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Published
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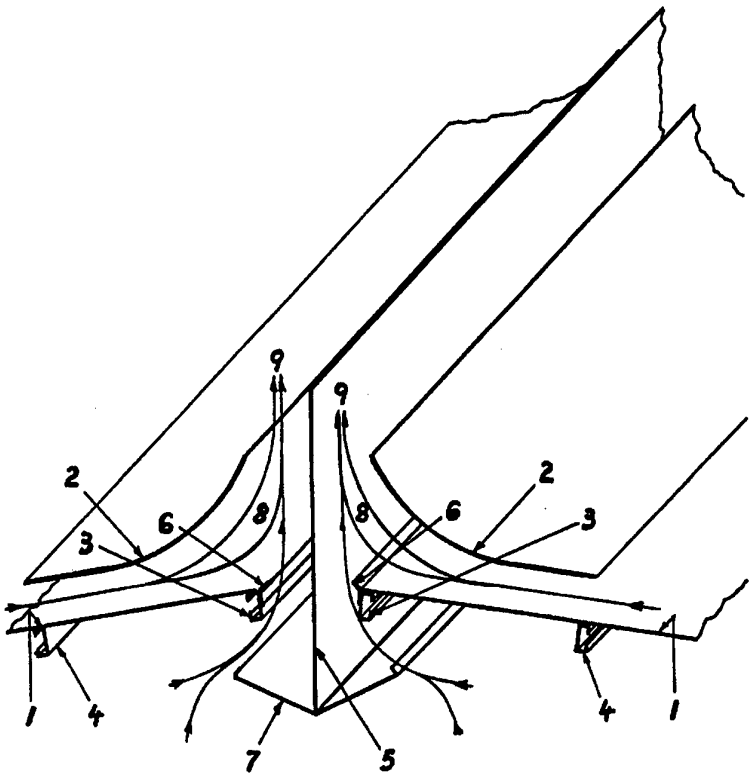
(54) Title: ACTIVE ROOF EXHAUSTER

(57) Abstract

A roof ventilator which includes curved sheets (2) which cooperate with roof sheets (1) and divider sheet (5) to provide a pair of channels (11 and 12) which extend from inlet openings (13) to outlet openings (14). The channels (11 and 12) vary in cross section to draw air through an aperture in the roof.



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Active Roof Exhauster

Technical Field

The present invention relates to ventilators and more particularly but not exclusively to roof exhausters.

Background of the Invention

Roof ventilators and exhausters are weather-proof, static, wind or power driven devices, used to ventilate buildings.

The static roof ventilators comprise weather-proof side openings and operate by letting the air in or out of the building, depending on the expansion or contraction of the air within the building.

The wind driven roof exhausters use the wind to propel their fans or turbines, with more than half of the energy wasted on motion. If there is no wind, there is no exhaust to the building. The bearings of the moving parts must be maintained and replaced on a regular basis.

The motor driven roof exhausters are mainly electrically driven and are costly to run and to maintain.

Summary of the Invention

There is disclosed herein a ventilator assembly for a building, said assembly comprising:

a wall or roof building surface having an edge bordering an aperture which communicates with the interior of the building; and

a channel defining means having an inlet opening generally normal to said building surface and an outlet opening facing away from said building surface, and wherein said channel communicates with said aperture to draw air from the interior of said building as air passes from said inlet opening to said outlet opening.

Brief Description of the Drawings

A preferred form of the present invention will now be described by way of example with reference to the accompanying drawing wherein:

Figure 1 is a schematic perspective view of a roof ventilator. The ventilator is depicted without drainage pipes and bird mesh which would be normally employed in such a ventilator.

Detailed Description of the Preferred Embodiment

In the accompanying drawing, Figure 1, there is schematically depicted a roof 10 including spaced roof sheets 1, both of which terminate adjacent purlins 3, thus creating an opening along the imaginary ridge of the roof 10.

Two curved sheets 2 are set above the roof 10 to create apertures between the sheets 1 and 2 which are approximately equal to half the distance between the adjacent faces of the purlins 3. The curved sheets 2 start above the outer faces of the second set of purlins 4, run parallel with the sheets 1 for a distance approximately equal to 30% of the distance between the centre lines of the purlins 3 and 4, then curve upwards in a curve scribed by a radius equal too approximately 80% of the distance between the centre lines of purlins 3 and 4.

The height of curved sheets 2 is determined by the height of the apertures between the sheets 1 and the lower ends of the curved sheets 2 and is reached when the curves of sheets 2 approach the dividing sheet 5 to within, approximately 110% of the height dimensions of the above said apertures between the sheets 1 and 2.

The dividing sheet 5 sits on the bottom and on the centre line of the trough 7 and protrudes above the upper edges of the curved sheets 2 by a distance, approximately equal to the width of the apertures between the curved sheets 2 and the dividing sheet 5.

