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(54) AIR DISTRIBUTION PLANT AND DIFFUSER CONDUIT THEREFOR

LUFTVERTEILUNGSSYSTEM UND DIFFUSORROHR DAFÜR

SYSTÈME DE DISTRIBUTION D'AIR ET CONDUIT DIFFUSEUR POUR CELUI-CI

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Description

[0001] The present invention relates to an air flow distribution, preferably, though not exclusively, of treated air for conditioning an environment, such as for example cooled air, heated air, and the like.

[0002] In particular the invention relates to an air treatment plant provided with a trap door or discharge shutter for regulating a residual velocity of air in an environment, enabling ground-level regulation of air flow.

[0003] Air distribution plants usually comprise an appropriate channelling by which a flow of air is transferred from a device designed to provide energy to the air flow in the form of pressure increase (for example a ventilator) to a zone of use thereof, such as for example a particular room, an office, a laboratory, a workshop or the like.

[0004] The channelling is usually constituted by one or more transport conduits made of sheet metal and by one or more terminal vent elements, such as perforated diffuser channels made of sheet metal or textile.

[0005] The transport conduits are connected to the ventilator and are in fluid communication with the diffuser conduits.

[0006] Diffuser conduits can be made of a metal material or a flexible material (for example a textile) according to installation needs (for example textile for other uses at up to 40 metres high, metal for rooms of up to 10 metres high with slower air flow.

[0007] The diffuser conduits, whether made of metal or flexible materials, have the task of homogeneously distributing the air into the use zone, and, for this aim, are provided by a plurality of diffuser holes arranged along one or more walls of the conduit.

[0008] The diffuser holes enable the air to flow internally of the diffuser conduit to flow out of the conduit and diffuse in the use zone.

[0009] An example of said channeling is described in the patent application n. WO9315366A1; in particular, said document is directed to an air injection tube for injecting ventilating, cooling and/or heating air that may be installed in a room. The tube has a plurality of small, mutually spaced air injecting openings defined in its peripheral wall along at least one longitudinally extending wall zone of the tube. These air injection openings are angularly offset to each other and are arranged in groups each comprising at least two peripherally spaced rows of openings; the groups of openings are also mutually spaced along the length of the tube.

[0010] In particular, in diffusers known as "high induction", the air exiting the diffuser holes recalls the air from the environment surrounding the diffuser by inductive effect, and moves it towards the zones to be conditioned, mixing it with the air exiting the diffuser; in general terms, a succession of flows and/or micro-whirls are created which, as they generate turbulence, facilitate mixing of the air in inflow into the zone of use with the air already present in the zone of use, and resulting in a uniform temperature.

[0011] The formation of these inductive flows depends on the air outflow velocity from the distributor holes, as well as the geometry and distribution of the holes on the wall.

[0012] Note that the outlet velocity of the air from the distributor holes must also respond to the requirement not to directly strike the persons internally of the use zone with excessive velocity or with unpleasant draughts.

[0013] Thus the air outflow velocity from the diffuser holes must be at a differently-calculated for each plant, with the aim of obtaining residual velocity values at ground level (normally measured at a height of 1.5 metres) which can guarantee optimal comfort conditions for persons.

[0014] Therefore, for a good ground-level plant performance it is always necessary to find the best regulation of the outflow velocity from the holes which can lead, on the one hand, to the greatest possible homogeneity of the temperature, while on other hand avoiding exceeding ground-level velocities which might be unpleasant and which, as is well-known, vary according to the activity performed by the persons in the environment (for example if the persons are involved in work involving movement or if they are static), but also according to the degree of insulation (clothing) of the persons.

[0015] It is further evident that the two above-evidenced requirements are at least partially contrasting, as a very low residual ground-level velocity can lead to lack of temperature homogeneity in a room, while a too-high velocity can be unpleasant for those concerned.

[0016] Thus the dimensions, geometry and distribution of diffuser holes in air treatment plants which are among other things specific for each plant must be optimised time-by-time and are today of fundamental importance in order to respond to the above-mentioned needs.

[0017] In the light of the above, in prior art air distribution plants the diffuser holes are optimised such that the air in outflow from the diffuser holes is always close to, though below, an outflow velocity capable of leading to unpleasant residual ground-level velocities (in general, though not necessarily, the ground-level residual velocity must be maintained in a range between 0.15 e 0.35 m/s according to the type of room to be conditioned.

[0018] In other words, once the air flow to be introduced into the use zone and the geometry of the diffuser conduit have been established, the characteristics of the diffuser holes are optimised such as to have a residual ground-level velocity which can be considered optimal.

[0019] It should however be borne in mind that in deciding on the hole size for each perforated diffuser channel it is rather a complex matter to predict the phenomena which will disturb the desired correct diffusion outlined during the design stage. For example, it is not easy to take delivery temperature variations into account, nor the positions of accelerations of air, nor objects or obstacles to the flow which may not have been accountable.

[0020] What is more, the perturbing elements can vary over time and can also lead to generation of air draughts

which might require a change in the perforations, with consequent problems of changes to the original design and operations to the structure.

[0021] Owing to the above-cited problems, for questions of prudence the perforations are carefully dimensioned such as to generate outflow velocities which are lower than optimal, with an at least partial sacrificing of temperature homogeneity and consequently of energy conservation.

[0022] In this context, the technical objective at the basis of the present invention is to provide an air distribution plant which obviates the drawbacks in the prior art as described above.

[0023] In particular, the present invention aims to provide an air distribution plant in which the residual ground-level velocity in the use zone is always adjustable in such a way as to respond to the users' needs at all times and optimally.

[0024] An objective of the invention is thus to enable greater freedom in the diffuser design while enabling optimal regulation thereof after installation has been completed.

[0025] A further aim of the invention is to enable recuperation of treated air possibly expelled from the channels in the higher part of the room by effect of high induction guaranteed by the air outflow velocity from the holes (a particularity of high-induction plants is to enable aspiration of environmental air in a volume of up to 30 times the quantity of air outflowing from the holes).

[0026] A further aim of the present invention is to provide an air distribution plant which can easily be set up and regulated in terms of air outflow velocity from the holes.

[0027] The described technical objective and the set aims are substantially attained by an air distribution plant, comprising the technical characteristics set out in one or more of the appended claims.

[0028] Further characteristics and advantages of the present invention will more clearly emerge from the non-limiting description that follows of an air distribution plant, as illustrated in the accompanying figures of the drawings, in which:

figure 1 is a perspective view of the air distribution plant of the present invention;
figures 2a and 2b are perspective views of variants of the plant of figure 1;
figure 3 illustrates a detail of the plant of figure 1;
figure 4 is a section view, along plane IV-IV, of the detail of figure 3; and
figure 5 illustrates a component of the plant of figures 2a and 2b.

