used in operating my closeable ventilator.

Referring first to Figure 1, it will be seen that a house to which the present invention may be applied, ordinarily has a roof 10 and an eave 11. An opening 12 for ventilating purposes is provided in eave 11, and this opening is covered by a screen 13. As shown in Figure 4, for instance, the screen 13 is fastened to and held in place by a frame 14, which is preferably of die cast aluminum construction and frame 14 is in turn connected to the eave 11 by screws 15. In accordance with a preferred embodiment of my invention, the screen 13 is normally fastened to frame 14 by either rivets or pins, which remain in place before, during, and after installation. As may be seen from a consideration of Figure 4, once my unitized ventilator is actually mounted in a building structure, the screws 15 cause the frame 14 to bear against the eave 11, and the screen 13 which is thereby interposed between the eave and frame is thereby effectively and permanently held in place. The use of auxiliary pins or rivets (not shown), however, do not in any way interfere with the operation of my ventilator once it is installed and, in fact, greatly facilitate the shipping and installation of the ventilator structure.

A cover plate 16, which is also preferably of metal construction, is pivotally mounted on frame 14. In this respect, the frame 14 is constructed to have two raised portions 17 and 27 spaced on opposite side thereof, and the plate 16 has complementary pivots 18 cooperating therewith. The plate 16 is so dimensioned that, when it is forced to assume a "closed" position, it is substantially parallel to screen 13 and covers completely the screened opening in frame 14, thereby effectively closing off the opening 12 in eave 11. Referring especially to Figures 3 and 5, it will be seen that the frame 14 has a further raised projection 19 extending through the screening material 13, and a helical coil spring 20 is coupled between the projection 19, on the frame, and the cover plate 16 adjacent the pivot 17.

Special attention will now be given to the actual coupling configuration between spring 20, plate 16, and frame 14. As shown in Figures 3 and 5, especially, the plate 16 defines a curved section 21 adjacent pivot 17, and spring 20 is attached to section 21 at a point off-center with respect to pivot 17. This attachment may be effected by placing a loop, at the end of spring 20, in a notch defined in the periphery of section 21, by slipping the end of spring 20 through a hole in section 21, or by any other appropriate scheme. As a result of this spring system, when plate 17 is in a "closed" position, spring 17 exerts a clockwise moment on plate 16, around the pivot 17, and the plate 16 thereby tends to remain in the said closed position. If, on the other hand, the plate 16 is somehow forced toward an "open" position, the moment of spring 20 around pivot 17 becomes less and less in a clockwise direction, until eventually a point is reached in the position of plate 16 at which time the moment actually reverses, and spring 20 exerts a counterclockwise moment around pivot 17. In accordance with a practical embodiment of my ventilator, this critical point of moment equilibrium occurs when plate 16 is at an angle of 22½ degrees with respect to the horizontal, and once the plate 16 is urged to this position from a full "closed" position, spring 20 pulls the cover plate 16 to a full "open" position. Again, once the plate 16 is in such an open position, the spring 20 will cause the plate to maintain this position until the plate 16 is once more urged in the opposite direction through the position of

moment equilibrium, at which time cover plate 16 is forcibly snapped shut.

As a practical matter, it will be appreciated that my ventilator, being mounted in the eaves of a building, would not be easily capable of direct manual operation under ordinary circumstances. Further, inasmuch as the cover plate, to which actuating force must be applied, is separated from an operator by screen 13, certain provision must be made for the actual and somewhat remote application of actuating force to cover plate 16. I accomplish this by providing two openings 22 and 23 in the frame 14, which openings each define a channel extending completely through both frame 14 and screen 13. These openings 22 and 23 in turn cooperate with an actuator 24, shown in Figure 6, comprising an elongated handle member 25 and a finger 26. As may be seen from Figure 2, cover plate 16 (on that side of the ventilator corresponding to pivot 17) extends over hole 23 and is then recessed at 28 to permit movement of spring 20 during the opening and closing of plate 16. Inasmuch as plate 16 does nevertheless extend directly over hole 23 below recess 28, force may be brought to bear directly upon plate 16 by inserting finger 26 of actuator 24 into hole (or channel) 23, and the application of such force effects a counterclockwise moment around pivots 17 and 27, in opposition to the moment of spring 20 in the closed cover position, and thereby "opens" the plate 16, in accordance with the preceding discussion.

