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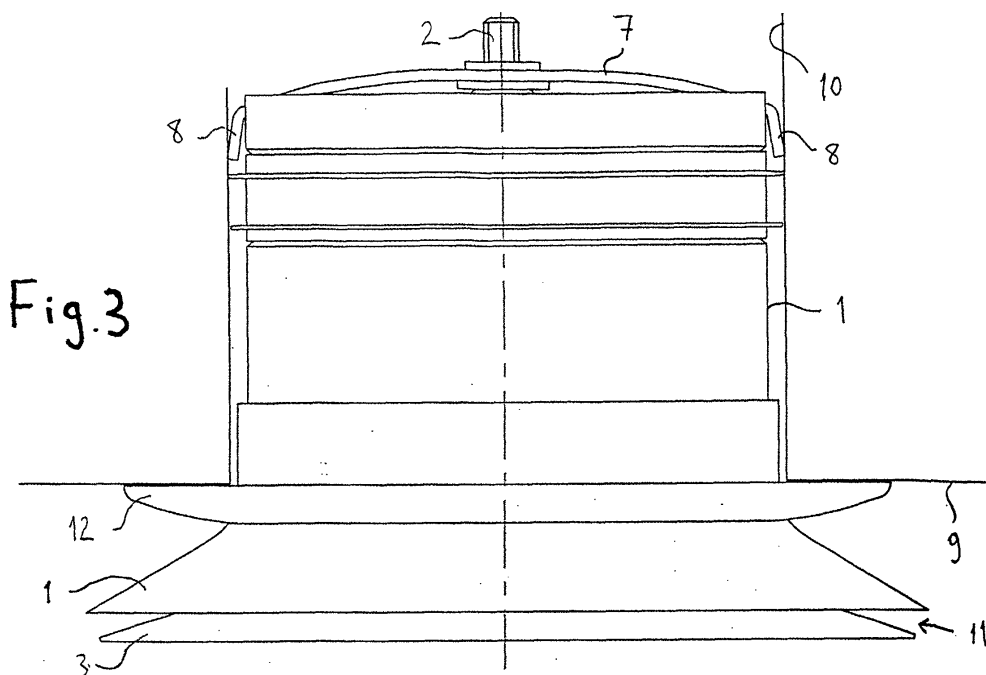
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(54) **Mechanism for detachably mounting an air diffuser to an air duct**

(57) A mechanism is provided for mounting an air diffuser to the interior wall of an air duct (10), the diffuser comprising a body part (1) with a shaft (2) adjustable relative to the body part in the air flow direction and having a control disc (3) affixed to the distal end of the shaft, whereby the spacing (11) between the diffuser body part and the control disc forms an adjustable air flow gap. The invention is implemented so that the shaft (2) of the control disc (3) at the end portion of the diffuser inserted in the air duct (10) is connected to the diffuser body part (1) by means of a springed element (7) having a shape

flexibly yielding in the direction of the control disc shaft (7) such that the springed element (7) extends partially outside said diffuser body part in at least two substantially opposite points relative to the shaft (2), whereby an imaginary circle drawn about the distal ends (8) of the springed element (7) has a larger diameter than the outer diameter of the diffuser body part (1) at the perimeter of the diffuser portion to be inserted in the air duct (10) and that the diameter of said imaginary circle can be reduced by pressing the diffuser control disc (3) in the direction of the shaft (2) inward relative to the diffuser body part (1) toward the interior of the air duct (10).



## Description

**[0001]** The present invention relates to a mechanism for mounting an air diffuser to the interior wall of an air duct, the diffuser comprising a body part with a shaft adjustable relative to the diffuser body part in the air flow direction and having a control disc affixed to the distal end of the shaft, whereby the spacing between the diffuser body part and the diffuser control disc forms an adjustable air flow gap.

**[0002]** In the art are known plural different ways of mounting an air diffuser at the end of an air duct. E.g., in FI laid-open publication 59299 is described a mounting method based on providing the outer rim of the diffuser base with springed tabs slightly angled relative to the axial direction of the diffuser, whereby dismounting the diffuser can occur by rotation in one direction only. This type of diffuser is easy to mount and remains reliably secured in place. However, the dismounting of the diffuser by rotation is problematic inasmuch as the springed tab elements tend to detach or break readily.

