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Amended claims in accordance with Rule 137(2) EPC.

(54) **CONTROL UNIT FOR AIR PURIFIER AND AIR PURIFIER**

(57) The invention relates to an air purifier and to a control unit for an air purifier.
The control unit (3) comprises
- an upper cover comprising an upper cover frame (3.3) and a flat pane (3.2) inserted with the frame (3.3),
- means (3.5) for enclosing and protecting the electronic equipment of the control unit, said means (3.5) being fixed to the upper cover,
- an attachment and support structure (3.12) for the attachment of an electromotor (3.14) with blades, said attachment and support structure (3.12) being fixed to the upper cover and preferably equipped with spacing means (3.13) for spacing the attachment and support structure (3.12) from the upper part of a body of the air purifier; said attachment and support structure (3.12) is configured so that in use, its bottom surface is arranged perpendicularly to the longitudinal axis of the body of the air purifier,
- an electromotor (3.14) equipped with blades which is attached to the attachment and support structure (3.12).
The air purifier comprises the control unit (3) and a body (2) comprising a filter unit.

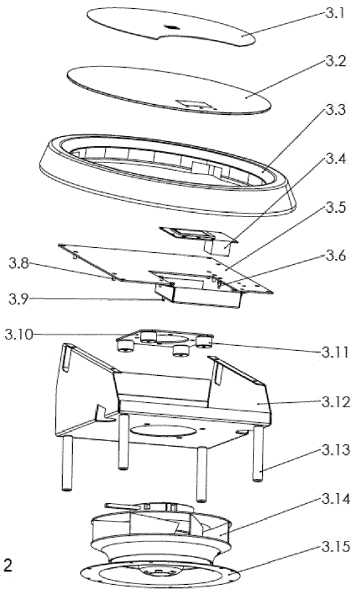


Fig. 2

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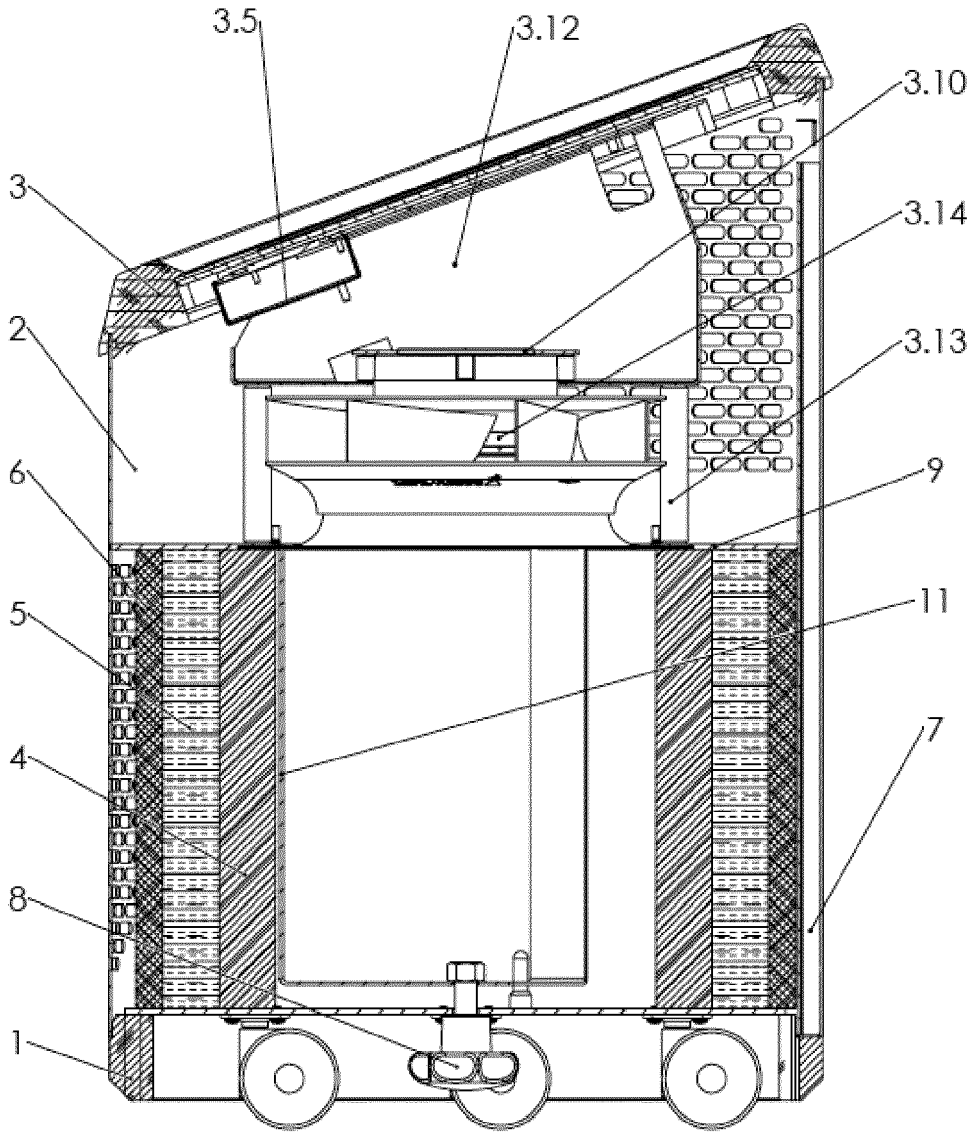


Fig. 3

## Description

### Field of Art

**[0001]** The present invention relates to a control unit for an air purifier, and to an air purifier containing the said control unit.