[0029] With reference to the accompanying figures of the drawings, an air distribution plant of the present invention is denoted in its entirety by number 1.

[0030] The plant 1 comprises a channelling 2 through which an air flow is transferred from a device destined to transmit energy to the air flow in the form of an increase of pressure to a use zone.

[0031] The device is, for example, constituted by one or more ventilators 100.

[0032] By "use zone", in the context of the present invention reference is made to the environment into which the air flow is transferred. Examples of use zones could be a workshop, an office, a shop, a warehouse or the like.

[0033] The channelling 2 comprises at least a transfer conduit 3 located in fluid communication with the above-cited device and at least a diffuser conduit 4 placed in fluid communication with the transfer conduit 3.

[0034] The transfer conduit or conduits 3 are generally constituted by tracts of channel 5 having a polygonal or circular section, and by hollow connecting sections 6 between the tracts of channel 5.

[0035] The hollow sections 6 have the function of joining the tracts of channel 5 together, even where these exhibit different transversal dimensions.

[0036] The transfer conduits 3 are preferably made of a metal material (sheet metal) and are generally without breather openings for the air; thus they transfer the whole air flow towards the true and proper diffusers 4. Further, often the transfer conduits 3 are already installed in the structure to be conditioned, thus constituting an *a priori* constraint for the design of the diffuser conduits 4.

[0037] In general the sheet metal channel 3 carries low-velocity air (5-10 m/s) towards the diffusers 4.

[0038] The diffusers 4 are generally elements which receive the air flow in arrival from the conduits 3 and diffuse it into the environment via appropriate holes set in communication with the outside environment.

[0039] In a case of linear diffusers, these are perforated diffuser conduits 4, which can be a plurality in series communication (such as illustrated in figures 1 and 2) or a single conduit.

[0040] Perforated diffuser conduits 4 are hollow pipes having circular, semi-circular, polygonal or other section, and are set in fluid communication with the transfer conduits 3 via connecting portions 7.

[0041] The connecting portions 7 are for example connections for air dispensing from the transfer conduits, as illustrated in figures 1, 2a and 2b.

[0042] The diffuser conduits 4 are provided with a plurality of diffuser holes 8 arranged on at least an external wall of the conduit itself.

[0043] The air exits from the diffuser holes 8 and is injected into the use zone.

[0044] Diffusion systems can be of a "classic" type, in which the channels are transport elements and entrusting the air diffusion quality to the terminal element.

[0045] In other terms, the channels divide the air flow according to the division of loads into the room and the diffuser thrusts the delivery air towards the ground with the aim of spreading the air delivery into the zone that it has been attributed to.

[0046] In this sense the traditional methods are known as delivery air diffusion methods by sub-division of the

delivery air.

[0047] In high-induction perforated channels it is the channels themselves that are the motor element of the totality of the mass of environmental air.

[0048] The delivery air exiting from the holes at high velocity creates strong micro-whirls which cause a significant depression close to the perforated zone, which aspirates air by induction at rates of about 30 times above the quantity of blown air.

[0049] In high-induction (or pulsion) diffusers, the air exiting from the diffuser holes 8 creates an inductive effect on the surrounding air, leading to a mixing and a uniform diffusion internally of the use zone, with a severe drop in flow velocity at a distance of a few centimetres from the holes.

[0050] The diffuser holes 8 are preferably organised in rows (figures 1 and 2 show two, three or four rows of holes 8) and preferably involve all or nearly all of the longitudinal development of each diffuser conduit.

[0051] Note that the diffuser holes 8 can have different dimensions to one another (figures 2a and 2b) according to design requirements and also note that a transfer conduit can be interposed between a diffuser conduit 4 and a next connected thereto in series.

[0052] The choice of geometric configuration of the channelling 2, i.e. the choice of connecting in series or in parallel a plurality of perforated diffuser conduits 4, of interposing transport conduit 3 between two perforated diffuser conduits 4, depends on the position of the ventilator device, the position of the use zone and the configuration thereof.

[0053] The channelling 2 advantageously comprises at least a discharge trap door (101) defined by an access 9 and a corresponding opening system 11 of the access 9.

[0054] The access 9 has larger dimensions that those of each diffuser hole 8 and is afforded on an external wall 10 of the channelling; the access 9 preferably has dimensions that are at least 10 times, or more, greater than the dimensions of each of the diffuser holes 8, i.e. the access 9 has an area for the outflow of air which is at least 10 times greater than the area of a diffuser hole 8.

[0055] In the preferred embodiment, the opening exhibits a shape which is in plan view substantially rectangular and has dimensions such as to prevent any production of whistling or sound vibrations during the outflow of the air when the plant is in use.

[0056] For example, a length of between 35 and 55 mm (and preferably between 40 and 50 mm with an optimal length of 45mm) and a breadth comprised between 15 mm and 35 mm (and preferably between 20 and 30 mm with an optimal breadth of 25 mm) have been shown to be suitable.

[0057] The opening system 11 associated to the access 9 is mobile between a plurality of stable positions comprised between a closed position of the opening and an open position thereof.

[0058] By operating appropriately on the opening system 11, i.e. by opening the access 9 to a greater or lesser degree, the quantity of air unleashed into the environment in the high zone of the room can be varied.

[0059] The greater the quantity of air released into the room through the discharge trap door 101, the lower the air outflow velocity will be from the diffusers 4 holes and thus the lower the residual velocity at ground level will be.

[0060] In this way, the plant is able correctly to diffuse air into the use zone, i.e. in such a way that the air outflow velocity from the diffuser holes 8 is just less than the "critical" velocity (i.e. the value of velocity, variable according to the situation, which leads to a user's being struck by an air flow having a residual ground-level air flow considered unpleasant).

[0061] This effect is furthermore guaranteed even following variations of delivery T, the position of encumbrances and in general all those *a priori* unpredictable phenomena which can vary over time and which in the past would have necessitated modifications in the perforating of the plant.

[0062] Should the outflow velocity of the air from the diffuser holes 8 be greater than the optimal velocity calculated during the design stage, due to reasons as set out above, in particular generating unpleasant residual velocity to the ground level, by acting on the opening system 11 of the access 9, in particular by opening the access 9, a flow loss is created in the transiting air flow in the channelling 2 which enables the air outflow velocity from the diffuser holes 8 to be reduced.

