



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/SE83/00054</p> <p>(22) International Filing Date: 21 February 1983 (21.02.83)</p> <p>(31) Priority Application Number: 8201142-0</p> <p>(32) Priority Date: 24 February 1982 (24.02.82)</p> <p>(33) Priority Country: SE</p> <p>(71)(72) Applicant and Inventor: PALJAKKA, Olavi [FI/SE]; Stenbockens gata 114 6 tr, S-136 62 Handen (SE).</p> <p>(81) Designated States: AT (European patent), AU, BE (European patent), BR, CF (OAPI patent), CG (OAPI patent), CH (European patent), CM (OAPI patent), DE (European patent), DK, FI, FR (European patent), GA (OAPI patent), GB (European patent), HU, JP, KP, LK, LU (European patent), MC, MG, MW, NL (European patent), NO, RO, SE (European patent), SN (OAPI patent), SU, TD (OAPI patent), TG (OAPI patent), US.</p>		<p>Published</p> <p><i>With international search report.</i></p> <p><i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i></p> <p><i>In English translation (filed in Swedish).</i></p>
(54) Title: VENTILATING WALL ELEMENT		
(57) Abstract		
<p>The invention pertains to the sphere of house building technology and refers to the heat-insulating part of an outer wall in a building. (If applicable it also relates to floors and ceilings). Also other walls in the building may be suitable if there are temperature differences between spaces and a need for ventilation. The invention is intended to be used for both heated and cold spaces and deals with the problem of energy losses in relation to ventilation, the humidity of the room air and surface temperature. The basic principle consists in the wall construction itself constituting a heat exchanger of counterflow type and transmitting both humidity and heat from the exhaust air (fresh air) to the fresh air (exhaust air). At the same time the same surface temperature is achieved as that of the ambient air.</p>		

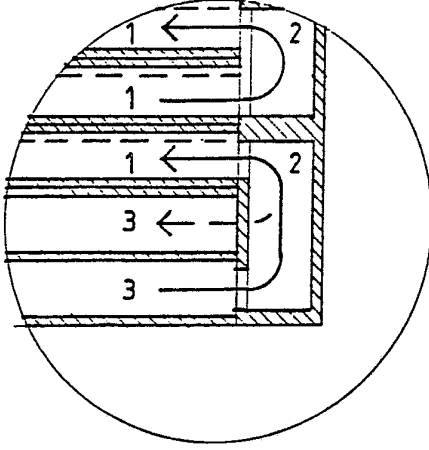
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Ventilating Wall Element

In the assembled state the ventilating wall elements are intended to form the heat insulating part of an outer wall in a house building. (Where applicable the term wall also includes floors and ceilings.) Also other building walls may be appropriate, if there are temperature differences between spaces and a need for ventilation.

The problems underlying the invention are dealt with in the manual Bygg, del 6 : Husbyggnadsteknik (Building, part 6: House building technology).

The energy losses which occur when ventilating heated (or cooled) spaces are considerable. E.g. in a dwelling house in northern latitudes the heat losses due to ventilation are about equally large as the heat flow through insulated walls and the ceiling. In workshops, where there is a major need for ventilation, the losses too are multiplied.

A well known difficulty which arises when ventilating heated spaces consists in the dry room air. Comprehensive air conditioning systems are frequently too expensive and take too much space. Also the heat recovery systems currently available cannot dispose of the humidity from the exhaust air and have, owing to the danger of freezing, a low efficiency.

In heated spaces where people are constantly present the surface temperature at the walls is also of great importance. Owing to the transfer resistance of the wall surfaces this temperature is always lower than the air temperature, which gives rise to so-called drafts and discomfort by way of irregularity in heat radiation.

The ventilating wall element transmits both humidity and heat from the exhaust air (fresh air) to the fresh air (exhaust air), as a result of which the energy losses arising in the course of ventilation are eliminated. Furthermore, the wall surface temperature becomes the same as that of the room air.

These characteristics are achieved owing to the fact that the element is designed as a heat exchanger of counterflow type and is produced entirely or in part of moisture-permeable material as well as in that the exhaust air is blown in at the rear of the wall surface.