### Background Art

**[0002]** Air purifiers are devices that remove pollutants from air, typically from a room air. They are often used by people suffering from allergies and asthma, or by pet owners. Similarly, they are also used in restaurants and hotels to remove smells and dust from the air. They also find use in hospitals or offices. The air purifiers can be provided as stand-alone units (portable units) or integrated within air conditioning devices.

**[0003]** There is a number of air purifying technologies used by currently produced air purifiers, such as thermodynamic sterilization, ultraviolet irradiation, ozone generation, or filters. Filters are technology which is most suitable for daily use in various environments, such as homes, offices, restaurants or hotels.

**[0004]** The currently available air purifiers using the filter technology typically contain a body which comprises a filter unit, a fan with a drive unit, and control means, wherein all these components are typically fixedly attached to each other and any of them is difficult to reach separately. It is thus difficult to exchange the filters, and to repair and maintain individual units. Additionally, often the total area of the filters is either rather small, or not efficiently utilized, which requires a more frequent exchange of filters. The air intake area is also rather limited in the known air purifiers. Moreover, the vast majority of existing air purifiers use many plastic parts (e.g. plastic housing, plastic mesh frame for filters, plastic upper cover or other inner parts, etc.) that pollute the air through emissions of gas pollutants such as formaldehyde, etc.

**[0005]** The present invention aims at reducing or overcoming the above-described drawbacks.

### Summary of Invention

**[0006]** The present invention provides an air purifier containing a body comprising a filter unit; and a control unit. In some embodiments, the invention relates to the control unit for the air purifier.

**[0007]** The control unit for an air purifier comprises

- an upper cover,
- means for enclosing and protecting the electronic equipment of the control unit fixed to the upper cover,
- an attachment and support structure for the attachment of an electromotor with blades, said attachment and support structure being fixed to the upper cover and preferably equipped with spacing means for spacing the attachment and support structure from the upper part of the body of the air purifier; said attachment and support structure is configured so that in use, its bottom surface is arranged perpendicularly to the longitudinal axis of the body,
- an electromotor equipped with blades which is attached to the attachment and support structure.

**[0008]** Such arrangement of the control unit allows to construct the control unit as a unit which can be handled separately from the body of the air purifier and from the filter unit. This facilitates repairs and maintenance of the electronic, control and motor parts of the air purifier, and in case of need, it is easier to exchange the control unit which maintaining the air purifier body.

**[0009]** The electronic equipment of the control unit may comprise a processor, one or more control buttons, and optionally a display for displaying information to the user.

**[0010]** The upper cover may have an oval or round form. Preferably, the upper cover is oval, and its surface is slanting relative to the bottom part of the attachment and support structure which is in use parallel to the ground. The slanting arrangement of the upper cover allows the user to easily and comfortably see and approach the control buttons and the display (if provided), compared to arrangement of the upper cover in parallel with the ground.

**[0011]** The upper cover may preferably comprise an upper cover frame and a flat pane inserted within the frame. The flat pane may preferably be at least partially transparent.

**[0012]** In some embodiments, the upper cover frame is made of wood (preferably hardwood), and the flat pane is made of glass, wood, metal or a combination thereof.

**[0013]** The means for enclosing and protecting the electronic equipment of the control unit may be fixed to the upper cover by attachment to the upper cover frame or to the flat pane. Attachment to the upper cover frame is preferred. The means for enclosing and protecting the electronic equipment are typically attached to the upper cover so that they are located between the upper cover and the attachment and support structure. The means for enclosing and protecting the electronic equipment may preferably be made of wood or metal.

**[0014]** The attachment and support structure is a frame structure coupled to the upper cover, preferably to the upper cover frame. It encloses and supports a flange for attaching the motor. The flange for attaching the motor is typically coupled to the attachment and support structure through vibration-silencing means such as rubber bushing. The attachment and support structure has an opening in its bottom surface, said opening allowing coupling of the motor to the flange, thereby the motor is coupled through the flange to the attachment and support structure. Due to the presence of the vibration-silencing means, the vibrations of the motor are not transmitted to the remaining parts of the control unit.

**[0015]** The coupling of the motor to the attachment and support structure, in particular via the flange and the vi-

bration-silencing means, allows to safely and reliably fix the motor within the control unit, while allowing the control unit to be handled independently of the air purifier body, when needed.

**[0016]** Typically, the attachment and support structure also encloses the means for enclosing and protecting the electronic equipment and the electronic equipment of the control unit.

**[0017]** The attachment and support structure has a shape which is adapted for fixing to the upper cover and at the same time is adapted for coupling the motor through the flange so that the motor and the blades are substantially perpendicular to the longitudinal axis of the air purifier body.

**[0018]** The attachment and support structure may have a substantially rectangular shape, especially when the upper cover is substantially perpendicular to the longitudinal axis of the air purifier body. When the upper cover is slanting, two opposite side walls of the attachment and support structure preferably have a quadrilateral or quintilateral shape, so that the above-described conditions are fulfilled.

**[0019]** Optimally, the attachment and support structure is made of metal, such as metal sheet and/or metal beams.

**[0020]** The electromotor (sometimes also referred to as "motor") comprises a fan (i.e., a rotor having a plurality of blades) for ensuring the required blowing of the air through the air purifier, and a drive unit. The drive unit may preferably be an electronically commutated drive unit.

**[0021]** The control unit is adapted to be attached to the body of the air purifier so that the attachment is dismountable. In particular, the upper cover shape may be configured for cooperation with the upper rim of the air purifier body, and the spacing means are adapted to space the attachment and support structure of the control unit from the upper part of the body of the air purifier.

