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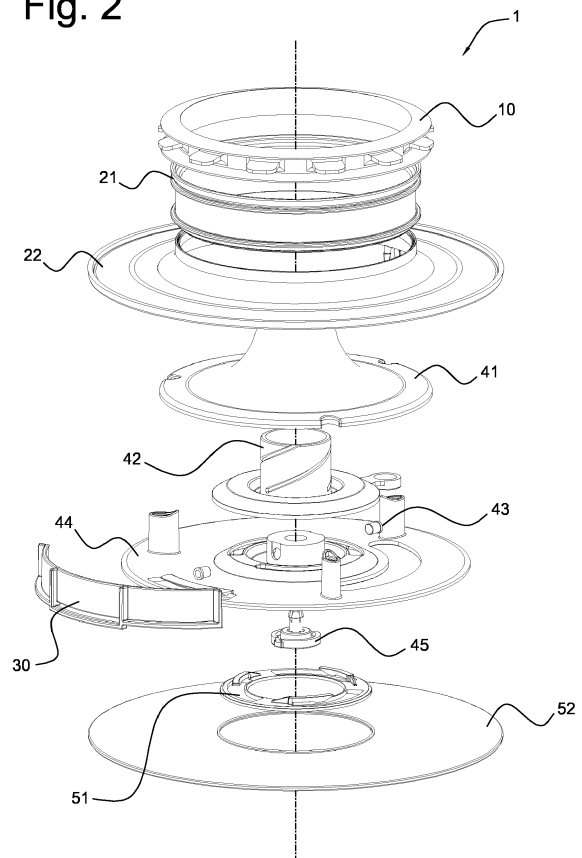
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(54) **VENTILATION VENT**

(57) The current invention relate to a ventilation valve, comprising a main body with passage that extends through with means for attaching the main body to a ventilation opening of structure; a base with means for attaching to the base to the main body at a distance to the main body such that an airflow passage extends between them; and an airflow controller to vary the airflow through the airflow passage. The ventilation valve also comprises a cover to prevent access to the exterior side. The cover is detachably connected to the base so that the relative position between the airflow controller and the base is adjusted while the base is attached to the main body. The base is detachably connected to the main body, so that the base and airflow controller is removed from the main body while they are held in place in the relative position between the airflow controller and the base.

Fig. 2



## Description

[0001] The current invention relates to a ventilation valve comprising a main body with a passage that extends therethrough and having means for attaching the main body to a ventilation opening of the structure, a base with means for attaching to the base to the main body at a distance to the main body such that an airflow passage extends between them; and an airflow controller to vary the airflow through the airflow passage. The current invention relates to a method for controlling the airflow in a ventilation system.

## State of the Art of Technology

[0002] Ventilation valves (also called air valves) are an essential component of mechanical ventilation systems and of ventilation systems with heat recovery (HR). A ventilation valve is placed on the ventilation opening of the ventilation system and controls the quantity of air supply and exhaust (also called the flow).

[0003] Needles of existing ventilation valves are exposed to undesired influence of the supply control by the user after calibration by the installer, among other things. Particularly during the maintenance of the ventilation valve, it is often necessary to disrupt existing ventilation valves. In addition, during the cleaning of the room where the ventilation valve is located, there may be influence on the adjustment mechanism. Removing such valves for maintenance is not easy and time intensive. In addition, existing ventilation valves cannot be designed to be compact.

[0004] A ventilation valve where undesired influence of the adjustment mechanism can take place is described in the Dutch patent publication NL 2021027 B1. This describes a method for adjusting the airflow in an air distribution system, comprising the following steps: creating an air distribution system and control of the airflow for the adjustment of the position of the airflow controller with regard to the air distribution basis. The cover of the air diffuser is provided with a rotating disc for handling the airflow controller, and the position of the airflow controller is adjusted by rotating the rotatable disc.

## Objective of the invention

[0005] The current invention and its preferred designs have the objective of offering a solution for one or more of the aforementioned disadvantages. One objective of the invention could therefore be to create a ventilation valve of the aforementioned type that hinders the undesirable influence of the set flow. A further objective of the invention could be to create a side guide of the aforementioned type that allows for the maintenance of the passage behind it, without influencing the set flow and/or hindering the set flow in an aesthetic way.

## Description of the invention

[0006] This objective is achieved, according to the invention, with a ventilation valve that displays the technical characteristics of the first independent claims. For this, the current invention is a ventilation valve that attaches to a ventilation opening of a structure. In particular, the invention provides an outlet valve (also called an extraction valve) for the extraction of used, contaminated air from a room or in a supply valve (also called a pulse valve) for the supply of fresh air into a room. The current invention also relates to a method for controlling the airflow through a ventilation valve.

[0007] In a first aspect of the invention, which may occur in combination with the other aspects and embodiments of the invention described herein, the invention comprises a ventilation valve, consisting of:

- a main body with a passage extending therethrough and having means for attaching the main body to a ventilation opening of a structure;
- a base with means for attaching the base to the main body at a distance from the main body such that an airflow passage extends between them;
- an airflow controller provided on the inner side of the base, wherein the position of the airflow controller is adjustable with regard to the base to vary the airflow through the airflow passage;
- control means configured to adjust the position of the airflow controller, manually controllable by a user from the outer side of the base, wherein the position of the control means is adjustable with regard to the base such that the movement of the control means causes a respective change in the position of the airflow controller relative to the base,
- a cover with means for attaching the cover to the base which prevents access to the outer side and operation of the control means during normal use, such that changing the relative position between the airflow controller and base is prevented.

[0008] Contrary to the rotatable disc of the valve described in the Dutch patent publication NL 2021027 B1, because the cover prevents access to the exterior side, the access to the control means is also prevented and the user cannot manually disrupt the valve. Because of this, it is not necessary to install a securing piece. In addition, the adjustment mechanism is not visible from the outer side, which increases the aesthetic value of the valve.

[0009] The cover is detachably connected to the base *for example, using a twist & lock connection*, so that the relative position between the airflow controller and the base is adjustable by the user whilst the base is attached to the main body and the cover is removed from the base. The base is detachably connected to the main body, *for example with a snap-fit connector*, so that the base, airflow controller and protector plate is removable from the

main body whilst they are held in place in the relative position between the airflow controller and the base.

**[0010]** Through this, various conditions for on the one hand, adjustment by the professional installer and annual cleaning by the user is defined. In order to adjust the valve, the installer only has to remove the cover and to maintain the valve, the user can remove the entire adjustment mechanism without disrupting it.

**[0011]** A first embodiment, which may occur in combination with the other aspects and embodiments of the invention described here, involves an aforementioned ventilation valve, wherein the airflow controller is attached to the base by a longitudinal extending coupling element such that rotation of the coupling element causes a corresponding change in the longitudinal position of the airflow controller opposite the base.