The element is functionally symmetrical and can be used equally well for heated and for cooled spaces. Described below is an embodiment of an element intended for heated spaces and produced of cardboard:

5 List of figures (see drawing):

Fig. 1: The element seen from the room, from the side and from above.

Fig. 2: Dit. A. Enlarged horizontal section.

Fig. 3: Dit. B. Enlarged vertical section.

10 The element consists of thin vertical layers comprising narrow horizontal ducts (1) alternating for exhaust air and fresh air respectively. The ends of the element contain ducts (2) linking the above-mentioned ducts. The two outer layers on both sides of the element do not contain ducts and operate as pressure equalising gaps
15 (3).

The exhaust air is blown into the element from a header ducts (4) at the ceiling. The velocity is regulated with the aid of a fan. The air leaves the element through small openings at the bottom (5).

20 Fresh air is sucked in by the negative pressure at skirting (6) and enters the element through small openings at the top (7). If the required negative pressure is not available, use is made of a ducted fan also for the fresh air.

25 The air velocity is so adjusted as to counteract the natural convection. If the fan is not switched on the element acts as a conventional heat insulation.

30 The parameters for the element are on the one hand the temperature drop at right angles to the plane of the element, and on the other hand the temperature drop along the plane of the element. The temperature drop along the plane of the element, i.e. through the duct walls characterises the element's efficiency as regards heat recovery. The latter is controlled by the duct length (and choice of material). The amounts of air are controlled by the combined cross-sectional area of the ducts (and the air velocity).

35 Since the exhaust air gives off the major part of its humidity prior to cooling, formation of ice is of less importance under normal



conditions. If required defrosting is effected by increasing the air velocity and reducing the amount of fresh air through valves, as a result of which the element heats up.



Patent Claim

A ventilating wall element intended for ventilation and heat insulation between two spaces subject to different temperatures, where air from these spaces is conducted subject to induced pressure through a system of ducts so that both types of air are separated by thin walls with a view to exchanging heat and humidity, respectively, characterised in that in a plane at right angles to the wall surface the element is subdivided into a number of ducts (1) parallel to the wall surface, whereby these ducts are joined in pairs at the ends with the aid of special ducts (2) thus giving rise to a single coherent duct in the same plane, in that the element consists of several such coherent ducts alternately arranged for both types of air, and in that the outer ends of the ducts on both sides of the element are joined to special pressure equalising gaps (3) for the respective types of air.



