(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 500 664 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
11.03.2015 Bulletin 2015/11

(51) Int Cl.:
F24F 9/00 *(2006.01)*

(21) Application number: **12159160.6**

(22) Date of filing: **13.03.2012**

(54) Automatic lateral sliding door

Automatische, seitlich oeffnende Schiebetür

Porte automatique coulissante latérale

(84) Designated Contracting States:
AL 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 RS SE SI SK SM TR

(30) Priority: **15.03.2011 IT VI20110053**

(43) Date of publication of application:
19.09.2012 Bulletin 2012/38

(73) Proprietor: **Bertoldo Fratelli S.n.c.**
36034 Malo (VI) (IT)

(72) Inventor: **Bertoldo, Fabio**
36034 Malo (VI) (IT)

(74) Representative: **Bettello, Pietro**
Via Col d'Echele, 25
36100 Vicenza (IT)

(56) References cited:
EP-A1- 1 801 341
DE-A1- 4 404 733
US-A1- 2007 298 703

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 2 500 664 B1

Printed by Jouve, 75001 PARIS (FR)

Description

[0001] The present finding regards an automatic lateral sliding door, according to the general part of claim 1.

[0002] As it is well known, even in rooms well thermally insulated from the external environment, where all design precautionary measures are taken as regards the efficiency of the doors and windows, there often arises the need to resolve some heating drawbacks caused by the so-called "air masses", which move within the environments upon opening the doors.

[0003] If at domestic level the impact of these air currents is not particularly important, in that the period of time the door remains open is extremely short, on the contrary, in business buildings the issue becomes much more important.

[0004] Business buildings are subject to a continuous flow of clients coming in and out, hence implying continuously opening and closing the doors, thus leading to the occurrence of airflows from outside and heat efficiency loss from inside, this being caused by the difference between the internal temperature and the external temperature (even in absence of wind).

[0005] This phenomenon causes a series of more or less significant problems, such as:

- the formation of unpleasant air currents at the door;
- heat-hygrometric unbalance of the internal environment with ensuing head loss of the air condition system;
- entry of dust and pollutant agents from the outside to a point that, in case of a busy traffic area or industrial area, the pollution and external dust level jeopardise any air cleaning effort by the air purification system.

[0006] The problem is solved by introducing the so-called "air-blade barriers" constituted by an appropriate airflow, configured according to a vertical slat configuration, which form a vertical barrier, which withholds the airflow in horizontal direction.

[0007] In the current state of the art, the air jet or "air blade" is provided by an apparatus operating on the principle of the fan, which is arranged in a raised position, from the internal part of the door.

[0008] More specifically, such apparatus, which will be identified hereinafter by the general term of "ventilation group", is a substantially parallelepiped-shaped casing, provided with a port for suctioning air and a lower slit for the exit of the airflow, which provides for the "heat curtain", invisible and descendent, which serves as a barrier against the air masses, which would naturally enter from outside the door itself. Such apparatus - being positioned on the internal part of the door, where means for controlling the door are also provided, should, for this reason, necessarily be sufficiently spaced from the door itself, hence generating an interspace between the door and the "heat curtain"; however, this jeopardizes the action of countering the air barrier, as described more in detail hereinafter.

[0009] A second drawback which arises with the use of the ventilator groups of the known type regards the aesthetic aspect, in that these apparatuses, constituting a separate block from the door structure, are "cumbersome containers" hanging on the ceiling and unpleasant to sight.

[0010] As the most relevant documents of the state of the art EP 1801341 A1, US 2007/298703 A1, DE 4404733 A1 are cited.

[0011] An object of the present finding is to provide an automatic lateral sliding door provided with an air blade barrier, without the drawbacks revealed by the similar products of the known type.

[0012] This object is attained by means of an automatic lateral sliding door, which is characterized by the fact that the ventilator group is applied on the upright of the door, so as to have the air suctioning port arranged on one side of the door, usually the one facing inwards, while the slit for blowing the air blade is positioned on the other side of the door, usually the one facing outwards.