[0063] By opening the access 9 by such a quantity as to return the ground-level residual velocity to an acceptable level for the users, air injection into the user zone is optimised.

[0064] In other terms, the outflow from the access 9 of a certain quantity of air, adjustable during the stage of verification of functioning of the plant, reduces the air flow towards the diffuser holes and thus optimises the inductive effect according to requirements.

[0065] The discharge trap door 101 operates such as to adjust the residual velocity of the air in the environment, either reducing or eliminating (according to requirements) the draughts which might be present.

[0066] In a first embodiment of the invention (illustrated in figure 1), the perforated diffuser conduits 4 are made of a metal material and, for example, have a substantially hollow cylindrical form.

[0067] In this embodiment, the access or accesses 9 are preferably afforded on one or more perforated diffuser conduits 4.

[0068] In this way, the air outflowing from the accesses 9, which as indicated above can be, purely by way of example, hot or cool air conditioning, is re-injected into the use zone thanks to the inductive effect.

[0069] This ensures that the energy used for conditioning the air is not "wasted" by the hot or cool air being diffused into high areas of the room.

[0070] In a second embodiment of the plant 1 (illustrated in figures 2a and 2b), the perforated diffuser conduits

4 are realised in flexible material, for example a textile material.

[0071] In this embodiment the plant further comprises a hollow connecting element 12 for connecting up the transport channel 3 and the diffuser conduit 4 (see figure 5).

[0072] The connecting element 12 has the function of stably constraining the transport conduit 2, made of a metal material, to the diffuser conduit 4, which is made of a flexible material.

[0073] The diffuser conduit 4 can be tapered (hollow truncoconical), as shown in the figure.

[0074] In the second embodiment, the access 9 is afforded on the connecting element 12, which is preferably located in the use zone.

[0075] In both the first and second embodiments, constraining means 13 are provided to constrain the perforated diffuser conduits 4, and possibly the transport conduits 3, to the ceiling of the use zone.

[0076] The accesses 9 (which can be in any number according to design needs) are located in a channelling portion 2 that substantially faces the ceiling of the use zone.

[0077] In this way, the air outflow from the accesses 9 is not directly aimed towards the users occupying the use zone, and in any case, should the access 9 be in proximity of the diffuser holes 8, the inductive effect created thereby recalls the air that has exited from the access 9, and redirects it towards the use zone, thus preventing any waste of energy.

[0078] By exploiting the above-described solution, it is also possible to realise air distribution plants in which the flow is subdivided between (one or two) perforated diffuser conduits 4 destined to generate the above-mentioned inductive effect and (one or more) discharge channels exclusively destined to inject air into the environment but not to generate induction effects (exclusively reserved for the diffuser conduits 4).

[0079] The discharge channels can be provided with a plurality of the discharge trap doors 101 such as to enable injection of the desired quantity of air into the environment, into the zones considered to be most appropriate, thus correspondingly reducing the outflow velocity from the diffuser holes.

[0080] The air discharged into the environment is, as explained herein above, recuperated by inductive effect thanks to the perforated diffuser conduits 4, and homogenized to the flow, thus preventing energy loss.

[0081] The discharge trap door 101 is provided with a shutter 14 (figures 3 and 4) which is slidable between the plurality of stable positions which define various discharge conditions for the air into the environment.

[0082] In other words, the shutter 14 (sometimes known as a guillotine) is slidable between a plurality of positions which, once attained, are stably maintained.

[0083] These positions are comprised between a position of complete closure of the access 9 and a position of almost total or maximum aperture of the access 9.

[0084] The opening system 11 further comprises two sliding guides 15 for the shutter 14 (illustrated in a broken line in figure 3).

[0085] The shutter 14 is able to slide along the two guides 15, which develop along opposite edges of the shutter 14.

[0086] The two guides have a longitudinal development which is parallel to the sliding direction of the shutter 14.

[0087] At least one of the two guides 15 is provided with at least an elastic element 16 for compressing the shutter 14 against an edge 17 of the access 9 and for keeping it stably in the position reached (see figure 4).

[0088] The elastic elements 16 are preferably an elastic element 16 for each of the two guides 15 and they are in permanent contact with the slide 14 along respective single lines of contact.

[0089] In this way, the area of contact between the guides 15 and the shutter 14 is minimised.

[0090] This characteristic minimises oxidation of the hatch 14 caused by contact with the guides 14 and also prevents possible blockage of the sliding of the hatch 14 along the guides 15.

[0091] In the preferred embodiment of the invention, the elastic elements 16 are constituted by a metal band 18 which develops from a constraint portion 19 of each guide 15.

[0092] In particular, the constraint portion 19 develops parallel to the wall 10 of the channelling portion on which the guide is constrained.

[0093] The metal band 18 is inclined with respect to the constraint portion 19 (see figure 4) and comprises a first end which bears on the shutter 14, pressing it against the wall 10 of the channelling portion 2.

[0094] A second end, opposite the first, is constrained to and is preferably in a single piece with the constraint portion 19 through a spacer band 320 (figure 4).

[0095] The guides 15 are preferably constrained to an internal surface of the wall 10 of the channelling 2 in order to arrange the shutter 14 internally of the channelling 2 in a substantially parallel position to the wall 10 of the channelling 2.

[0096] In particular, the guides 15 are stably constrained, for example by rivets, to the internal surface of the wall 10 of the channelling 2 by means of the constraint portions 19 (see figure 4).

[0097] The shutter 14 can be moved by activating means 21 which are removably engageable by a moving tool (figure 3).

[0098] In this way, the shutter 14 can be displaced, thus regulating the opening space only by using a moving tool; this prevents the shutter 14 from being accidentally moved once the plant has been set up and adjusted.

[0099] In the preferred embodiment of the invention, the activating means 21 are constituted by a hole 22 made in the shutter 14 in proximity of an end zone thereof.

[0100] In this case, the movement tool can be any tool (for example a screwdriver) destined to engage the hole

22 and to transmit a force to the shutter 14 which is directed along the guide 15.

[0101] The invention attains the set aims.

[0102] By acting on the trap door or discharge shutter, in particular by opening the access 9, a flow loss is created and thus the speed of the air flow transiting in the channelling 2 lowers, which enables the outflow velocity of the air from the diffuser holes 8 to be reduced.

[0103] By opening the access 9 by a quantity such as to return the air outflow velocity from the holes 8 to just below the critical velocity, the injection of air into the use zone is made optimal.