**[0003]** In FI Pat. No. 104,582 is described the use of separate clamp pieces by means of which an air diffuser equipped with clamp elements made from a spring wire can be mounted at the end of an air duct. According to this embodiment, the number of the L-shaped clamp pieces is advantageously two and both of them include a groove suited to accommodate the spring wire element. While this method is appropriate for mounting a diffuser to an air duct, it needs multiple extra parts (such as the clamp pieces, spring wire elements, etc.).

**[0004]** It is an object of the present invention to provide an air diffuser that allows the mounting of the diffuser to an air duct to take place in a dismountable fashion simply and without the need for dedicated tools. The air diffuser according to the invention is characterized in that the shaft of the diffuser control disc at the end portion of the diffuser inserted in the air duct is connected to the diffuser body part by means of a flexible springed element having a shape flexibly yielding in the direction of the control disc shaft such that the springed element extends partially outside said diffuser body part in at least two substantially opposite points relative to the control disc shaft, whereby an imaginary circle drawn about the distal ends of the springed element has a larger diameter than the outer diameter of the diffuser body part at the perimeter of the diffuser portion to be inserted in the air duct and that the diameter of the imaginary circle can be reduced by pressing the diffuser control disc in the direction of the control disc shaft inward relative to the diffuser body part toward the interior of the air duct.

**[0005]** A preferred embodiment of the invention is characterized in that the springed element is made from a wire material and its distal ends are adapted to extend through the wall of the diffuser body part to the exterior side thereof and that the springed element is connected to an adjuster nut provided with an inner thread by

means of which it rotates about the control disc shaft.

**[0006]** Another preferred embodiment of the invention is characterized in that the distal ends of the springed element are bent from the general plane of the spring-wire element in the direction of the diffuser control disc.

**[0007]** A still another preferred embodiment of the invention is characterized in that the distal ends of the springed element are bent about 40-80°, advantageously about 50-70°, toward the diffuser control disc.

**[0008]** The benefits of the invention are appreciated in its extremely simple and secure-to-use mounting mechanism. Mounting and dismounting of the air diffuser takes place easily and cleanly without causing any damage to the diffuser or the air duct. Furthermore, no extra accessories or tools are needed to mount and dismount the diffuser.

**[0009]** In the following, the invention is described in more detail with reference to the appended drawings in which

FIG. 1 shows an air diffuser according to the invention prior to its mounting to an air duct with the right side of diffuser being illustrated in a section;

FIG. 2 shows an air diffuser according to the invention during its mounting, again with the right side of diffuser being illustrated in a section;

FIG. 3 shows an air diffuser according to the invention ready mounted in an air duct; and

FIG. 4 shows an air diffuser according to the invention in a view illustrating the diffuser from that end which is to be inserted into an air duct.

**[0010]** Now referring to FIG. 1, therein is shown an air diffuser according to the invention suitable for use as an inlet air diffuser or outlet air diffuser. In the diagrams, reference numeral 1 generally denotes the body part of the diffuser having a control disc 3 mounted thereon by means of a shaft 2 that extends through the entire longitudinal length of the diffuser. The control disc 3 is affixed to the shaft 2. To the interior of the diffuser body part 1 is adapted a bridge member 4 extending diagonally over the entire interior diameter of the diffuser body part and having at the center thereof a guide bushing for supporting the diffuser control disc shaft 2. The shaft 2 is adapted freely movable in its longitudinal direction relative to the bridge member 4. To the end of the shaft 2 opposite to that connected to the control disc 3 is made an outer thread and an adjuster nut 6 with a compatible inner thread is adapted to rotate on the control disc shaft. Hence, the spacing of the air flow gap 11 remaining between the control disc 3 and the diffuser body part 1 can be adjusted by rotating the control disc, whereby the shaft rotates relative to the adjuster nut. To the adjuster nut 6 is connected a springed element 7 which is made from a wire-like material and whose distal ends

are adapted to extend through and outside the wall of the diffuser body part 1. The distal ends of the springed wire element 7 are denoted by reference numerals 8. Here, the distance between the distal ends of the element (or in other words, the diameter of an imaginary circle drawn about the distal ends of the element) in the rest position (FIG. 1) of the springed element is made greater than the outer diameter of that portion of the diffuser body part 1 which is intended to be inserted in an air duct 10 terminated on a wall 9 or room ceiling. The distal ends 8 of the springed element 7 are bent "downward", that is, toward the control disc. The element tips are bent to angle of, e.g., about 40-80°, advantageously about 50-70°.