[0013] Specifically, the ventilator group is configured so that the air suctioning port is substantially in line, or at least minimally projecting, with respect to the frame of the door, while the slit for discharging the air is positioned so that the air barrier that is formed is the closest possible to the external face of the door and, specifically, with lateral extension at least equivalent to the opening of the same door.

[0014] The finding will be further defined through the description of a possible embodiment thereof, provided by way of non-limiting example, with reference to the attached drawings, wherein:

- fig 1 (table I) represents an elevational and sectional view of the ventilation group applied on a sliding door;
- figs 2, 3 (table II) represent views, respectively, from inside and outside, of a sliding door, provided with the apparatus according to fig 1;
- figs 4, 5 (table III) represent the installation and operation of a ventilation group, respectively, of the known type and innovative type according the invention.

[0015] As observable in figs 1-3, the ventilation group, indicated in its entirety with reference 1, is mounted on the upper crosspiece 2 of the door 3, so as to be able to suction an airflow "F2" from inside and transform it into an air blade barrier "B", which is positioned immediately before the external part of said door.

[0016] From a construction point of view, the ventilation group 1 comprises a blowing apparatus 10, enclosed within a protection casing 20.

[0017] Specifically, the blowing apparatus 10 consists of a metal structure 11, applied, through connectors 12, to the upright 2 of the door 3, containing a fan 13, which suctions air from the port 14 and conveys it into the ta-

pered conduit 15 where the air barrier "B" flow is formed.

[0018] Still specifically, the protection casing 20, suitably shaped and removable, is made up of a rear part 21, provided with a grid 22, which allows suctioning the airflow and by a front part 23, provided with slits 24, for the exit of the air barrier "B". There are considerable advantages obtained from the application of the finding. Actually, practically, as observable in fig 4, the common ventilation group 100 is positioned in proximity of the internal part of the door, where the automation members "K" of the aforementioned door are also present hence said group should necessarily remain sufficiently spaced from the door itself.

[0019] Such current arrangement results in the air barrier "B1" being necessarily spaced from the door and specifically from the passage opening of the door, hence due to such distance, the horizontal entry airflow "Z", meant to be countered, travels the space of the interspace "H", present between the open door and the "heat curtain" and it is discharged laterally on the two sides of said barrier, thus being able to freely enter into the environment to be protected against external air and almost entirely jeopardizing the countering action of the "air blade".

[0020] On the contrary, as observable in fig 5, by applying the ventilation group 1 according to the invention, the air barrier "B", being positioned outside the door, in an almost flushed manner and extending well beyond the passage opening "C", entirely prevents the horizontal entry airflow "Z" from exceeding beyond the door itself.

[0021] In addition, figures 4, 5, clearly reveal another advantage of the finding, i.e. that the ventilation group 1 can also be mounted on previously installed sliding doors 3, exploiting the space present between the upper crosspiece of the door and the ceiling for introducing a suctioning grid.

[0022] Lastly, as clearly observable in fig. 5, it is possible to observe the advantage of the smaller overall dimension required by the ventilation group 1, in that it is positioned substantially in line with the structure of the sliding door; furthermore, given that it is provided with an interchangeable protection casing, the external aspect of the apparatus can be configured variously, adapting it to the technical needs of the door on which it is applied and thus minimising the presence of said apparatus to the minimum.

[0023] The finding thus conceived can be subjected to modifications and variants and the construction details thereof can be replaced by other technically equivalent elements as long as they fall within the inventive concept defined by the claims that follow.