**[0012]** A second embodiment, which may occur in combination with the other aspects and embodiments of the invention described here, involves an aforementioned ventilation valve, wherein the base is provided with a banana-shaped (curved) slot opening, and wherein the control means are formed by a *preferably ring-shaped* protrusion that is attached to the coupling element and extends in or through the slot opening such that the rotation of the protrusion between the ends of the slot opening causes a corresponding rotation of the coupling element.

**[0013]** A third embodiment, which may occur in combination with the other aspects and embodiments of the invention described here, involves an aforementioned ventilation valve, wherein, in cross section, the shape and dimension of the slot opening correspond to the shape and dimensions of the cumulative surface of the part of the protrusion extending into the slot opening in all positions of the protrusion. The cumulative surface corresponds to the surface achieved by overlapping the separate surfaces of the cross section of the slot opening in all possible positions. There is thus minimal play in the slot opening between the protrusion and the edges of the base surrounding the slot opening. In other words, if during rotation between a start and end position, each point of the cross section of the part of the protrusion extending into the slot opening will make up a part of an arc, and all arcs together form the cumulative surface corresponding to the shape and dimension of the slot opening. In the case of a protrusion with a circular cross section, a curved, banana-shaped slot will be formed.

**[0014]** By preference, in cross section, the shape and dimensions of the slot opening correspond with the cumulative surface of the part of the protrusion extending into the slot opening after rotation over an angle of 100 degrees.

**[0015]** A fourth embodiment, which may occur in combination with the other aspects and embodiments of the invention described herein, is an aforementioned ventilation valve, wherein the position of the flow controller is adjustable in a longitudinal direction relative to the base. In addition, the airflow controller is a controller cone that

is attached on the interior side of the base.

**[0016]** A fifth embodiment, which can occur in combination with the other aspects and embodiments of the invention described herein, involves an aforementioned ventilation valve, further comprising one or more of airflow screens that are set up to block the airflow out of one or more of the airflow zones.

**[0017]** A sixth embodiment, which can occur in combination with the other aspects and embodiments of the invention described herein, involves an aforementioned ventilation valve, wherein the base is detachably connected to the main body at a fixed distance from the main body. Preferably, the base is provided with one or more, preferably three, spacers for the removable attachment of the base to the main body.

**[0018]** A seventh embodiment of the invention, which may occur in combination with the other aspects and embodiments of the invention described herein, the invention comprises an aforementioned ventilation valve, the base comprising a static plate-shaped part with an interior and an exterior side, wherein the means for attaching the base to the main body are equipped on the interior side of the plate-shaped part.

**[0019]** An eighth embodiment of the invention, which may occur in combination with the other aspects and embodiments of the invention described herein, the invention comprises an aforementioned ventilation valve, wherein the cover extends further than the static plate-shaped part of the base in a radial direction.

**[0020]** A ninth embodiment of the invention, which may occur in combination with the other aspects and embodiments of the invention described herein, the invention comprises an aforementioned ventilation valve, wherein the main body comprises a cylindrical wall section with a flange extending to the outer side on one end for attaching to a surface area that surrounds the ventilation opening.

**[0021]** A tenth embodiment of the invention, which may occur in combination with the other aspects and embodiments of the invention described herein, the invention comprises an aforementioned ventilation valve, the main body comprising means for the clamping in of collaborative spacers of the cover.

**[0022]** In a second aspect of the invention, which may occur in combination with the other aspects and embodiments of the invention described herein, the invention comprises a method for the regulation of the airflow in a ventilation system consisting of the following steps:

- providing a ventilation valve according to one of the preceding claims;
- removing the cover,
- controlling the airflow by the adjusting the position of the airflow controller relative to the base,

wherein the base is provided with a curved slot opening to receive a protrusion of the control means and wherein the position of the airflow controller is adjusted by rotating

the protrusion.

### Summary description of the figures

**[0023]** The invention will be explained in more detail using an embodiment shown in the figure.

Figure 1 shows an openwork view of a simplified representation of a ventilation valve according to one embodiment of the current invention;

Figure 2 shows an openwork view of the ventilation valve shown in figure 1;

Figures 3A and 3B show a side view and cross section of the ventilation valve shown in figure 2;

Figures 4A and 4B show in perspective of the screw connection of the ventilation valve shown in figure 3;

Figures 5A and 5B show multiple views of the base of the ventilation valve shown in figure 2;

Figures 6A and 6B show in perspective of the ventilation valve shown in figures 1 and 2 in maintenance condition; and

Figure 7 shows in perspective the ventilation valve shown in figures 1 and 2 in installation condition.

### Detailed description of the figures

**[0024]** The current invention will be described with regard to particular embodiments and with reference to certain figures, but the invention is not limited to these and is only determined by the claims. The figures described are only schematic and non-limiting. In the figures, the size of certain element is exaggerated and not drawn to scale for illustrative purposes. The dimensions and the relative dimensions are not necessarily consistent with actual practical designs of the invention.

**[0025]** Furthermore, the terms first, second, third and the like are used in the description and claims to differentiate between similar elements and not necessarily to describe a sequential or chronological sequence. The terms are interchangeable under fitting circumstances and the embodiments of the invention can be applied in sequences other than those described or illustrated here.

**[0026]** Moreover, the terms, top, bottom, over, under and the like are used in the description and claims are used for illustrative purposes and not necessarily to describe relative positions. The terms used are interchangeable under fitting circumstances and the embodiments of the invention described can be applied in other orientations than described or illustrated here.

**[0027]** Furthermore, the various embodiments, even though called "preferred designs" must be considered as a manner of example of how the invention can be designed rather than as a limitation of the range of the invention.

**[0028]** The term "encompassing", used in the claims, must not be interpreted as being limited to the resources or steps listed after it. The term does not exclude other elements or steps. The term should be interpreted as

specifying for the presence of the listed features, elements, steps or components which are referenced, but does not exclude the presence or addition of one or more other features, elements, steps or components or groups thereof. The range of the expression "a design encompassing resources A and B" must thus not be limited to designs that consist only of A and B. The intention is that, with regard to the current invention, only the components A and B of the design are summarized, and the claim must be further interpreted as they also contain equivalents of these components.