**[0022]** The spacing means may consist of at least three spacers, such as rods, which in use extend between the attachment and support structure and the upper part of the air purifier body. The spacing means may preferably consist of four spacers. The upper part of the air purifier body may comprise an annulus on which the spacers may rest, for example.

**[0023]** The air purifier of the invention comprises a control unit as described above and a body comprising a filter unit.

**[0024]** In a preferred embodiment, the body of the air purifier has a substantially cylindrical housing enclosing the filter unit. The housing has a plurality of openings allowing the air to be filtered to enter the housing, and a plurality of openings allowing the clean air to leave the housing. The filter unit is concentric with the housing, and comprises a filter holder having at least three arms which extend in parallel with the longitudinal axis of the body, all of them in the same distance from the longitudinal axis of the body.

**[0025]** The openings in the housing are provided in any suitable area of the housing. Preferably, the openings are provided in at least 25%, more preferably in at least 50 %, of the area of the housing. This allows intake of a large amount of air.

**[0026]** The distance of the arms of the filter holder from the longitudinal axis of the body is such that when filter(s) is(are) stacked on the arms, there is a gap of at least 0.5 cm, more preferably of 1-5 cm, between the filter(s) and the housing. This gap allows the air to enter the filter(s) not only in the area of the openings, but anywhere along the area of the filter, and thus allows to efficiently utilize the whole area of the filter(s).

**[0027]** In some embodiments (e.g., in use), at least one filter is stacked on the filter holder. The filter has a substantially cylindrical shape (a shape of the shell of a cylinder) which dimensionally corresponds to the arms of the filter holder so that the at least one filter can be stacked on the said arms.

**[0028]** The filter may be enclosed in a mesh frame, preferably a metallic mesh frame, which may be provided in order to hold the filter in the required shape.

**[0029]** The filter holder having arms configured for stacking of the filters onto the said arms allows for a very easy exchange of the filters by the user, e.g., by opening the body of the air purifier (either by removing the control unit or by removing the bottom cover of the body) and simply taking away the used filers and replacing them by new filters, without the need for any specific tools.

**[0030]** The filter may preferably be selected from an activated carbon filter and a HEPA filter. The active carbon filter is particularly useful for adsorption of gaseous pollutants and smells. The HEPA (high efficiency particulate air) filter is particularly useful for capturing solid biological and non-biological contaminants (particles) such as dust, pollen, mites, fungi, soot, pet allergens, viruses, bacteria, etc.

**[0031]** Even more preferably, at least two concentric filters may be used in combination. For example, a carbon filter, a HEPA filter and a pre-filter can be used. In some embodiments, the carbon filter is the innermost filter layer, while the pre-filter is the outermost filter layer.

**[0032]** The carbon filters, the HEPA filters and the pre-filters for HEPA filters are known and commercially available.

**[0033]** The construction of the filter unit according to the present invention allows to utilize various combinations of filters as necessary for particular applications, while still remaining simple and versatile. The combination of the three filters (pre-filter, HEPA filter, carbon filter) is particularly efficient. Due to this construction and the construction of the control unit, the air is blown around centrifugally and thus passes through a larger area of the filters, resulting in a better purification of the air.

**[0034]** The body of the air purifier may preferably have an annulus in its upper part which is dimensionally adapted to cooperate with the fan of the motor. In particular, the central opening of the annulus has dimensions which

are the same or smaller than the dimensions of the fan. This creates a suction neck through which the passage of the air through the air purifier is provided.

**[0035]** The body of the air purifier is typically provided with a bottom cover. The bottom cover may in some embodiments be coupled to the body by an attachment means (e.g., a nut and bolt) provided for attaching the bottom cover to the filter holder, preferably in the center of the bottom part of the filter holder, wherein the filter holder is fixedly coupled to the annulus.

**[0036]** The bottom cover of the body may preferably be equipped with moving means, such as rollers, which allows to move the air purifier around the room as needed.

**[0037]** Preferably, the air purifier body and the filter holder are made of metal.

**[0038]** The components of the air purifier of the invention may preferably be made of natural and recyclable materials such as metal, wood and/or glass. When made of such materials, the air purifier is environmentally friendly, has a long service life, and can then be fully or almost fully recycled.

**[0039]** The air purifier of the invention is embodied in particular in a stand-alone air purifier.

**[0040]** The function of the air purifier of the present invention is as follows: the air is taken in through the openings in the lower part of the housing. Due to the blowing by the rotor with blades (fan), the air is moved centrifugally (in a spiral) and enters the filter(s). Because of the gap between the housing and the filter(s), the air may enter the filter anywhere, not only in the area of the openings. After passing through the filters, the air enters the central volume of the body, between the arms of the filter holder, and from there, it is drawn by the fan through the suction neck to the upper part of the housing and discharged through the openings in the upper part of the housing. The speed of the fan and other parameters may be set up by the user using the electronic equipment. When a change of the filters is required, the user may open the body by removing the control unit or by removing the bottom cover, and exchange the filters stacked on the filter holder. When a maintenance or repair or exchange of the control unit is needed, the control unit may simply be removed from the body and handled separately.

## Brief Description of Drawings

**[0041]**

Fig. 1 is an axonometric view of the control unit.

Fig. 2 is an exploded view of the control unit, showing the individual components.

Fig. 3 is a view of the air purifier in section along its longitudinal axis.

Fig. 4 is a view of the air purifier with 25% cut-out.

## Detailed Disclosure of a Preferred Embodiment

**[0042]** The preferred embodiment, representing an example of the air purifier of the invention, is described herein with the aid of figures 1-4.

**[0043]** As shown in figures 3 and 4, the air purifier contains a body 2 comprising a filter unit; and a control unit 3.

