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(54) **HUMIDIFIER**

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(56) References cited:
EP-A1- 1 619 451
DE-A1- 19 513 943
JP-A- 2006 046 729
JP-A- 2008 035 998
KR-U- 20000 005 364
WO-A1-95/13506
JP-A- 11 325 520
JP-A- 2006 317 086
KR-A- 20030 011 586

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Description

Technical Field

[0001] The present invention relates to a humidifier, including a water tank settlement unit in which a water tank is seated and a water guide in which an accommodation unit is formed, wherein the water tank settlement unit is placed on the lower front side of a ventilator and a humidification filter is inserted into the accommodation unit.

Background Art

[0002] In general, a humidifier is configured to suck a dry indoor air, humidify the sucked air, and then blow the humidified air into a room. That is, the humidifier is based on the principle that clear water is changed to particles by electricity and then blown into a room. Accordingly, since an indoor air continues to have an adequate level of humidity, respiratory distress and diseases can be prevented and a pleasant indoor ambient can be maintained.

[0003] Humidifiers may be divided into an ultrasonic humidifier, a heating type humidifier, a combined type humidifier, etc. depending on humidification methods.

[0004] The ultrasonic humidifier uses a method of generating ultrasonic waves at the lower portion of a water tank, splitting water into small particles, and blowing the split water particles to the outside. Here, steam blown by the humidifier is cool steam. The heating type humidifier uses a method of boiling water within the humidifier and blowing the boiled water particles as steam. Here, steam blown by the humidifier is hot steam. The combined type humidifier uses a combination of the ultrasonic type and the heating type in order to take advantages of the heating type and the ultrasonic type. The combined type humidifier uses a method of raising water temperature in a heating pipe, sterilizing the water, and then blowing the sterilized using ultrasonic waves. In the combined type humidifier, warm steam and cool steam may be selected according to circumstances.

[0005] There has been recently used a natural evaporation type humidifier for humidifying a room by naturally evaporating water within the humidifier without forcibly evaporating the water. This humidifier can evaporate water depending on the degree of indoor dryness because it humidifies a room through natural evaporation.

[0006] However, in the conventional natural evaporation type humidifier, the size of a water accommodation unit for naturally evaporating water is large, and elements, such as a filter placed in the water accommodation unit and configured to provide moisture to water flowing through the humidifier, occupy a large part of space within the humidifier. Accordingly, the conventional natural evaporation type humidifier is

[0007] There has been recently used a natural evaporation type humidifier for humidifying a room by naturally evaporating water within the humidifier without forcibly evaporating the water. This humidifier can evaporate water depending on the degree of indoor dryness because it humidifies a room through natural evaporation.

[0008] However, in the conventional natural evaporation type humidifier, the size of a water accommodation unit for naturally evaporating water is large, and elements, such as a filter placed in the water accommodation unit and configured to provide moisture to water flowing through the humidifier, occupy a large part of space within the humidifier. Accordingly, the conventional natural evaporation type humidifier is problematic in that the size of a humidifier main body is inevitably large. The closest prior art can be found in JP 2008 035998, which discloses the preamble of claim 1 and wherein the air filter is accommodated between a front panel and a division wall of the humidifier.

[Disclosure]

[Technical Problem]

[0009] It is, therefore, an object of the present invention to provide a humidifier, which is capable of making a humidifier main body slim by placing a water tank and a water guide into which a humidification filter is inserted on the lower front side of a ventilator.

[Technical Solution]

[0010] In accordance with an embodiment of the present invention, there is provided a humidifier according to claim 1.

[0011] The humidifier may further include a discharge unit for discharging electricity while coming into contact with water contained in the water guide, and a power source unit for supplying voltage to the discharge unit. The water guide may further include a discharge accommodation unit for accommodating water in contact with the discharge unit.

[0012] Meanwhile, the water tank settlement unit may be formed on one side of the accommodation unit, and the discharge accommodation unit may be formed on the other side of the accommodation unit. The water guide may be placed in the main body so that the water guide may be slidingly attached to or detached from the main body. The discharge unit may be rotatably placed on an upper portion of the accommodation unit so that the discharge unit engages a rear side of the discharge accommodation unit according to the sliding movement of the water guide.

[0013] The humidifier of the present invention may further include an ion purification resin filter for purifying water output through the entrance/exit portion. The water tank settlement unit may have a shape corresponding to a shape of the ion purification resin filter so that the ion purification resin filter may be inserted into the water tank settlement unit and then fixed thereto.

[0014] Here, the ion purification resin filter may include

an insertion portion into which the entrance/exit portion may be inserted, a filter flow passage through which water introduced through the insertion portion flows, and an outlet portion for outputting the water that has passed through the filter flow passage to the accommodation unit.

[0015] Further, a cap through which the water of the water tank passes may be placed in the entrance/exit portion of the water tank so that the cap may be projected from the entrance/exit portion, and the insertion portion may be opened so that the insertion portion corresponds to a shape of the cap. A cap through which the water of the water tank passes may be placed in the entrance/exit portion of the water tank so that the cap may be projected from the entrance/exit portion. The insertion portion may be depressed so that the insertion portion corresponds to a shape of the cap. A flow passage through which water flows may be formed in the cap, the cap may include a valve body for opening or closing the flow passage while moving along the flow passage, and a movement projection for moving the valve body may be formed in the insertion portion. Further, a projection may be formed in the water tank settlement unit, and a fixing portion into which the projection may be fit may be formed in the movement projection.

[0016] Meanwhile, the water tank settlement unit may have a shape corresponding to a bottom shape of the water tank. A cap through which the water of the water tank passes may be placed in the entrance/exit portion of the water tank, a flow passage through which the water flows may be formed in the cap, the cap comprises a valve body for opening or closing the flow passage while moving along the flow passage, and a projection for moving the valve body may be formed in the water tank settlement unit.

Advantageous Effects

[0017] The humidifier having the above construction according to the embodiments of the present invention has the following advantages.

[0018] First, the water tank settlement unit in which the water tank is seated is formed in the water guide. Accordingly, the utilization of space within the main body can be increased and the main body can have a small size because an additional construction where the water tank is placed needs not to be formed within the humidifier.

[0019] Second, the humidification filter is placed in the water guide placed on the lower front side of the ventilator. Accordingly, the utilization of space within the main body can be increased and the main body can have a small size because an additional construction where the humidification filter is placed needs not to be formed within the humidifier.

[0020] Third, the humidification filter is seated in the water guide placed in front of the ventilator in order to minimize space between the humidification filter and the ventilator. Accordingly, noise caused by air flowing through the space can be reduced.

Brief Description of Drawings

[0021]

FIG. 1 is a perspective view of a humidifier according to a first embodiment of the present invention;

FIG. 2 is an exploded perspective view of the humidifier according to the first embodiment;

FIG. 3 is a front view of the humidifier when right and left doors are opened according to the first embodiment;

FIG. 4 is a lateral cross-sectional view of the humidifier according to the first embodiment;

FIG. 5 is a perspective view of the humidifier from which a purification filter is separated in the first embodiment;

FIG. 6 is an exploded perspective view of a water guide and a water tank according to the first embodiment;

FIG. 7 is a perspective view of an ion purification resin filter according to the first embodiment;

FIG. 8 is a perspective view showing that the humidification filter and the water tank are placed in the water guide in the first embodiment;

FIG. 9 is a partial cross-sectional view showing the operation of a discharge unit before and after the water guide is attached in the first embodiment;

FIG. 10 is an exploded perspective view of the water guide and the water tank according to another embodiment of the present invention;

FIG. 11 is a perspective view of an ion purification resin filter according to another embodiment; and

FIG. 12 is a rear perspective view of the ion purification resin filter according to another embodiment.

