COMBINED SKYLIGHT AND VENTILATOR

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This invention relates generally to roof mounted ventilating or air exhausting apparatus and in particular to a unitary ventilating and skylight assembly.

Conventionally, ventilators and skylights are installed separately on building roofs on separate curb constructions. The assembly of the present invention brings together in a unitary apparatus the ventilator and skylight whereby these components can be installed on a single curb. There have been combinations of skylights and small propeller type ventilators heretofore, however, there has been a realization that all the ventilating air in applications requiring movement of substantial volumes of air, and the propeller type fan operating against a conventional louvre arrangement did not provide dependable ventilation against heavy wind pressures.

It is an object of the present invention to provide a ventilator-skylight assembly which can be installed on a single curb construction with the components arranged to provide a relatively low exterior contour and a finished appearance viewed from the interior of the building being vented.

A further object of the present invention is to provide a unitary assembly of the type referred to which can accommodate one or a plurality of centrifugal-type exhaust blowers and in which the skylight and blower components can be repeated to accommodate various skylighting and ventilating requirements.

A further object of the present invention is to provide a unitary assembly of the type referred to wherein the exhaust blower component is dropped partially inside the curb structure so that the overall height of the assembly above the roof level is at a minimum.

A further object of the present invention is to provide an assembly of the type referred to in which the blower component discharges air across back-draft dampers and into a plenum chamber which is relieved of pressure through permanently open louvres, the louvres being spaced from the back-draft dampers so that positive discharge of air occurs even under extreme wind conditions.

A further object of the present invention is to provide an assembly of the type referred to in which the discharge of the ventilating component is directed at a right angle to the direction of horizontal extension of the skylight component so that deposits from the ventilator exhaust do not build up on the exterior surface of the skylight component.

A further object of the present invention is to provide an assembly of the type referred to in which all the fasteners holding the assembly on the curb structure are inaccessible from the exterior of the ventilator-skylight thereby rendering the assembly burglar resistant.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

FIG. 1 is a perspective cut-away view of an assembly embodying the present invention.

FIG. 2 is a sectional view taken generally along the line 2—2 of FIG. 1.

FIG. 3 is a sectional view taken at the blower chamber.

FIG. 4 is a fragmentary sectional view illustrating an alternate mounting arrangement for the assembly.

FIG. 5 is a perspective view showing a modified form of the assembly which includes a single ventilating component and two skylight components.

FIG. 6 illustrates a further modified form of the assembly which includes two ventilator components and a single skylight component.

FIG. 7 is a fragmentary perspective view of one corner of the assembly.

FIG. 8 is an enlarged, fragmentary, perspective view of the junctional area of the frame and transverse member forming components of the present invention.

Referring initially to FIGS. 1, 2 and 3, there is shown an assembly embodying the present invention mounted upon a preconstructed curb structure 10 which frames a ventilating and light-receiving opening in the roof of a building. Supported upon and overlying the curb structure is a generally rectangular frame 11 which is preferably formed from an aluminum extrusion. The cross-sectionally central area of the extrusion is provided with two horizontally extending flanges which are disposed in the central area of the extrusion and rests upon the upper surface of the curb structure 10. The frame is attached to the curb structure by means of hold-down brackets 13 which, as may best be seen in FIG. 3, are secured to the curb structure by means of screws 14 or similar fasteners. Underlying the depending outer portion 25 of the frame is a conventional flashing strip 20, the outer portion or leg 25 being spaced from the flashing. The inner marginal portion 16 of the extrusion 11 is inclined upwardly and is provided with a vertically extending ledge 15.

A central vertical leg 17 of the extrusion carries a rubber extrusion strip or grommet 18 (FIG. 3) along its upper margin. The vertical legs or flanges 17 terminate adjacent the corners of the frame leaving space for the drainage of moisture as shown in FIG. 7. Overlying and supported on the grommet 18 is a skylight component which includes a generally rectangular, light-passing upper skylight element 19 and a light-passing lower skylight element 21. The upper element has a generally dished configuration and is disposed upon the frame 11 so that its convex surface faces outwardly. The upper element 19 is sized to overlie all of the area bounded by the frame 11 except for a rectangularly shaped end section disposed of transversely across the left end of the frame as viewed in FIG. 1. The skylight elements 19 and 21 may be formed of any suitable transparent or translucent material such as Lucite, Plexiglas or the like. It will be understood that for some installations, the lower element 21 may be omitted. In installations where moisture condensation is a problem, the dead air space between the upper and lower elements provides the required thermal insulating characteristics.