**[0029]** Figure 1-3B show a ventilation valve 1 according to an embodiment of the current invention. The ventilation valve 1 is made up of a ceiling body 20 (hereafter also called the main body) that can be attached to a ventilation opening of a ventilation passage, an adjustment assembly 40 that can be attached to the ceiling body 20 at a distance from the ceiling body 20 such that an airflow passage extends between them, and a cover 50 that can be attached to the adjustment assembly 40 such that the adjustment assembly 40 extends between the ceiling body 20 and the cover 50, wherein the cover 50 is fitted to shield the adjustment assembly 40. Optionally, the ventilation valve 1 may also have an airflow screen 30 that can be attached to the adjustment assembly 40 or the ceiling body 20 such that that airflow screen 30 extends between the ceiling body 20 and the adjustment assembly 40 to block the airflow in one or more radial directions.

**[0030]** In operational mode, shown in figures 3A and 3B, the ceiling body 20, the controlling mechanism 40 and the cover 50 are detachably connected to each other. By removing the cover, 50, while the regulation mechanism 40 is connected to the ceiling body 20, the ventilation valve can be provided in adjustment node (shown in figure 7) in which the regulation mechanism 40 can be adjusted. Alternatively, by removing the regulation mechanism 40, while the regulation mechanism 40 is attached to the cover 50, the ventilation valve can be set in maintenance mode, shown in figures 6A and 6B, in which the ventilation passage behind it can be accessed while the setting of the regulation mechanism 40 can be retained. Through this, various conditions for on the one hand, adjustment by the professional installer and annual cleaning by the user can be defined. In order to adjust the valve, the installer only has to remove the cover and to maintain the valve, the user can remove the entire adjustment mechanism without disrupting it.

**[0031]** The ceiling body 20 according to the embodiment shown consists of a cylindershaped element 21 with a diameter  $d_1$ , such as 115 mm, and a funnel shaped element 22 with a cylindrical wall section and a flanged extending outward on one end for gripping onto a surface area that surrounds the ventilation opening. The ceiling body 20 is arranged to partially be inserted into a ventilation passage at a height  $h_2$ , such as 38 mm and using a sealing ring 10, creates an airtight seal of the space between the cylindershaped section 2 and the ventilation

passage.

**[0032]** The regulation mechanism 40, according to the embodiment shown, consists of an adjustable cone 41 that is attached using a coupling element 42 to a base 44 such that the rotation of the coupling element 42 causes a corresponding change in the longitudinal position of the adjustable cone 41 relative to the base 44. For this, the coupling element 42 is provided with three spiral-shaped recesses 422 that work together with complementary means of the adjustable cone 41. The coupling element 42 is attached to the base with the aid of a pressure nail 45 and a spring pin. The pressure nail 45 holds the complete regulation mechanism 40 together and provides for a strong connection that is difficult to disconnect. The spring pins 43 work together with alternating click recesses 423 on the inside of the coupling element 42 to set a number of discrete adjustment positions. In this way, through the multiple functions of the coupling element, the number of parts of the adjustment mechanism is limited. This also results in a compact, hidden (not visible from the outer side) adjustment mechanism because the adjustment mechanism is mostly hidden under the cone 41.

**[0033]** The base 44 has a dial 441, spacers 443 to secure the dial to the ceiling body and means 444 for the removable coupling of the airflow screen 30 to the dial 441. In the dial 441 there is a slot opening 442 provided to receive a protruding control element 421 of the screw connection 21 and to use this from a side opposite the dial. By rotating the control element 421, and thus the coupling element 42, the longitudinal position of the adjustable cone 41 relative to the base 44 will change and thus the airflow will vary through the airflow canal. On this opposite side of the dial 441, indications can be provided along the slot opening (not shown) that are consistent with the various discrete positions of the adjustable cone 41. The slot opening 442 extends in an angular direction between successive spacer 443 and allows for the rotation of the control element 421 over nearly an angle of 100 degrees.

**[0034]** The cover 50, according to the embodiment shown, consists of central elements 51 for rotatable attachment of the cover to the base and the disc 52 extending around it with an exterior diameter  $d_2$ , such as 190 cm, and an exterior side at a distance  $h_1$  of the ventilation opening.

#### List with reference numbers

##### [0035]

- 10. Sealing ring, passage end
- 20. Ceiling body
- 21. Cylinder shaped ceiling element
- 22. Funnel-shaped ceiling element
- 30. Airflow screen
- 40. Adjustment mechanism
- 41. Cone

- 42. Coupling element
  - 421. Control element
  - 422. Spiral-shaped recess
  - 423. Click recess
- 5 43. Spring pins
- 44. Base
  - 441. Dial
  - 442. Slot opening
  - 443. Spacer
- 10 444. Screen coupling means
- 45. Pressure nail
- 50. Cover
- 51. Twist 'n' lock connection
- 52. Shield disc

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**[0036]** The embodiments of the invention and its aspects are further characterized in the following clauses.

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#### 1. Ventilation valve, comprising:

- a main body (20) with a passage extending therethrough and having means for attaching the main body to a ventilation opening of a structure;
- a base (44) with means for attaching the base to the main body at a distance from the main body such that an airflow passage extends between them;
- an airflow controller (41) provided on the inner side of the base, wherein the position of the airflow controller is adjustable with regard to the base to vary the airflow through the airflow passage;
- control means (42) configured to adjust the position of the airflow controller, manually controllable by a user from the exterior side of the base, wherein the position of the control means is adjustable with regard to the base such that the movement of the control means causes a respective change in the position of the airflow controller relative to the base,
- a cover (50) with means for attaching the cover to the base and in normal use, hinders access to the exterior side,

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wherein the base is detachably connected to the main body, so that the base and airflow controller is removable from the main body while they are held in place in the relative position between the airflow controller and the base, and wherein the cover is detachably connected to the base, so that the relative position between the airflow controller and the base is adjustable while the base is attached to the main body.

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2. Ventilation valve according to one of the preceding clauses, wherein the airflow controller is attached to the base

by a longitudinally extending coupling element such that rotation of the coupling element causes a corresponding change in the longitudinal position of the airflow controller relative to the base.

3. Ventilation valve according to clause 2,

wherein the base is provided with a curved slot opening, and wherein the control means are formed by a protrusion that is attached to the coupling element and extends in or door the slot opening such that the rotation of the protrusion between the ends of the slot opening causes a corresponding rotation of the coupling element.

4. Ventilation valve according to clause 3, wherein, in cross section, the shape and dimensions of the slot opening correspond with the cumulative surface of the part of the protrusion extending into the slot opening in all positions of the protrusion.

5. Ventilation valve according to clause 3 or clause 4, By preference, in cross section, the shape and dimensions of the slot opening correspond to the cumulative surface of the part of the protrusion extending into the slot opening after rotation over an angle of 100 degrees.

6. Ventilation valve according to one of the preceding clauses, wherein the position of the flow controller in the longitudinal direction of the airflow passage is adjustable relative to the base.

7. Ventilation valve according to one of the preceding clauses, wherein, the airflow controller is a controller cone that is attached on the interior side of the base.