Best Mode for Carrying out the Invention

[0022] Hereinafter, embodiments of the present invention will be described in detail with reference to the accompanying drawings so. In describing the present embodiments, the same reference numbers are used throughout the drawings to refer to the same parts, and an additional description thereof is omitted.

[0023] FIG. 1 is a perspective view of a humidifier according to a first embodiment of the present invention, FIG. 2 is an exploded perspective view of the humidifier according to the first embodiment, FIG. 3 is a front view of the humidifier when right and left doors are opened according to the first embodiment, FIG. 4 is a lateral cross-sectional view of the humidifier according to the first embodiment, FIG. 5 is a perspective view of the humidifier from which a purification filter is separated in the first embodiment, FIG. 6 is an exploded perspective view of a water guide and a water tank according to the first embodiment, FIG. 7 is a perspective view of an ion pu-

rification resin filter according to the first embodiment, FIG. 8 is a perspective view showing that the humidification filter and the water tank are placed in the water guide in the first embodiment, and FIG. 9 is a partial cross-sectional view showing the operation of a discharge unit before and after the water guide is attached in the first embodiment.

[0024] Referring to FIGS. 1 to 9, the humidifier according to the present embodiment includes an air intake unit for sucking air and an air blower unit for blowing air, which are formed in a main body 2.

[0025] In the present embodiment, it is assumed that the humidifier is mounted on a wall in the state in which it is spaced apart from a flat surface at a specific interval. In the present embodiment, it is assumed that the humidifier is configured to suck air from the front and lower sides of the main body 2 and blow the air upwardly from the main body. The air intake unit and the air blower unit are described in more detail later.

[0026] The main body 2 includes a rear casing 30, a front casing 40, and front doors 12 and 14.

[0027] The rear casing 30 forms an external rear appearance of the main body 2. The front casing 40 is placed in front of the rear casing 30.

[0028] An air blower hole 6 for blowing air is formed on the top of the front casing 40. A blower vane 72 for adjusting the wind of blown air and a vane motor 74 for rotating the blower vane 72 are placed in the air blower hole 6.

[0029] An opening 4 is formed on the front side of the front casing 40. Air sucked by the air intake unit passes through the opening 4 and a purification filter 110 in order. Further, a water tank 80 and a water guide 90 enter or exit from the main body 2 through the opening 4.

[0030] The opening 4 is partitioned into a portion into which indoor air is sucked and a portion into which the water tank 80 is inserted by the partition wall 65 of a fan housing 60. A purification filter 110 for purifying alien substance among indoor air passing therethrough is placed in the portion into which indoor air is sucked, of the opening 4. One or more locking projections 49 with which latch grooves 86 and 87 of the water tank 80 are engaged are formed in the portion into which the water tank 80 of the front casing 40 is inserted.

[0031] The opening 4 may extend from the front side of the front casing 40 to a side where the water tank 80 is placed, thereby exposing the side of the water tank 80. Accordingly, a user can easily attach or detach the water tank 80 to or from the main body 2 through the opening 4. A user can also check the water level of the water tank 80 through the display window 13 of the door.

[0032] Display insertion portions 47 and 48 are depressed and formed on the upper and lower portions of the opening 4. A display 20 is inserted into the display insertion portions 47 and 48 when the doors 12 and 14 are closed while covering the opening 4.

[0033] A lower intake hole 46 for sucking air is formed on the lower portion of the front casing 40. As described above, the humidifier according to the present embodiment may be placed in the state in which it is spaced apart from a flat surface at a specific interval. Accordingly, in the present embodiment, the lower intake hole 46 can be formed on the lower portion of the front casing 40 in order to suck air. Further, the lower intake hole 46 may be formed on the front side of the opening 4.

[0034] The front door 10 may be coupled to the front casing 40 in various ways. In the present embodiment, the front door 10 includes a left door 14 and a right door 12.

[0035] The left door 14 is rotatably coupled to the left side of the front casing 40, and the right door 12 is rotatably coupled to the right side of the front casing 40.

[0036] The left door 14 and the right door 12 are rotated to thereby cover the front casing 40 and, at the same time, form an air intake duct while partially exposing the opening 4.

[0037] The display 20 is placed at a position where the opening 4, which is exposed when the right and left doors 12 and 14 are closed, is not seen from the front. The display 20 is placed in the rear of the right and left doors 12 and 14 so that air intake ducts 16 and 18 can be formed between the display 20 and the right door 12 and between the display 20 and the left door 14, respectively.

[0038] The display 20 may be coupled to any one of the right and left doors 12 and 14. Alternatively, the display 20 may be formed in the display insertion portions 47 and 48 of the front casing 40. In the present embodiment, it is assumed that the display 20 is placed in the right door 12 so that the air intake duct 18 can be formed therebetween.

[0039] A display window 13 through which the water level of the water tank 80 can be checked outside the main body 2 is formed in one of the right and left doors 12 and 14, which covers the water tank 80.

[0040] Information about the operation of the humidifier may be displayed on the display 20, and a variety of patterns for increasing a feeling of beauty may be formed in the display 20 because the display 20 is exposed on the front side of the humidifier.

[0041] A ventilator, the water tank 80, the purification filter 110, a humidification filter 100, the water guide 90, and a control box 160 are placed within the main body 2 (that is, space between the front casing 40 and the rear casing 30).

[0042] The ventilator functions to suck air into the main body 2 and blow air, humidified in the main body 2, to the outside of the main body 2. The ventilator includes the fan housing 60, a blower fan 56, and a fan motor 54.

[0043] The fan housing 60 is placed in the space between the front casing 40 and the rear casing 30. The fan housing 60 has a box form whose rear side is open and is combined with the rear casing 30, thereby forming a ventilation room. The blower fan 56 and the fan motor 54 for rotating the blower fan 56 are placed in the ventilation room. An air blower unit 64 is formed on the top of a circumference portion of the fan housing 60 and con-

figured to communicate with the air blower hole 6 of the front casing 40.

[0044] An air intake unit 67 is formed on the front side of the fan housing 60. A safety network may be placed in the air intake unit 67. The humidification filter 100 for supplying moisture to air passing through the air intake unit 67 is placed in front of the air intake unit 67.

[0045] The partition wall 65 is projected forwardly from the fan housing 60. The partition wall 65 is projected toward a side into which the water tank 80 is inserted, of the right and left sides of the air intake unit 67.

[0046] The partition wall 65 partitions the front side of the fan housing 60 into space into which air is sucked and space where the water tank 80 is placed. Further, the partition wall 65 partitions the opening 4 of the front casing 40 into space into which air is sucked and space into which the water tank 80 is inserted. Accordingly, the partition wall 65 is placed between the humidification filter 100 and the water tank 80, which are placed in front of the air intake unit 67.

[0047] Further, space 60a into which the backward projection portion 83 of the water tank 80 is inserted and accommodated may be formed between the portion of the front side of the fan housing 60, in which the water tank 80 is placed, and the rear casing. Accordingly, the utilization of space within the main body 2 of the water tank 80 can be increased, and the size of the water tank can also be increased.

