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(54) **Ceiling disperser for conducting supply air into a room by alternating standard and high volume air**

(57) A ceiling disperser for conducting supply air into an inside space of a building, more particularly into a room, wherein the supply air is arranged to flow for most of the time with a certain air volume, which ceiling disperser comprises a duct part (6), by means of which the ceiling disperser is connected to the supply air duct, a frame part (4), which surrounds the duct part, and also

a front plate (1), which comprises apertures or nozzles (3) at least at the point of the duct part. The invention is implemented such that at the point of the duct part (6) a pipe (7) that is smaller in diameter than the duct part is installed partly inside the duct part, which smaller pipe can be moved in the vertical direction between a lower position and an upper position.

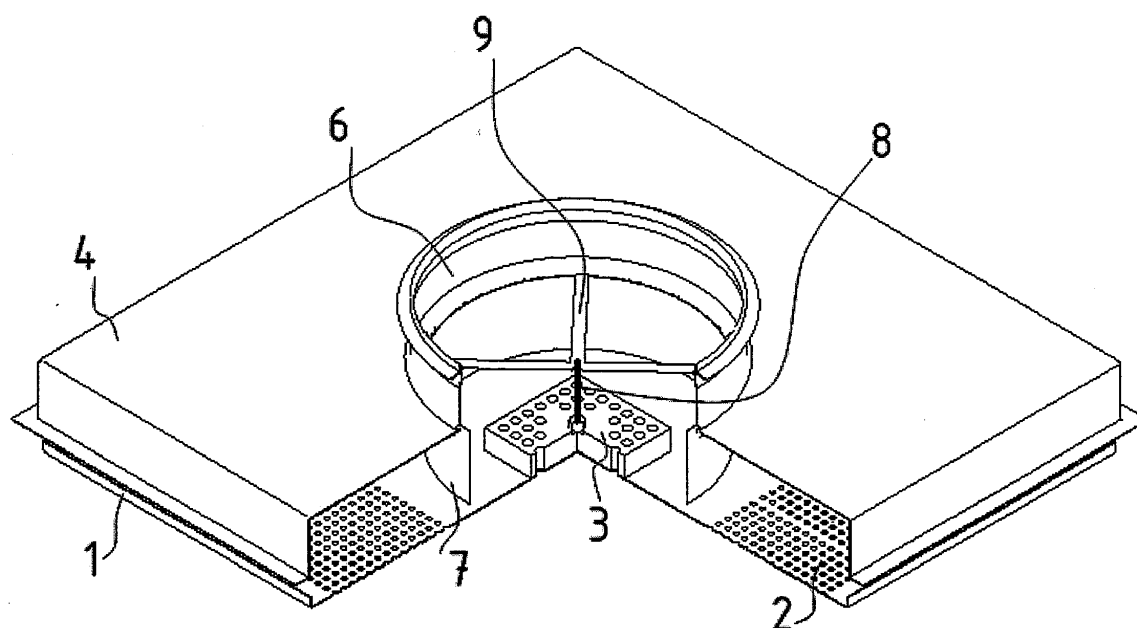


Fig. 4

Description

[0001] The object of this invention is a ceiling disperser for conducting supply air to an inside space of a building, more particularly into a room, wherein the supply air is arranged to flow for most of the time with a certain air volume, which ceiling disperser comprises a duct part, by means of which the ceiling disperser is connected to the supply air duct, a frame part, which surrounds the duct part, and also a front plate, which comprises apertures or nozzles at least at the point of the duct part.

[0002] The ventilation of an inside space of a building, such as a room, more particularly a classroom, an office or a corresponding space, which typically contains numerous people, is challenging. People generate a thermal load, which endeavors to gradually raise the inside temperature of the room. To compensate this, there are in principle two solutions: the room can be cooled mechanically, or more air can be supplied to the room. Mechanical cooling is rather expensive to install and consumes a lot of energy. Additional (uncooled) air flow can, for its part, result in air flow velocities that are too high, which produce discomfort and a continuous draft for those people in the room.