Clamping means are provided for securing the skylight component upon the frame and this clamping means takes the form of a further aluminum extrusion 22 which is generally L-shaped in cross-sectional configuration. As may best be seen in FIG. 2, the extrusion 22 is tightened against the skylight element 19 by means of screws 23 which extend through the frame 11 and are threaded into the vertical portion of the extrusion 22. Spacers 24 may be provided to limit the extent to which the extrusion 22 may be drawn toward the frame 11. It will be understood that in installations where the lower skylight element 21 is omitted, spacers of a somewhat shorter height may be utilized to adapt the assembly to the reduced thickness of the skylight component. As will be evident from FIG. 2, the extrusion 22 together with the inclined marginal portion 16 of the extrusion form a condensation gutter which directs condensate toward the exterior of the frame. As may be seen in FIG. 7, the side and end members of the frame...
11 are joined by a mitre cut and welded. The vertical sections 17 of the extrusions are foreshortened at the corners of the frame so that moisture and condensate may move to the exterior of the sections 17 as indicated by arrows in FIG. 7. The condensate gutter thus formed is drained at the corners of the frame.

As may best be seen in FIG. 2, the end of the sky-light component adjacent the ventilator component is supported on a transverse extrusion member 11a. This extrusion member 11a is similar to the extrusion 11 except that it is not provided with a depending skirt as is the extrusion 11 and is provided with spaced, identically formed elements 16a and 16b, 17a and 17b, the vertically extending portion 17a carrying a grommet 18a.

As may best be seen in FIG. 8, the junction between the transverse member 11a and the longitudinal side members of the frame 11 is formed by providing an angled or pointed notch 30 in the generally horizontal portion of the frame 11. The ends of the transverse member 11a is diametrically cut to fit within the notch 30 and the junction is welded or otherwise rigidly secured. The vertical elements 17a and 17b of the member 11a are foreshortened as are the vertical elements 17 of the frame extrusion 11 to provide a gap through which moisture may drain to the exterior as indicated by arrows in FIG. 5.

The ventilator component of the assembly includes an outer hood 26 which is arched in cross-sectional configuration having its ends closed by means of end members 27. The end members are provided with a series of fixed louvres 28 which overlie slots or apertures 29 in the end members serving to vent the area enclosed by the hood. As may best be seen in FIG. 3, the junction between the end members and the hood is provided with an overhang insert 31. The hood assembly is attached to the frame by means of screws 35, the longitudinal edge of the hood 26 resting against the central, horizontal portion of the frame extrusion 11 as may best be seen in FIG. 1. A plate 32 is disposed within the hood and is provided with side portions 33 (FIG. 1) and 34 (FIG. 2). The portions 33 and 34 carry on their lower margins rubber extrusion strips or grommets 35a and 35b, respectively. The grommets 35a and 35b rest against the adjacent upwardly inclined portions of the brackets 11 and 11a, respectively. The plate 32 is composed of a front, inclined section 36 and a rear inclined section 36a, as may be seen in FIG. 1. The section 36 is provided with a plurality of apertures 37 and back-draft dampers 38 are pivotally supported in overlying relation to the apertures 37 so that the dampers being pivotally movable to uncover the apertures. The plate 32 and the hood 26 thereby form a plenum chamber which is vented to atmosphere through the openings 29 in the end members 27.

Secured by means of bolts 39 to the underface of the plate portion 36 is a centrifugal type blower unit indicated generally at 41. As herein disclosed, the blower unit includes a centrifugal blower 42 having an inlet aperture 43 and a discharge aperture 44. The unit also includes a second centrifugal type blower 43 which is shown only fragmentarily in FIG. 1. The two blower impellers are mounted coaxially with an electric drive motor 44 disposed between the blowers. As will be evident from FIG. 1, the discharge aperture 44 of the blower 42 registers with the adjacent aperture 37 in the plate 36 so that with the blower in operation, the back-draft damper 38 will be moved to open position permitting the blower to discharge air into the plenum chamber.