[0048] The water guide 90 functions to receive water from the water tank 80 and supply the supplied water to the humidification filter 100. The water guide 90 is detachably installed in the main body 2 through the opening 4 of the front casing 40.

[0049] The water guide 90 includes a water tank settlement unit 95, an accommodation unit 96, a float mounter 97, and a discharge accommodation unit 98. Water introduced from the water tank 80 to the water tank settlement unit 95 flows through the accommodation unit 96, the float mounter 97, and the discharge accommodation unit 98 in order.

[0050] The water tank 80 is inserted into the water tank settlement unit 95 and then mounted therein. The water tank settlement unit 95 has a shape corresponding to the bottom shape of the water tank 80. Accordingly, the water tank settlement unit 95 functions to fix the water tank 80 thereto.

[0051] Meanwhile, an ion purification resin filter 93 for making soft hard water by lowering the hardness of hard water in such a manner that ions coated on the resin surface of the ion purification resin filter 93 substitute Ca and Mg, which decide the hardness of water, is placed in the water tank settlement unit 95 (refer to FIG. 7). The water tank settlement unit 95 may have a shape corresponding to a shape of the ion purification resin filter 93 so that the ion purification resin filter 93 is inserted into the water tank settlement unit 95 and then fixed thereto.

[0052] The ion purification resin filter 93 according to the present embodiment is inserted into part of the water tank settlement unit 95. Further, a portion of the water tank settlement unit 95 in which the ion purification resin filter 93 is seated has a shape corresponding to a shape of the ion purification resin filter 93.

[0053] The ion purification resin filter 93 includes an insertion portion 93a, a filter flow passage 93b, and an outlet portion 93c.

[0054] The insertion portion 93a is formed in the ion purification resin filter 93 and has a hole shape whose top and bottom are opened. Accordingly, a cap 85 placed in the entrance/exit portion 80a of the water tank 80 is inserted into the insertion portion 93a, thereby fixing the water tank 80. The insertion portion 93a is formed at a position where the projection 91 of the water tank settlement unit 95 is formed in order to expose the projection 91 therethrough. Further, part of the circumference portion of the insertion portion 93a is opened and therefore configured to communicate with the filter flow passage 93b.

[0055] The filter flow passage 93b may have a variety of shapes so that water can be made soft while flowing therethrough. In the present embodiment, it is assumed that the filter flow passage 93b has a curved shape along the circumference portion of the insertion portion 93a. Alternatively, the filter flow passage 93b may have a spiral shape in order to increase the time taken for water to flow through the filter flow passage 93b or an area in which water comes into contact with the filter flow passage 93b.

[0056] The outlet portion 93c is formed to communicate with the filter flow passage 93b and to output water, which is made soft while flowing through the filter flow passage 93b, to the accommodation unit 96.

[0057] In the case in which the water tank 80 is inserted into the water tank settlement unit 95 through the insertion portion 93a of the ion purification resin filter 93 and then settled therein, the projection 91 formed in the water tank settlement unit 95 functions to move a valve body 85a in order to open the flow passage of the cap 85.

[0058] Consequently, the water tank settlement unit 95 enables the water tank 80 to be seated therein and also the water of the water tank 80 to flow into the accommodation unit 96 via the ion purification resin filter 93.

[0059] The humidification filter 100 is inserted into the accommodation unit 96 and then placed therein. The accommodation unit 96 accommodates water output from the water tank settlement unit 95 and then supplies moisture to the humidification filter 100. Meanwhile, the humidification filter 100 is paced in front of the air intake unit 67 of the fan housing 60. Accordingly, the accommodation unit 96 is placed on the front side of the ventilator, that is, the fan housing 60.

[0060] The purification filter 110 is placed in front of the humidification filter 100. Accordingly, the accommodation unit 96 is depressed backward, thus forming a space 90a where the bottom of the purification filter 100 is placed.

[0061] The bottom of the fan housing 60 is placed on

the rear side of the accommodation unit 96. The accommodation unit 96 is depressed forward, thus forming a space 90b where the bottom of the fan housing 60 is placed. Accordingly, in the present embodiment, the main body 2 can be made slim.

[0062] In the case in which the front and rear portions of the accommodation unit 96 are depressed as described above, the accommodation unit 96 may have a width corresponding to the width of the humidification filter 100 so that the humidification filter 100 can be inserted into the accommodation unit 96 and then fixed thereto.

[0063] The length of the accommodation unit 96 may be longer than that of the humidification filter 100. Accordingly, water supplied to the humidification filter 100 can be accommodated in the accommodation unit 96 sufficiently. In this case, a fixing portion for fixing the humidification filter 100 is formed in the accommodation unit 96. The fixing portion may have a variety of shapes. In the present embodiment, one or more fixing portions 99, each having a rib shape, are projected from the accommodation unit 96.

[0064] The float mounter 97 communicates with the accommodation unit 96. A float 92 for detecting the water level of the water guide 90 is placed in the float mounter 97. Further, a float sensor (not shown in the drawing) for detecting the height of the float is placed on the top of the float 92 within the main body 2.

[0065] Accordingly, when the float 92 has a specific height or more, the operation of the humidifier is stopped in order to prevent an electric leakage, which may happen due to the overfill of the water guide 90. The humidifier according to the present embodiment may further include a control unit for generating a water shortage signal when the float 92 has a specific height or less.

[0066] In the case in which the water tank settlement unit 95 is formed on one side of the accommodation unit 96, the float mounter 97 may be formed on the other side of the accommodation unit 96. In general, the air intake unit 67 formed in the fan housing 60 is placed at the central portion of the main body 2. Further, the humidification filter 100 is placed in front of the air intake unit 67, and the humidification filter 100 is inserted into the accommodation unit 96. Accordingly, the utilization of space within the main body 2 can be increased because the water tank settlement unit 95 and the float mounter 97 are respectively formed on the right and left sides of the accommodation unit 96.

[0067] The discharge accommodation unit 98 forms space where a discharge unit 94 may come into contact with water accommodated in the water guide 90. The discharge accommodation unit 98 may be formed in various places of the water guide 90, but, in the present embodiment, formed on the rear side of the float mounter 97 in order to use the space within the main body 2. That is, like the above-described float mounter 97, the discharge accommodation unit 98 may be formed on the other side of the accommodation unit 96, which is opposite to the side where the water tank settlement unit 95, in order to increase the utilization of space within the main body 2. Further, as described above, the accommodation unit 96, the float mounter 97, and the discharge accommodation unit 98 are configured to communicate with each other. Accordingly, water sterilized by the discharge accommodation unit 98 flows into the float mounter 97 and the accommodation unit 96, so that the sterilized water is supplied to the humidification filter 100 inserted into the accommodation unit 96.

[0068] The discharge unit 94 is placed in the upper space of the discharge accommodation unit 98 so that it comes into contact with the water accommodated in the discharge accommodation unit 98. The discharge unit 94 sterilizes water using H_2O_2 generated by generating discharge in the water. Further, a power source unit (not shown in the drawing) for supplying electricity to the discharge unit 94 may be placed within the main body 2.