[0003] Hans Wigö's doctoral thesis "Technique and human perception of intermittent air velocity variation, September 2005, University of Gävle, Sweden" has investigated these problems. The doctoral thesis endeavors to show that it is, in fact, more pleasant for people in a room if momentarily "excess" air flows into the room. This more abundant air flow can last e.g. five minutes, after which a smaller amount of air is brought to the room for e.g. 15 minutes. An abundant air flow for five minutes was experienced as cooling and the feeling of an unpleasant draft was not experienced. The temperature does not in this case need to be mechanically cooled, but instead a sufficiently pleasant indoor air is achieved.

[0004] The aim of this invention is to apply the concept of a stronger supply air flow occurring intermittently as presented in the aforementioned doctoral thesis. This is achieved with a ceiling disperser that is **characterized in that** at the point of the duct part a pipe that is smaller in diameter than the duct part is installed partly inside the duct part, which smaller pipe can be moved in the vertical direction between a lower position and an upper position, and in that in its lower position the pipe is essentially against the front plate or near it, in which case the air flow is conducted only via the holes in the front plate that are at the point of the duct part.

[0005] One preferred embodiment of the ceiling disperser according to the invention is **characterized in that** in the upper position the pipe is at a distance from the front plate, in which case the air flow is directed also to the sides.

[0006] A second preferred embodiment of the ceiling disperser according to the invention is **characterized in that** the vertical movement of the pipe is implemented with a step motor.

[0007] One advantage of the invention is that with ceiling disperser the distribution of supply air can be implemented in pulses, i.e. at times more air, at times less, at certain regular intervals.

[0008] In the following, the invention will be described in more detail by the aid of some preferred embodiments with reference to the attached drawings, wherein

Fig. 1 presents an oblique bottom view of a ceiling disperser according to one embodiment of the invention.

Fig. 2 presents an oblique bottom view of a ceiling disperser according to a second embodiment of the invention.

Fig. 3 presents a side view of a ceiling disperser according to the invention.

Fig. 4 presents an oblique top view of a partially sectioned ceiling disperser according to one embodiment of the invention.

Fig. 5 presents an oblique top view of a partially sectioned ceiling disperser according to a second embodiment of the invention.

[0009] In the invention the technology presented in the aforementioned doctoral thesis is utilized in the form of a ceiling disperser. The principle of the technology in question is thus that supply air is brought into the inside space of a building, e.g. into a room, which can be e.g. a conference room or corresponding, for a certain time e.g. 15 minutes. After it, considerably more supply air is brought, e.g. for five minutes. Although the temperature of the room is not cooled any more than before as measured by a thermometer, the persons in the room experience the air pulses as pleasantly cooling, and do not experience the feeling of a draft. The aforementioned duration times of the air flows can be varied, but the basic principle is that the basic flow always lasts longer than the stronger flow.

[0010] Fig. 1 presents an oblique bottom view of a ceiling disperser, i.e. mainly the front plate 1 is seen in it. The front plate comprises a number of apertures 2 near the outer edges. In addition a group of apertures 3 or nozzles is formed in essentially the center part of the front plate 1. In this embodiment the aperture group is essentially round. In the embodiment of Fig. 2 the aperture group is, for its part, rectangular in shape.

[0011] It is observed from Fig. 3 that there is a gap 5 between the front plate 1 and the frame part 4. This gap can be adjusted e.g. to two different dimensions according to need.

[0012] In addition, it is observed from Fig. 3 that the ceiling disperser comprises a duct part 6, which is connected to the supply air duct (not shown), and via which the supply air is conducted into the ceiling disperser. The

ceiling disperser according to the invention also comprises a pipe 7 that is adjustable in the vertical direction, the diameter of which pipe is slightly smaller than that of the duct part 6. The pipe also extends to inside the duct part 6 and, as mentioned, can be moved in the vertical direction between a lower position (Fig. 3) and an upper position. An appreciable gap may not remain between the pipe and the duct part, so that the air does not "escape" from between them.