[0011] In FIG. 2 is shown the initial state of diffuser installation having the control disc 3 pushed inward relative to the diffuser body part 1. Prior to mounting the diffuser, the air flow gap 11 must obviously be adjusted sufficiently wide. Then, having the control disc 3 pushed inward relative to the diffuser body part 1, the springed element 7 is forced to bow in the fashion shown in FIG. 2, whereby the distance between the distal ends 8 of the springed element 7 is reduced and the distal ends 8 of the element are aligned parallel to the walls of the air duct. Keeping the control disc in this inward-pushed position, it is easy to insert the diffuser body into the air duct 10 as far as to make the diffuser body collar 12 to fit flush with the surface of the wall 9. Now, the hold of the control disc 3 is released, whereby the spring force of the springed element 7 pushes the distal ends 8 thereof against the walls of the air duct 10. Hereby, the air diffuser remains firmly clamped in its place.

[0012] Respectively, dismounting the air diffuser from the air duct only needs an inward push on the control disc 3 relative to the diffuser body part and then a pulling grip to remove the diffuser. Inward pushing of the control disc in regard to the air diffuser body part can be accomplished by using a grip of both hands placed on the rear side of the diffuser body part. Then, the thumbs of both hands are applied on the control disc to push the same inward.

[0013] In FIG. 4 is shown an air diffuser mounted in an air duct 10 in a view elucidating a practicable fashion of implementing the springed wire element 7. As can be seen, the distal ends 8 of the springed element 7 are tensioned against the inner wall of the air duct 10 so as to keep the diffuser firmly in place. Also the connection of the springed element 7 to the adjuster nut 6 can be seen in FIG. 4.

[0014] Obviously, the springed element 7 may be implemented in plural alternative ways. Nevertheless, it is an essential specification of the invention that the inward pressing of the diffuser control disc relative to the diffuser body part causes a reduction in the distance between the clamping element ends (in other words, in the diameter of an imaginary circle drawn about the clamping element ends) for inserting the air diffuser into an air duct or for withdrawing the diffuser from the duct and that this

kind of an air diffuser inserted in an air duct is kept in place in the duct by means of the distal ends or the like clamping portions of the clamping element. The number of the springed elements may be plural and the shape of the elements may be varied. Obviously, also the number and shape of the clamping tips may vary.

[0015] The above description and illustrating drawings disclose chiefly those elements of the air diffuser that are essential to the understanding of the invention. In addition, an air diffuser according to the invention may include plural other components such as seals, etc. In lieu of a wire spring, other type of springed element may be used such as a leaf spring, for instance.

[0016] Not being limited by the above description related to an exemplary embodiment of the invention particularly in conjunction with an air duct of a circular cross section, the scope and spirit of the invention covers as well its application to an air duct of a polygonal cross section.

## Claims

1. A mechanism for mounting an air diffuser to the interior wall of an air duct (10), the diffuser comprising a body part (1) with a shaft (2) adjustable relative to the body part in the air flow direction and having a control disc (3) affixed to the distal end of the shaft, whereby the spacing (11) between the diffuser body part and the control disc forms an adjustable air flow gap, **characterized in that** the shaft (2) of the control disc (3) at the end portion of the diffuser inserted in the air duct (10) is connected to the diffuser body part (1) by means of a flexible springed element (7) having a shape flexibly yielding in the direction of the control disc shaft (7) such that said springed element (7) extends partially outside said diffuser body part in at least two substantially opposite points relative to said shaft (2), whereby an imaginary circle drawn about the distal ends (8) of said springed element (7) has a larger diameter than the outer diameter of said diffuser body part (1) at the perimeter of the diffuser portion to be inserted in said air duct (10) and that the diameter of said imaginary circle can be reduced by pressing the diffuser control disc (3) in the direction of said shaft (2) inward relative to said diffuser body part (1) toward the interior of said air duct (10).
2. The mechanism of claim 1, **characterized in that** said springed element (7) is made from a wire material and its distal ends (8) are adapted to extend through the wall of the diffuser body part to the exterior side thereof and that said springed element (7) is connected to an adjuster nut (6) provided with an inner thread allowing the nut to rotate on said control disc shaft.

3. The mechanism of claim 1 or 2, **characterized in that** the distal ends (8) of said springed element (7) are bent from the general plane of said spring-wire element in the direction of said diffuser control disc.

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4. The mechanism of claim 3, **characterized in that** the distal ends (8) of said springed element (7) are bent about 40-80°, advantageously about 50-70°, toward the diffuser control disc.