Claims

1. AUTOMATIC LATERAL SLIDING DOOR, of the type provided with an air blade barrier, obtained with an appropriate airflow (F), configured according to a vertical slats configuration, which form a vertical barrier (B), which withholds the air flow in horizontal direction, said automatic door (3) **characterised in that** a ventilation group (1) which provides for the air barrier (B), is applied on the upright (2) of the door (3), so as to have a port (21) for suctioning the airflow (F) arranged on one side of the door (3) and a slit (24), for blowing the air that forms the barrier (B), positioned on the other side of the door (3) itself.

2. AUTOMATIC LATERAL SLIDING DOOR, according to claim 1, **characterised in that** the ventilation group (1) is configured so that the port (21) for suctioning the airflow (F) is substantially in line, or minimally projecting, with respect to the door frame (3) while the slit (24) for discharging the air is positioned so that the air barrier (B) that is formed is the closest possible to the external face of the door, at the opening (C) of the same door.

3. AUTOMATIC LATERAL SLIDING DOOR, according to claim 2, **characterised in that** the ventilation group (1) comprises a blowing apparatus (10) enclosed within a protection casing (20).

4. AUTOMATIC LATERAL SLIDING DOOR, according to claim 3, **characterised in that** the blowing apparatus (10) is constituted by a metal structure (11), applied through connectors (12) to the upright (2) of the door (3) and containing a fan (13), which suctions air from the opening (14) and conveys it into the tapered conduit (15), where the flow of the air barrier (B) is formed.

5. AUTOMATIC LATERAL SLIDING DOOR, according to claim 3, **characterised in that** the protection casing (20), suitably shaped, is made up of a rear part (21), provided with a grid (22) which allows suctioning the airflow and by a front part (23), provided with slits (24) for the exit of the air barrier (B).

6. AUTOMATIC LATERAL SLIDING DOOR, according to claim 5, **characterised in that** the component parts (21, 23) of the protection casing (20) are withheld on the upright (2) in a removable manner, so as to allow substitution thereof with others having different shapes.

7. AUTOMATIC LATERAL SLIDING DOOR, according to one or more of the preceding claims, **characterised in that** the air barrier (B) has a greater lateral extension than the width of the door opening (C).

8. Automatic lateral sliding door, according to one or more of the preceding claims **characterized in that** the ventilation group (1) is provided with a blowing apparatus (10), constituted by a metal structure (11), which contains the fan (13), which suctions the air from the opening (14) and conveys it into the tapered

conduit (15), where the flow of the air barrier (B) is formed, said apparatus being enclosed in a protection casing (20), made up of a rear part (21), provided with a grid (22), which allows suctioning the airflow and by a front part (23), provided with slits (24), for the outflow of the airflow.

Patentansprüche

1. AUTOMATISCHE SCHIEBETÜR des Typs, der mit einem Luftschleier versehen ist, der mit einem geeigneten Luftstrom (F) erhalten wird, der gemäß einer Konfiguration mit senkrechten Lamellen gestaltet ist, die eine senkrechte Barriere (B) bilden, die den Luftstrom in waagrechter Richtung aufhält, wobei diese automatische Tür (3) **dadurch gekennzeichnet ist, dass** eine Luftzufuhreinheit (1), die den Luftschleier (B) bereitstellt, derart am Pfosten (2) der Tür (3) angebracht ist, dass sie eine Öffnung (21) zum Ansaugen des Luftstroms (F), die auf einer Seite der Tür (3) angeordnet ist, und einen Schlitz (24) zum Blasen der die Barriere (B) bildenden Luft aufweist, der auf der anderen Seite der Tür (3) positioniert ist.

2. AUTOMATISCHE SCHIEBETÜR nach Anspruch 1, **dadurch gekennzeichnet, dass** die Luftzufuhreinheit (1) derart gestaltet ist, dass die Öffnung (21) zum Ansaugen des Luftstroms (F) im Wesentlichen in einer Linie mit dem Türrahmen (3) ist oder geringfügig über ihn herausragt, während der Schlitz (24) zum Ausströmen der Luft derart angeordnet ist, dass der Luftschleier (B), der gebildet wird, möglichst nahe an der Außenseite der Tür bei der Öffnung (C) dieser Tür ist.

