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(54) **Ventilation apparatus**

(57) The present invention relates to a ventilation apparatus (1) for recirculating or freshening air in a space. This ventilation apparatus (1) comprises a housing (2) with air displacing means (3), an air inlet (10) into the housing (2) for the purpose of supplying air, and a substantially downward and laterally oriented air outlet out

of the housing and into the space for emitting a recirculated or freshening airflow, characterized in that the air inlet (10) is laterally oriented relative to the housing (2) and is in open connection with the air displacing means in the housing via a channel arranged over the air displacing means (3).

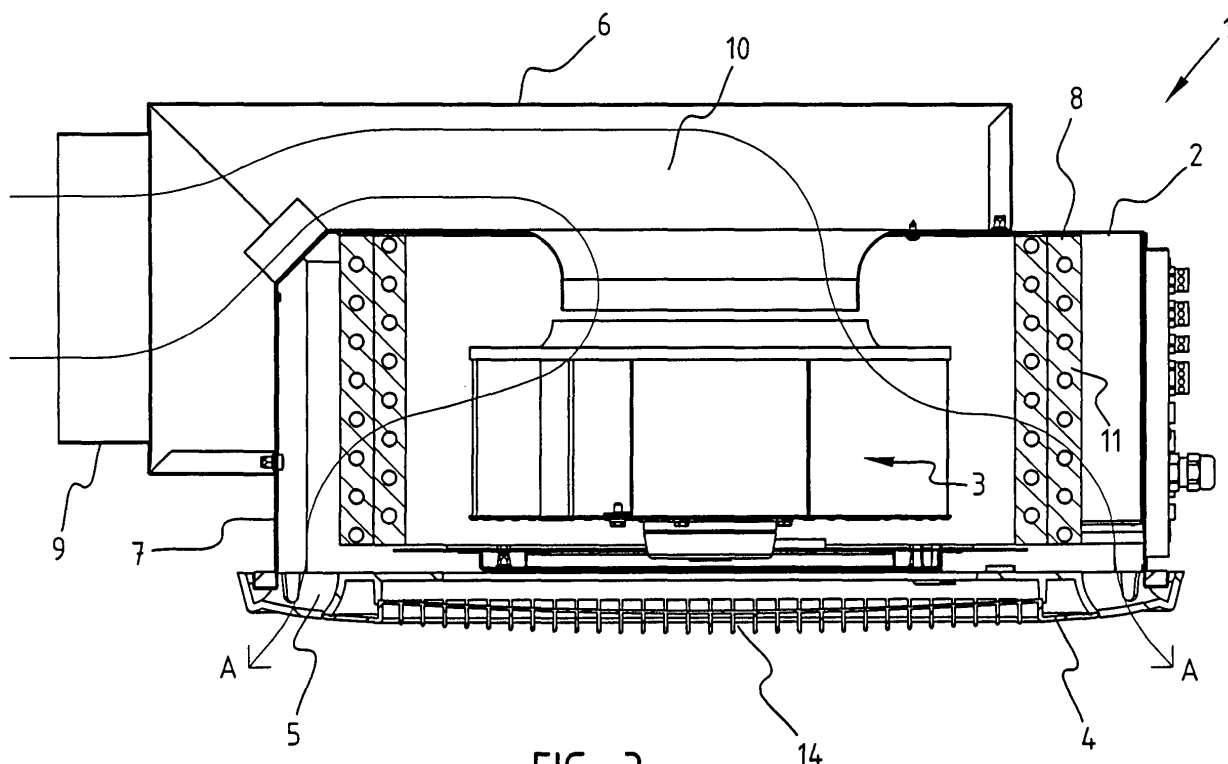


FIG. 3

Description

[0001] The present invention relates to a ventilation apparatus for recirculating or freshening air in a space, comprising: a housing with air displacing means; an air inlet into the housing which is oriented laterally relative to the housing for the purpose of supplying air; and a substantially downward oriented air outlet out of the housing and into the space for emitting a recirculated or freshening airflow.