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5. The mechanism of any one of foregoing claims 1-4, **characterized in that** to the interior of said diffuser body part (1) is adapted a bridge member (4) extending diagonally over the entire interior diameter of said diffuser body part and having at the center thereof a guide bushing (5) for supporting said diffuser control disc shaft.

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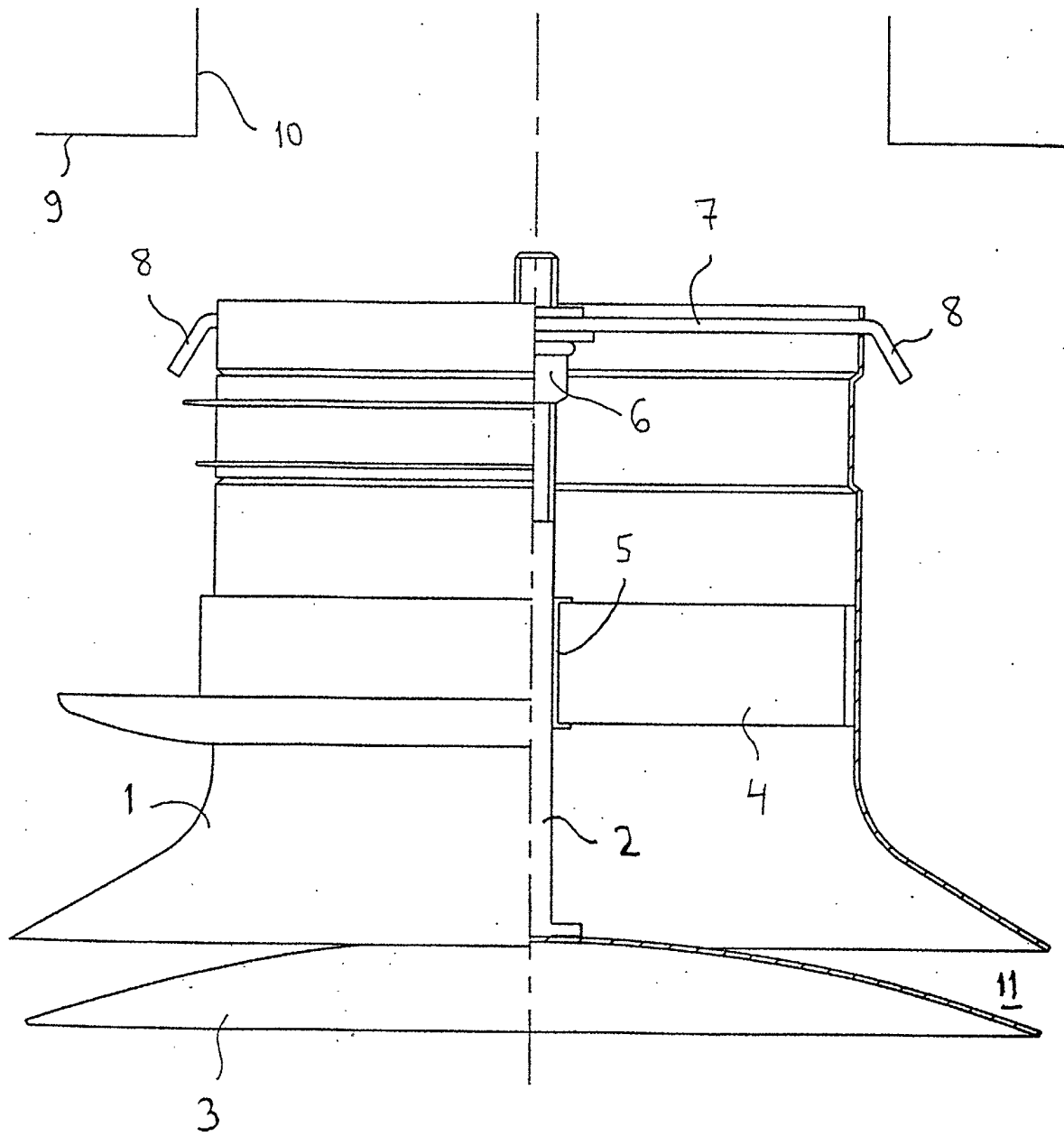