3. AUTOMATISCHE SCHIEBETÜR nach Anspruch 2, **dadurch gekennzeichnet, dass** die Luftzufuhreinheit (1) eine Blasvorrichtung (10) umfasst, die in ein Schutzgehäuse (20) eingeschlossen ist.

4. AUTOMATISCHE SCHIEBETÜR nach Anspruch 3, **dadurch gekennzeichnet, dass** die Blasvorrichtung (10) von einer Metallkonstruktion (11) gebildet wird, die durch Verbinder (12) am Pfosten (2) der Tür (3) angebracht ist und ein Gebläse (13) enthält, das Luft von der Öffnung (14) ansaugt und sie in den sich verjüngenden Kanal (15) leitet, wo der Strom des Luftschleiers (B) gebildet wird.

5. AUTOMATISCHE SCHIEBETÜR nach Anspruch 3, **dadurch gekennzeichnet, dass** das in geeigneter Weise geformte Schutzgehäuse (20) aus einem hinteren Teil (21), der mit einem Gitter (22) versehen ist, welches das Ansaugen des Luftstroms ermöglicht, und einem vorderen Teil (23) besteht, der mit Schlitzen (24) für den Austritt des Luftschleiers (B) versehen ist.

6. AUTOMATISCHE SCHIEBETÜR nach Anspruch 5, **dadurch gekennzeichnet, dass** die Bestandteile (21, 23) des Schutzgehäuses (20) in einer lösbaren Weise auf dem Pfosten (2) festgehalten werden, so dass ihr Austausch durch andere mit anderen Formen möglich ist.

7. AUTOMATISCHE SCHIEBETÜR nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** der Luftschleier (B) eine seitliche Ausdehnung aufweist, die größer als die Breite der Türöffnung (C) ist.

8. AUTOMATISCHE SCHIEBETÜR nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** die Luftzufuhreinheit (1) mit einer Blasvorrichtung (10) versehen ist, die von einer Metallkonstruktion (11) gebildet wird, die das Gebläse (13) enthält, das die Luft von der Öffnung (14) ansaugt und sie in den sich verjüngenden Kanal (15) leitet, wo der Strom des Luftschleiers (B) gebildet wird, wobei diese Vorrichtung in ein Schutzgehäuse (20) eingeschlossen ist, das aus einem hinteren Teil (21), der mit einem Gitter (22) versehen ist, welches das Ansaugen des Luftstroms ermöglicht, und einem vorderen Teil (23) besteht, der mit Schlitzen (24) für das Ausströmen des Luftstroms versehen ist.

Revendications

1. Porte automatique coulissant latéralement, du type muni d'une barrière à lame d'air, obtenue avec un flux d'air approprié (F), configurée suivant une configuration de lamelles verticales qui forment une barrière verticale (B), qui retient le flux d'air en direction horizontale, ladite porte automatique (3) étant **caractérisée en ce qu'**un groupe de ventilation (1) qui fournit la barrière d'air (B) est appliqué au montant (2) de la porte (3), de manière à avoir une ouverture (21) pour aspirer le flux d'air (F) agencé sur un côté de la porte (3) et une fente (24), pour souffler l'air qui forme la barrière (B), positionnée de l'autre côté de la porte (3) elle-même.

2. Porte automatique coulissant latéralement selon la revendication 1, **caractérisée en ce que** le groupe de ventilation (1) est configuré de manière que l'ouverture (21) pour aspirer le flux d'air (F) est sensiblement aligné, ou à peine en saillie, par rapport à l'encadrement de porte (3) alors que la fente (24) pour décharger l'air est positionnée de manière que la barrière d'air (B) qui est formée soit le plus près possible de la face externe de la porte, au niveau de l'ouverture (C) de ladite porte.