[0069] As described above, the water guide 90 is attached to or detached from the main body 2 through the opening 4 of the front casing 40. Accordingly, a user can clean or replace the water guide 90. In the case in which the water guide 90 is pulled out from the main body 2, the discharge unit 94 engages the rear face 98a of the discharge accommodation unit 98. Accordingly, a user has to detach the discharge unit 94 from the main body 2 and then the water guide 90 from the main body 2. In the present embodiment, the discharge unit 94 is rotatably placed in the main body 2 (refer to FIG. 9).

[0070] Accordingly, in the case in which the water guide 90 is detached from the main body 2, the discharge unit 94 engages the rear face 98a of the discharge accommodation unit 98 and then rotates forward from the main body 2, simultaneously with the movement of the water guide 90. When the water guide 90 is fully detached from the main body 2, the discharge unit 94 is rotated backward from the main body 2, while being released from the rear face 98a, and then returns to its original position.

[0071] In the case in which the water guide 90 is inserted into the main body, the discharge unit 94 engages the rear face 98a and then rotates backward from the main body 2, simultaneously with the movement of the water guide 90. When the water guide 90 is fully inserted into the main body 2, the discharge unit 94 is rotated forward from the main body 2, while being released from the rear face 98a, and then positioned in the discharge accommodation unit 98.

[0072] The water tank 80 is seated in the water tank settlement unit 95 and configured to supply water to the accommodation unit 96, the float mounter 97, and the discharge accommodation unit 98. The water tank 80 is attached to or detached from the inside of the main body 2 through the opening 4 of the front casing 40. The latch grooves 86 and 87 inserted into the locking projections 49 of the front casing 40 are formed in the water tank 80. The latch grooves 86 and 87 may be formed at various positions of the water tank 80 in various numbers. How-

ever, in the present embodiment, it is assumed that a pair of the latch grooves 86 and 87 is formed on each of the right and left sides of the water tank 80. Accordingly, a pair of the locking projections 49 is also formed at the positions of the front casing 40, which correspond to the latch grooves 86 and 87.

[0073] The latch grooves 86 and 87 include a locking portion 87 that the locking projection 49 engages and a guide portion 86 that is guided into the locking projection 49. In greater detail, the water tank 80 is inserted into the main body 2 through the opening 4 of the front casing 40, and the guide portions 86 of the water tank 80 are inserted into the respective locking projections 49 formed in the front casing 40. Further, the locking projections 49 are guided into the locking portions 87 by the respective guide portions 86, so the locking projections 49 fix the water tank 80 to the main body 2. As described above, the water tank 80 is seated in the water tank settlement unit 95 while being inserted thereinto.

[0074] The backward projection portion 83 is formed in one of the right and left sides of the water tank 80 and configured to project backward therefrom. The backward projection portion 83 is inserted into the space 60a between the rear casing 30 and the front surface of the fan housing 60. Accordingly, in the present embodiment, the space within the main body 2 can be made compact and a great amount of water can be contained in the water tank 80.

[0075] A concave portion 84 is formed on the front side of the water tank 80. A handle 82 is formed in the concave portion 84. Accordingly, a user can put his hands into the concave portion 84, hold the handle 82, and conveniently attach or detach the water tank 80 through the opening of the front casing 40.

[0076] The entrance/exit portion 80a through which water enters or exits is formed in the water tank 80, and the cap 85 for controlling water is placed in the entrance/exit portion 80a. The cap 85 is projected from the entrance/exit portion 80a, and may be inserted into the insertion portion 93a and then fixed thereto.

[0077] A flow passage 85b through which water flows is formed in the cap 85. The valve body 85a of the cap 85 functions to open or close the flow passage 85b while moving along the flow passage 85b. The flow passage 85b and the valve body 85a may have a variety of shapes. In the present embodiment, it is assumed that the flow passage 85b is formed at the center of the cap 85 and configured to have its top and bottom opened. The valve body 85a further includes a cap for plugging the top of the flow passage having the open top and bottom and a pole for pushing and opening or closing the cap while moving along the flow passage 85b.

[0078] Further, when the water tank 80 is mounted in the water tank settlement unit 95, the pole is moved upward from the flow passage 85b by the projection 91 formed in the water tank settlement unit 95, thereby opening the cap.

[0079] When the water tank 80 is pulled out from the above-described humidifier, a user rotates the door 12, which is placed in front of the water tank 80, sideways. At this time, the water tank 80 is exposed to the outside through the opening 4.

[0080] When a user puts his hands into the opening 4, holds the front part (in particular, the handle 82) of the water tank 80 and then raises the water tank 80 up to a specific height, the cap 85 of the water tank 80 is released from the insertion portion 93a formed in the ion purification resin filter 93, and the locking portions 87 are released from the locking projections 49.

[0081] Next, when the user pulls the water tank 80 in an upward direction while obliquely rotating it forward, the water tank 80 obliquely exits from between the front casing 40 and the partition wall 65 while the guide portions 86 are guided by the locking projections 49, and then exits from the main body 2 through the opening 4.

[0082] To the contrary, in the case in which the water tank 80 is mounted in the main body 2, when a user obliquely places the water tank 80 on the upper front side of the water guide 90 and then obliquely pushes the water tank 80 between the front casing 40 and the partition wall 65, the guide portions 86 guide the insertion of the water tank 80 while being guided by the locking projections 49.

[0083] When the user stands the water tank 80 up and then pulls it downward, both the upper portions of the water tank 80 engage the locking portions 87 while the locking portions 87 are engaged with the respective locking projections 49. At this time, the water tank 80 is placed on the top of the water tank settlement unit 95 of the water guide 90, and all or part of the cap 85 is inserted into the insertion portion 93a, formed in the ion purification resin filter 93, and then fixed thereto.

[0084] That is, all the latch grooves 86 and 87 and the cap 85 of the water tank 80 are stably fixed. Further, the projection 91 of the water tank settlement unit 95 opens the flow passage 85b of the cap 95 while moving the valve body 85a of the cap 85 upward.

[0085] Next, when the door 12 opened in order to pull out the water tank 80 is closed, the door 12 protects the water tank 80 while covering part of the opening 4.

[0086] The humidification filter 100 provides moisture to air that has passed through the humidification filter 100. Accordingly, the humidification filter 100 absorbs the water of the accommodation unit 96 while the bottom of the humidification filter 100 is inserted into the accommodation unit 96 of the water guide 90. The water absorbed by the humidification filter 100 is naturally evaporated by air that has passed through the purification filter 110, and the air is humidified and then blown into a room.

[0087] The control box 160 controls a variety of sensors of the humidifier. In the present embodiment, it is assumed that the control box 160 is coupled to the top of the partition wall 65, of the front portion of the fan housing 60, via a fixing member. Accordingly, an electric leakage, which may happen due to the contact of moisture within the main body 2 with the control box 160, can be prevented.

[0088] The operation of the present invention having the above construction is described below.

[0089] When the humidifier is operated, an indoor air flows into the main body 2 via the air intake ducts 16 and 18, respectively formed between the right door 12 and the display 20 and between the left door 14 and the display 20, and the lower intake hole 46. Alien substance is removed from the flown air while the air passes through the purification filter 110 in the space of the opening 4 of the front casing 40. At this time, the opening 4 is partitioned into the portion into which the indoor air is sucked and the portion into which the water tank 80 is placed by the partition wall 65. The air that has passed through the purification filter 110 absorbs moisture while passing through the humidification filter 100. The humidified air flows into the ventilation room, which is formed by the fan housing 60 and the rear casing 30, via the air intake unit 67 of the fan housing 60. The air is then blown into a room through the air blower unit 64 of the fan housing 60 and the air blower hole 6 of the front casing 40.