Fig. 1

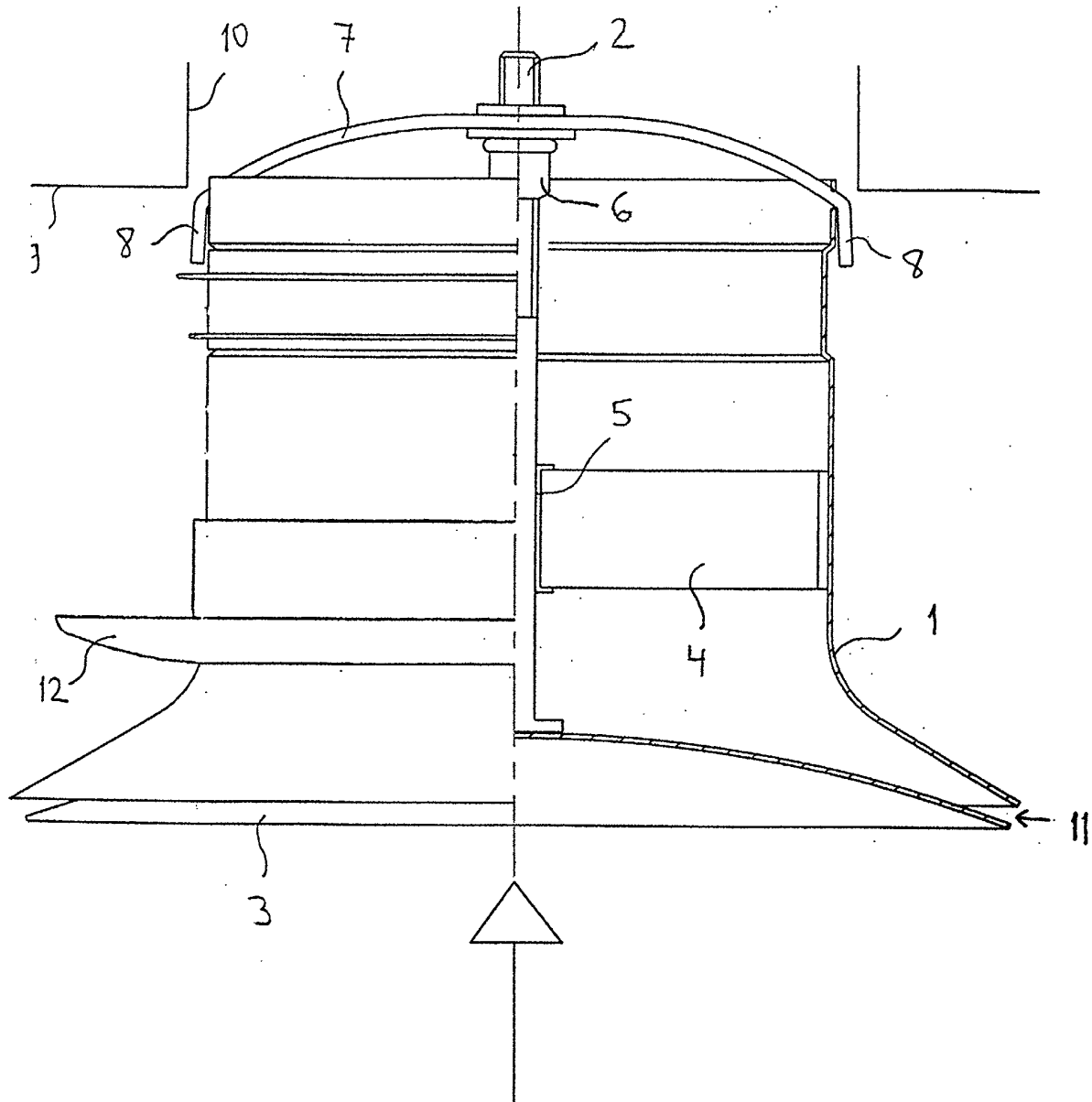


Fig. 2

Fig. 3