Curved portion 21 of plate 16 further defines an abutment member 29, as is best seen in Figure 5, below the point of coupling of spring 20 and portion 21. The abutment member 29 may itself act as a stop member to define the "open" limit position of plate 16, or separate stop means may be provided elsewhere adjacent plate 16. The hole (or channel) 22 is formed in frame 14 directly below the position of this abutment member 29, and when cover plate 16 is in the "open" position, the said member 29 comes to rest directly adjacent the top of hole 22. Thus, if the finger 26 of actuator 24 is inserted in hole 22 when the cover plate is in "open" position, the actuator will again apply a force in opposition to that of spring 20, to thereby urge the cover plate 16 to a "closed" position. As a result of this construction, it follows that a single actuator member may be utilized to urge a single-spring biased cover plate in either of two opposite directions with respect to a vent opening. While I have shown the use of a manually operated actuator, it must be understood that the above discussed structure readily lends itself to systems of remote control, such as solenoid operated actuators, and such structures are intended to be included within the scope of the instant disclosure.

In addition to the foregoing structure, it is preferable to include a latching member 30 in the ventilator, for instance to aid in maintaining the cover plate 16 in a closed position once it is caused to assume such a position. Such a latching member is not always necessary but, on the other hand, it may be of considerable importance in those areas where wind forces, bearing on cover plate 16 through screen 13, may be of sufficient magnitude to overcome the forces of spring 20. Such a latch can be no more than a spring steel detent attached to either cover plate 16 or frame 14 adjacent a lateral edge of plate 16.

The structure of the instant invention finds ready utility anywhere that a ventilating opening is provided in a building structure, or in other forms of structure requiring selective ventilation. For example, and referring particularly to building structures, some houses have a basement under only a part of the house, and a ventilating opening from the basement to the space existing between the ground and the rest of the house. The instant vent closure may readily be used to cover such an opening.

Having thus described my invention, I claim to have invented:

1. A ventilator comprising a frame member defining

a central opening through which air may pass, a screen member, of substantially the same dimensions as those of said frame, attached to the said frame and covering the said central opening, a cover plate of substantially the same dimensions as that of said central opening pivotally mounted on said frame over said central opening, said cover plate being spring biased to selectively assume either one of two stable equilibrium positions with respect to said central opening, said frame defining first and second bores extending therethrough and located respectively on opposite sides of the said pivotal mounting point whereby actuating forces may be selectively brought to bear through said bores onto said cover plate to cause said cover plate to assume selectively said stable equilibrium positions.

2. A ventilator comprising a substantially rectangular frame defining a central opening through which air may pass, a screen member adjacent the said frame and covering the said opening, a cover plate of substantially the same dimensions as those of said opening pivotally mounted on said frame adjacent said opening, a spring member coupled between said cover plate and said frame to selectively urge said cover plate to either of two predetermined stable equilibrium positions with respect to said opening, said frame defining two channels passing therethrough and located respectively on opposite sides of said point of pivotal mounting, whereby forces may be applied through said frame to said cover plate so as to exert moments on said plate in opposition to the moment exerted thereon by the said spring member.

3. The ventilator of claim 2 in which said spring member comprises a coil spring coupled to said plate adjacent said point of pivotal mounting of said plate, said spring member, said plate, and said pivotal mounting defining a force system wherein said spring member selectively causes one of two opposite moments to be exerted on said plate about said point of pivoted mounting depending upon the angular position of said plate with respect to said screen.

4. The ventilator of claim 3 wherein said plate defines an abutment member adjacent one of said openings for the reception of the forces of said actuator.

5. A ventilator comprising a frame having first and second side edges parallel to one another, and front and rear edges substantially parallel to one another and respectively orthogonal to and joining said side edges, said side edges, front edge, and rear edge defining a central opening therebetween, a screen member contiguous with each of said edges and covering said central opening, a first pivot point adjacent the juncture of said first side edge and said front edge, a second pivot point adjacent the juncture of said second side edge and said front edge, a cover plate having substantially the same dimensions as that of said central opening and pivotally mounted between said first and second pivot points, said cover plate defining an arcuate edge adjacent said first pivot point, a projection on the said first edge of said frame extending through said screen member, a coil spring coupled between the said projection and the said arcuate edge of said cover plate, said coil spring exerting a clockwise moment on said cover plate about said pivot points when said cover plate defines less than a predetermined angle with respect to said screen member, and said coil spring exerting a counterclockwise moment on said cover plate about said pivot points when said cover plate defines an angle greater than said predetermined angle with respect to said screen member, and first and second bores in said first side edge of said frame, said bores each extending through both said frame and said screen member and being respectively disposed on opposite sides of said first pivot point adjacent said cover plate whereby forces may be selectively applied through the said bores in said frame to said cover plate to oppose a given moment exerted thereon by the said spring.

6. The ventilator of claim 5 wherein said first bore is adjacent said first pivot point and said arcuate edge of said plate, and said second bore is disposed adjacent said plate

5

substantially midway of said front and rear edges, said arcuate edge of said plate defining an abutment surface adjacent said first bore against which abutment surface forces applied through said first bore may be brought to bear.

7. The ventilator of claim 6 in which said cover plate defines a recess between said projection and said first pivot point for the reception of said coil spring.

8. The ventilator of claim 7 including a latch between said frame and said cover plate.

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6

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