3. Porte automatique coulissant latéralement selon la revendication 2, **caractérisée en ce que** le groupe de ventilation (1) comprend un dispositif soufflant (10) enfermé à l'intérieur d'une enceinte de protection (20).

4. Porte automatique coulissant latéralement selon la revendication 3, **caractérisée en ce que** le dispositif soufflant (10) est constitué par une structure métallique (11), appliquée par l'intermédiaire de connecteurs (12) au montant (2) de la porte (3) et contenant un ventilateur (13), qui aspire l'air à partir de l'ouverture (14) et le transporte dans le conduit effilé (15), où le flux de la barrière d'air (B) est formé.

5. Porte automatique coulissant latéralement selon la revendication 3, **caractérisée en ce que** l'enceinte de protection (20), de forme appropriée, est constituée par une partie arrière (21), munie d'une grille (22) qui permet l'aspiration du flux d'air, et par une partie avant (23), munie de fentes (24) pour la sortie de la barrière d'air (B).

6. Porte automatique coulissant latéralement selon la revendication 5, **caractérisée en ce que** les parties constitutives (21, 23) de l'enceinte de protection (20) sont retenues sur le montant (2) de manière amovible, de manière à permettre leur remplacement par d'autres ayant des formes différentes.

7. Porte automatique coulissant latéralement selon une ou plusieurs des revendications précédentes, **caractérisée en ce que** la barrière d'air (B) a une extension latérale supérieure à la largeur de l'ouverture de porte (C).

8. Porte automatique coulissant latéralement selon une ou plusieurs des revendications précédentes, **caractérisée en ce que** le groupe de ventilation (1) est équipé d'un dispositif soufflant (10), constitué par une structure métallique (11), qui contient le ventilateur (13), qui aspire l'air à partir de l'ouverture (14) et le transporte dans le conduit effilé (15), où le flux de la barrière d'air (B) est formé, ledit dispositif étant enfermé dans une enceinte de protection (20), constituée par une partie arrière (21), munie d'une grille (22) qui permet l'aspiration du flux d'air et, par une partie avant (23), munie de fentes (24) pour la sortie du flux d'air.