[0104] The plant is thus able to diffuse air into the use zone correctly, i.e. such that the outlet velocity of the air from the diffuser holes 8 is such as to guarantee residual ground-level velocity that is either not perceived or at least is not unpleasant.

[0105] Note that this effect is guaranteed even following variations made after the initial design conditions for the plant were drawn up, which enables easy and rapid plant adjustment.

[0106] Further, the air that has exited from the access 9 can be recuperate thanks to the inductive effect guaranteed by the diffuser holes.

[0107] Note that the dimensions (and the presence of an opening which, with an equal air outflow section exhibits a smaller perimeter with respect to the perimeter of grids or the like) of the breather hole do not lead to any generation of noise during the outflowing of the air.

[0108] Further, the presence of an access internally of the channel advantageously constitutes a visual inlet for inspecting the channel.

Claims

1. An air distribution plant comprising a channelling (2) through which an air flow is transferred by a device destined to transmit energy to the air flow via an increase in pressure to a use zone, the channelling (2) comprising at least a transfer conduit (3) placed in fluid communication with the device and at least a diffuser conduit (4) placed in fluid communication with the transfer conduit (3) and provided with a plurality of diffuser holes (8) arranged on at least an external wall thereof in order to inject air into the use zone; **characterised in that** the channelling (2) comprises at least a discharge trap door (101) exhibiting an access (9) having larger dimensions than dimensions of each diffuser hole (8) afforded on an external wall (10) of the channelling (2) for dispensing air from the channelling towards an outside environment and **in that** it comprises an opening system (11) for the access (9) which opening system (11) is mobile among a plurality of stable positions comprised between a closed position of the access (9) and a position of maximum opening of the access (9).

2. The plant of claim 1, **characterised in that** the diffuser conduit (4) exhibits diffuser holes (8) destined to generate an inductive recall effect of the air surrounding the diffuser, the access (9) preferably being placed in a vicinity of the holes in order for the outflowing air to be recuperated by inductive effect, and the access (9) more preferably being afforded on the diffuser conduit (4).

3. The plant of claim 1, further comprising a hollow connecting element (12) for connecting the transport conduit (3) and the diffuser conduit (4), the access (9) being located on an external wall of the connecting element (12).

4. The plant of any one of the preceding claims, wherein the opening system (11) comprises a hatch or shutter (14) which is slidable among the stable progressive closed/open positions of the access (9).

5. The plant of claim 4, wherein the opening system (11) further comprises two sliding guides (15) for the shutter (14); at least one of the two guides (15) being provided with at least an elastic element (16) for compressing the shutter (14) against an edge of an access (9) and maintaining stable a position reached, the at least an elastic element (16) being preferably in permanent contact with the shutter (14) along respective single contact lines.

6. The plant of any one of the preceding claims, comprising activating means (21) for the shutter (14) for displacing the shutter (14) among the plurality of stable positions; the activating means (21) being removably engageable by a movement tool for moving the shutter (14).

7. The plant of claim 5, wherein the guides (15) are constrained to an internal surface of the wall (10) of the channelling (2) in order for the shutter (14) to be arranged internally of the channelling (2) in a substantially parallel position to the wall (10) of the channelling (2).

8. The plant of any one of the preceding claims, wherein the access (9) is located in a portion of channelling (2) which is facing a ceiling of the use zone.

9. The plant of any one of the preceding claims, comprising at least a diffuser conduit (4) for injecting air into an environment, generating an inductive effect, and at least an air outflow channel for injecting air into an environment without substantially perturbing an effect of the diffuser conduit (4), the diffuser conduit (4) and the air outflow channel being in fluid communication with the transfer conduit (3), the outflow conduit exhibiting one or more of the accesses (9) in order to increase/diminish a quantity of air injected

into the environment via the outflow channels and in order thus to regulate an outflow velocity of the air from the diffuser conduit (4).

Patentansprüche

1. Luftverteilungssystem umfassend einen Kanal (2), durch den ein Luftstrom von einer Vorrichtung zur Energieübertragung zum Luftstrom unter Druckzunahme zu einem Verwendungsbereich übertragen wird, wobei der Kanal (2) mindestens ein mit der Vorrichtung in Fluidkommunikation gesetztes Übertragungsrohr (3) und mindestens ein in Fluidkommunikation mit dem Übertragungsrohr (3) gesetztes Diffusionsrohr (4) umfasst, das mit einer Vielzahl von Diffusionslöchern (8) ausgestattet ist, die auf mindestens einer Außerwand davon angeordnet sind, um Luft in den Verwendungsbereich einzupressen; **dadurch gekennzeichnet, daß** der Kanal (2) mindestens eine Ablassklapptür (101) umfasst mit einem Zugang (9), der größer ist als jedes auf einer Außenseite (10) des Kanals (2) angeordnete Diffusionsloch (8) zur Abgabe von Luft aus dem Kanal in eine Außenumgebung, und daß es ein Öffnungssystem (11) für den Zugang (9) umfasst, welches Öffnungssystem (11) zwischen einer Vielzahl von feststehenden Stellungen bewegbar ist, zwischen einer geschlossenen Stellung des Zugangs (9) und einer Stellung von maximaler Öffnung des Zugangs (9).

2. System nach Anspruch 1, **dadurch gekennzeichnet, daß** das Diffusionsrohr (4) Diffusionslöcher (8) aufweist zur Erzeugung eines induktiven Rückholeffektes der den Diffusor umgebenden Luft, wobei der Zugang (9) in der Nähe der Löcher bevorzugt positioniert ist, um die abströmende Luft durch einen induktiven Effekt wiederzugewinnen, und wobei der Zugang (9) auf dem Diffusionsrohr (4) bevorzugter angeordnet ist.

3. System nach Anspruch 1, weiter umfassend ein hohles Verbindungselement (12) zur Verbindung des Übertragungsrohrs (3) und des Diffusionsrohrs (4), wobei der Zugang (9) auf einer Außenseite des Verbindungselementes (12) angeordnet ist.

4. System nach irgendeinem der vorherigen Ansprüche, worin das Öffnungssystem (11) eine Tür oder Klappe (14) umfasst, die zwischen den feststehenden, progressiven geschlossenen/offenen Stellungen des Zugangs (9) gleitend ist.

5. System nach Anspruch 4, **dadurch gekennzeichnet, daß** das Öffnungssystem (11) zwei gleitende Führungen (15) für die Klappe (14) weiter umfasst; wobei mindestens eine der beiden Führungen (5) mit mindestens einem elastischen Element (16) zum Drücken der Klappe (14) gegen eine Kante des Zugangs (9) und zum feststehenden Aufrechterhalten einer erreichten Stellung ausgestattet ist, wobei das mindestens eine elastische Element (16) bevorzugt in dauerhaftem Kontakt mit der Klappe (14) entlang entsprechender Einzelkontaktlinien steht.