The trough 7 is shaped to channel water and has a width to catch drips from the innermost purlins 3. The trough 7 centrally located under the centre line of the ridge of the roof 10. The uppermost ends of the trough 7 end in inward facing lips which are parallel to the upper ends of the deflector mouldings 6. The extreme upper ends of the trough 7 are preferably no closer to the lower extremities of the innermost purlins 3 than half the distance between the innermost purlins 3 to provide sufficiently large aperture for the free passage of the air from within the building.

The deflector mouldings 6 provide a seal at the upper ends of the sheets 1 to deflect the air upwards and keep out the water from the spaces between the roof 10 and the innermost purlins 3. The upper ends of the mouldings 6 lean inwards, towards the dividing sheet 5 the mouldings 6 are also approximately parallel to the plain that would be a tangent to the curved sheets 2. The lower portions of the mouldings 6 conform and are parallel to the inner faces of the innermost purlins 3.

Air flowing over the sheets 1 towards the ridge of the roof 10, flows along the channel under the curved sheets 2. Where the lines of the curved sheets 2 cease to run parallel to the lines of the roof 1, an area of reduced pressure is created. The air from within the building is drawn up to provide an equilibrium and the air is exhausted to the atmosphere 9.

The sheets 1 and 2 enclose channels 11 and 12 which extend from air inlet openings 13 to air outlet openings 14. The inlet openings are generally normal to the sheets 1 while the outlet openings are generally parallel to the sheets 1.

Ideally, the materials used in construction of this roof exhauster will be compatible with the roof materials, however, any sheet materials which can be readily bent, moulded or rolled and can securely hold fasteners to fasten straps, stays, etc. can

be used. The above exhauster is meant to run continuously on top of ridges of roofs but shorter may be successfully utilised.

It should further be appreciated that the channels 11 and 12 increase in cross-section from the inlet openings 13 to the area 8; and then decreases to the outlet openings 14.

The above preferred embodiment can also be applied to tents, with the tent roof interacting with a channel defining member extending to an aperture in the tent roof. Accordingly in the specification the term "buildings" includes temporary buildings such as tents.

It should further be appreciated that the curved sheets 2 could be replaced with sheets having straight segments, but still providing the change is cross-section described above.

CLAIMS

1. A ventilator assembly for a building, said assembly comprising:

a wall or roof building surface having an edge bordering an aperture which communicates with the interior of the building; and

a channel defining means having an inlet opening generally normal to said building surface and an outlet opening facing away from said building surface, and wherein said channel communicates with said aperture to draw air from the interior of said building as air passes from said inlet opening to said outlet opening.

2. The ventilator assembly of claim 1, further including an arcuate sheet providing part of said channel providing means, said channel being located between said building surface and said arcuate sheet.

3. The ventilator of claim 1 or 2, wherein said channel defining means includes a sheet member extending away from said roof surface and extending to said outlet opening.

4. The ventilator assembly of any one of claims 1 to 3 further including a trough located below said aperture to aid in the collection of rain that may enter the ventilator assembly.

5. A ventilator assembly for a building, said assembly comprising:

a wall or roof building surface having a pair of edges between which an aperture is located, which aperture communicates with the interior of the building;

a pair of arcuate sheet members located on opposite sides of the aperture and cooperating with the building surface to provide a pair of channels which extend from inlet openings generally normal to the building surface and outlet openings facing away from the building surface; and

a dividing means extending from the aperture to a position between the outlet openings.

6. The ventilator of claim 5, further including trough means below the aperture to collect rain that enters the ventilator assembly.

7. The ventilator assembly of claim 1 or 6, wherein the transverse cross section of the channel first increases from said inlet opening to a maximum cross-section and then decreases in cross-section to the outlet opening/s.