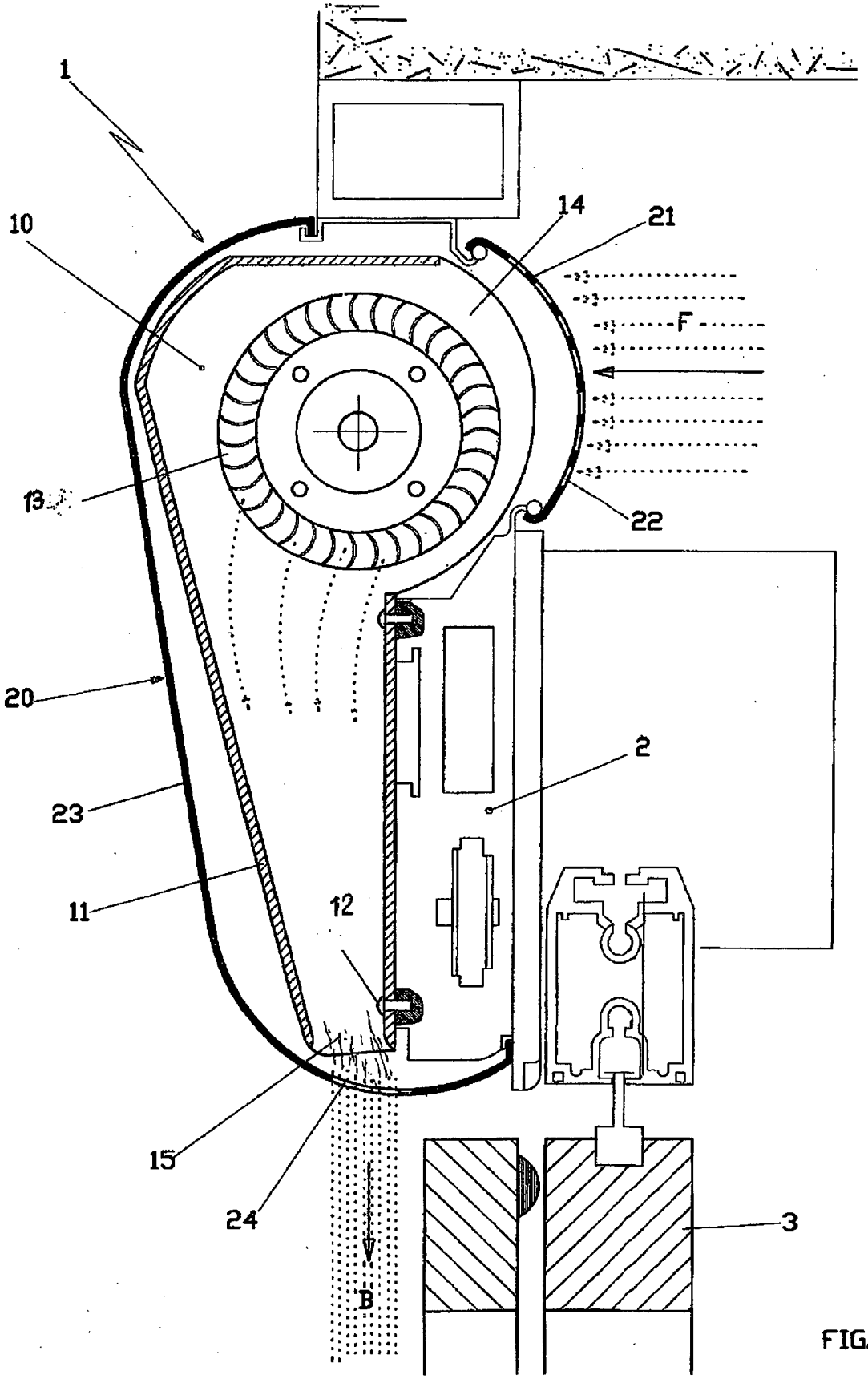


FIG.1

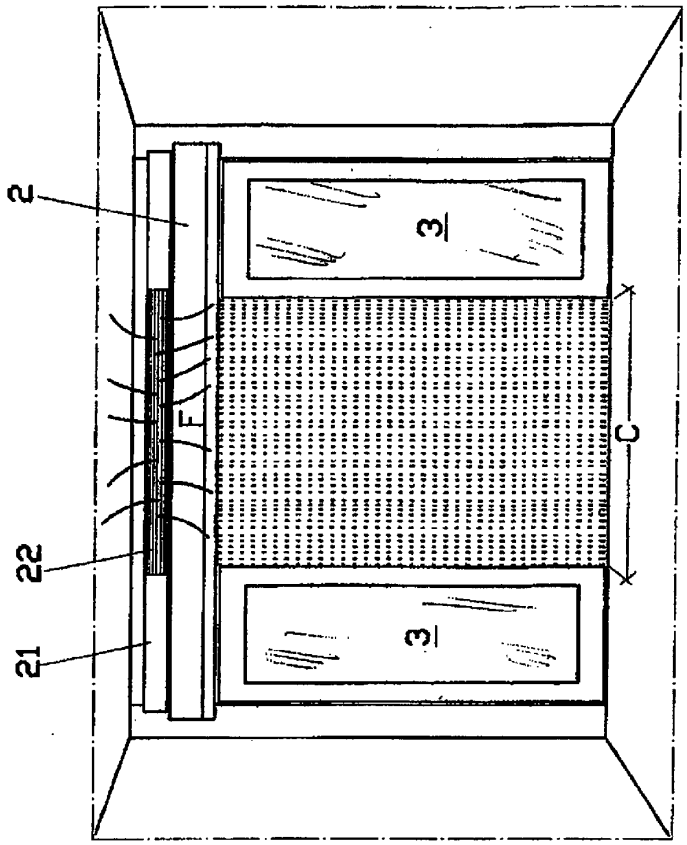


FIG.3

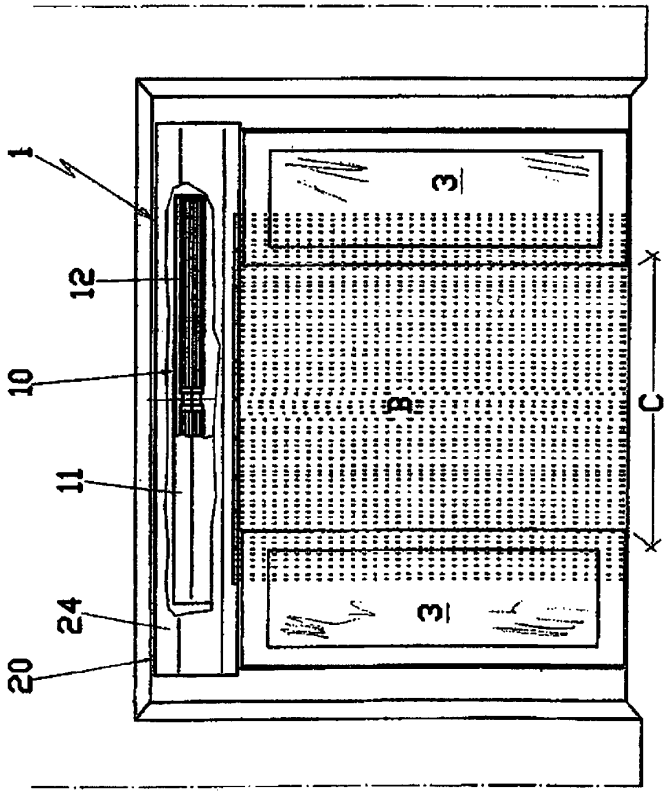