6. System nach irgendeinem der vorherigen Ansprüche, umfassend Aktivierungsmittel (21) für die Klappe (14) zum Bewegen der Klappe (14) zwischen der Vielzahl von feststehenden Stellungen; wobei die Aktivierungsmittel (21) durch ein Bewegungswerkzeug zum Bewegen der Klappe (14) lösbar eingreifbar sind.

7. System nach Anspruch 5, worin die Führungen (15) mit einer Innenfläche der Wand (10) des Kanals (2) fest verbunden sind, so daß die Klappe (14) im Inneren des Kanals (2) in einer wesentlich parallelen Stellung zur Wand (10) des Kanals (2) angeordnet werden kann.

8. System nach irgendeinem der vorherigen Ansprüche, worin der Zugang (9) in einem Abschnitt des Kanals (2) angeordnet ist, der einer Decke des Verwendungsbereiches zugewandt ist.

9. System nach irgendeinem der vorherigen Ansprüche, umfassend mindestens ein Diffusionsrohr (4) zum Einpressen von Luft in eine Umgebung, wodurch ein induktiver Effekt erzeugt wird, und mindestens einen Luftabströmkanal zum Einpressen von Luft in eine Umgebung, ohne einen Effekt des Diffusionsrohres (4) wesentlich zu stören, wobei das Diffusionsrohr (4) und der Luftabströmkanal in Fluidkommunikation mit dem Übertragungsrohr (3) stehen, wobei das Abströmrohr einen oder mehreren der Zugänge (9) aufweist, um eine in die Umgebung eingepresste Luftmenge durch die Abströmkanäle zuzunehmen/abzunehmen und dadurch eine Abströmgeschwindigkeit der Luft aus dem Diffusionsrohr (4) einzustellen.

Revendications

1. Système de distribution d'air comprenant une canalisation (2) à travers laquelle un flux d'air est transféré par un dispositif apte à transmettre l'énergie au flux d'air au moyen d'une augmentation de pression à une zone d'utilisation, la canalisation (2) comprenant au moins un conduit de transfert (3) mis en communication de fluide avec le dispositif et au moins un conduit diffuseur (4) mis en communication de fluide avec le conduit de transfert (3) et muni d'une pluralité de trous diffuseurs (8) rangés sur au moins une paroi extérieure de celui-ci afin d'injecter l'air dans la zone d'utilisation; **caractérisé en ce que** la canalisation

(2) comprend au moins un panneau de décharge (101) présentant un accès (9) plus grand que chaque trou diffuseur (8) rangé sur une paroi extérieure (10) de la canalisation (2) pour distribuer l'air de la canalisation vers un environnement extérieur, et **en ce que** il comprend un système d'ouverture (11) pour l'accès (9), lequel système d'ouverture (11) est mobile parmi une pluralité de positions fixes comprises entre une position fermée de l'accès (9) et une position d'ouverture maximale de l'accès (9).

2. Système selon la revendication 1, **caractérisé en ce que** le conduit diffuseur (4) présente des trous diffuseurs (8) aptes à générer un effet de rappel inductif de l'air autour du diffuseur, l'accès (9) étant placé préférablement proche des trous afin de permettre la récupération de l'air en sortie par effet inductif, et l'accès (9) étant rangé plus préférablement sur le conduit diffuseur (4).

3. Système selon la revendication 1, comprenant en outre un élément de liaison creux (12) pour relier le conduit de transfert (3) et le conduit diffuseur (4), l'accès (9) étant placé sur une paroi extérieure de l'élément de liaison.

4. Système selon l'une quelconque des revendications précédentes, où le système d'ouverture (11) comprend un panneau ou volet (14) glissant parmi les positions progressives fixes fermées/ouvertes de l'accès (9).

5. Système selon la revendication 4, où le système d'ouverture (11) comprend en outre deux guides glissants (15) pour le volet (14); au moins l'un des deux guides (15) étant muni d'au moins un élément élastique (16) pour comprimer le volet (14) contre un bord de l'accès (9) et maintenir la stabilité d'une position atteinte, l'au moins un élément élastique (16) étant préférablement en contact permanent avec le volet (14) le long de lignes de contact individuelles respectives.

6. Système selon l'une quelconque des revendications précédentes, comprenant des moyens d'activation (21) pour le volet (14) aptes à déplacer le volet (14) parmi la pluralité de positions fixes; les moyens d'activation (21) étant engageables de façon amovible par un outil de déplacement apte à déplacer le volet (14).

7. Système selon la revendication 5, où les guides (15) sont reliés à une surface intérieure de la paroi (10) de la canalisation (2) de sorte que le volet (14) puisse être rangé à l'intérieur de la canalisation (2) dans une position sensiblement parallèle à la paroi (10) de la canalisation (2).

8. Système selon l'une quelconque des revendications précédentes, où l'accès (9) est placé dans une portion de canalisation (2) en face d'un plafond de la zone d'utilisation.

9. Système selon l'une quelconque des revendications précédentes, comprenant au moins un conduit diffuseur (4) pour injecter l'air dans un environnement, générant un effet inductif, et au moins un canal de sortie de l'air pour injecter l'air dans un environnement sans perturber sensiblement un effet du conduit diffuseur (4), le conduit diffuseur (4) et le canal de sortie de l'air étant en communication de fluide avec le conduit de transfert (3), le conduit de sortie présentant un ou plusieurs des accès (9) afin d'augmenter/réduire une quantité d'air injecté dans l'environnement à travers les canaux de sortie et ainsi afin de régler une vitesse de sortie de l'air du conduit diffuseur (4).