8. Ventilation valve according to one of the preceding clauses, further comprising: one or more airflow screens that are set up to block the airflow from one or more of the airflow zones.

9. Ventilation valve according to one of the preceding clauses, wherein the base is detachably connected to the main body at a fixed distance from the main body.

10. Ventilation valve according to clause 9, wherein the base is provided with one or more spacers for the removable attachment of the base to the main body.

11. Ventilation valve according to one of the preceding clauses, the base comprising a static plate-shaped part with an interior and an exterior side,

wherein the means for attaching the base to the main body are provided on the interior side of the plate-shaped part.

12. Ventilation valve according to clause 11, wherein the cover extends further than the static plate-shaped part of the base in all radial directions.

13. Ventilation valve according to one of the preceding clauses, wherein the main body comprises a cylindrical wall section with a flange extending to the outer side on one end for attaching to a surface area that surrounds the ventilation opening.

14. Ventilation valve according to one of the preceding clauses, the main body comprising means for the clamping in of collaborative spacers of the cover.

15. Method for controlling the air flow in a ventilation system, comprising the following steps:

- providing a ventilation valve according to one of the preceding clauses;
- removing the cover; and
- controlling the airflow by the adjusting the position of the airflow controller relative to the base,

wherein the base is provided with a curved slot opening to receive a protrusion of the control means and wherein the position of the airflow controller is adjusted by rotating the protrusion.

## Claims

1. Ventilation valve, comprising:

- a main body (20) with a passage extending therethrough and having means for attaching the main body to a ventilation opening of a structure;
- a base (44) having means for attaching the base to the main body at a distance from the main body such that an airflow passage extends between them;
- an airflow controller (41) provided on the inner side of the base, wherein the position of the airflow controller is adjustable with regard to the base to vary the airflow through the airflow passage;
- control means (42) configured to adjust the position of the airflow controller and manually controllable by a user from the outer side of the base, wherein the position of the control means is adjustable with regard to the base

such that the movement of the control means causes a respective change in the position of the airflow controller relative to the base,

a cover (50) having means for attaching the cover to the base and which cover prevents access to the outer side and operation of the control means during normal use such that changing the relative position between the airflow controller and base is prevented,

wherein the base is detachably connected to the main body, so that the base and the airflow controller is removable from the main body while they are held in place in the relative position between the airflow controller and the base, and wherein the cover is detachably connected to the base, so that the relative position between the airflow controller and the base is adjustable by the user while the base is attached to the main body and the cover is removed from the base.

2. Ventilation valve according to claim 1, wherein after attachment the cover is statically connected to the base.
3. Ventilation valve according to one of the preceding claims, wherein the cover is removable by rotating the cover relative to the base.
4. Ventilation valve according to one of the preceding claims, wherein the base is removable from the main body while the cover is attached to the base.
5. Ventilation valve according to one of the preceding claims, wherein the airflow controller is attached to the base by a longitudinally extending coupling element such that rotation of the coupling element causes a corresponding change in the longitudinal position of the airflow controller relative to the base.
6. Ventilation valve according to claim 5, wherein the base is provided with a curved slot opening, and wherein the control means are formed by a protrusion (421) that is attached to the coupling element and extends in or door the slot opening such that the rotation of the protrusion between the ends of the slot opening causes a corresponding rotation of the coupling element.
7. Ventilation valve according to claim 6, wherein, in cross section, the shape and dimensions of the slot opening correspond with the cumulative surface of the part of the protrusion extending into

the slot opening in all positions of the protrusion.

8. Ventilation valve according to claim 6 or claim 7, wherein, in cross section, the shape and dimensions of the slot opening correspond with the cumulative surface of the part of the protrusion extending into the slot opening after rotation over an angle of 100 degrees.
9. Ventilation valve according to one of the preceding claims, wherein the position of the flow controller in the longitudinal direction of the airflow passage is adjustable relative to the base.
10. Ventilation valve according to one of the preceding claims, wherein the airflow controller is a controller cone that is attached on the interior side of the base.
11. Ventilation valve according to one of the preceding claims, further comprising: one or more airflow screens that are set up to block the airflow from one or more of the airflow zones.
12. Ventilation valve according to one of the preceding claims, wherein the base is detachably connected to the main body at a fixed distance from the main body.
13. Ventilation valve according to claim 12, wherein the base is provided with one or more spacers for the removable attachment of the base to the main body.
14. Ventilation valve according to one of the preceding claims, the base comprising a static plate-shaped part having an interior and an exterior side, wherein the means for attaching the base to the main body are provided on the interior side of the plate-shaped part.
15. Ventilation valve according to claim 14, wherein the cover extends further than the static plate-shaped part of the base in all radial directions.
16. Ventilation valve according to one of the preceding claims, wherein the main body comprises a cylindrical wall section having a flange extending to the outer side on one end for attaching to a surface area that surrounds the ventilation opening.
17. Ventilation valve according to one of the preceding claims, the main body comprising means for clamping in collaborative spacers of the cover.

18. Method for controlling the air flow in a ventilation system, comprising the following steps:

- providing a ventilation valve according to one of the preceding claims; 5
- removing the cover; and
- controlling the airflow by the adjusting the position of the airflow controller relative to the base,

wherein the base is provided with a curved slot opening to receive a protrusion of the control means and wherein the position of the airflow controller is adjusted by rotating the protrusion. 10

