



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**23.06.2010 Bulletin 2010/25**

(51) Int Cl.:  
**F24F 13/068** <sup>(2006.01)</sup> **F24F 13/06** <sup>(2006.01)</sup>

(21) Application number: **09178298.7**

(22) Date of filing: **08.12.2009**

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR**  
**HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL**  
**PT RO SE SI SK SM TR**  
Designated Extension States:  
**AL BA RS**

(30) Priority: **10.12.2008 FI 20086182**

(71) Applicant: **RC-Linja Oy**  
**FI-00701 Helsinki (FI)**

(72) Inventor: **Uksila, Tommi**  
**FI-00170 Helsinki (FI)**

(74) Representative: **Laako, Tero Jussi**  
**Berggren Oy Ab**  
**P.O. Box 16**  
**00101 Helsinki (FI)**

(54) **Supply air device**

(57) The invention relates to a supply air device (1), comprising an elongated body (2), said body (2) having its first end (3) connected to a supply air duct, and the body (2) has its second end (5) provided with apertures (6), at least some of said apertures (6) being fitted with guide nozzles (7).

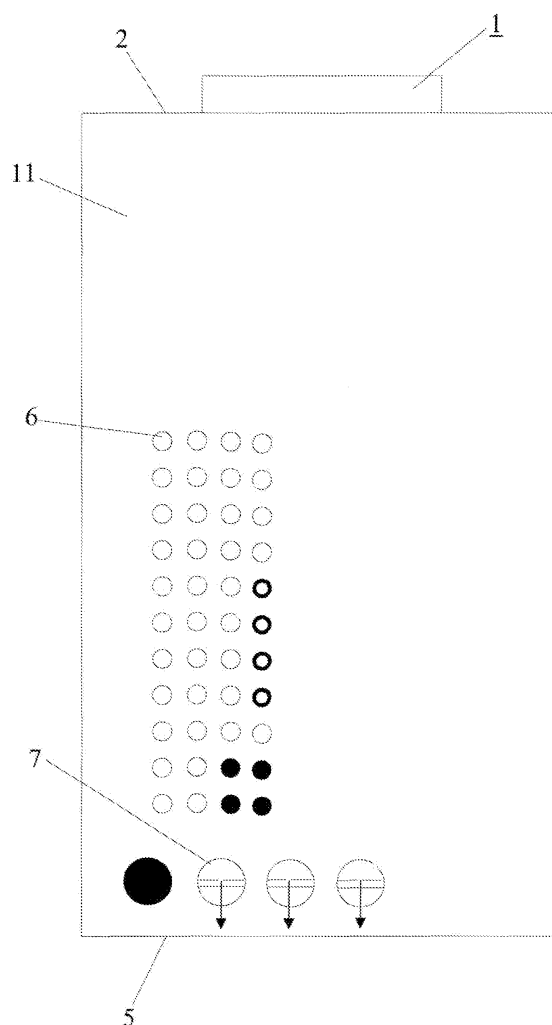


Fig. 3

## Description

**[0001]** This invention relates to a supply air device. More specifically, it concerns a supply air device, having an elongated body and being at least partially perforated over its external surface.

**[0002]** For the ventilation of high-ceilinged spaces, in which the overheated air is brought down, exist a wide range of supply air devices. Typical applications include slot diffusers, tray diffusers, swirl diffusers, and diffusers provided with jet nozzles. Supply air devices of the above type can be used for bringing overheated air down to the public area, for example in shopping malls, indoor sports arenas, and industrial facilities.

**[0003]** The shortcomings of swirl diffusers and tray diffusers include the breadth of a blow pattern generated by the diffusers and the inability to redirect the blow pattern during the life cycle of a ventilation system. Such a need to modify ventilation may come up for example in the process of redoing a shop layout. The slot diffuser establishes a narrow blow pattern and a long casting distance. The narrow blow pattern is particularly important when overheated air is delivered for example into a space between chest freezers in a shop. In the event that the blow pattern of a supply air device spreads out, the warm air flow falls on chest freezers, resulting in frosting, ice-forming, and unnecessary energy consumption. The blow pattern of slot diffusers involves the same problem as swirl and tray diffusers, i.e. the blow patterns thereof cannot be changed. The shop layout undergoes several changes during its life cycle, and a situation is often encountered in which the supply air devices are located unfavorably, for example with respect to the location of chest freezers. A solution to the problem has been sought by outfitting the premises with jet diffusers, whereby the blow pattern can be redirected as desired. A drawback with jet diffusers is, however, the inability thereof to provide a long casting distance or a narrow blow pattern.