[0013] Fig. 4 illustrates in more detail the principle of the invention by means of a sectioned isometric drawing. Supply air flows into the ceiling disperser via the duct part 6. A pipe 7 is fitted inside the duct part, which pipe can thus be moved in the vertical direction. In the situation of Fig. 4 the pipe 7 is in its lower position, i.e. it is essentially against the front plate 1, in which case supply air is forced into the aperture group 3 and via it onwards into the room. With this a so-called "supply air pulse" is produced, i.e. the flow is aimed directly downwards and considerably more strongly than in the basic operating position of the ceiling disperser, in which the pipe 7 is raised into its upper position (not presented). When the pipe 7 is in its upper position, supply air is able to flow immediately after the duct part also in the lateral direction, in which case it comes into the room considerably more evenly.

[0014] The ceiling disperser is used for most of the time in this so-called basic operating position, in which the pipe 7 is raised into its upper position, where it is at a distance from the front plate 1. This supply air flow can last e.g. approx. 15 minutes, after which the pipe 7 is lowered down and the air is aimed directly into the apertures 3 and onwards into the room. This phase can last e.g. approx. five minutes. After this, these two phases can be repeated following the same pattern.

[0015] Fig. 5 presents entirely the same principle as Fig. 4 except that the aperture group 3 is now round in shape, whereas in the situation in Fig. 4 it is rectangular in shape. The aperture group 3 can be formed from a different piece, into which apertures are made, and which is fixed onto the front plate of the ceiling disperser.

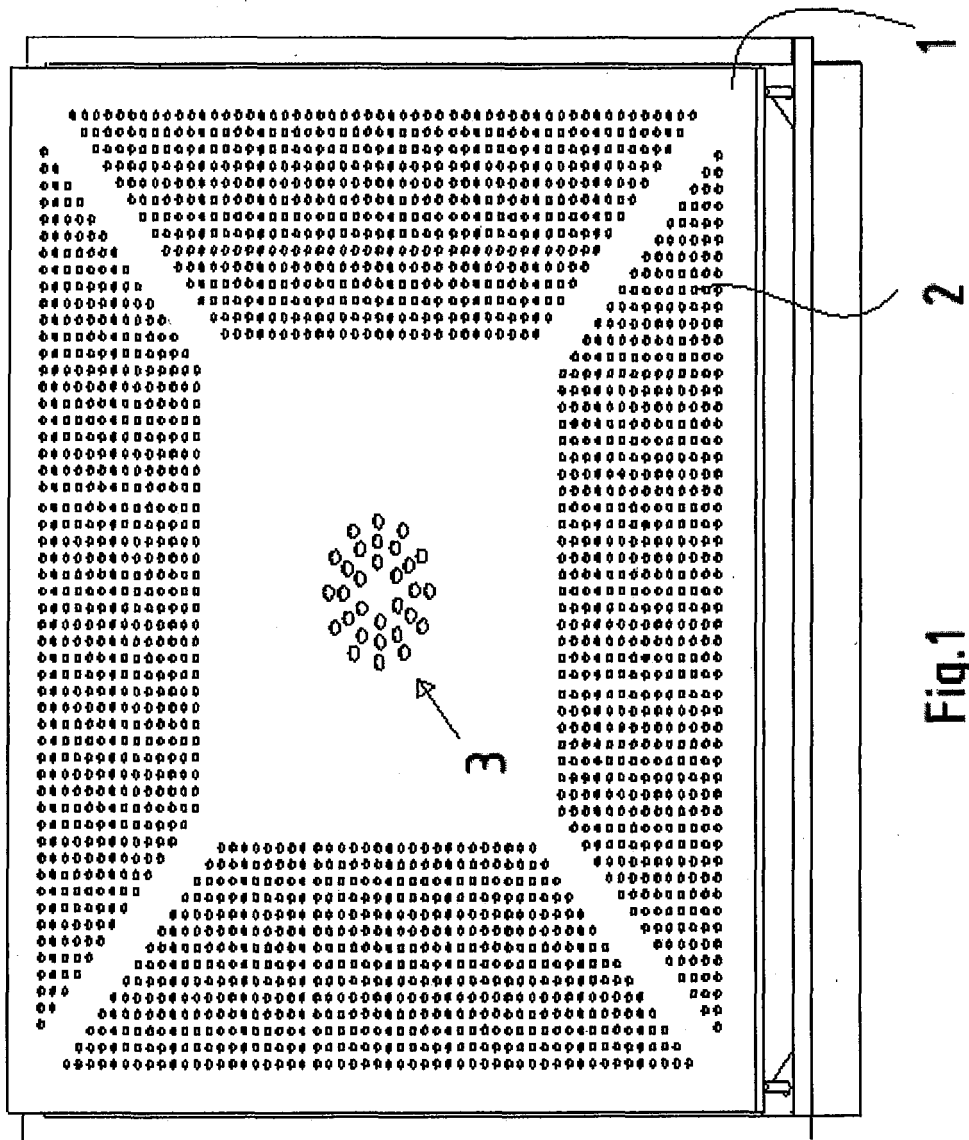
[0016] The pipe 7 that is movable in the vertical direction between two extreme positions and that functions as an adjustment means of the supply air flow is used e.g. with a step motor (not shown). The step motor is in connection with a rotating shaft 8, which via a rotary movement and threads raises and lowers the support means 9 of the pipe and thereby the pipe itself. This is not, however, the only alternative and a person skilled in the art can, according to need, construct a suitable moving mechanism.