**[0044]** As shown in figures 1 and 2, the control unit 3 of the air purifier comprises

- an upper cover having a frame 3.3, a flat pane 3.2, and a flat pane cover 3.1,
- means 3.5 for enclosing and protecting the electronic equipment 3.4 of the control unit fixed to the upper cover,
- an attachment and support structure 3.12 for the attachment of the electromotor 3.14 with blades, said attachment and support structure 3.12 being fixed to the upper cover and equipped with spacing means 3.13 for spacing the attachment and support structure from the upper part of the body of the air purifier; said attachment and support structure 3.12 being configured so that in use, its bottom surface is arranged perpendicularly to the longitudinal axis of the body 2,
- an electromotor 3.14 equipped with blades which is attached to the attachment and support structure.

**[0045]** The electronic equipment 3.4 of the control unit comprise a processor, control buttons, and a display for displaying information to the user.

**[0046]** The upper cover has an oval form. Its surface is slanting relative to the bottom part of the attachment and support structure 3.12 and consequently to the ground. The slanting arrangement of the upper cover allows the user to easily and comfortably see and approach the control buttons and the display, compared to arrangement of the upper cover in parallel with the ground.

**[0047]** The upper cover comprises a wooden upper cover frame 3.3 and a flat pane 3.2 inserted within the frame 3.3. The flat pane 3.2 is in this particular case made of transparent or translucent glass, and partially covered by a flat pane cover 3.1 made of wood. The cover 3.1 is a design feature and may or may not be present.

**[0048]** The means 3.5 for enclosing and protecting the electronic equipment of the control unit is fixed to the upper cover by attachment to the upper cover frame 3.3. The means 3.5 for enclosing and protecting the electronic equipment are attached to the upper cover so that they are located between the upper cover and the attachment and support structure. The means 3.5 for enclosing and protecting the electronic equipment is made of metal.

**[0049]** Press studs 3.6, 3.8 and 3.9 are used to attach the means 3.5 for enclosing and protecting the electronic equipment and the attachment and support structure 3.12 to the upper cover frame 3.3. The attachment and support structure 3.12 thus encloses the means 3.5 for enclosing and protecting the electronic equipment and

the electronic equipment 3.4 of the control unit.

**[0050]** The attachment and support structure 3.12 is a frame structure coupled to the upper cover frame 3.3. It encloses and supports the flange 3.10 for attaching the motor. The flange 3.10 for attaching the motor is coupled to the attachment and support structure 3.12 through four vibration-silencing rubber bushings 3.11. The attachment and support structure 3.12 has a circular opening in its bottom surface, said opening allowing coupling of the motor 3.14 to the flange 3.10, thereby the motor 3.14 is coupled through the flange 3.10 to the attachment and support structure 3.12. Due to the presence of the rubber bushings 3.11, the vibrations of the motor are not transmitted to the remaining parts of the control unit. The coupling of the motor to the attachment and support structure, in particular via the flange and the vibration-silencing means, allows to safely and reliably fix the motor within the control unit, while allowing the control unit to be handled independently of the air purifier body, when needed.

**[0051]** The attachment and support structure 3.12 has a substantially rectangular shape of its bottom part, with two opposite side walls of the attachment and support structure having a auintilateral shape, so that it can be fixed to the upper cover frame 3.3 and at the same time it can couple the motor 3.14 through the flange 3.10 so that the motor and the blades are substantially perpendicular to the longitudinal axis of the air purifier body 2. The attachment and support structure is made of metal sheet.

**[0052]** The electromotor 3.14 (sometimes also referred to as "motor") comprises a fan (i.e., a rotor having a plurality of blades) for ensuring the required blowing of the air through the air purifier, and a drive unit. The drive unit may preferably be an electronically commutated drive unit. A shaped suction neck 3.15 is connected with the motor 3.14.

**[0053]** The control unit is adapted to be attached to the body of the air purifier so that the attachment is not permanent. As shown in figure 3, the upper cover 3.3 shape is shaped for cooperation with the upper rim of the air purifier body 2, and the spacing means 3.13 are adapted to space the attachment and support structure of the control unit from the annulus provided in the upper part of the body of the air purifier. Thus, the control unit rests on the body of the air purifier, and is coupled so that it does not shift, but it can easily be separated from the air purifier body. Locking means (not shown) can be provided for an even safer attachment.

**[0054]** The spacing means are four rods 3.13 which extend between the attachment and support structure 3.12 and an annulus 9 which is in the upper part of the air purifier body 2.

**[0055]** This control unit can be handled separately from the body of the air purifier and from the filter unit. This facilitates repairs and maintenance of the electronic, control and motor parts of the air purifier, and in case of need, it is easier to exchange the control unit which maintaining the air purifier body.

**[0056]** The body 2 of the air purifier has a substantially cylindrical housing 10 enclosing the filter unit. The housing has a plurality of openings in the lower part allowing the air to be filtered to enter the housing, and a plurality of openings in the upper part allowing the clean air to leave the housing. The openings in the housing are provided in any suitable area of the housing. Preferably, the openings are provided in at least 25% of the area of the housing. This allows intake and discharge of a large amount of air. A channel 7 for the electric cord for powering the motor is provided close to the wall of the housing.

**[0057]** The filter unit is concentric with the housing 10, and comprises a filter holder 11 having three arms which extend in parallel with the longitudinal axis of the body 2, all of them in the same distance from the longitudinal axis of the body 2.

**[0058]** The distance of the arms of the filter holder 11 from the longitudinal axis of the body is such that when filters are stacked on the arms, there is a gap of at least 0.5 cm between the outermost filter 6 and the housing 10. This gap allows the air to enter the filters not only in the area of the openings, but anywhere along the area of the filter, and thus allows to efficiently utilize the whole area of the filters.