8. A ventilator substantially as hereinbefore described with reference to the accompanying drawings.

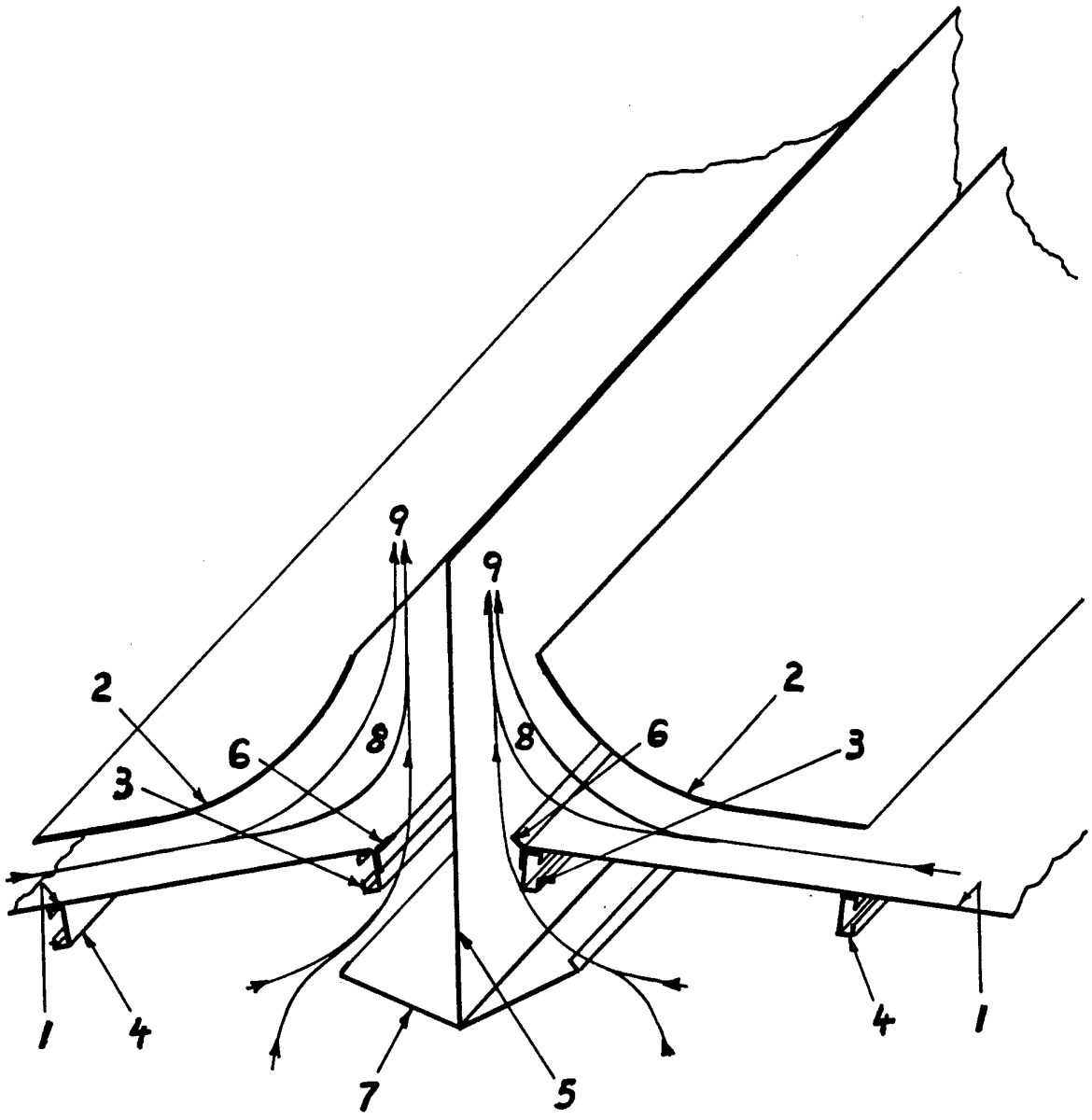

FIG. 1

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/AU 96/00341

A. CLASSIFICATION OF SUBJECT MATTER

Int Cl[6]: F24F 7/013, 7/02.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int. Cl. F24F 7/013 7/02 E04D 13/14 13/143 13/152 13/17 E04F 17/04

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
AU : IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
DERWENT: divid
JAPIO: divid

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	SU, A 1649080 (KURCHIKOV) 15 May 1991 (15.05.91) see abstract	1-3, 5
X	EP, A 0288020 (FLECK) 26 October 1988 (26.10.88)	1, 2
X	EP 00666838, A (FLORATTI) 15 December 1982 (15.12.82) Fig. 6, page 7 lines 14-26, page 8 lins 6-10	1-3, 5

[X] Further documents are listed in the continuation of Box C

[X] See patent family annex

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Date of the actual completion of the international search	Date of mailing of the international search report
2 August 1996	15 AUG 1996

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INTERNATIONAL SEARCH REPORT

International Application No.
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C (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 9119868, A (DANSK ETERNIT-FABRIK A/S) 26 December 1991 (26.12.91) Fif. 1	1, 2
X	WO 8400187, A (MARLEY TILE A.G.) 19 January 1984 (19.01.84) Fig. 1, page 5 lines 1-16	1
X	AU 10235/95, A (NORM A.M.C. AG) 27 July 1995 (27.07.95) Fig. 1, page 7 lines 4-27	1, 2
X	AU 50774/93, B (656093) (AIR DESIGN (QLD) PTY LTD) 31 March 1994 (31.03.94) Fig. 1, page 5 lines 26-33	1, 2
X	GB 2136558, A (Buckley Products Inc) 19 September 1984 (19.09.84) Fig. 2, page 1 line 123 to page 2 line 42	1, 2

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No.
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This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
WO	9119868	DK	1503/90				
AU	10235/95	CA	2140322	DE	4401139	EP	663488
		FI	950191	NO	950153		
EP	66838	IT	1205347	JP	58013950	US	4621569
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GB	2136558	CA	1188866				
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		FI	933533	NO	932836	US	5332393
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WO	8400187	BR	8307419	CA	1193413	EP	112360
		GB	2123050	US	4685265	ZA	8304599
		ZW	145/83				

END OF ANNEX