[0002] In the known art such ventilation apparatuses are usually used as built-in element in system ceilings. It is the case here that the underside of the ventilation apparatuses must preferably lie as flush as possible with other parts of that system ceiling. Above such a system ceiling there is only a limited installation height available for the known ventilation apparatuses. This installation height generally produces problems, particularly in respect of the supply of air to the ventilation apparatus which must be used for freshening the air in the space where the ventilation apparatus is then suspended. This is because the supplied air is preferably distributed through the space in all directions, this being preferably associated with an air inlet on the top side of the housing, but due to the limited installation height this is generally not possible and moreover results in problems with the installation of air conduits and the connection thereof to the known ventilation apparatuses, because this connection must then take place on the top side of the housing of these ventilation apparatuses.

[0003] The invention has for its object to obviate or at least reduce the above stated drawbacks of the known art and also to provide other advantages, for which purpose a ventilation apparatus according to the present invention is distinguished in that the air inlet is in open connection with the air displacing means in the housing via a channel arranged over the housing and the air displacing means therein, and is connected to the channel relative to the housing substantially at the position of the air displacing means. A considerable improvement is thus provided with an addition to the ventilation apparatus in the form of said channel, wherein supply of air into the housing is realized along the top and emission of airflows in all directions from the bottom of the ventilation apparatuses is thus made possible, while lateral connection to air supply conduits is likewise made possible and a small installation height is also realized.

[0004] In a possible embodiment, a ventilation apparatus according to the invention has the feature that the air inlet has an effective passage size, and in particular height, for intake of air. A height of the channel in relation to the total height of the ventilation apparatus is significantly lower here than that of the air inlet. A ventilation apparatus having a smaller total height can thus be provided, which is particularly favourable in applications with a limited installation space in for instance a system ceiling.

[0005] In a preferred embodiment, the air outlet is ori-

ented substantially around the ventilation apparatus. This means that emission of airflows is also actually realized in all directions.

[0006] In another preferred embodiment, orienting means are arranged in the air outlet for orienting the airflows out of the ventilation apparatus. In an embodiment in which use is made of a cooler, a heater, a heat exchanger or other similar air treatment system, use can be made of such orienting means to impart to the airflows for emission an orientation relative to the horizontal which is optimal for cooling, heating, etc. If use is made of such an element, it is preferably disposed between the air displacing means and the air outlet. The air thus travels the shortest possible distance in order to have the greatest possible effect on the space.

[0007] Use can additionally be made of an extra air inlet for recirculation of air from the space, which air inlet can be oriented downward. This is therefore not only a ventilation apparatus for air freshening but also for air recirculation, although refreshing is deemed the main function and recirculation an option.

[0008] In a situation of use of the ventilation apparatus the channel preferably has a greater width than the height thereof. Taking into account the capacity of the air displacing means, a sufficient air throughput capacity through the channel can thus be chosen without an unacceptable increase in the overall height of the ventilation apparatus.

[0009] In another possible preferred embodiment, a ventilation apparatus according to the invention has the feature that the air inlet has an effective passage size, wherein a height of the channel in relation to the width thereof corresponds to the passage size of the air inlet. The intake capacity of the air inlet can thus correspond to the throughput capacity of the channel, so that the channel does not form an obstacle in the passage of air from the air inlet to the air displacing means, and a limited total height of the ventilation apparatus can still be realized for the purpose of the installation of the ventilation apparatus where a limited installation space is available, for instance in conjunction with system ceilings.

[0010] The air inlet preferably has a coupling element and can be connected therewith to a feed for infeed of air which has been treated at or originates from a remote location. The ventilation apparatus can thus be suspended and mounted and then connected to the relevant feed using said coupling elements, which results in a considerable simplification compared to a connection or coupling element on the top side of the housing, where access is difficult and connection of the coupling element is therefore also difficult to bring about.