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Fig. 1

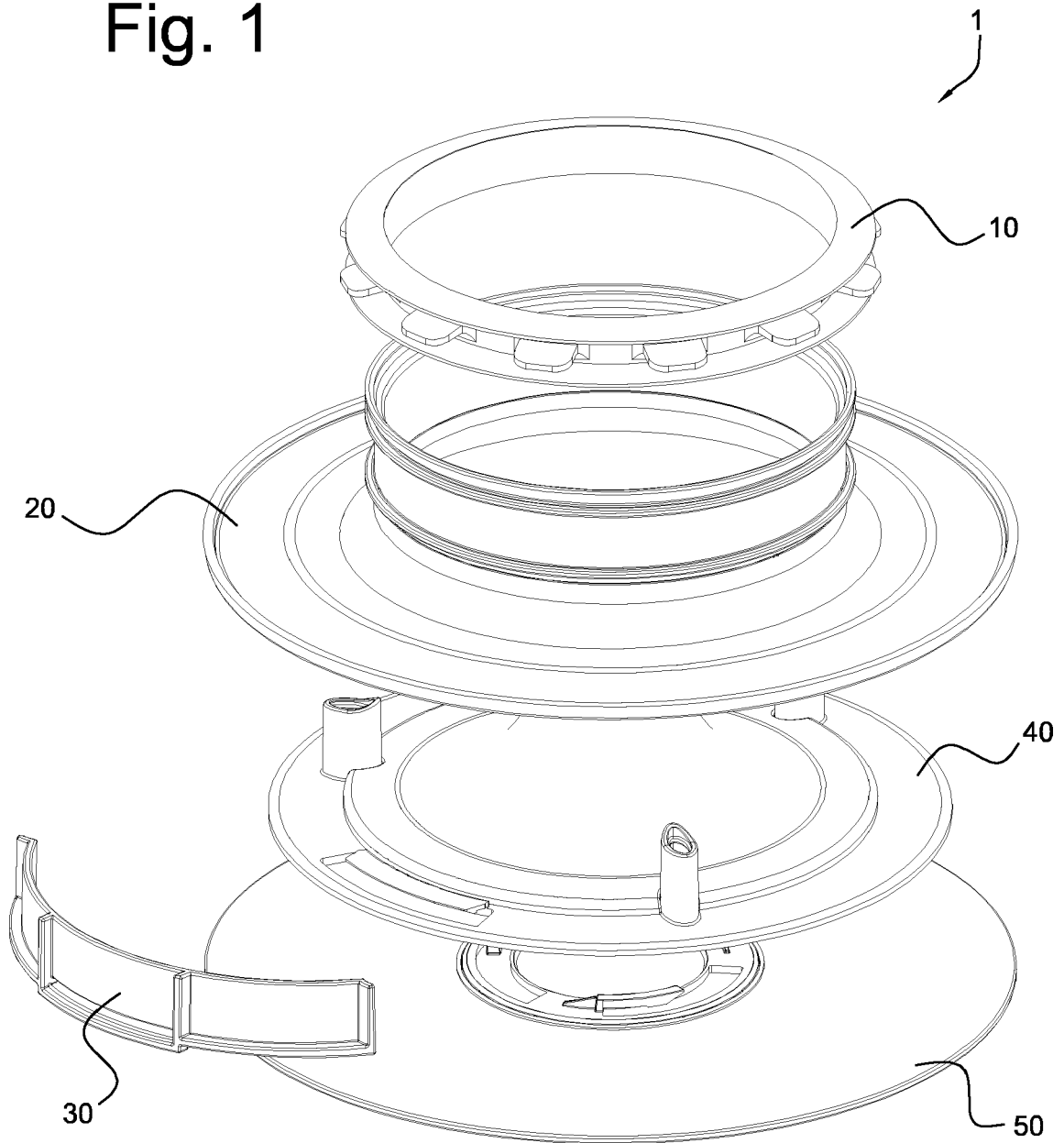


Fig. 2

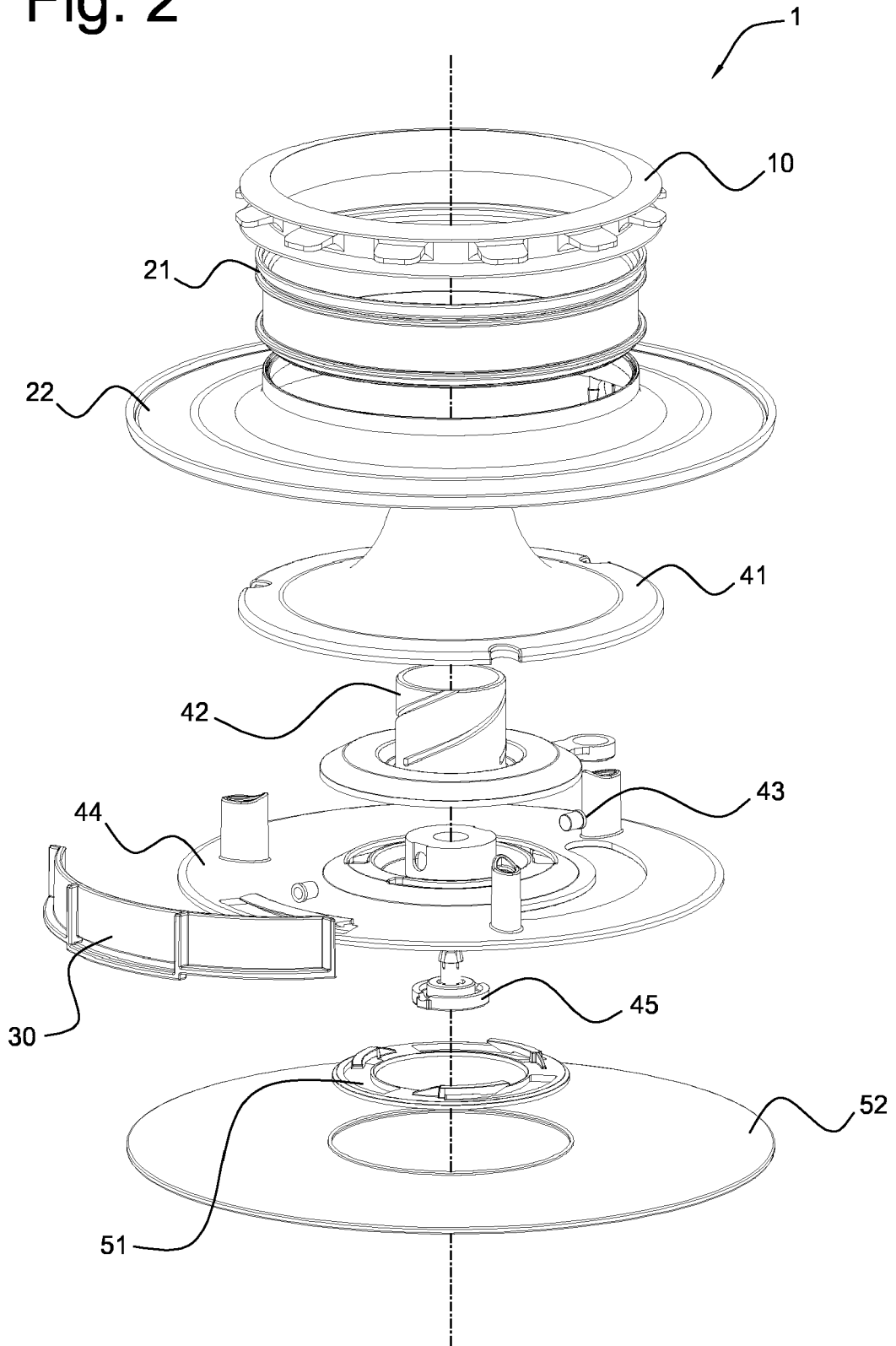


Fig. 3A

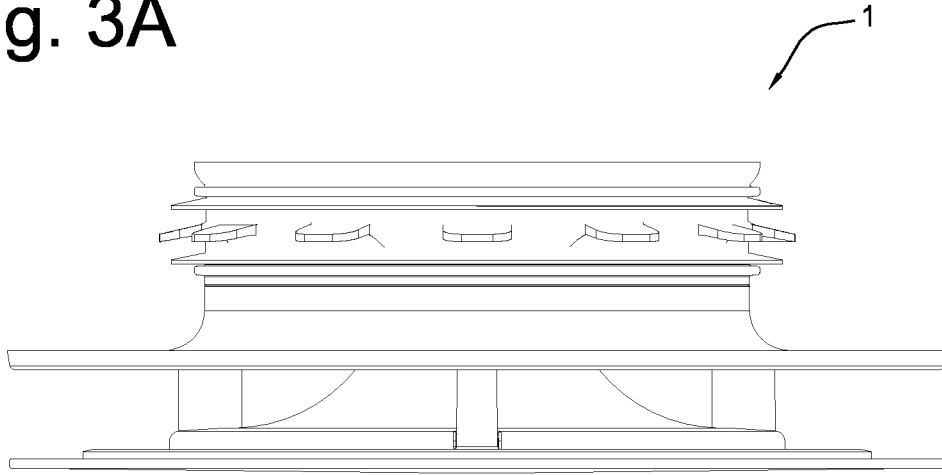


Fig. 3B

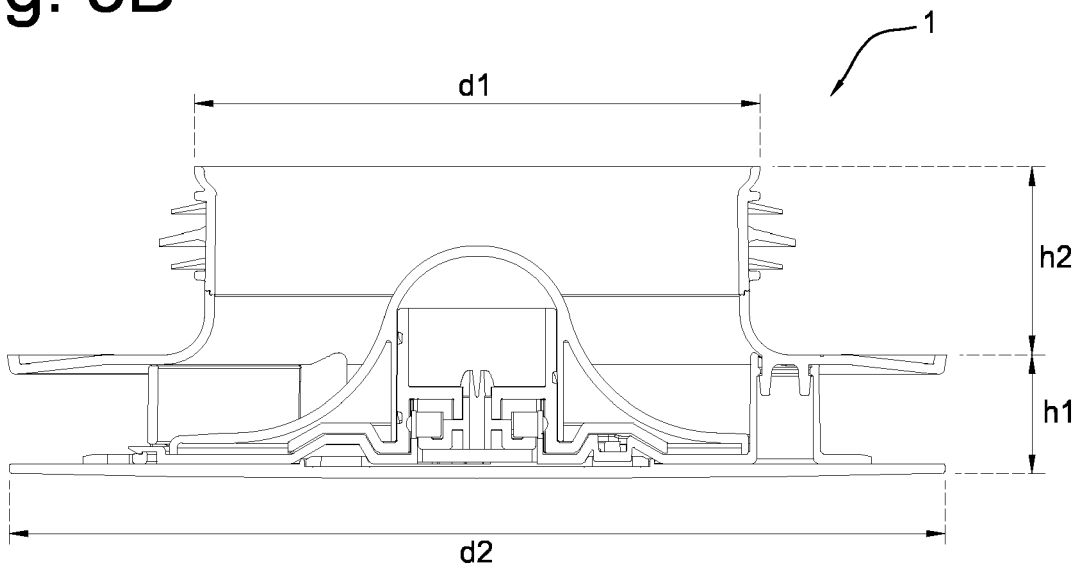


Fig. 4A