**[0059]** In the embodiment shown in the figures, three concentric filters are stacked on the filter holder 11. The filters have a substantially cylindrical shape (a shape of the shell of a cylinder) which dimensionally corresponds to the arms of the filter holder 11 so that the filters can be stacked on the said filter holder. The filters are: a prefilter 6, a HEPA filter 5, and an activated carbon filter 4.

**[0060]** Each filter is enclosed in a metallic mesh frame, which is provided in order to hold the filter in the required substantially cylindrical shape.

**[0061]** The body of the air purifier has an annulus 9 in its upper part which is dimensionally adapted to cooperate with the fan of the motor 3.14. In particular, the central opening of the annulus 9 has dimensions which are the same or smaller than the dimensions of the fan. This creates a suction neck through which the passage of the air through the air purifier is provided.

**[0062]** The body 2 of the air purifier is provided with a bottom cover 1. The bottom cover 1 is coupled to the body 2 by a nut 8 and screw connection provided for attaching the bottom cover to the filter holder, in the center of the bottom part of the filter holder.

**[0063]** The filter holder 11 having arms configured for stacking of the filters onto the said arms allows for a very easy exchange of the filters by the user. The filter holder 11 is permanently coupled to the annulus 9 of the air purifier body 2. , The user can thus exchange the filters by opening the body of the air purifier (by removing the bottom cover of the body) and simply taking away the used filers and replacing them by new filters, without the need for any specific tools.

**[0064]** The bottom cover 1 of the body is equipped with

rollers, which allows to move the air purifier around the room as needed.

**[0065]** The air purifier body and the filter holder are made of metal.

**[0066]** In this preferred embodiment, the air purifier of the invention is embodied as a stand-alone air purifier.

## Claims

**1.** A control unit (3) for an air purifier, which comprises

- an upper cover comprising an upper cover frame (3.3) and a flat pane (3.2) inserted with the frame (3.3),
- means (3.5) for enclosing and protecting the electronic equipment of the control unit, said means (3.5) being fixed to the upper cover,
- an attachment and support structure (3.12) for the attachment of an electromotor (3.14) with blades, said attachment and support structure (3.12) being fixed to the upper cover and preferably equipped with spacing means (3.13) for spacing the attachment and support structure (3.12) from the upper part of a body of the air purifier; said attachment and support structure (3.12) is configured so that in use, its bottom surface is arranged perpendicularly to the longitudinal axis of the body of the air purifier,
- an electromotor (3.14) equipped with blades which is attached to the attachment and support structure (3.12).

**2.** The control unit according to claim 1, wherein the upper cover (3.3 and 3.2) has an oval form and its surface is slanting relative to the bottom part of the attachment and support structure (3.12).

**3.** The control unit according to any one of the preceding claims, wherein the means (3.5) for enclosing and protecting the electronic equipment of the control unit are fixed to the upper cover by attachment to the upper cover frame (3.3) so that they are located between the upper cover and the attachment and support structure (3.12).

**4.** The control unit according to any one of the preceding claims, wherein the attachment and support structure (3.12) is a frame structure coupled to the upper cover, preferably to the upper cover frame (3.3), and encloses and supports a flange (3.10) for attaching the motor, wherein the said flange (3.10) for attaching the motor is typically coupled to the attachment and support structure (3.12) through vibration-silencing means (3.11), and wherein the attachment and support structure (3.12) has an opening in its bottom surface, said opening allowing coupling of the motor to the flange (3.10).

**5.** The control unit according to any one of the preceding claims, wherein the attachment and support structure (3.12) has a shape which is adapted for fixing to the upper cover and at the same time is adapted for coupling the motor through the flange so that the motor and the blades are substantially perpendicular to the longitudinal axis of the air purifier body.

**6.** The control unit according to claim 5, wherein the attachment and support structure (3.12) has a substantially rectangular shape, with two opposite side walls of the attachment and support structure having a quadrilateral or quintilateral shape.

**7.** The control unit according to any one of the preceding claims, wherein the electromotor comprises a fan and a drive unit which is an electronically commutated drive unit.

**8.** The control unit according to any one of the preceding claims, wherein the spacing means (3.13) consist in at least three spacers, such as rods, which are configure to extend between the attachment and support structure and the upper part of the air purifier body.

**9.** An air purifier comprising a control unit (3) according to any one of the preceding claims and a body (2) comprising a filter unit.

**10.** The air purifier according to claim 9, wherein the body (2) of the air purifier has a substantially cylindrical housing (10) enclosing the filter unit, wherein the housing has a plurality of openings allowing the air to be filtered to enter the housing, and a plurality of openings allowing the clean air to be discharged from the housing.

**11.** The air purifier according to any one of the claims 9-10, wherein the filter unit is concentric with the housing (10), and comprises a filter holder (11) having at least three arms which extend in parallel with the longitudinal axis of the body (2), all of them in the same distance from the longitudinal axis of the body, and the distance of the arms of the filter holder (11) from the longitudinal axis of the body (2) being such that when at least one filter is stacked on the arms, there is a gap between the filter(s) and the housing.

**12.** The air purifier according to any one of the claims 9-11, wherein at least one filter is stacked on the arms of the filter holder (11), preferably wherein three filters: a pre-filter (6), a HEPA filter (5) and an activated carbon filter (4), are stacked on the arms of the filter holder (11)

**13.** The air purifier according to any one of the claims 9-12, wherein the body (2) of the air purifier has an annulus (9) in its upper part which is dimensionally adapted to cooperate with the fan of the electromotor (3.14) to create a suction neck through which the passage of the air through the air purifier is provided.