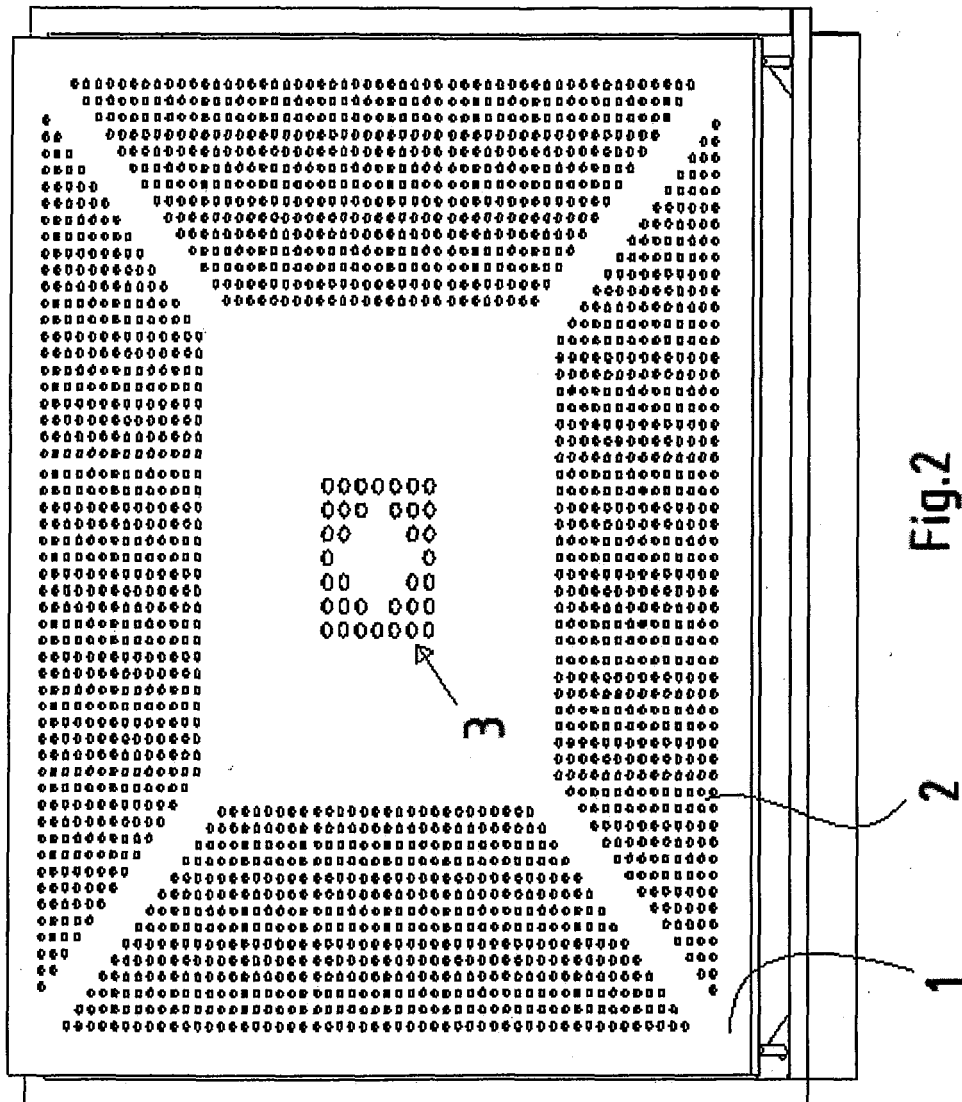
[0017] It is obvious to the person skilled in the art that the invention is not limited to the embodiments presented above, but that it can be varied within the scope of the claims presented below. Described above is a front plate of a ceiling disperser, which front plate comprises a number of apertures 2 nearer the outer edge. It is also possible that the front plate does not comprise apertures