[0011] The present invention will be further described on the basis of a specific exemplary embodiment of a ventilation apparatus according to the present invention as shown in the accompanying drawings, in which:

fig. 1 shows a perspective bottom view of a ventilation apparatus according to the present invention;

fig. 2 is a perspective top view of the same ventilation apparatus as in fig. 1; and

fig. 3 shows schematically an outline of the operating principle of the ventilation apparatus of fig. 1 and fig. 2.

[0012] Fig. 1 shows a ventilation apparatus 1 according to the present invention. In the embodiment shown here ventilation apparatus 1 is suitable for recirculating and/or refreshing air in a space. Ventilation apparatus 1 comprises a housing 2 having therein a fan 3 which forms the air displacing means and which can for instance be based on an electric motor.

[0013] Ventilation apparatus 1 further comprises a front plate 4 with an outflow opening 5 along which airflows are guided out of ventilation apparatus 1 in the direction of arrows A under the influence of fan 3. Outflow opening 5 is circular, but can also be elliptical or rectangular or polygonal, or consist of discrete gaps, each of which could extend along an edge of front plate 4. Opening 5 can also have a triangular form. In the embodiment of ventilation apparatus 1 shown here the emission of airflows in all directions is thus possible in principle.

[0014] Placed on top of housing 2 is a casing 6 which extends along a side wall 7 of housing 2 and over the upper surface 8 thereof. Casing 6 defines a channel from the side of ventilation apparatus 1 corresponding to side wall 7 to the top side of the apparatus. The top side refers of course to the situation of use in which ventilation apparatus 1 is mounted in a system ceiling.

[0015] On the side of casing 6 corresponding to side wall 7 are arranged coupling elements 9 to be connected to air hoses or similar components, which serve for supply to the ventilation apparatus of air which can for instance be cooled at or obtained from a remote location, for instance from the vicinity of the building having the space with ventilation apparatus 1 therein. Coupling elements 9 are thus oriented laterally, which optimizes an easy connection of coupling elements 9 to for instance said air hoses.

[0016] On the top side the housing 2 comprises an inlet 10 over which the casing 6 extends. The channel formed by casing 6 thus extends from coupling elements 9 to inlet 10 in the top side 8 of housing 2. Directly beneath opening 10 is situated the fan 3, which is an embodiment of air displacing means. The displacement paths of airflows shown in fig. 3 are thus realized due to the action of fan 3.

[0017] In addition to fan 3, and preferably around fan 3, there is arranged another element 11. This element can be a cooler or a heater, or more generally the element 11 can be a heat exchanger. In the part of the airflow displacement path, of which two such paths are shown in fig. 3, the element is disposed such that the airflow is subjected to a treatment before it is driven outside through outflow opening 5, i.e. into the space where ventilation apparatus 1 is disposed or suspended.

[0018] It is further noted that the rear side of ventilation

apparatus 1 is shown in fig. 2. Rear side is understood to mean that side of housing 2 which is situated opposite coupling elements 9.

[0019] In this rear side of housing 2 are arranged connections 12 for infeed and outfeed of a cooling medium or a heating fluid or other medium required to allow the element 11 shown in fig. 3 to operate in the desired manner. On the rear side of ventilation apparatus 1 in fig. 2 is also arranged an electronics compartment 13, where the necessary electrical and electronic installations can be arranged which are required for control and functioning of ventilation apparatus 1, for instance the fan 3 thereof in particular. Fuses and the like can also be arranged in the electronics compartment.

[0020] It is noted that outflow opening 5 in fig. 1 is circular, but as further alternative can have any random shape. In the embodiment shown therein the outflow opening 5 encircles a grating 14 which can be used for supply of air to fan 3 from the space in which ventilation apparatus 1 is disposed. Ventilation apparatus 1 can thus also play a part in air recirculation and, if desired, valve means of any type can be used to switch between a supply of air via coupling elements 9 or a supply of air via grating 14. Diverse alternative and additional embodiments are thus found to be possible within the scope of the present invention as defined in the appended claims, wherein these potential embodiments do not actually fall within the scope of protection of the present invention only when they deviate from the invention to a considerable extent, in particular from the essence and spirit thereof. It is thus possible to also make use in another embodiment of coupling elements which are more adapted to air conduit ducts of rectangular cross-sectional form. An element for air treatment can be omitted when coupling elements 9 are for instance connected to air conduits which lead to a central air conditioning device, for instance for cooling or heating air to be emitted.