[0090] FIG. 10 is an exploded perspective view of the water guide and the water tank according to another embodiment of the present invention, FIG. 11 is a perspective view of an ion purification resin filter according to another embodiment, and FIG. 12 is a rear perspective view of the ion purification resin filter according to another embodiment.

[0091] An ion purification resin filter 93' according to another embodiment of the present invention is described below with reference to FIGS. 10 to 12. The insertion portion 93a of the ion purification resin filter 93' according to the present embodiment is depressed so that it corresponds to the shape of the cap 85. A movement projection 93d for moving the valve body 85a is formed at the bottom of the insertion portion 93a.

[0092] Accordingly, in the present embodiment, all water introduced into the insertion portion 93a can flow into the filter flow passage 93b. Further, the movement projection 93b fixes the water tank 80 while opening the valve body 85a. That is, according to the present embodiment, the valve body 85a can be moved even without the projection 91 of the water tank settlement unit 95 according to the first embodiment.

[0093] Meanwhile, in the present embodiment, in the case in which the projection 91 of the water tank settlement unit 95 according to the first embodiment is formed, a fixing portion 93d' into which the projection 91 is fit can be formed in the movement projection 93d. The fixing portion 93d' is depressed from the bottom of the insertion portion 93a into the inside of the movement projection 93d. Accordingly, when the fixing portion 93d' is inserted into the projection 91 of the water tank settlement unit 95, the ion purification resin filter 93 is fixed to the water tank settlement unit 95. The remaining elements and operation of the humidifier according to another embodiment of the present invention are identical to those according to the first embodiment of the present invention, and a description thereof is omitted for simplicity.

[0094] While the invention has been shown and described with respect to the embodiments, it will be understood by those skilled in the art that various changes and modifications may be made without departing from the scope of the invention as defined in the following claims.

Claims

1. A humidifier, comprising:

a main body (2) having an air intake unit and an air blower unit formed therein;
a ventilator for sucking air through the air intake unit and blowing the air through the air blower unit;
a water tank (80) having an entrance/exit portion formed therein, wherein water enters or exits from the entrance/exit portion;
a water guide (90), comprising a water tank settlement unit (95) in which the water tank (80) is seated and an accommodation unit (96) for accommodating water output from the water tank (80), wherein the accommodation unit (96) is placed so that the accommodation unit (96) is positioned on a lower front side of the ventilator; and
a humidification filter (100) seated in the accommodation unit(96) so that the humidification filter (100) is positioned between the air intake unit and the ventilator,
wherein a purification filter (110) for purifying the air sucked into the air intake unit is placed in front of the humidification filter (100),
characterized in that the accommodation unit (96) is depressed backward so that the purification filter (110) is placed in the depressed portion of the accommodation unit (96).

2. The humidifier of claim 1, further comprising:

a float (92) configured to move up and down depending on a water level of the water contained in the accommodation unit (96), and
a float sensor for detecting a height of the float (92),
wherein the water guide(90) further comprises a float mounter (97) for accommodating the float (92).

3. The humidifier of claim 2, wherein:

the water tank settlement unit (95) is formed on one side of the accommodation unit (96), and
the float mounter (97) is formed on the other side of the accommodation unit (96).

4. The humidifier of claim 2, further comprising a control unit for generating a water shortage signal when the water contained in the water guide (90) is a preset height or less as a detection result of the float sensor.

5. The humidifier of claim 2, further comprising a control unit for stopping an operation of the humidifier when the water contained in the water guide (90) is a preset height or less as a detection result of the float sensor.

6. The humidifier of claim 1, further comprising:

a discharge unit for discharging electricity while coming into contact with water contained in the water guide (90), and
a power source unit for supplying voltage to the discharge unit,
wherein the water guide (90) further comprises a discharge accommodation unit (96) for accommodating water in contact with the discharge unit.

7. The humidifier of claim 6, wherein:

the water tank (80) settlement unit is formed on one side of the accommodation unit (96), and
the discharge accommodation unit (96) is formed on the other side of the accommodation unit (96).

8. The humidifier of claim 6, wherein:

the water guide (90) is placed in the main body (2) so that the water guide (90) is slidingly attached to or detached from the main body (2), and
the discharge unit (94) is rotatably placed on an upper portion of the accommodation unit (96) so that the discharge unit (94) engages a rear side of the discharge accommodation unit (96) according to the sliding movement of the water guide (90).

9. The humidifier of claim 1, further comprising an ion purification resin filter (93) for purifying water output through the entrance/exit portion (80a),
wherein the water tank settlement unit (95) has a shape corresponding to a shape of the ion purification resin filter (93) so that the ion purification resin filter (93) is inserted into the water tank settlement unit (95) and then fixed thereto.

10. The humidifier of claim 9, wherein the ion purification resin filter (93) comprises:

an insertion portion (93a) into which the entrance/exit portion(80a) is inserted,
a filter flow passage (93b) through which water introduced through the insertion portion flows, and
an outlet portion (93c) for outputting the water that has passed through the filter flow passage (93b) to the accommodation unit (96).

11. The humidifier of claim 10, wherein:

a cap (85) through which the water of the water tank (80) passes is placed in the entrance/exit portion (80a) of the water tank (80) so that the cap (85) is projected from the entrance/exit portion (80a), and
the insertion portion (93a) is opened so that the insertion portion (93a) corresponds to a shape of the cap (85).

12. The humidifier of claim 10, wherein:

a cap (85) through which the water of the water tank (80) passes is placed in the entrance/exit portion (80a) of the water tank (80) so that the cap (85) is projected from the entrance/exit portion (80a), and
the insertion portion (93a) is depressed so that the insertion portion (93a) corresponds to a shape of the cap (85).

13. The humidifier of claim 12, wherein:

a flow passage (85b) through which water flows is formed in the cap (85),
the cap (85) comprises a valve body (85a) for opening or closing the flow passage (85b) while moving along the flow passage (85b), and
a movement projection (93d) for moving the valve body (85a) is formed in the insertion portion (93a).

14. The humidifier of claim 13, wherein:

a projection (91) is formed in the water tank settlement unit (95), and
a fixing portion (93d) into which the projection (91) is fit is formed in the movement projection (93d).

15. The humidifier of claim 1, wherein:

a cap (85) through which the water of the water tank (80) passes is placed in the entrance/exit portion (80a) of the water tank (80),
a flow passage through which the water flows is formed in the cap (85),
the cap (85) comprises a valve body (85a) for opening or closing the flow passage while moving along the flow passage, and
a projection (91) for moving the valve body (85a)

is formed in the water tank settlement unit (95).