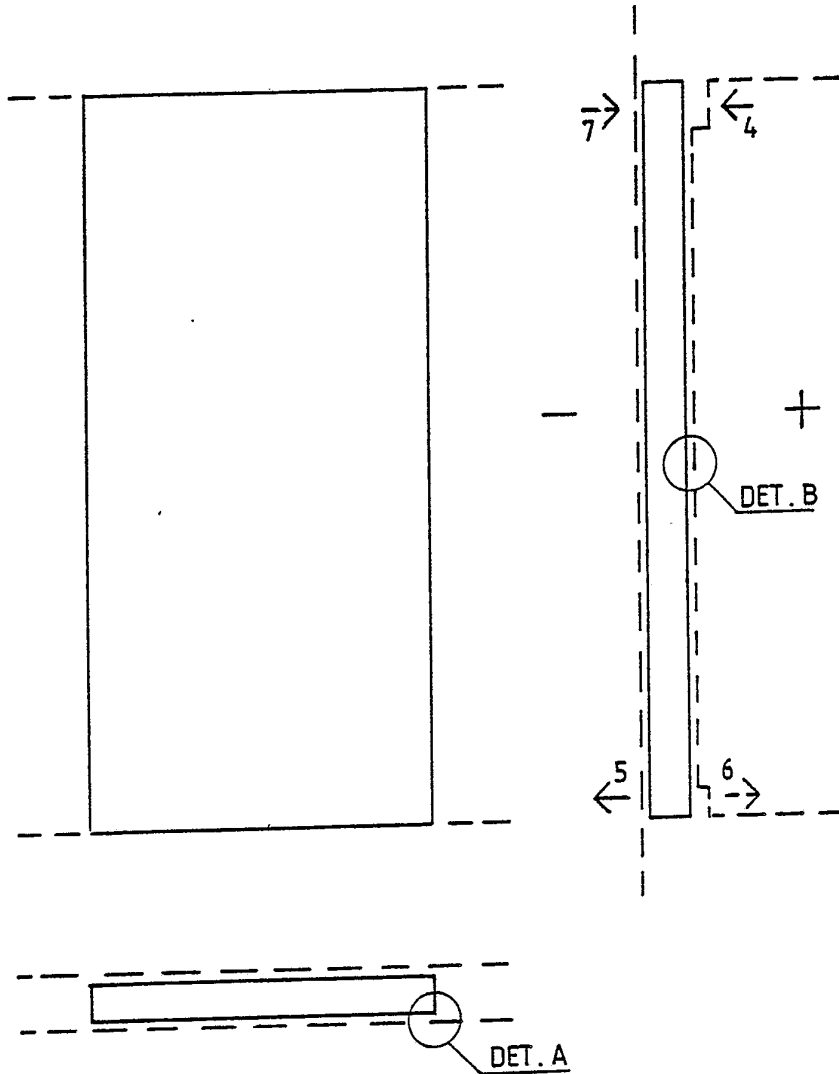


FIG. 1,

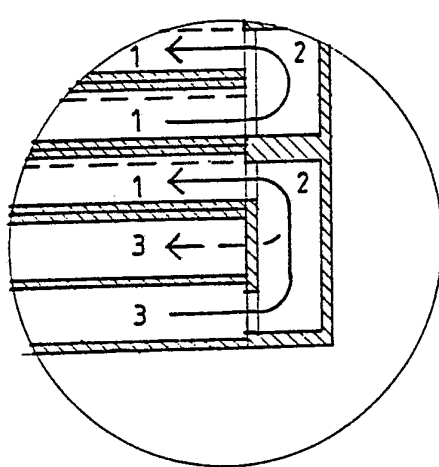


FIG. 2, DET. A

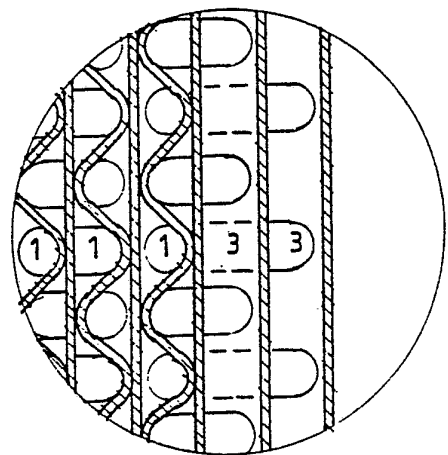
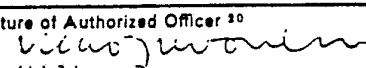


FIG. 3, DET. B

INTERNATIONAL SEARCH REPORT

International Application No PCT/SE83/00054

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ³		
According to International Patent Classification (IPC) or to both National Classification and IPC 3		
E 04 B 1/74		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁴		
Classification System	Classification Symbols	
IPC 3	E 04 B 1/74,76,78, F 24 D 5/10, F 24 F 5/00, 7/00,007,013,08	
US C1	98:33; 165:49,53,59,66; 237:46,49,69 7/10	
Documentation Searched other than Minimum Documentation to the extent that such Documents are included in the Fields Searched ⁵		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴		
Category ⁶	Citation of Document, ¹⁴ with indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁴
A	SE, B , 393 421 (JANSSON G) 9 May 1977	1
A	SE, B , 410 880 (NOKKALA M S) 12 November 1979	1
A	SE, A, 8001952-4 (BERNANDER K G, SKOGSTRÖM L, ANDERSSON L O) 13 September 1981	1
A	NO, C, 60 262 (BEHRINGER H) 9 January 1939	1
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IV. CERTIFICATION		
Date of the Actual Completion of the International Search ³	Date of Mailing of this International Search Report ³	
1983-05-30	1983-05-28	
International Searching Authority ¹	Signature of Authorized Officer ²⁰	
Swedish Patent Office	 Vilho Juvonen	