Claims

1. Ventilation apparatus for recirculating or freshening air in a space, comprising:

- a housing with air displacing means;
- an air inlet into the housing which is oriented laterally relative to the housing for the purpose of supplying air; and
- a substantially downward oriented air outlet out of the housing and into the space for emitting a recirculated or freshening airflow,

characterized in that the air inlet is in open connection with the air displacing means in the housing via a channel arranged over the housing and the air displacing means therein, and is connected to the channel relative to the housing substantially at the position of the air displacing means.

2. Ventilation apparatus as claimed in claim 1, wherein the air inlet has an effective passage size, and in particular height, for intake of air, wherein a height of the channel in relation to the total height of the ventilation apparatus is significantly lower than that of the air inlet. 5
3. Ventilation apparatus as claimed in claim 1 or 2, wherein the air outlet is oriented substantially around the ventilation apparatus. 10
4. Ventilation apparatus as claimed in claim 1, 2 or 3, wherein orienting means are arranged at the air outlet for orienting the airflow. 15
5. Ventilation apparatus as claimed in claim 1, 2, 3 or 4, wherein at least one element is arranged in the housing from the group comprising: a cooler; a heater; a heat exchanger and so on. 20
6. Ventilation apparatus as claimed in claim 5, wherein the element is arranged between the air displacing means and the air outlet.
7. Ventilation apparatus as claimed in at least one of the foregoing claims, wherein an additional air inlet is arranged for recirculation of air from the space, which air inlet is oriented downward. 25
8. Ventilation apparatus as claimed in at least one of the foregoing claims, in particular claim 2, wherein in a situation of use of the ventilation apparatus the channel has a greater width than the height thereof. 30
9. Ventilation apparatus as claimed in at least one of the foregoing claims, wherein the air inlet has an effective passage size, wherein a height of the channel in relation to the width thereof corresponds to the passage size of the air inlet. 35
10. Ventilation apparatus as claimed in at least one of the foregoing claims, wherein the air inlet comprises a coupling element and can be connected therewith to a feed for infeed of air which has been treated at or originates from a remote location. 40 45