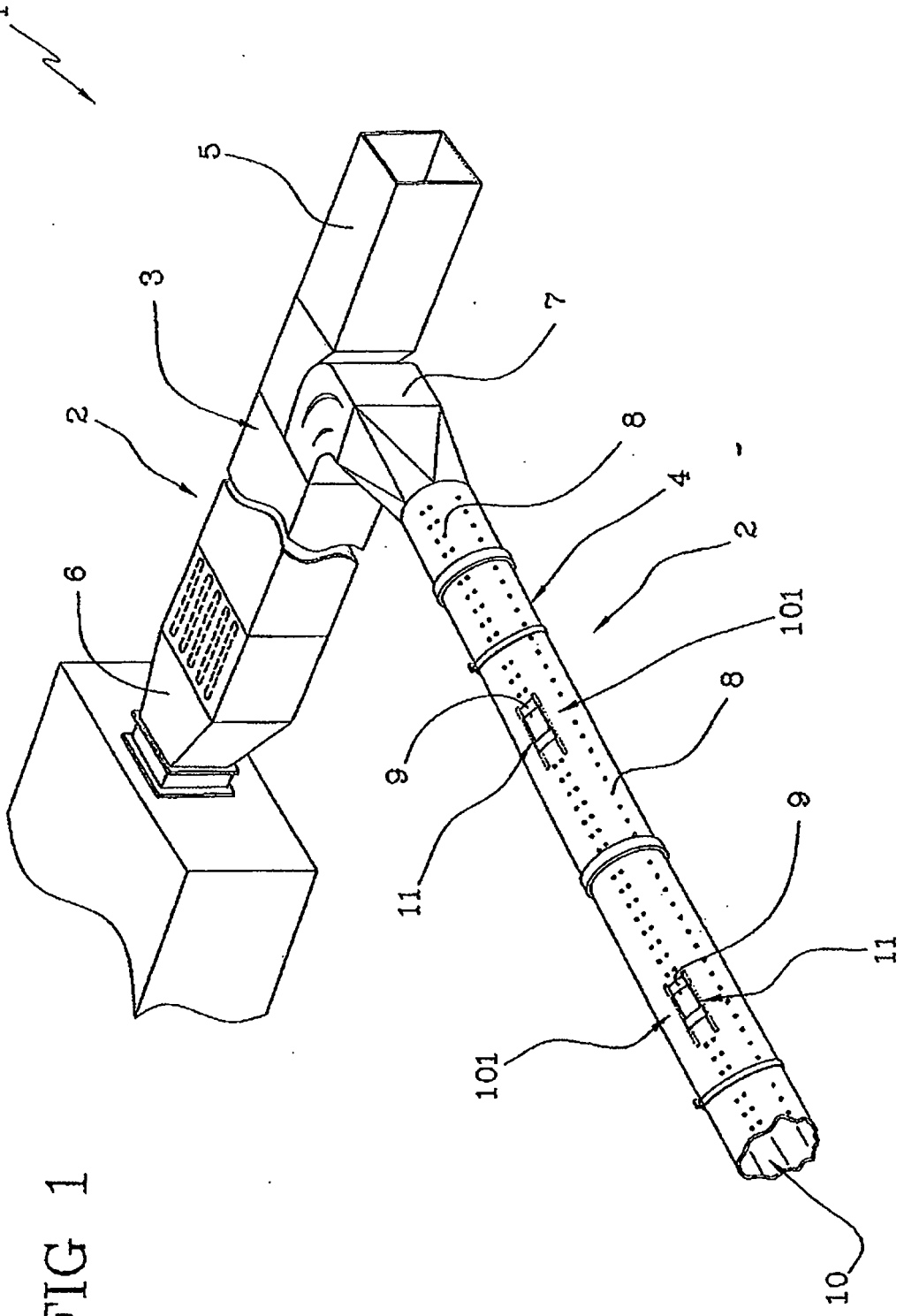


FIG 1

FIG 2a