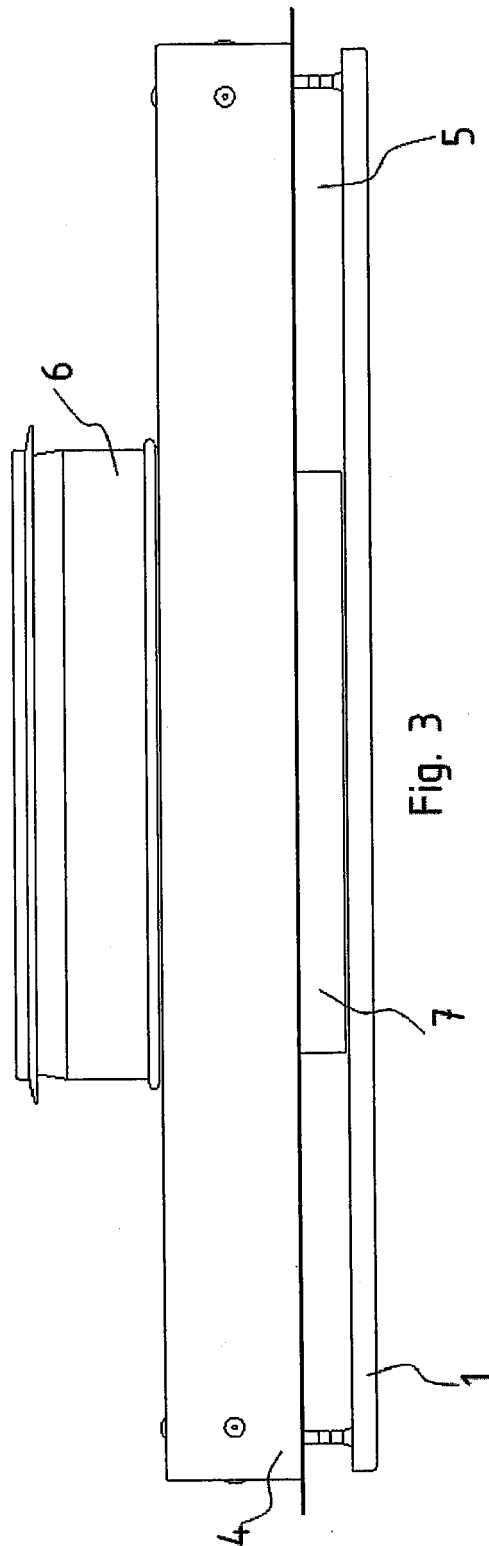
except for the aperture group 3 at the point of the duct part 6. In this case, in the basic operating position of the ceiling disperser the supply air flows from the gap 5 between the front plate 1 and the frame part, and of course also to some extent via the apertures 3. It is further obvious that the shape of the ceiling disperser does not need to be as rectangle, but instead it can also be another shape, e.g. round.

Claims

1. A ceiling disperser for conducting supply air to an inside space of a building, more particularly into a room, wherein the supply air is arranged to flow for most of the time with a certain air volume, which ceiling disperser comprises a duct part (6), by means of which the ceiling disperser is connected to the supply air duct, a frame part (4), which surrounds the duct part, and also a front plate (1), which comprises apertures or nozzles (3) at least at the point of the duct part, **characterized in that** at the point of the duct part (6) a pipe (7) that is smaller in diameter than the duct part is installed partly inside the duct part, which smaller pipe can be moved in the vertical direction between a lower position and an upper position, and **in that** in its lower position the pipe (7) is essentially against the front plate (1) or near it, in which case the air flow is conducted essentially only via the apertures (3) in the front plate that are at the point of the duct part.
2. Apparatus according to claim 1, **characterized in that** in the upper position the pipe (7) is at a distance from the front plate (1), in which case the air flow is directed also to the sides.
3. Apparatus according to claim 1 or 2, **characterized in that** the vertical movement of the pipe (7) is implemented with a step motor.