**[0004]** It is an object of the invention to bring forth an improvement for the foregoing drawbacks and to provide a versatile supply air device, having in combination a narrow blow pattern and a capability of redirecting the blow pattern. This object can be achieved according to the invention by means of a supply air device, having an elongated body and having its bottom perforated and at least some of the apertures fitted with jet nozzles. The supply air device according to the invention is characterized by what is defined in the characterizing clause of the appended independent claim 1.

**[0005]** The invention will now be described more precisely with reference to the accompanying drawings, in which

fig. 1 shows an elongated supply air device in a simplified side view,

fig. 2 shows a perforated end of the elongated supply air device, and

fig. 3 shows a more detailed side view of the supply air device.

**[0006]** Fig. 1 shows an elongated supply air device 1 in a side view. The supply air device 1 consists of an elongated body 2, whose first end 3 is attachable to a ventilation duct (not shown in the figure) by way of a joint 4. A second end 5 of the supply air device 1 is perforated and thereby the ventilation duct air is delivered into a space surrounding the supply air device.

**[0007]** Fig. 2 shows the perforated second end 5 of the supply air device 1. In order to direct the supply air coming from a ventilation duct, at least some of apertures 6 are provided with guide nozzles 7. The guide nozzles 7 can be stationary, but from the standpoint of adjustability and versatility it is preferred that at least some of the guide nozzles 7 be adjustable for enabling their blowing direction to be changed. Positioning the adjustable guide nozzles 7 along or in the vicinity of a periphery of the end 5 enables influencing, by changing their blow direction, also the direction of an air flow coming through the ordinary apertures 6. Thus, the entire air flow coming out of the end surface can be pointed in a desired direction and the blow pattern shaped as desired. The air flow discharges from the guide nozzles 7 in the direction of arrows 8. In fig. 2, the aperture system 6 is only sketched over a segment of the end surface, but the extent of aperture system is arbitrarily optional and so is the disposition and number of the guide nozzles 7.

**[0008]** The direction of an air flow coming from the guide nozzles 7 can be adjusted freely both by rotating the guide nozzle in the plane of a mounting surface and by a relative change of alignment in the direction of a mounting surface diagonal. This enables pointing the air flow in any direction from the plane of the surface. The guide nozzles 7 shown in fig. 2 are only designed to be mutable in the mounting plane, whereby the direction of a flow pattern established by one guide nozzle changes as determined by the lateral face of a cone. The diverse guide nozzles 7 according to the prior art are always capable of establishing a desired direction of flow. The guide nozzles are preferably made in plastics, thus being easy to press with their engagement tabs into the apertures 6 provided therefor and to pivot in a desired direction. The directionally adjustable guide nozzles 7 can be installed directly as such in the aperture 6 of the supply air device 1 or are installed in a separate adapter element (not shown in the figure) made of an elastic material, which also seals the resulting joint.

**[0009]** The blow pattern can be changed and adjusted as desired also by covering some of the apertures 6 or the guide nozzles 7 by fitting the same with plugs 9. Thereby, even during a ventilation cycle working at a reduced performance, it is possible to obtain a sufficiently extensive and effective blow pattern in a ventilated space. By plugging some of the apertures 6 or the guide nozzles 7, it is also possible to make a difference in the obtained blow pattern. Likewise, varying the size and

shape of the apertures 6 and the guide nozzles 7 enables obtaining a versatile blow pattern. If desired, the guide nozzles 7 can be replaced for example with another model for influencing the amount of air coming through the guide nozzles. Likewise, the ordinary apertures 6 can be fitted with discs 10 of a washer type, which reduce the size of an original aperture and diminish the throughput of air.

**[0010]** As described above, there is provided quite a versatile ventilation terminal 1, which lends itself particularly well to the controlled ventilation of high-ceilinged spaces. The terminal 1 can have its blow pattern adjusted precisely to a desired size and length by changing the ventilation performance or by opening/closing some of the apertures 6 by means of the plugs 9, as well as by directing and shaping the blow pattern by means of the guide nozzles 7.

**[0011]** Fig. 2 shows an elongated supply air device 1 circular in cross-section, but it should be appreciated that the supply air device can have an arbitrarily optional cross-section, being for example a square, a rectangle, a triangle, an ellipse, or any other such geometric shape. Likewise, the apertures 6 may come in various shapes and even the guide nozzles 7 can be shaped for example like polygons, thus being directed in a stepwise manner.