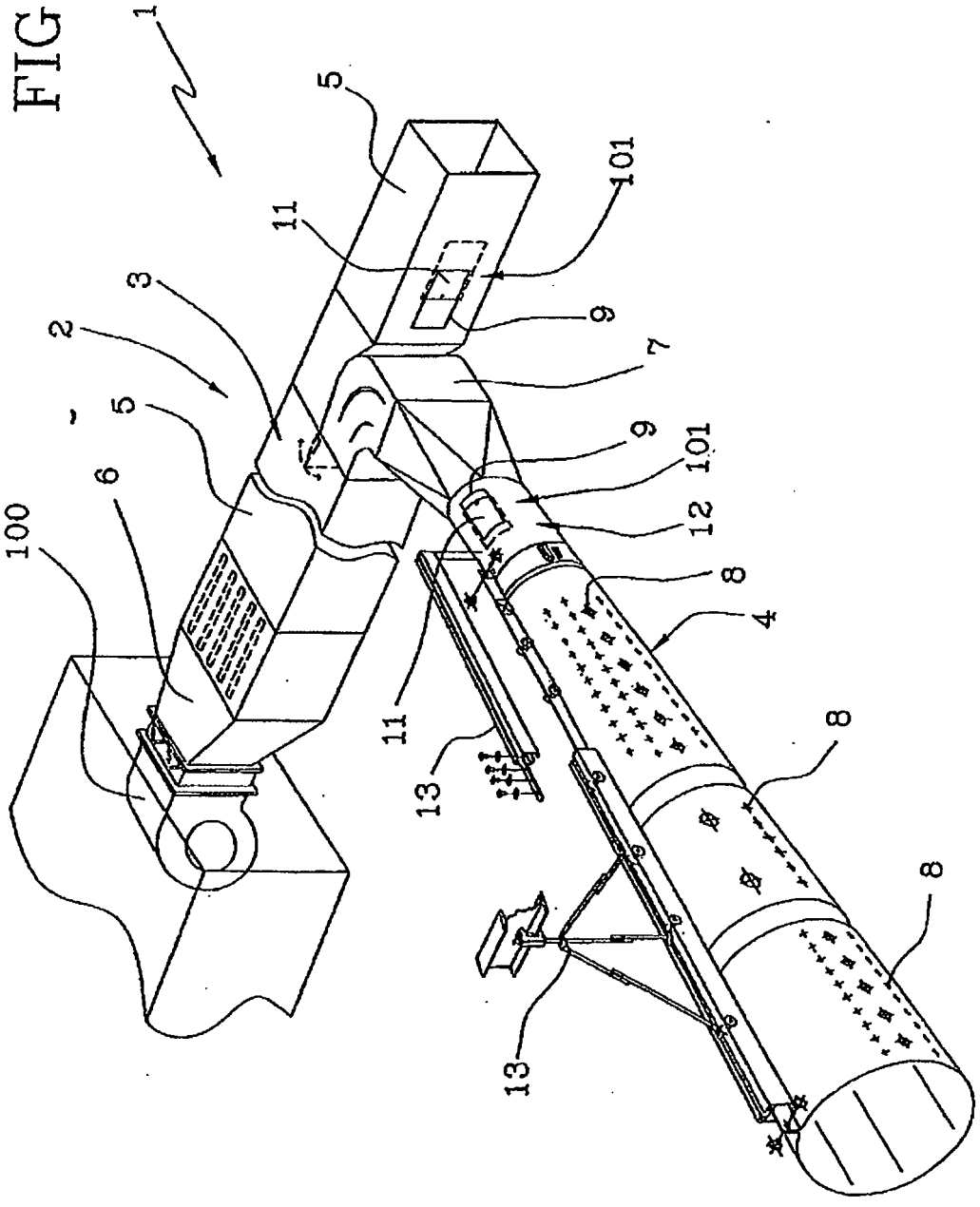
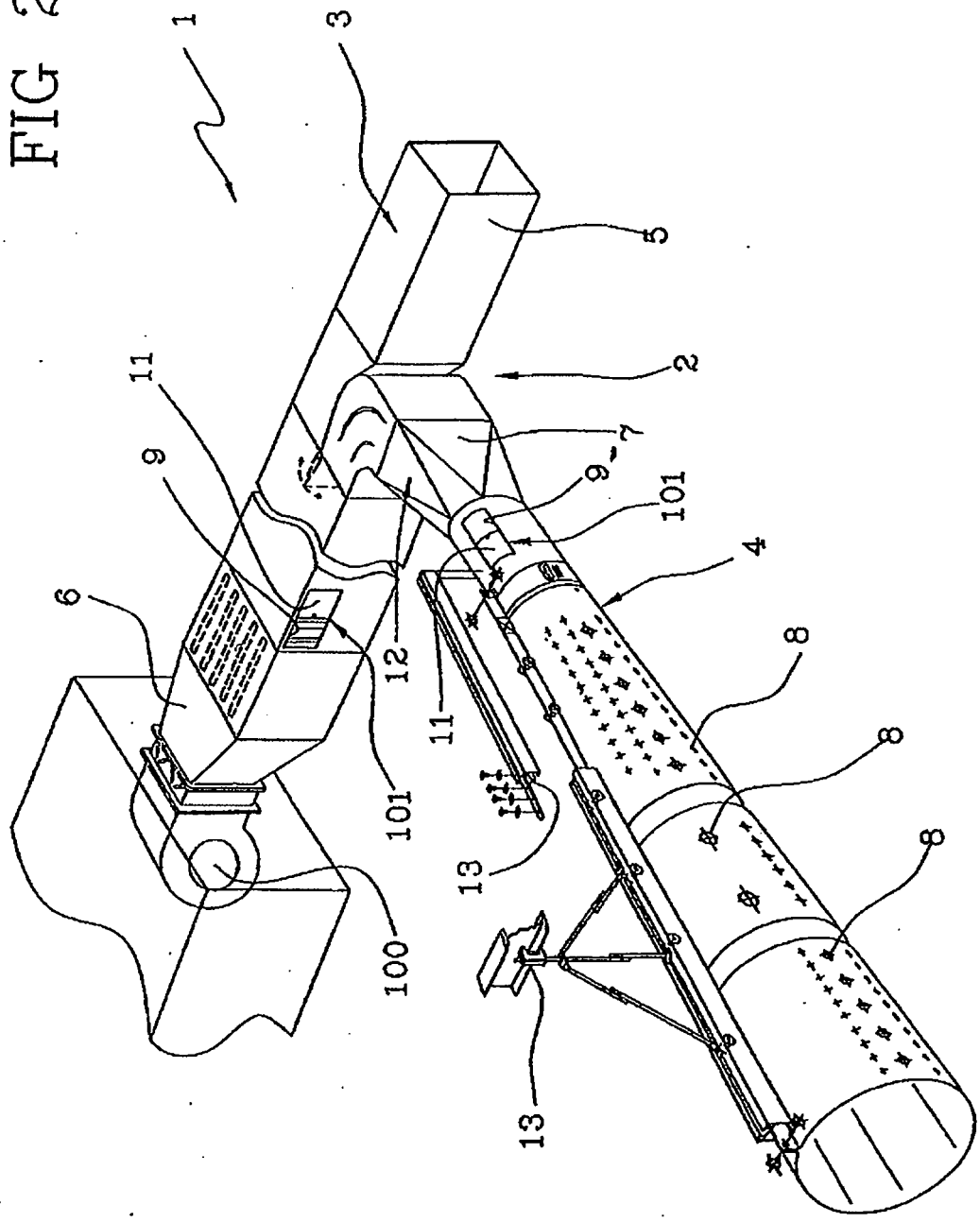