FIG.2

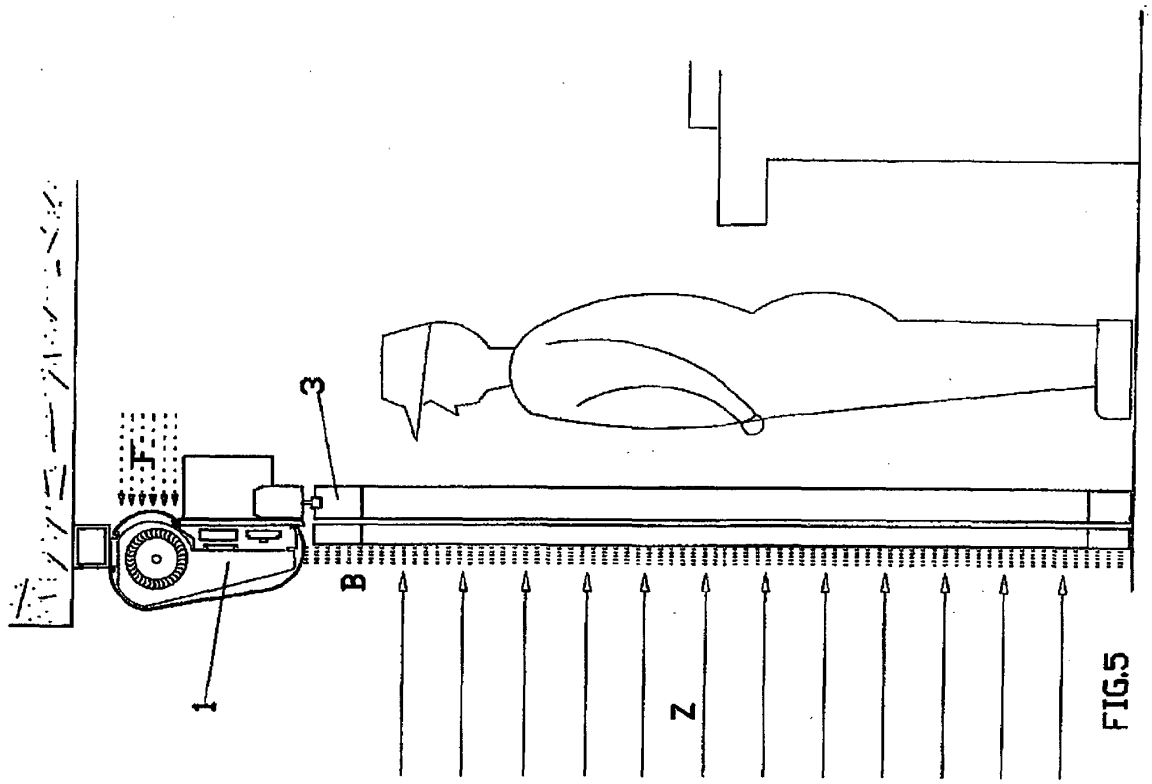


FIG.5

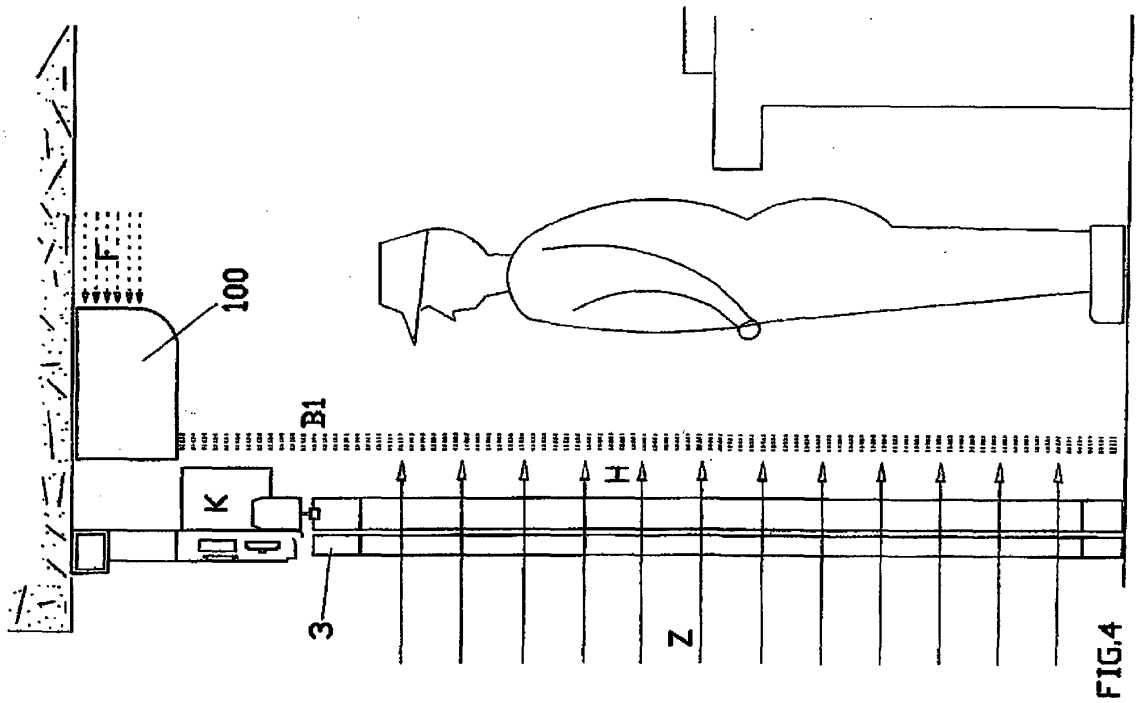


FIG.4

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 1801341 A1 **[0010]**
- US 2007298703 A1 **[0010]**
- DE 4404733 A1 **[0010]**