**[0012]** Fig. 3 shows the supply air device 1 more precisely in a side view. According to one embodiment of the invention, the supply air device 1 has also a side surface 11 of its body 2 at least partially covered with apertures. Identically to the end 5, at least some of the apertures 6 can be equipped with air directing fixed or mutable guide nozzles 7. Likewise, the air flow regulation can be conducted by means of plugging both some of the apertures 6 and some of the guide nozzles 7 or by downsizing the aperture system. The side aperture system can also be closed completely, whereby the entire air flow can be delivered out of the end 5 of a supply air device. The same way, it is possible to close the aperture system 6 and the guide nozzles 7 at the end 5 of a supply air device, thus developing a blow pattern solely by way of the aperture system and/or guide nozzles of the side surface 11. By closing some of the apertures in the side surface 11 and by redirecting some of the guide nozzles 7 in the side surface, a desired type of blow pattern and blow strength are obtained in lateral direction. Of course, the power of blow can also be influenced by changing the performances of a ventilation machine.

**[0013]** Fig. 3 shows an aperture 6 and guide nozzles 7 for visualizing the same in just a specific area of the side surface 11, but the number of disposition thereof can be selected freely as required by necessary ventilation.

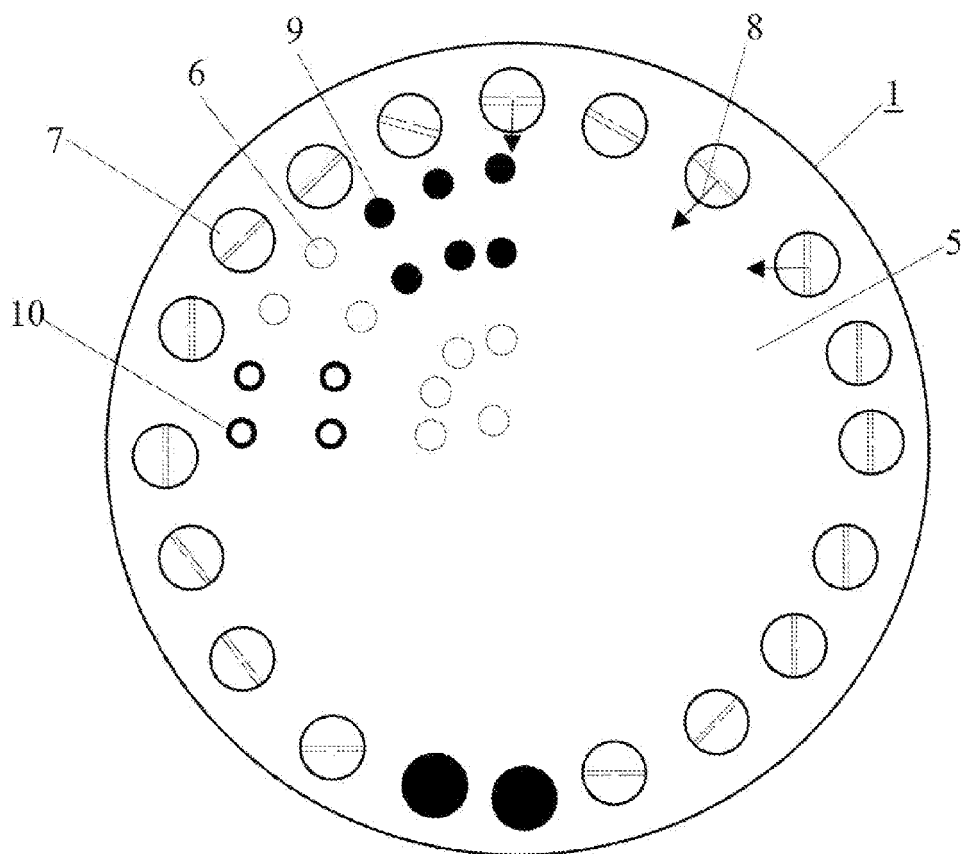
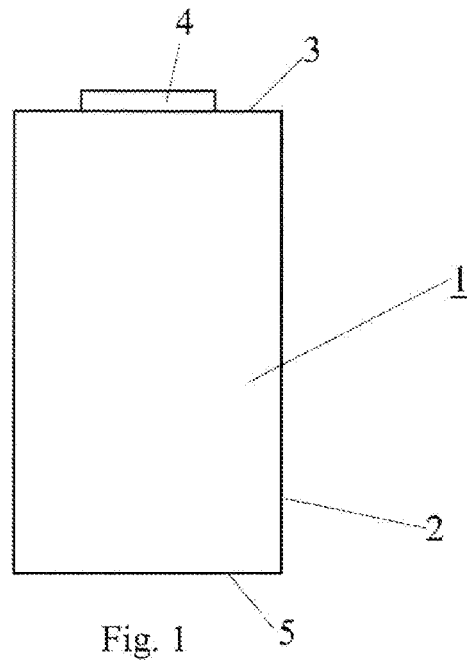
**[0014]** The air flow discharging from the end 5 of the supply air device 1 can also be influenced by the guide nozzles 7 mounted on the side surface 11 of the supply air device, which are capable of controlling the direction of a flow coming by way of the end.