Patentansprüche

1. Befeuchter, der aufweist:

einen Hauptkörper (2) mit einer Lufteinlasseinheit und einer Luftgebläseeinheit, die darin ausgebildet sind;
einen Ventilator zum Einsaugen von Luft durch die Lufteinlasseinheit und Blasen der Luft durch die Luftgebläseeinheit;
einen Wasserbehälter (80) mit einem darin ausgebildeten Eingangs-/Ausgangsabschnitt, wobei Wasser durch den Eingangs-/Ausgangsabschnitt eintritt oder austritt;
eine Wasserführung (90), die eine Wasserbehälter-Anordnungseinheit (95), in welcher der Wasserbehälter (80) auflagert, und eine Aufnahmeeinheit (96) zum Aufnehmen von Wasser, das von dem Wasserbehälter (80) ausgegeben wird, aufweist, wobei die Aufnahmeeinheit (96) derart angeordnet ist, dass die Aufnahmeeinheit (6) auf einer unteren Vorderseite des Ventilators positioniert ist; und
ein Befeuchtungsfilter (100), das in der Aufnahmeeinheit (96) auflagert, so dass das Befeuchtungsfilter (100) zwischen der Einlasslufteinheit und dem Ventilator positioniert ist,
wobei ein Reinigungsfilter (110) zum Reinigen der in die Lufteinlasseinheit gesaugten Luft vor dem Befeuchtungsfilter (100) angeordnet ist,
dadurch gekennzeichnet, dass die Aufnahmeeinheit (96) nach hinten vertieft ist, so dass das Reinigungsfilter (110) in dem vertieften Abschnitt der Aufnahmeeinheit (96) angeordnet ist.

2. Befeuchter nach Anspruch 1, der ferner aufweist:

einen Schwimmkörper (92), der aufgebaut ist, um sich abhängig von einem Wasserstand des in der Aufnahmeeinheit (96) enthaltenen Wassers auf und ab zu bewegen, und
einen Füllstandsensor zum Erfassen einer Höhe des Schwimmkörpers (92),
wobei die Wasserführung (90) ferner eine Schwimmkörper-Montageeinrichtung (97) zum Aufnehmen des Schwimmkörpers (92) aufweist.

3. Befeuchter nach Anspruch 2, wobei:

die Wasserbehälter-Anordnungseinheit (95), die auf einer Seite der Aufnahmeeinheit (96) ausgebildet ist, und
die Schwimmkörper-Montageeinheit (97) auf der anderen Seite der Aufnahmeeinheit (96) ausgebildet ist.

4. Befeuchter nach Anspruch 2, die ferner eine Steuereinheit zum Erzeugen eines Wassermangelsignals aufweist, wenn das in der Wasserführung (90) enthaltene Wasser als ein Erfassungsergebnis des Füllstandsensors eine vorgegebene Höhe oder weniger hat.

5. Befeuchter nach Anspruch 2, der ferner eine Steuereinheit zum Stoppen eines Betriebs des Befeuchters aufweist, wenn das in der Wasserführung (90) enthaltene Wasser als ein Erfassungsergebnis des Füllstandsensors eine vorgegebene Höhe oder weniger hat.

6. Befeuchter nach Anspruch 1, der ferner aufweist:

eine Entladungseinheit zum Entladen von Elektrizität, während sie in Kontakt mit in der Wasserführung (90) enthaltenem Wasser kommt, und eine Leistungsquelleneinheit zum Liefern von Spannung an die Entladungseinheit,
wobei die Wasserführung (90) ferner eine Entladungsaufnahmeeinheit (96) zum Aufnehmen von Wasser in Kontakt mit der Entladungseinheit hat.

7. Befeuchter nach Anspruch 6, wobei:

die Anordnungseinheit des Wasserbehälters (80) auf einer Seite der Aufnahmeeinheit (96) ausgebildet ist, und
die Entladungsaufnahmeeinheit (96) auf der anderen Seite der Aufnahmeeinheit (96) ausgebildet ist.

8. Befeuchter nach Anspruch 6, wobei:

die Wasserführung (90) derart in dem Hauptkörper (2) angeordnet ist, dass die Wasserführung (90) verschiebbar an dem Hauptkörper (2) befestigt oder davon gelöst wird, und
die Entladungseinheit (94) drehbar auf einem oberen Abschnitt der Aufnahmeeinheit (96) angeordnet ist, so dass die Entladungseinheit (94) gemäß der Schiebebewegung der Wasserführung (90) an einer Rückseite der Entladungsaufnahmeeinheit (96) eingreift.

9. Befeuchter nach Anspruch 1, das ferner ein Ionenreinigungsharzfilter (93) zum Reinigen von Wasser, das durch den Eingangs-/Ausgangsabschnitt (80a) ausgegeben wird, aufweist,
wobei die Wasserbehälter-Anordnungseinheit (95) eine Form hat, die einer Form des Ionenreinigungsharzfilters entspricht, so dass das Ionenreinigungsharzfilter (93) in die Wasserbehälter-Anordnungs-

einheit (95) eingesetzt und dann daran fixiert wird.

10. Befeuchter nach Anspruch 9, wobei das Ionenreinigungsharzfilter (93) aufweist:

einen Einsatzabschnitt (93a), in den der Eingangs-/Ausgangsabschnitt (80a) eingesetzt ist,
einen Filterströmungsdurchgang (93b), durch den Wasser, das durch den Einsatzabschnitt eingeleitet wird, strömt, und
einen Auslassabschnitt (93c) zum Ausgeben des Wassers, das den Filterströmungsdurchgang (93b) durchlaufen hat, an die Aufnahmeeinheit (96).

11. Befeuchter nach Anspruch 10, wobei:

eine Kappe (85), durch die das Wasser des Wasserbehälters (80) geht, in dem Eingangs-/Ausgangsabschnitt (80a) des Wasserbehälters (80) angeordnet ist, so dass die Kappe (85) von dem Eingangs-/Ausgangsabschnitt (80a) vorsteht, und
der Einsatzabschnitt (93a) derart geöffnet ist, dass der Einsatzabschnitt (93a) einer Form der Kappe (85) entspricht.

12. Befeuchter nach Anspruch 10, wobei:

eine Kappe (85), durch die das Wasser des Wasserbehälters (80) geht, in dem Eingangs-/Ausgangsabschnitt (80a) des Wasserbehälters (80) angeordnet ist, so dass die Kappe (85) von dem Eingangs-/Ausgangsabschnitt (80a) vorsteht, und
der Einsatzabschnitt (93a) derart vertieft ist, dass der Einsatzabschnitt (93a) einer Form der Kappe (85) entspricht.

13. Befeuchter nach Anspruch 12, wobei:

ein Strömungsdurchgang (85b), durch den Wasser strömt, in der Kappe (85) ausgebildet ist,
die Kappe (85) einen Ventilkörper (85a) zum Öffnen oder Schließen des Strömungsdurchgangs (85b) aufweist, während er sich entlang des Strömungsdurchgangs (85b) bewegt, und
ein Bewegungsvorsprung (93d) zum Bewegen des Ventilkörpers (85a) in dem Einsatzabschnitt (93a) ausgebildet ist.

14. Befeuchter nach Anspruch 13, wobei:

ein Vorsprung (91) in der Wasserbehälter-Anordnungseinheit (95) ausgebildet ist, und
ein Fixierungsabschnitt (93d), in den der Vorsprung (91) eingepasst wird, in dem Bewegungsvorsprung (93d) ausgebildet ist.

15. Befeuchter nach Anspruch 1, wobei:

eine Kappe (85), durch die das Wasser des Wasserbehälters (80) geht, in dem Eingangs-/Ausgangsabschnitt (80a) des Wasserbehälters (80) angeordnet ist,
ein Strömungsdurchgang, durch den das Wasser strömt, in der Kappe (85) ausgebildet ist,
die Kappe (85) einen Ventilkörper (85a) zum Öffnen oder Schließen des Strömungsdurchgangs (85b) aufweist, während er sich entlang des Strömungsdurchgangs (85b) bewegt, und
ein Vorsprung (91) zum Bewegen des Ventilkörpers (85a) in der Wasserbehälter-Anordnungseinheit (95) ausgebildet ist.