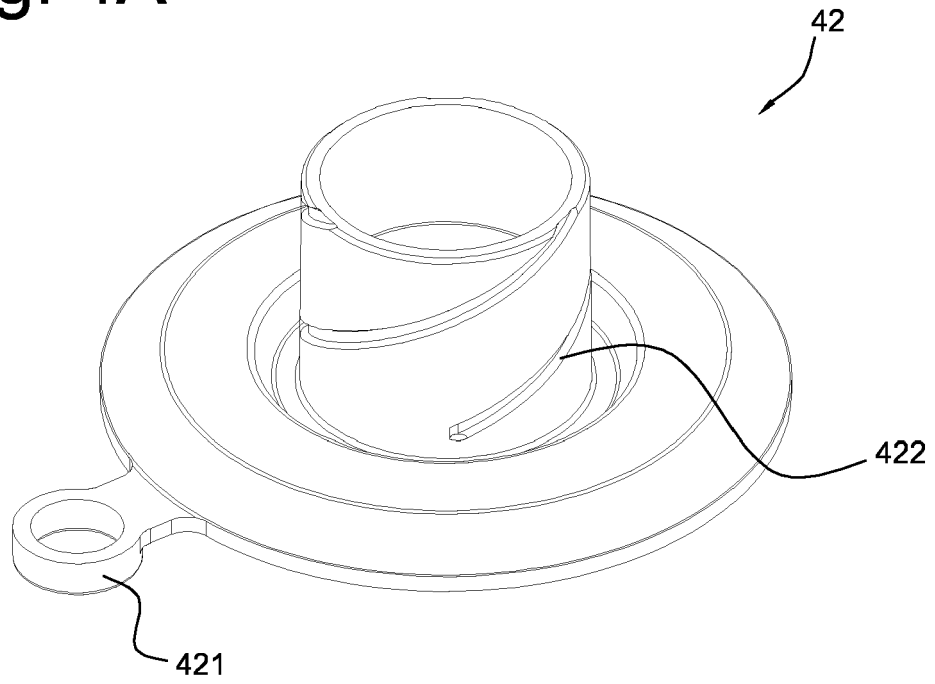


Fig. 4B

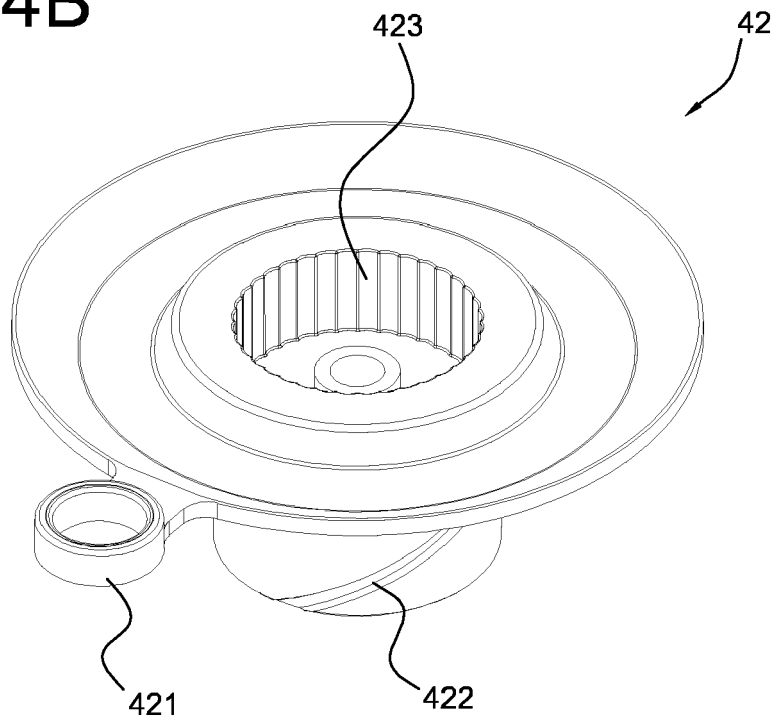


Fig. 5A

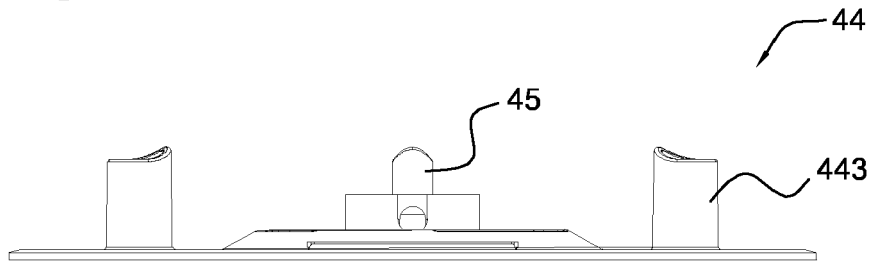


Fig. 5B

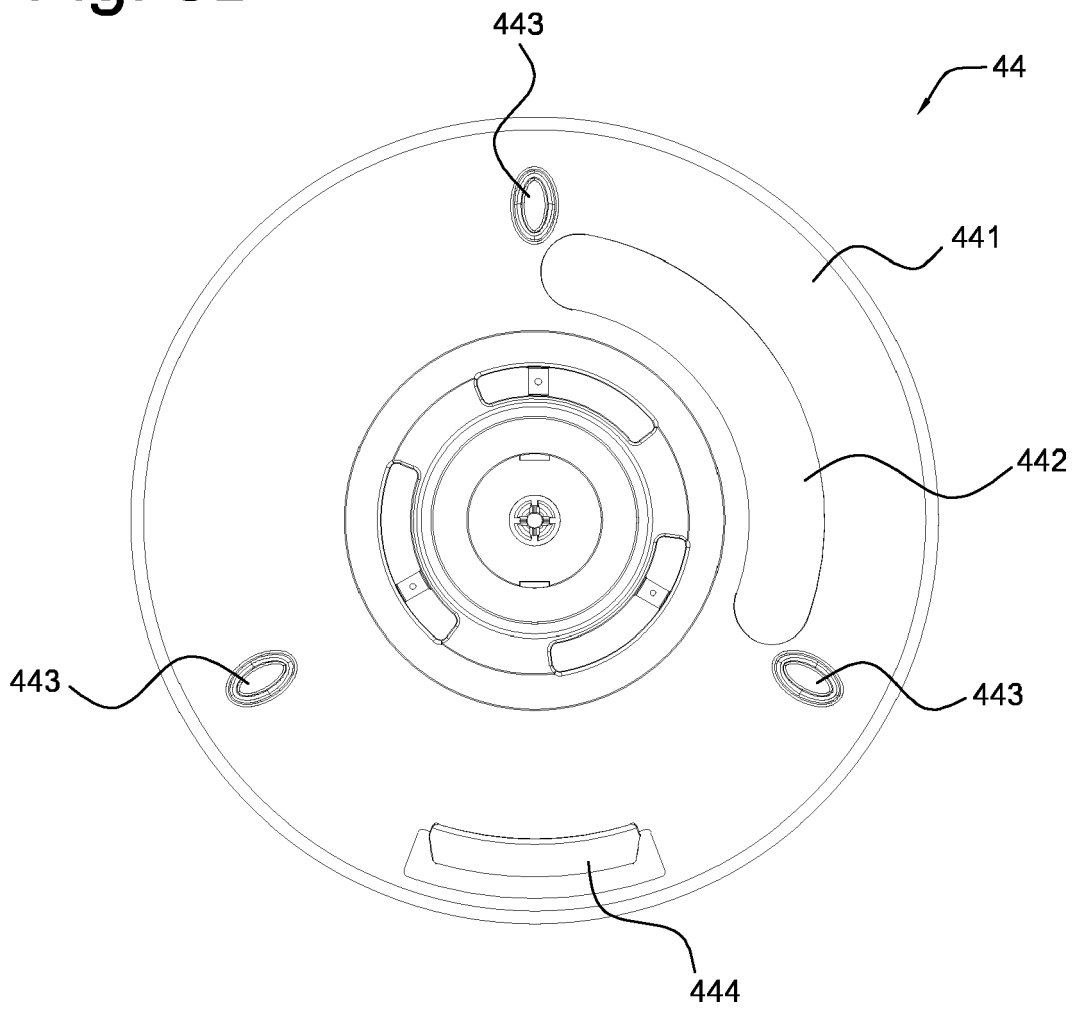


Fig. 6A

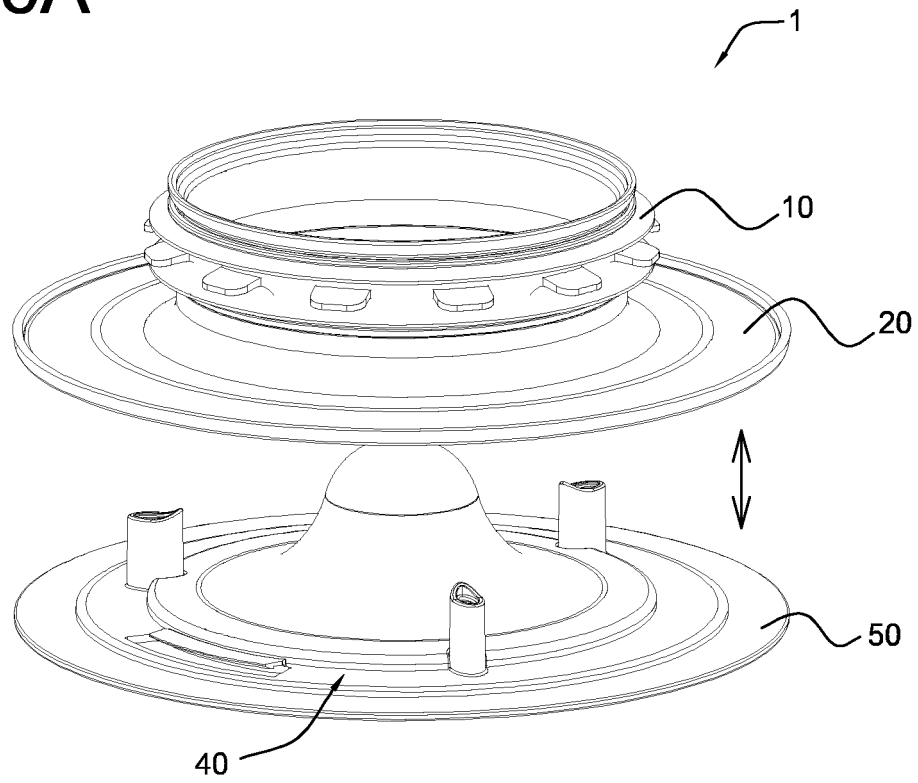


Fig. 6B

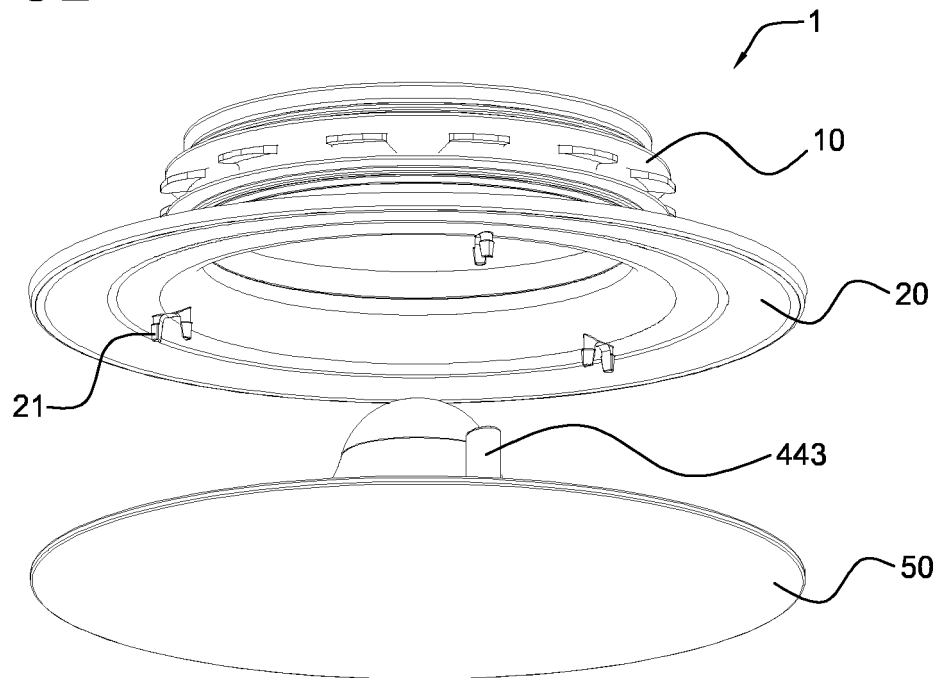