**14.** The air purifier according to any one of the claims 9-13, wherein the body of the air purifier is typically provided with a bottom cover (1) which is coupled to the body by an attachment means (8) for attaching the bottom cover to the filter holder (11), preferably the attachment means are provided in the center of the bottom part of the filter holder (11), and wherein the filter holder (11) is preferably fixedly coupled to the annulus (9); the bottom cover (1) of the body is preferably equipped with moving means.

**15.** The air purifier according to any one of the claims 9-14, wherein the components of the air purifier are made of metal, wood and/or glass.

**Amended claims in accordance with Rule 137(2) EPC.**

**1.** An air purifier comprising a control unit (3) and a body (2) comprising a filter unit, wherein

- the control unit (3) comprises

  - an upper cover comprising an upper cover frame (3.3) and a flat pane (3.2) inserted with the frame (3.3),
  - means (3.5) for enclosing and protecting the electronic equipment of the control unit, said means (3.5) being fixed to the upper cover,
  - an attachment and support structure (3.12) for the attachment of an electromotor (3.14) with blades, said attachment and support structure (3.12) being fixed to the upper cover and preferably equipped with spacing means (3.13) for spacing the attachment and support structure (3.12) from the upper part of a body of the air purifier; said attachment and support structure (3.12) is configured so that its bottom surface is arranged perpendicularly to a longitudinal axis of the body of the air purifier,
  - an electromotor (3.14) equipped with blades which is attached to the attachment and support structure (3.12);

- the body (2) of the air purifier has a substantially cylindrical housing (10) enclosing the filter unit, wherein the housing has a plurality of openings allowing the air to be filtered to enter the housing, and a plurality of openings allowing the clean air to be discharged from the housing;

**characterized in that**

- the upper cover (3.3 and 3.2) has an oval form and its surface is slanting relative to the bottom part of the attachment and support structure (3.12);
- the filter unit is concentric with the housing (10), and comprises a filter holder (11) having at least three arms which extend in parallel with the longitudinal axis of the body (2), all of them in the same distance from the longitudinal axis of the body, and the distance of the arms of the filter holder (11) from the longitudinal axis of the body (2) being such that when at least one filter is stacked on the arms, there is a gap between the filter(s) and the housing.

**2.** The air purifier according to claim 1, wherein the means (3.5) for enclosing and protecting the electronic equipment of the control unit are fixed to the upper cover by attachment to the upper cover frame (3.3) so that they are located between the upper cover and the attachment and support structure (3.12).

**3.** The air purifier according to any one of the preceding claims, wherein the attachment and support structure (3.12) is a frame structure coupled to the upper cover, preferably to the upper cover frame (3.3), and encloses and supports a flange (3.10) for attaching the motor, wherein the said flange (3.10) for attaching the motor is typically coupled to the attachment and support structure (3.12) through vibration-silencing means (3.11), and wherein the attachment and support structure (3.12) has an opening in its bottom surface, said opening allowing coupling of the motor to the flange (3.10).

**4.** The air purifier according to any one of the preceding claims, wherein the attachment and support structure (3.12) has a shape which is adapted for fixing to the upper cover and at the same time is adapted for coupling the motor through the flange so that the motor and the blades are substantially perpendicular to the longitudinal axis of the air purifier body.

**5.** The air purifier according to claim 4, wherein the attachment and support structure (3.12) has a substantially rectangular shape, with two opposite side walls of the attachment and support structure having a quadrilateral or quintilateral shape.

**6.** The air purifier according to any one of the preceding claims, wherein the electromotor comprises a fan and a drive unit which is an electronically commutated drive unit.

7. The air purifier according to any one of the preceding claims, wherein the spacing means (3.13) consist in at least three spacers, such as rods, which are configure to extend between the attachment and support structure and the upper part of the air purifier body.

8. The air purifier according to any one of the preceding claims, wherein at least one filter is stacked on the arms of the filter holder (11), preferably wherein three filters: a pre-filter (6), a HEPA filter (5) and an activated carbon filter (4), are stacked on the arms of the filter holder (11)

9. The air purifier according to any one of the preceding claims, wherein the body (2) of the air purifier has an annulus (9) in its upper part which is dimensionally adapted to cooperate with the fan of the electromotor (3.14) to create a suction neck through which the passage of the air through the air purifier is provided.

10. The air purifier according to any one of the preceding claims, wherein the body of the air purifier is typically provided with a bottom cover (1) which is coupled to the body by an attachment means (8) for attaching the bottom cover to the filter holder (11), preferably the attachment means are provided in the center of the bottom part of the filter holder (11), and wherein the filter holder (11) is preferably fixedly coupled to the annulus (9); the bottom cover (1) of the body is preferably equipped with moving means.

11. The air purifier according to any one of the preceding claims, wherein the components of the air purifier are made of metal, wood and/or glass.