Revendications

1. Humidificateur, comprenant :

un corps principal (2) ayant une unité d'admission d'air et une unité de soufflage d'air formées à l'intérieur ;
un ventilateur pour aspirer l'air à travers l'unité d'admission d'air et souffler l'air à travers l'unité de soufflage d'air ;
une cuve d'eau (80) ayant une portion d'entrée/de sortie formée à l'intérieur, l'eau entrant ou sortant par la portion d'entrée/de sortie ;
un guide d'eau (90), comprenant une unité d'installation de cuve d'eau (95) dans laquelle la cuve d'eau (80) est placée et une unité d'accueil (96) pour accueillir l'eau fournie en sortie par la cuve d'eau (80), dans lequel l'unité d'accueil (96) est placée de sorte que l'unité d'accueil (96) soit positionnée sur un côté avant inférieur du ventilateur ; et
un filtre d'humidification (100) assis dans l'unité d'accueil (96) de sorte que le filtre d'humidification (100) soit positionné entre l'unité d'admission d'air et le ventilateur, dans lequel un filtre de purification (110) pour purifier l'air aspiré dans l'unité d'admission d'air est placé devant le filtre d'humidification (100),
caractérisé en ce que l'unité d'accueil (96) est enfoncée vers l'arrière de sorte que le filtre de purification (110) soit placé dans la portion enfoncée de l'unité d'accueil (96).

2. Humidificateur selon la revendication 1, comprenant en outre :

un flotteur (92) configuré pour monter et descendre selon un niveau d'eau de l'eau contenue dans l'unité d'accueil (96), et

un capteur de flotteur pour détecter une hauteur du flotteur (92),
dans lequel le guide d'eau (90) comprend en outre un dispositif de montage de flotteur (97) pour accueillir le flotteur (92).

3. Humidificateur selon la revendication 2, dans lequel :

l'unité d'installation de cuve d'eau (95) est formée sur un côté de l'unité d'accueil (96), et
le dispositif de montage de flotteur (97) est formé sur l'autre côté de l'unité d'accueil (96).

4. Humidificateur selon la revendication 2, comprenant en outre une unité de commande pour générer un signal de manque d'eau lorsque l'eau contenue dans le guide d'eau (90) est à une hauteur préétablie ou moins en tant que résultat de détection du capteur de flotteur.

5. Humidificateur selon la revendication 2, comprenant une unité de commande pour arrêter un fonctionnement de l'humidificateur lorsque l'eau contenue dans le guide d'eau (90) est à une hauteur préétablie ou moins en tant que résultat de détection du capteur de flotteur.

6. Humidificateur selon la revendication 1, comprenant en outre :

une unité de décharge pour décharger de l'électricité tout en venant en contact avec l'eau contenue dans le guide d'eau (90), et
une unité de source d'alimentation pour fournir une tension à l'unité de décharge,
dans lequel le guide d'eau (90) comprend en outre une unité d'accueil de décharge (96) pour accueillir l'eau en contact avec l'unité de décharge.

7. Humidificateur selon la revendication 6, dans lequel :

l'unité d'installation de cuve d'eau (80) est formée sur un côté de l'unité d'accueil (96), et
l'unité d'accueil de décharge (96) est formée sur l'autre côté de l'unité d'accueil (96).

8. Humidificateur selon la revendication 6, dans lequel :

le guide d'eau (90) est placé dans le corps principal (2) de sorte que le guide d'eau (90) soit attaché à ou détaché en coulissement du corps principal (2), et
l'unité de décharge (94) est placée en rotation sur une portion supérieure de l'unité d'accueil (96) de sorte que l'unité de décharge (94) enclenche un côté arrière de l'unité d'accueil de décharge (96) selon le déplacement coulissant du guide d'eau (90).

9. Humidificateur selon la revendication 1, comprenant en outre un filtre en résine de purification d'ions (93) pour purifier l'eau fournie en sortie par la portion d'entrée/de sortie (80a),
dans lequel l'unité d'installation de cuve d'eau (95) a une forme correspondant à une forme du filtre en résine de purification d'ions (93) de sorte que le filtre en résine de purification d'ions (93) soit inséré dans l'unité d'installation de cuve d'eau (95) puis fixé à celle-ci.

10. Humidificateur selon la revendication 9, dans lequel le filtre en résine de purification d'ions (93) comprend :

une portion d'insertion (93a) dans laquelle est insérée la portion d'entrée/de sortie (80a),
un passage d'écoulement de filtre (93b) à travers lequel s'écoule l'eau introduite à travers la portion d'insertion, et
une portion de refoulement (93c) pour fournir en sortie l'eau qui est passée à travers le passage d'écoulement de filtre (93b) à l'unité d'accueil (96).

11. Humidificateur selon la revendication 10, dans lequel :

un bouchon (85) à travers lequel passe l'eau de la cuve d'eau (80) est placé dans la portion d'entrée/de sortie (80a) de la cuve d'eau (80) de sorte que le bouchon (85) soit protubérant de la portion d'entrée/de sortie (80a), et
la portion d'insertion (93a) est ouverte de sorte que la portion d'insertion (93a) corresponde à une forme du bouchon (85).

12. Humidificateur selon la revendication 10, dans lequel :

un bouchon (85) à travers lequel passe l'eau de la cuve d'eau (80) est placé dans la portion d'entrée/de sortie (80a) de la cuve d'eau (80) de sorte que le bouchon (85) soit protubérant de la portion d'entrée/de sortie (80a), et
la portion d'insertion (93a) est enfoncée de sorte que la portion d'insertion (93a) corresponde à une forme du bouchon (85).

13. Humidificateur selon la revendication 12, dans lequel :

un passage d'écoulement (85b) à travers lequel

s'écoule d'eau est formé dans le bouchon (85), le bouchon (85) comprend un corps de vanne (85a) pour ouvrir ou fermer le passage d'écoulement (85b) tout en se déplaçant le long du passage d'écoulement (85b), et
une protubérance de déplacement (93d) pour déplacer le corps de vanne (85a) est formée dans la portion d'insertion (93a).