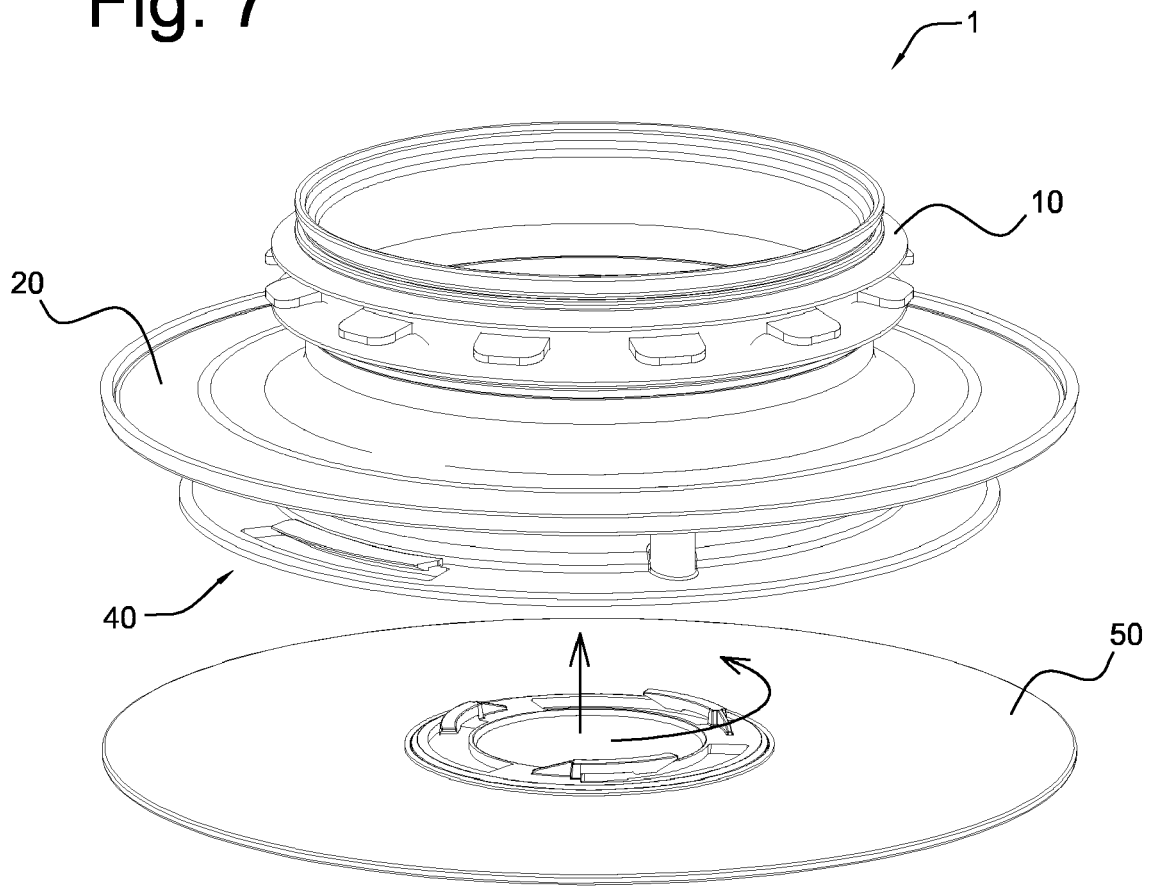


Fig. 7





EUROPEAN SEARCH REPORT

Application Number

EP 23 21 3412

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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	EP 3 575 702 A1 (VENTILAIR GROUP NEDERLAND B V [NL]) 4 December 2019 (2019-12-04) * the whole document *	1-18	INV. F24F13/062 F24F13/10
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Place of search <b>Munich</b>		Date of completion of the search <b>2 February 2024</b>	Examiner <b>Mattias Grenbäck</b>
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