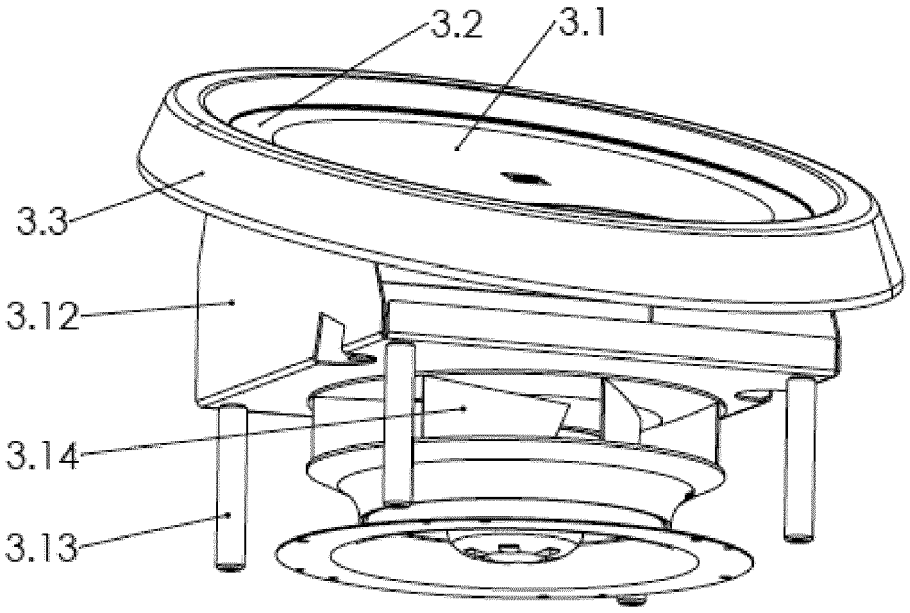


Fig. 1

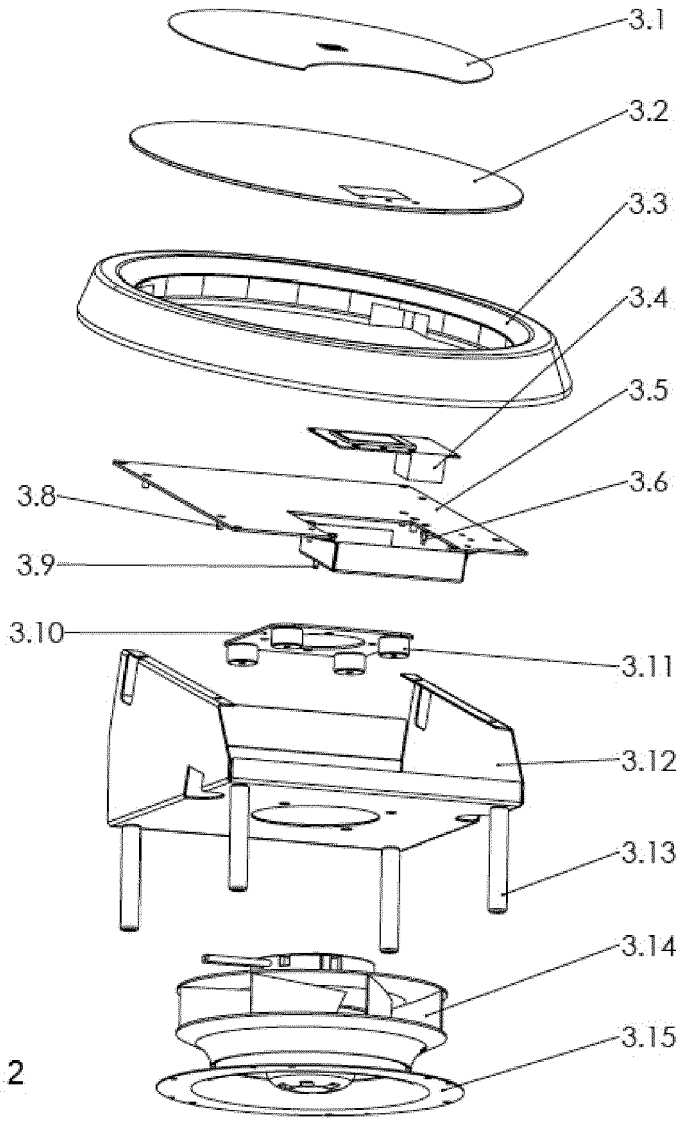


Fig. 2

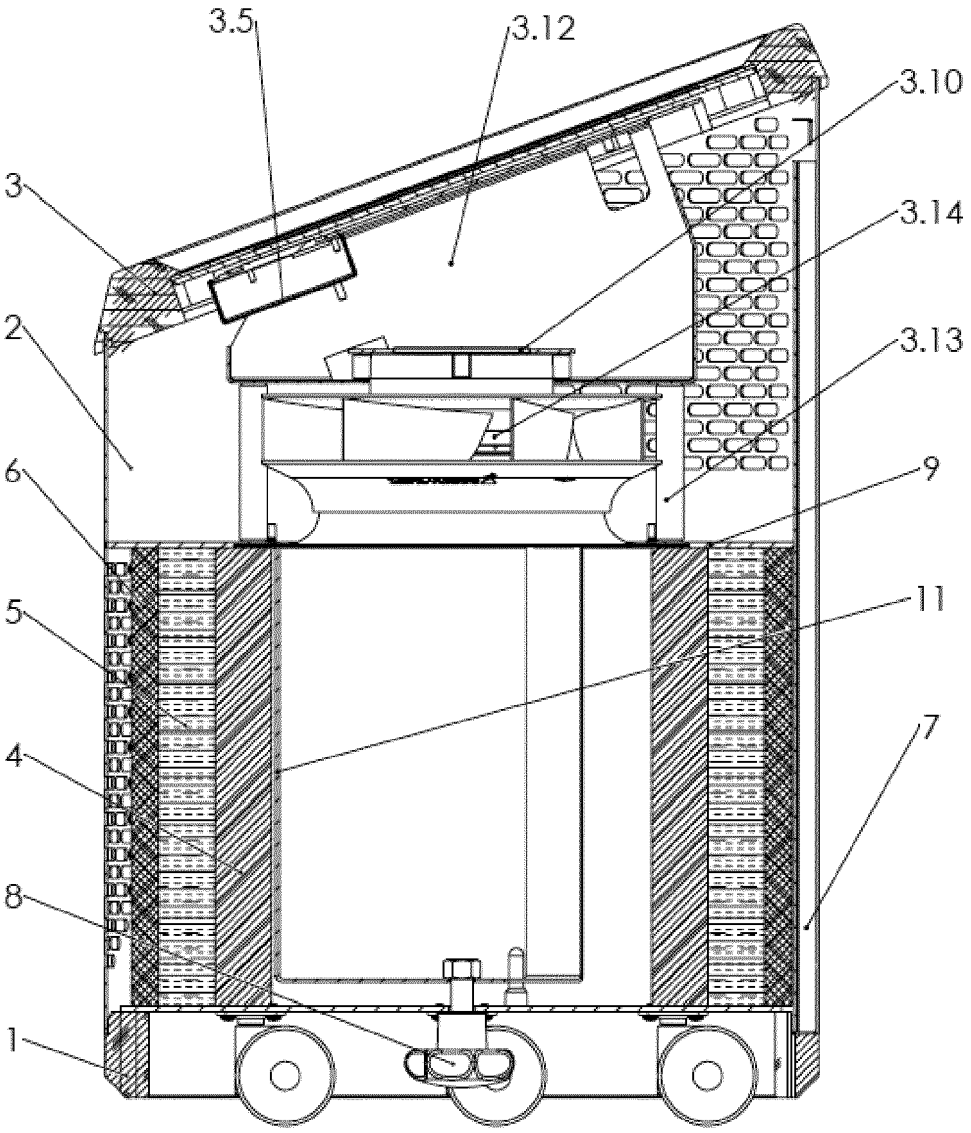


Fig. 3