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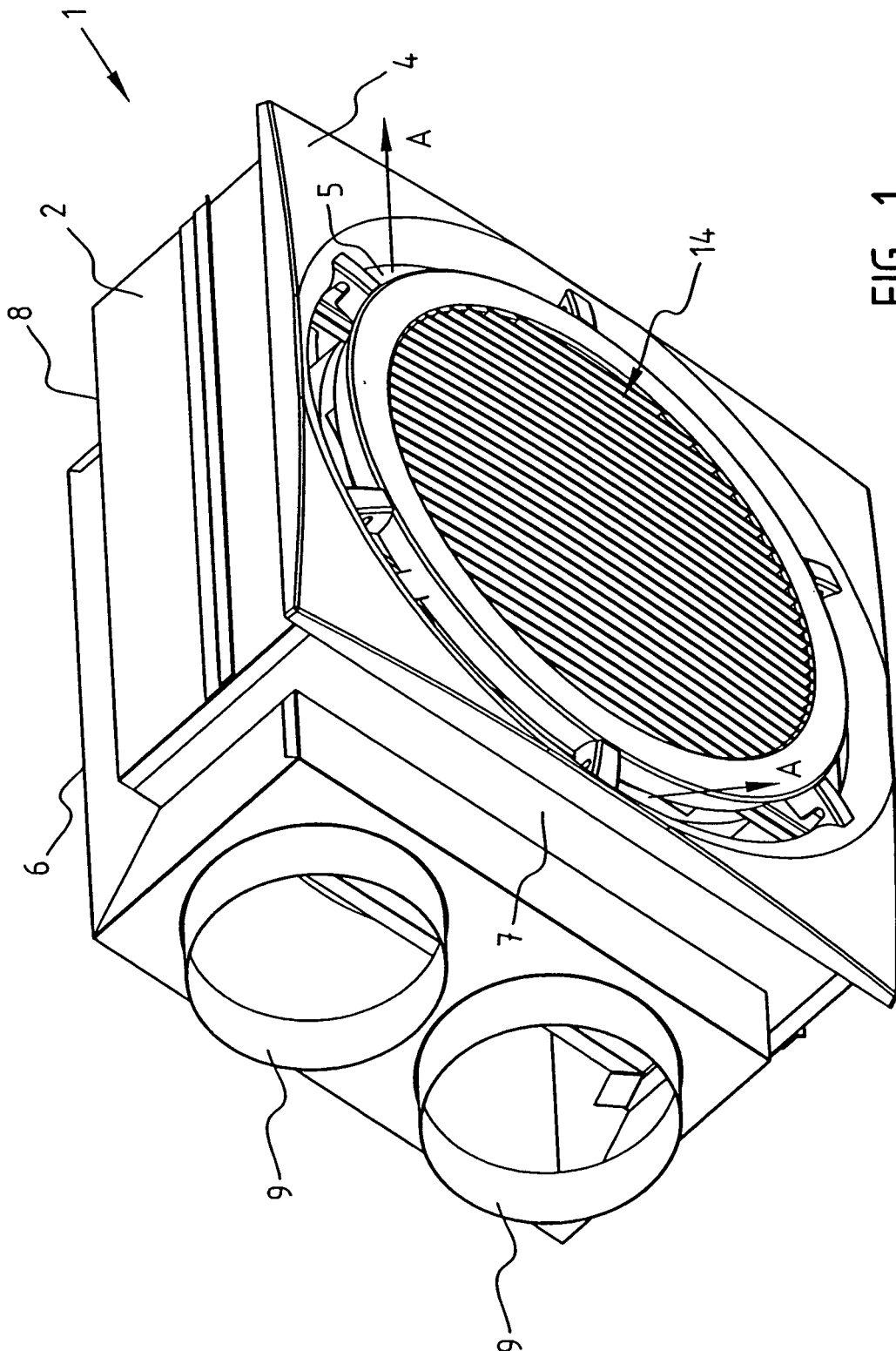
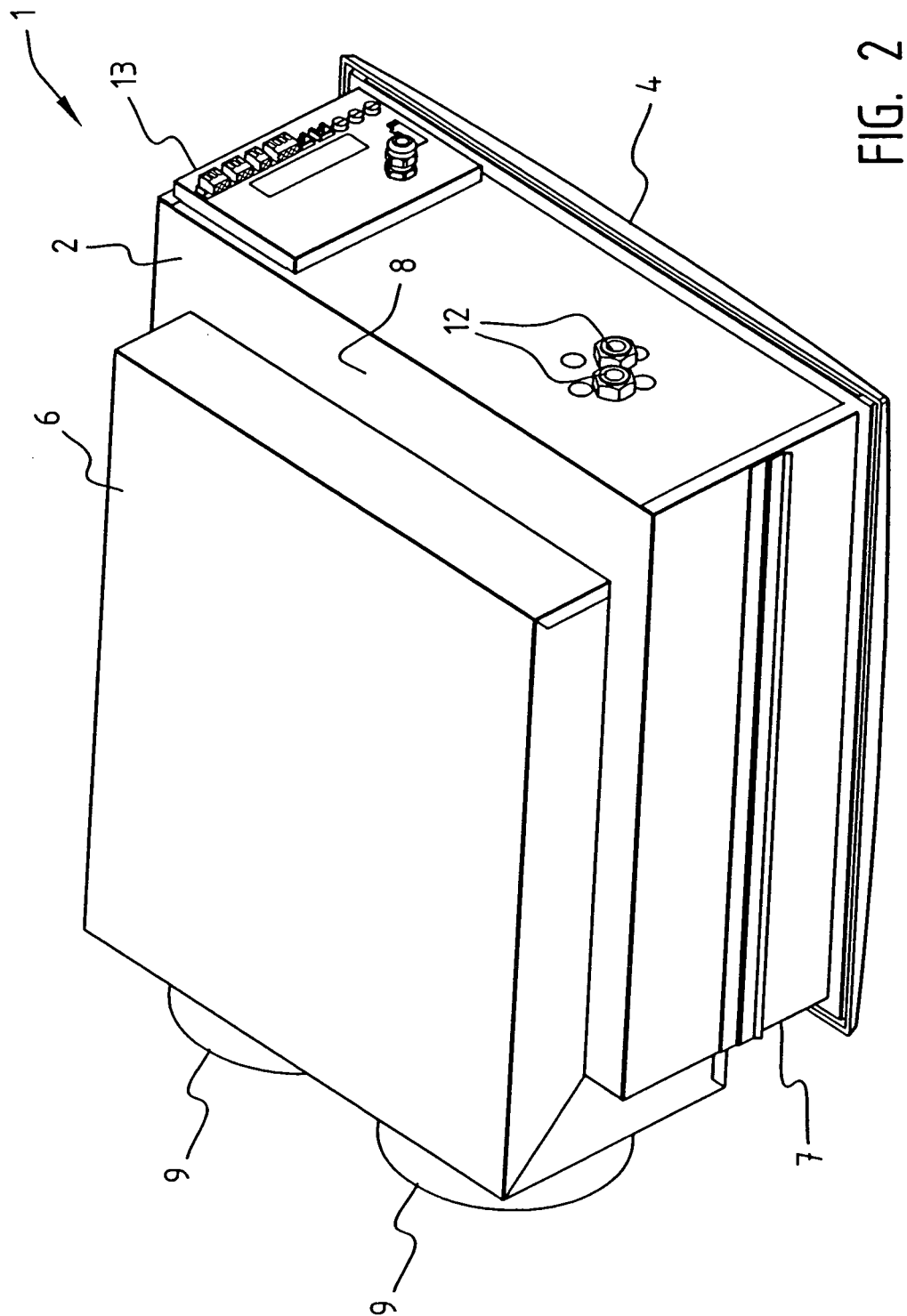