It will be understood that the blower 43 has a similar discharge aperture which registers with the plate aperture 37 shown closed by the adjacent back-draft damper 38 in FIG. 1. It will be understood that a blower unit identical to unit 41 is also installed identically to the installation of unit 41 beneath the rear plate section 36a. A sound attenuating baffle plate 46 is disposed across the area just below the blower units, the baffle plate being mounted on the curb structure by any suitable means such as hangers 47 (FIG. 1). Since the baffle plate 46 terminates vertically below the transverse member 11a as indicated at 46a in FIG. 1, and since the baffle plate is positioned well below the curb structure and frame 11, air moving upwardly through roof opening beneath the sky-light component will move laterally inward, as indicated in FIG. 1, to the blower inlets 43.

In operation, with the assembly of the present invention installed as shown in FIG. 1, operation of the blower units will draw air laterally inward into the space between the baffle plate 46 and the plate portions 36 and 36a. This air will enter the inlet apertures of the blowers and will be discharged past the back-draft dampers 38 and into the plenum chamber. Air moving through the plenum chamber will be discharged to atmosphere through the openings 29 in the end members 27 as indicated by arrows in FIG. 1.

It will be noted that the baffle plate 46 serves to reduce the sound transmitted back into the structure being vented. Air leaving the plenum chamber is directed normally to the direction of longitudinal extension of the sky-light element so that particles entrained in the discharged air do not build up upon the outer sky-light element 26. It will further be noted that the arrangement permits the blower unit to be dropped substantially below the upper margin of the curb structure so that the overall height of the assembly above the roof on which it is mounted can be held to a minimum. The inclined inner marginal portion 16 of the extrusion 11 provides a condensate arresting gutter about the inner margin of the assembly.

While two blower elements having a single acting motor have been described as comprising a blower unit, it will be understood that a single blower and its driving motor might also make up a blower unit. The positioning of the back-draft dampers 38 under the hood 26 provides for positive discharge of air from the assembly even under severe wind conditions. In applications where the sky-light area also requires artificial lighting, fluorescent tubes may be installed along the inner surface of the curb structure.

As shown by the bracket 14, it will be evident that the same fastening brackets 13 may be used to clamp the frame extrusion 11 to a curb structure having an upper margin of considerably larger width than the curb structure illustrated in FIG. 3. Under such conditions, the long Shank of the fastener 13 extends to the extrusion 11 with the short Shank of the fastener being attached to the curb structure 10a by means of screws 14.

As may be seen in FIGS. 5 and 6, the ventilator and sky-light components may be repeated or ganged in alternate side-by-side relation to provide enlarged ventilating and lighting capacities. It will be noted that the structures of FIGS. 1, 5 and 6 all utilize a frame 11 of the same configuration so that multiple units such as shown in FIGS. 5 and 6 may be conveniently fabricated. Where the ventilator component is centered in the frame 11 as in FIG. 5 or where ventilator components are placed at each end of the frame as in FIG. 6, it will be understood that additional transverse members 11a must be used. It will further be understood that in applications where either the sky-lighting or the ventilating function is not required, the ventilator component or the sky-light component might be installed individually.

As may be seen in FIG. 3, the fasteners 14 are accessible only from the interior of the assembly. Also, the fasteners 23 are hidden and relatively inaccessible from the exterior of the assembly. This arrangement provides a burglar resistant structure.

While the invention has been disclosed and described in some detail in the drawings and foregoing description, they are to be considered as illustrative and not restrictive in character, as modifications may readily sug-
gest themselves to persons skilled in this art and within
the broad scope of the invention, reference being had
to the appended claim.

The invention claimed is:

A unitary ventilator and skylight assembly adapted
for mounting on a preconstructed curb structure which
frame an opening in a building roof, said assembly
comprising a rectangular frame overlying said curb struc-
ture, said frame being formed of an aluminum extrusion
having an inwardly directed marginal flange extending
from its underside, fastening elements spaced around said
curb structure and cooperating with said inwardly di-
rected flange to secure said frame to the curb structure,
the inner marginal portion of said extrusion being in-
clined upwardly to form a condensate arresting gutter,
a rectangular, light-passing skylight element having a
dished configuration and outwardly flanged margins, said
skylight element being sized so as to overlie at least a
portion of the area bounded by said frame, a ridge
extending upwardly from the upper face of said extrusion
adapted to underlie and support the said flanged margins
of the skylight element, and clamping means for attaching
the skylight element to said frame, said clamping means
comprising a second aluminum extrusion overlying the
junction of said skylight margins and said ridge on said
frame, and means for adjustably fastening said frame
and said second extrusion together whereby skylight
elements of various marginal thicknesses may be
accommodated.

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