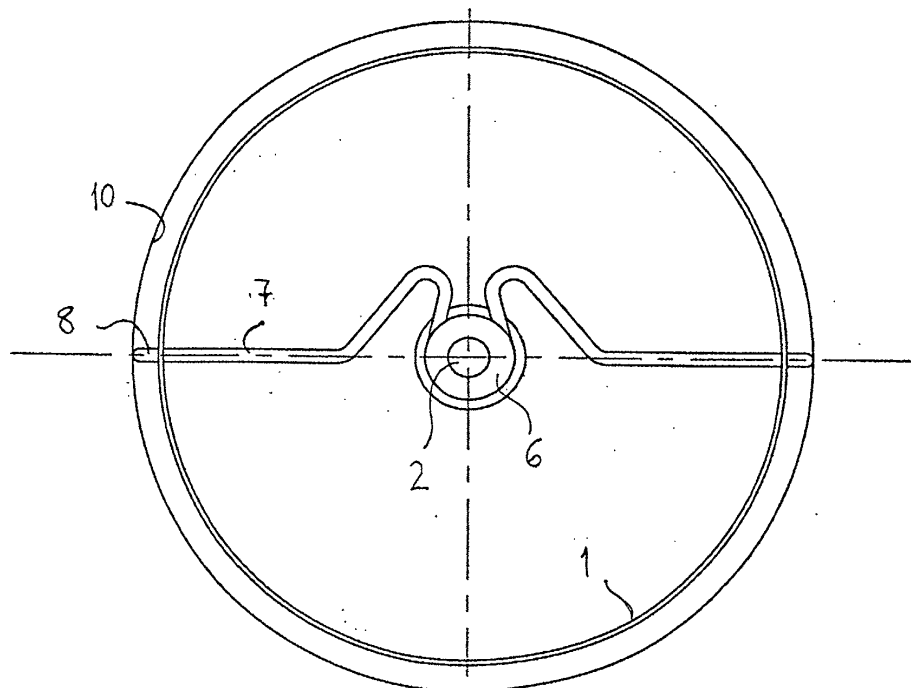
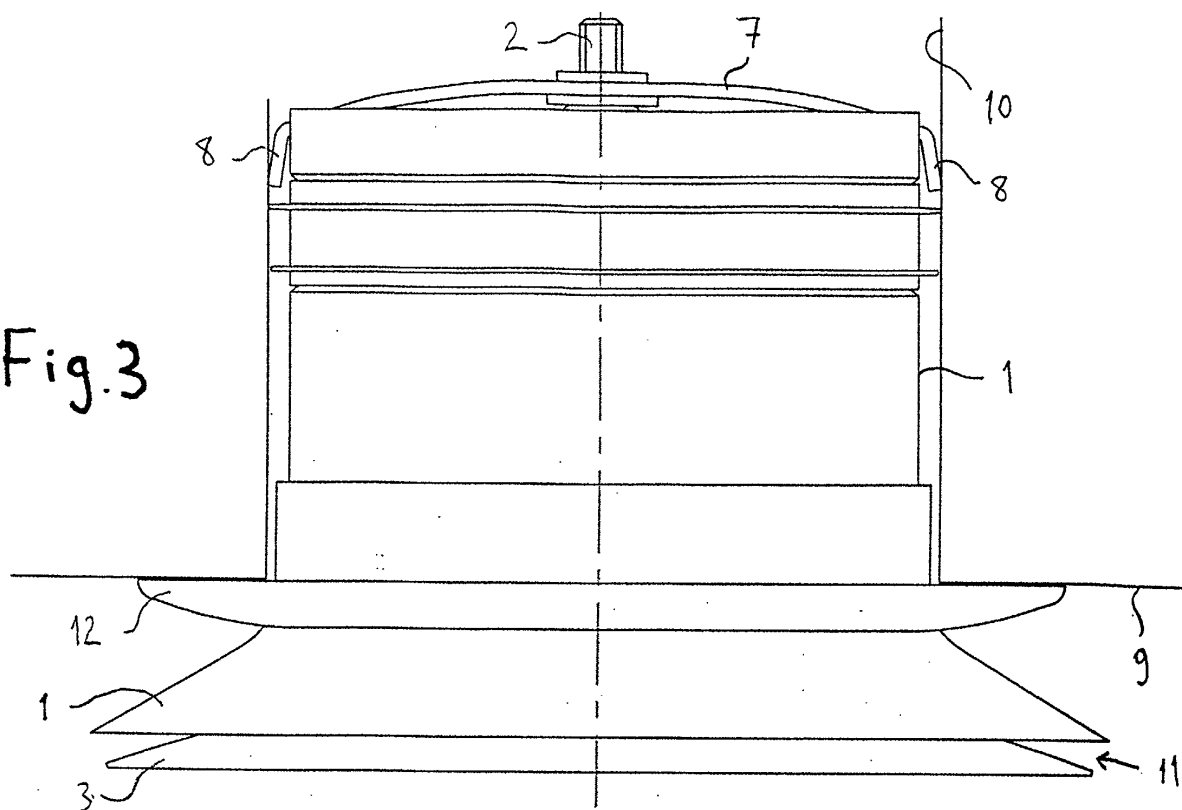


Fig. 4