**[0015]** Described above are just a few preferred em-

bodiments for a ventilation terminal of the invention. It is nevertheless understood that the presented examples are by no means limitative to the invention, but the scope of protection shall be determined in accordance with a scope of protection as defined by the appended claims.

## Claims

1. A supply air device (1), comprising an elongated body (2), said body (2) having its first end (3) connected to a supply air duct, **characterized in that** the body (2) has its second end (5) provided with apertures (6), and that at least some of the apertures (6) are fitted with guide nozzles (7).
2. A supply air device (1) according to claim 1, **characterized in that** at least some of guide nozzles (7) are mutable.
3. A supply air device (1) according to claim 1, **characterized in that** the elongated body (2) has at least a section of its side surface (11) provided with apertures (6).
4. A supply air device (1) according to claim 3, **characterized in that** the body (2) has at least some of the apertures (6) in its side surface (11) fitted with guide nozzles (7).
5. A supply air device (1) according to claim 4, **characterized in that** at least some of the guide nozzles (7) in the side surface (11) of the body (2) are mutable.
6. A supply air device (1) according to claim 1, **characterized in that** the supply air device (1) is connected to a ventilation duct terminating in a ceiling or wall.
7. A supply air device (1) according to claim 1 or 4, **characterized in that** the guide nozzles (7) are replaceable.
8. A supply air device (1) according to claim 1 or 3, **characterized in that** the apertures (6) are coverable either completely with plugs (9) or partially with washer type elements (10).