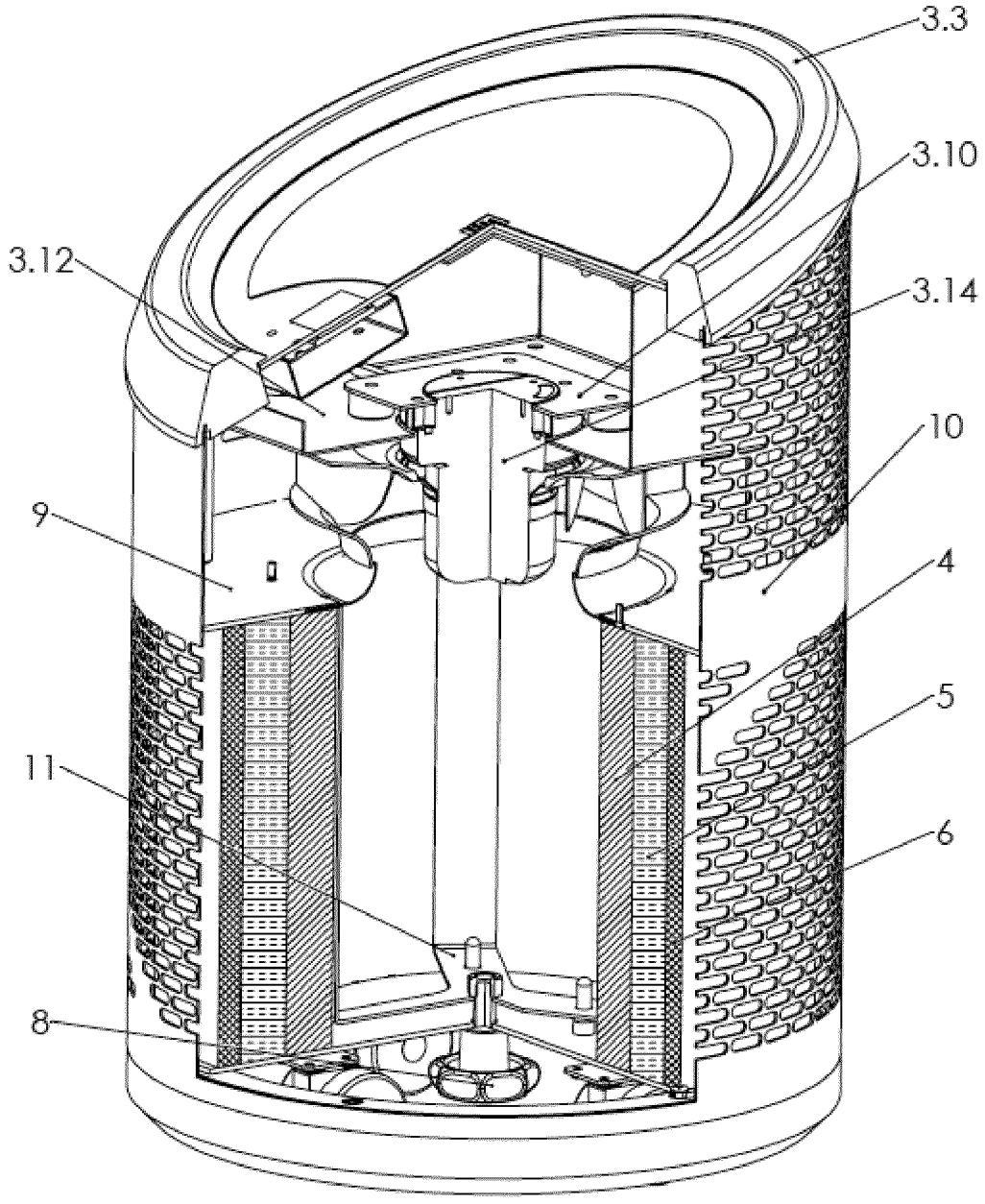


Fig. 4

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Application Number
EP 19 15 9147

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