FIG 2b



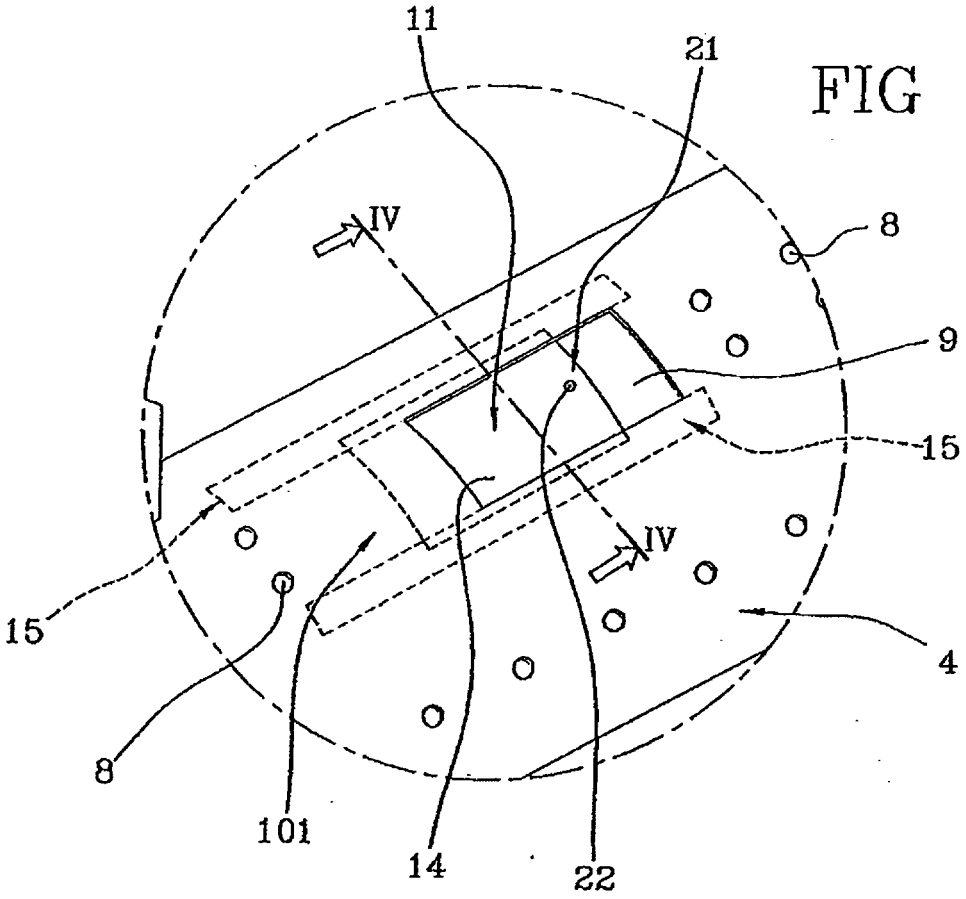
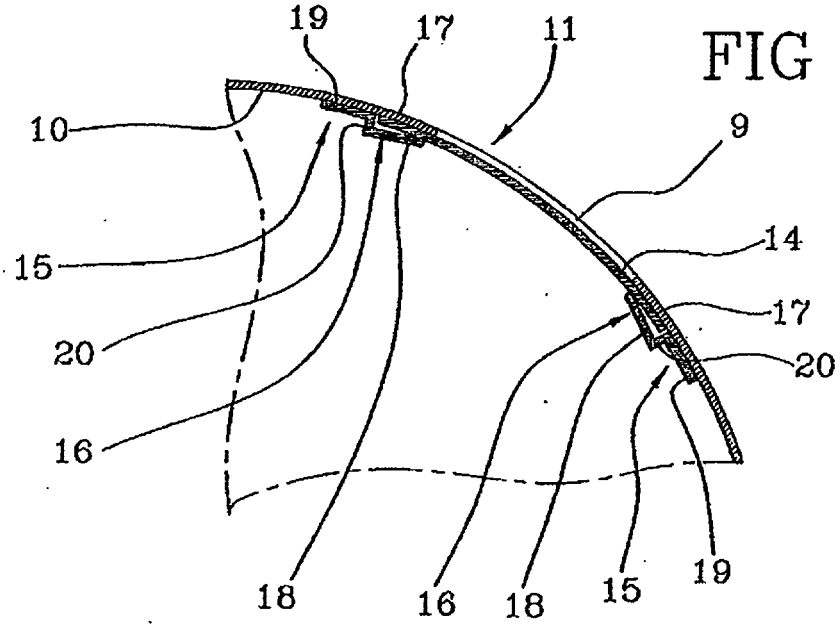

11
21
IV
8
9
15
IV
15
4
8
101
14
22

FIG 3


19
17
11
10
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14
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19

FIG 4

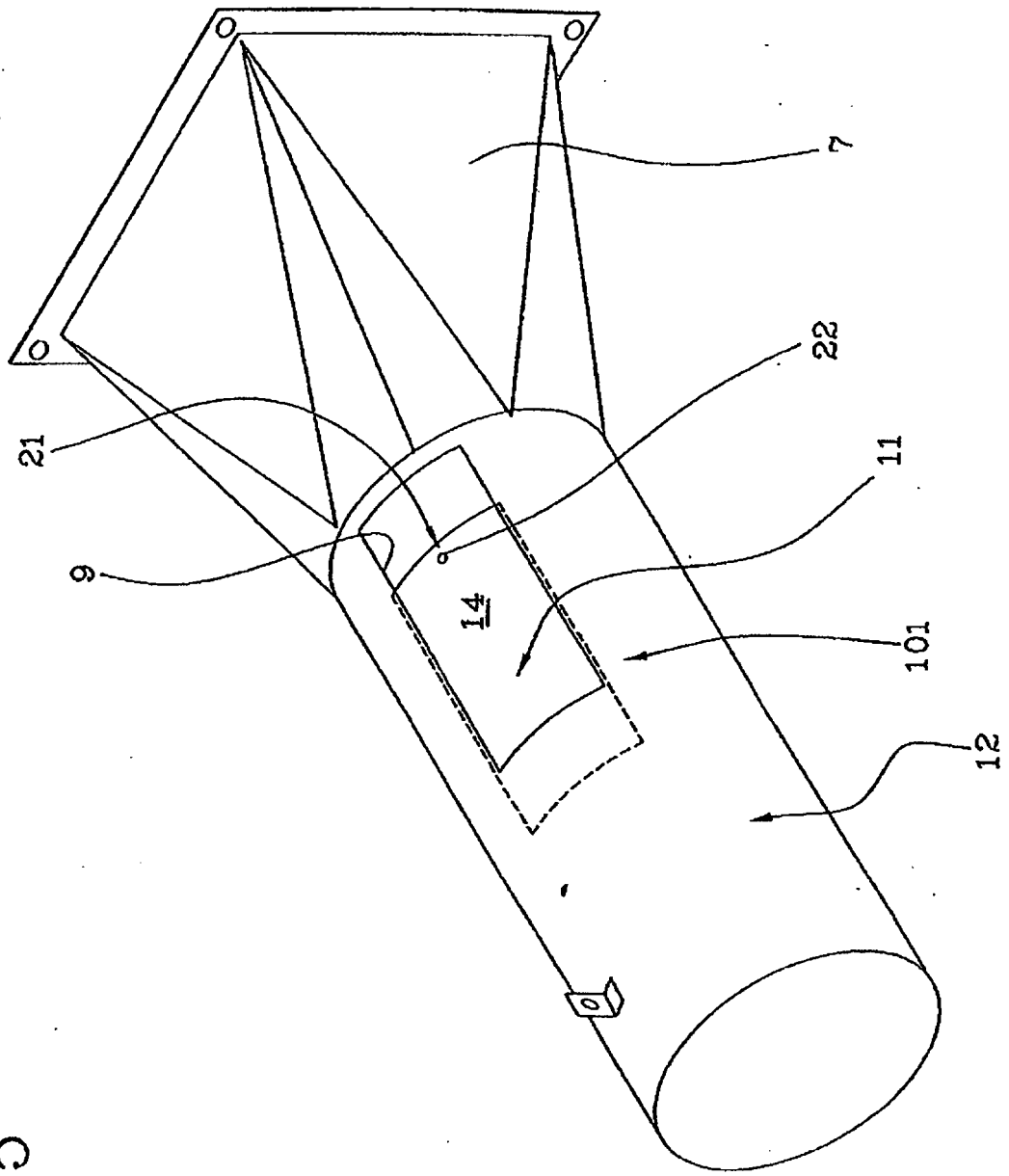

FIG 5

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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