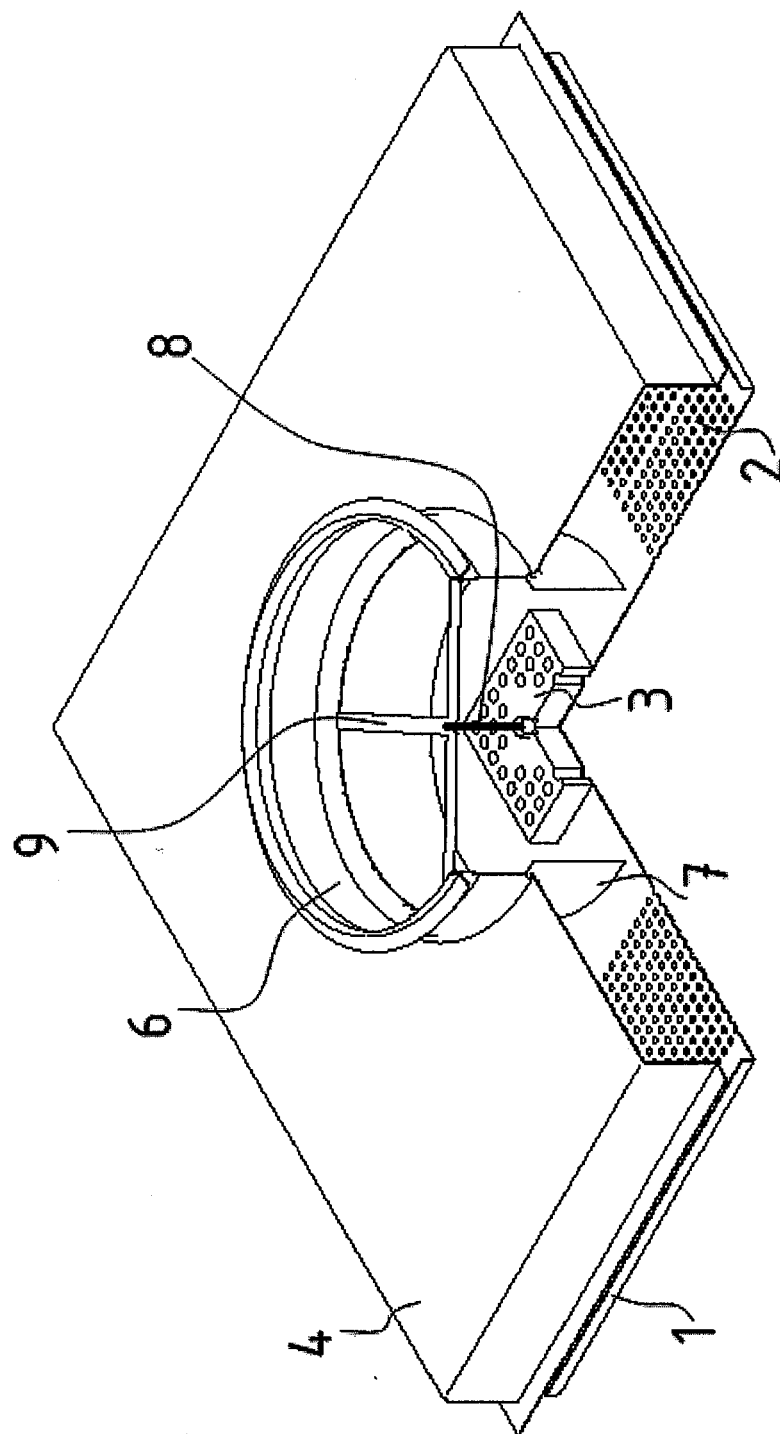


Fig. 4

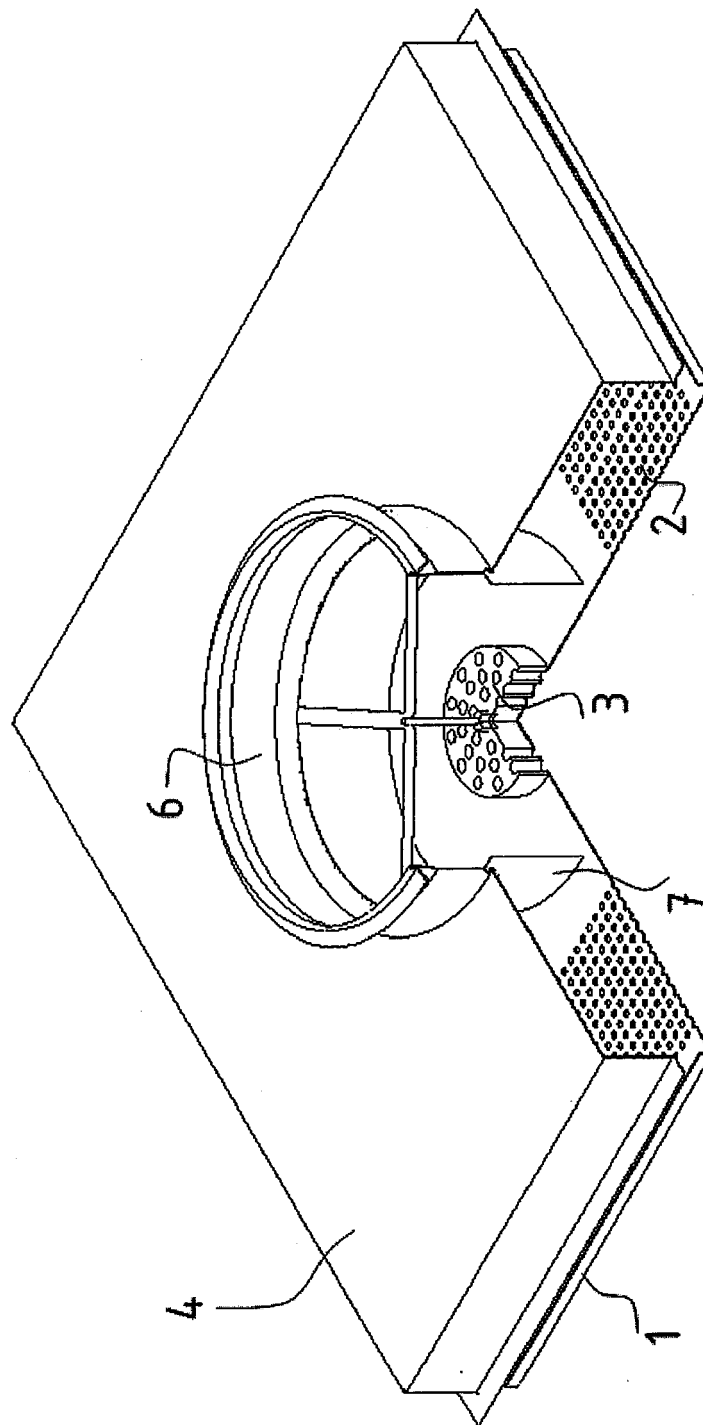


Fig.5



EUROPEAN SEARCH REPORT

Application Number
EP 10 39 7520

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	GB 2 155 170 A (WATERLOO GRILLE COMPANY LIMITE) 18 September 1985 (1985-09-18) * abstract; figures 1,2 * -----	1-3	INV. F24F13/068
A	DE 28 47 017 B1 (SCHAKO METALLWARENFABRIK) 8 November 1979 (1979-11-08) * claim 1; figures 1-6 * -----	1-3	
			TECHNICAL FIELDS SEARCHED (IPC)
			F24F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 7 April 2011	Examiner Decking, Oliver
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 10 39 7520

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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07-04-2011

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
GB 2155170	A	18-09-1985	NONE	

DE 2847017	B1	08-11-1979	NONE	