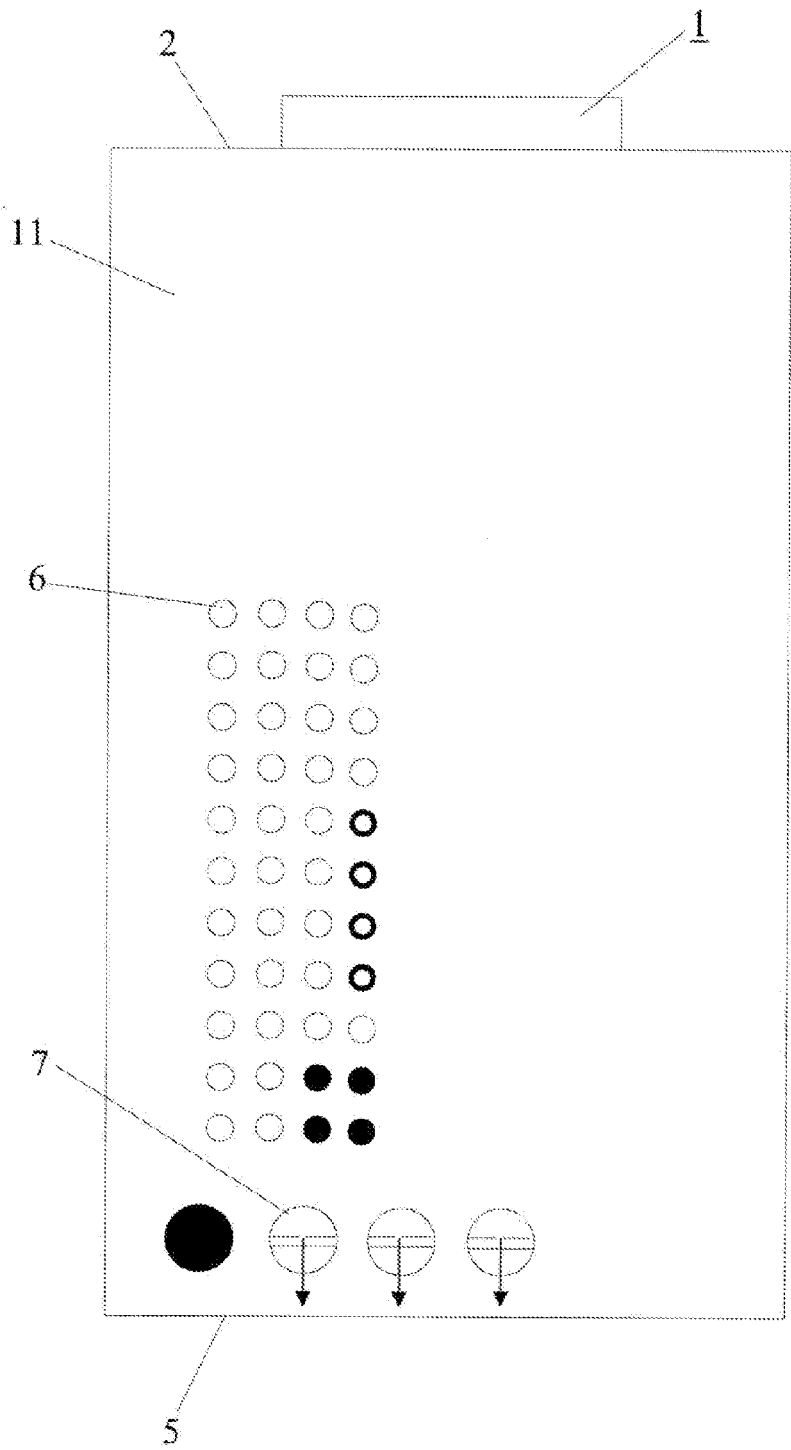


Fig. 3



## EUROPEAN SEARCH REPORT

Application Number  
EP 09 17 8298

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                              |                                                   |                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|--------------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Citation of document with indication, where appropriate, of relevant passages                                                                                | Relevant to claim                                 | CLASSIFICATION OF THE APPLICATION (IPC)    |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | DE 30 21 356 A1 (ENIG ENERGIEBERATUNG INNOVATIO [DE]) 25 March 1982 (1982-03-25)<br>* page 10, line 10 - page 11, line 11;<br>figures 1,2,5,6 *              | 1-8                                               | INV.<br>F24F13/068                         |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | DE 30 25 342 A1 (ENIG ENERGIEBERATUNG INNOVATIO [DE])<br>28 January 1982 (1982-01-28)<br>* page 8, line 12 - page 13, line 9;<br>figures 1,6,8 *             | 1-4                                               | ADD.<br>F24F13/06                          |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | CH 692 062 A5 (HESCO KLIMA SCHWEIZ AG [CH]) 15 January 2002 (2002-01-15)<br>* column 2, line 6 - line 64; figures 1,2,3 *                                    | 1-2                                               |                                            |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | EP 0 924 474 A2 (BERNHARDT ADAM [NL])<br>23 June 1999 (1999-06-23)<br>* paragraph [0017] - paragraph [0018];<br>figures 1,2 *                                | 1-2                                               |                                            |
| X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | DE 102 12 293 A1 (EIDMANN FRITZ JUERGEN [DE]; JAEGER REIMUND [DE])<br>9 October 2003 (2003-10-09)<br>* paragraph [0016] - paragraph [0018];<br>figures 1,2 * | 1                                                 | TECHNICAL FIELDS<br>SEARCHED (IPC)<br>F24F |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | EP 0 639 744 A2 (RENN LUKAS DIPL ING [DE])<br>22 February 1995 (1995-02-22)<br>* abstract *                                                                  | 3-4                                               |                                            |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                              |                                                   |                                            |
| Place of search<br>Munich                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                              | Date of completion of the search<br>19 March 2010 | Examiner<br>Lienhard, Dominique            |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone<br/>Y : particularly relevant if combined with another document of the same category<br/>A : technological background<br/>O : non-written disclosure<br/>P : intermediate document</p> <p>T : theory or principle underlying the invention<br/>E : earlier patent document, but published on, or after the filing date<br/>D : document cited in the application<br/>L : document cited for other reasons<br/>.....<br/>&amp; : member of the same patent family, corresponding document</p> |                                                                                                                                                              |                                                   |                                            |

1  
EPO FORM 1503 03/82 (P04C01)

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

EP 09 17 8298

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  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

19-03-2010

| Patent document<br>cited in search report |    | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|-------------------------------------------|----|---------------------|----------------------------|---------------------|
| DE 3021356                                | A1 | 25-03-1982          | NONE                       |                     |
| DE 3025342                                | A1 | 28-01-1982          | NONE                       |                     |
| CH 692062                                 | A5 | 15-01-2002          | NONE                       |                     |
| EP 0924474                                | A2 | 23-06-1999          | DE 29722570 U1             | 10-06-1999          |
| DE 10212293                               | A1 | 09-10-2003          | CH 696308 A5               | 30-03-2007          |
|                                           |    |                     | NL 1022977 C2              | 30-01-2004          |
|                                           |    |                     | NL 1022977 A1              | 23-09-2003          |
| EP 0639744                                | A2 | 22-02-1995          | NONE                       |                     |