FIG. 1



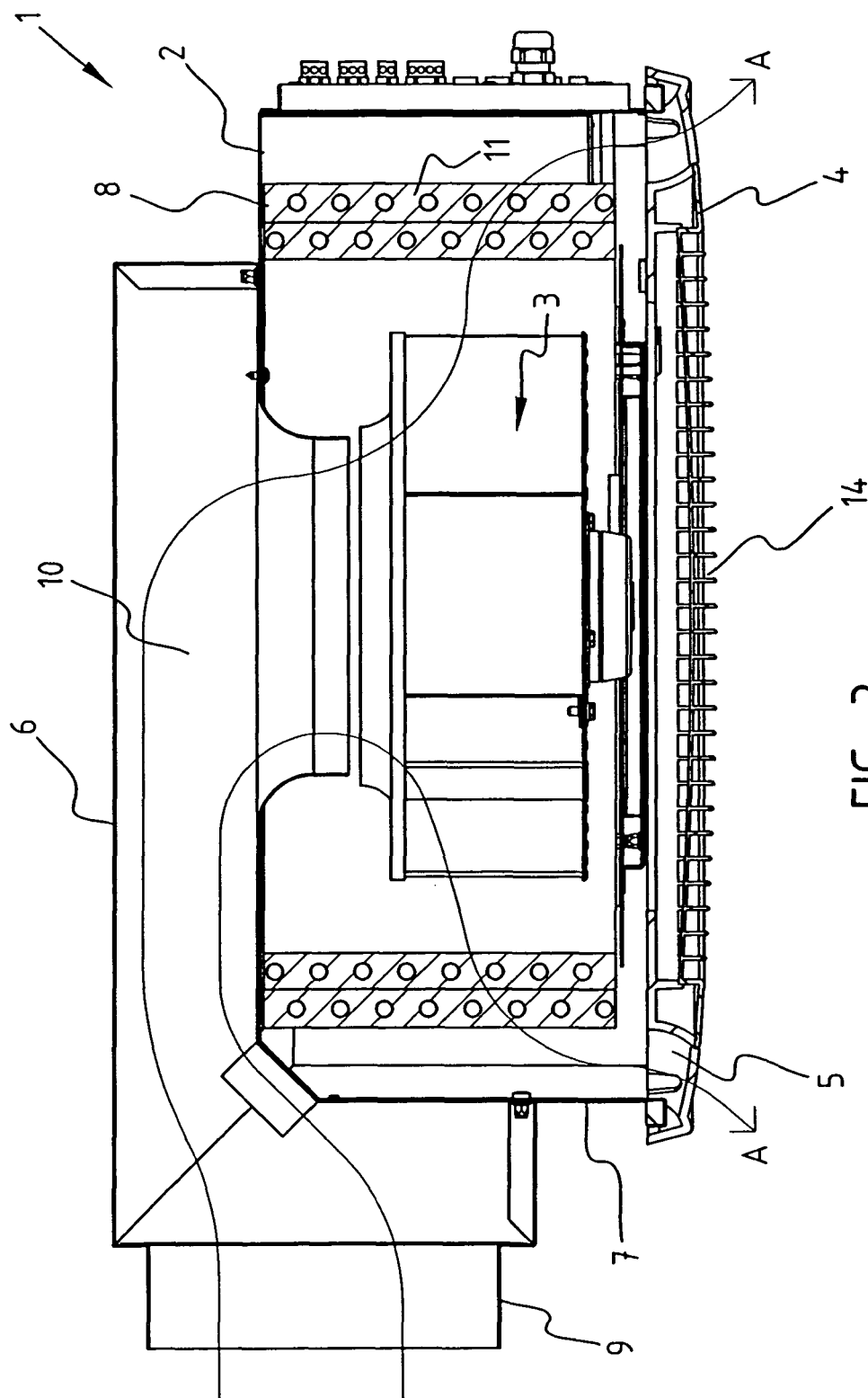


FIG. 3



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 05 07 6678

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 6 358 139 B1 (RENZ MANFRED) 19 March 2002 (2002-03-19) * column 2, line 6 - column 6, line 20; figures 1,3,7 *	1-10	F24F1/00 F24F13/06 F24F1/01
X	DE 20 2004 003427 U1 (LTG AKTIENGESELLSCHAFT) 13 May 2004 (2004-05-13) * the whole document *	1-10	
A	DE 298 22 930 U1 (GEBRUEDER TROX, GMBH, 47506 NEUKIRCHEN-VLUYN, DE) 25 February 1999 (1999-02-25) * the whole document *	1	
A	PATENT ABSTRACTS OF JAPAN vol. 2002, no. 05, 3 May 2002 (2002-05-03) -& JP 2002 005500 A (DAIKIN IND LTD), 9 January 2002 (2002-01-09) * abstract *	1	
A	DE 72 00 995 U (GAERTNER A; STIENS R) 12 January 1972 (1972-01-12) * abstract; figure *	1	TECHNICAL FIELDS SEARCHED (Int.Cl.7) F24F
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 11 October 2005	Examiner Gonzalez-Granda, C
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 05 07 6678

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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11-10-2005

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6358139	B1	19-03-2002	BR 0004250 A 23-07-2002
			CN 1293342 A 02-05-2001
			DE 29916321 U1 23-12-1999
			EP 1085270 A2 21-03-2001
			JP 2001133002 A 18-05-2001
			SG 84618 A1 20-11-2001

DE 202004003427	U1	13-05-2004	NONE

DE 29822930	U1	25-02-1999	NONE

JP 2002005500	A	09-01-2002	NONE

DE 7200995	U		NONE