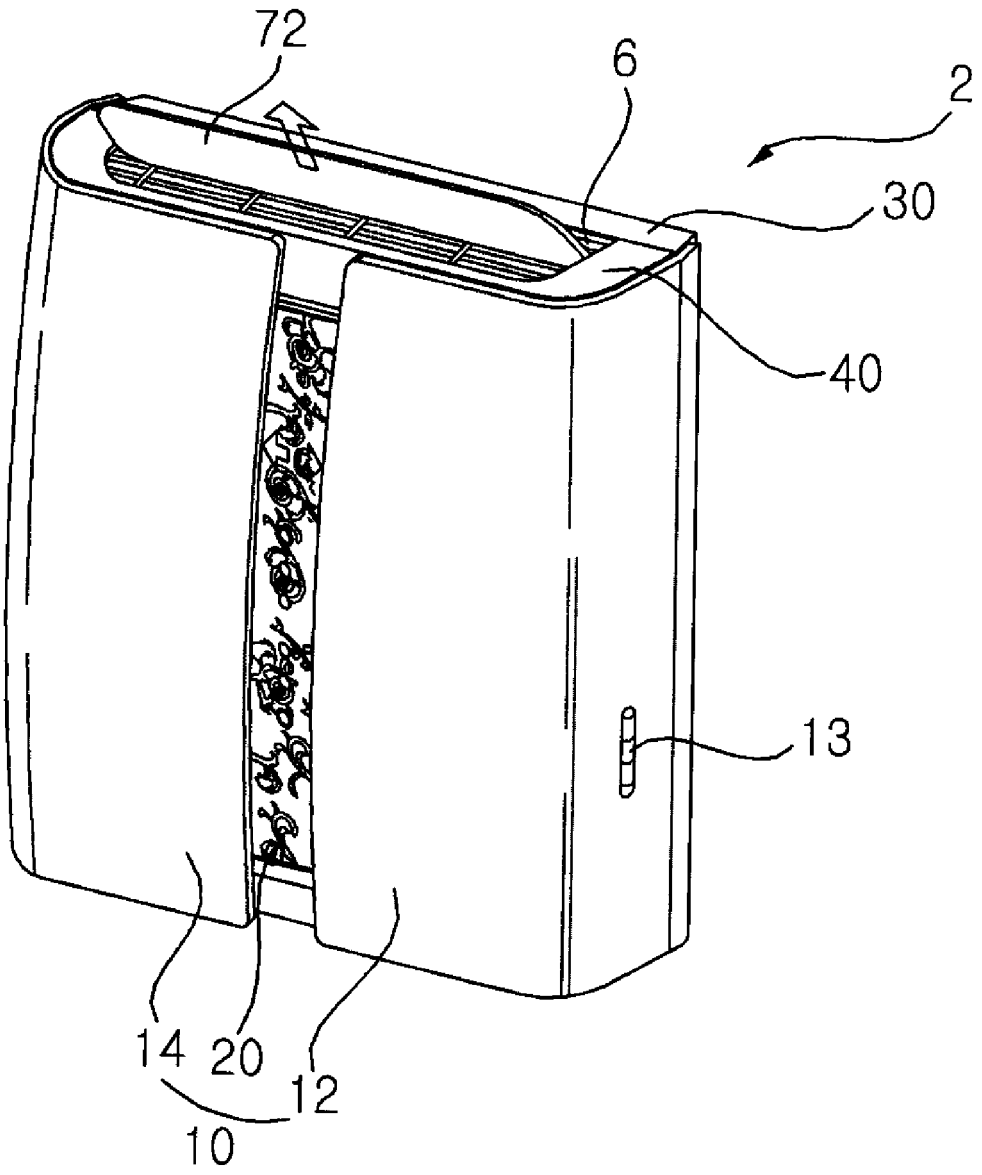
14. Humidificateur selon la revendication 13, dans lequel :

une protubérance (91) est formée dans l'unité d'installation de cuve d'eau (95), et
une portion de fixation (93d) dans laquelle est ajustée la protubérance (91) est formée dans la protubérance de déplacement (93d).

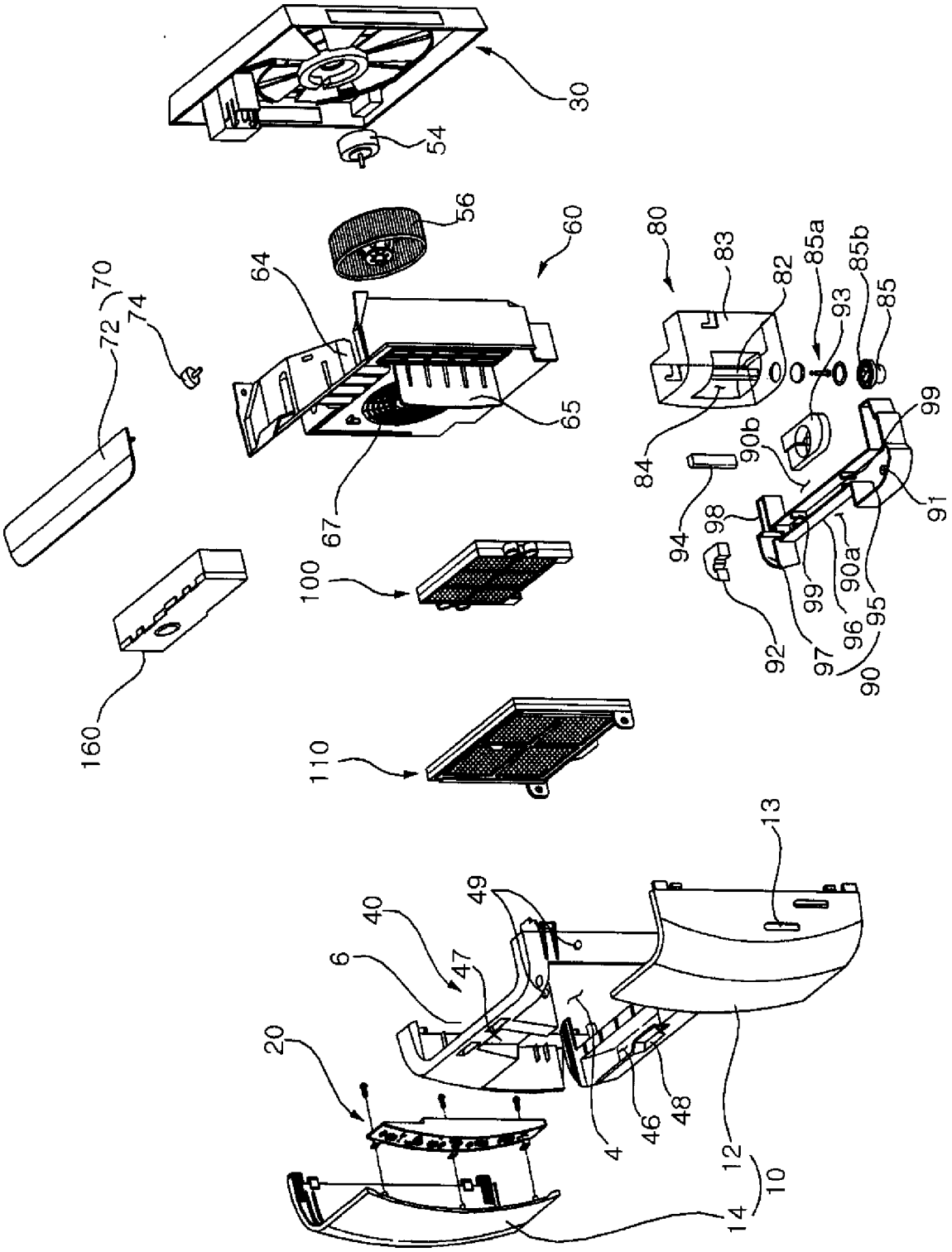
15. Humidificateur selon la revendication 1, dans lequel :

un bouchon (85) à travers lequel passe l'eau de la cuve d'eau (80) est placé dans la portion d'entrée/de sortie (80a) de la cuve d'eau (80),
un passage d'écoulement à travers lequel s'écoule l'eau est formé dans le bouchon (85),
le bouchon (85) comprend un corps de vanne (85a) pour ouvrir ou fermer le passage d'écoulement tout en se déplaçant le long du passage d'écoulement, et
une protubérance (91) pour déplacer le corps de vanne (85a) est formée dans l'unité d'installation de cuve d'eau (95).

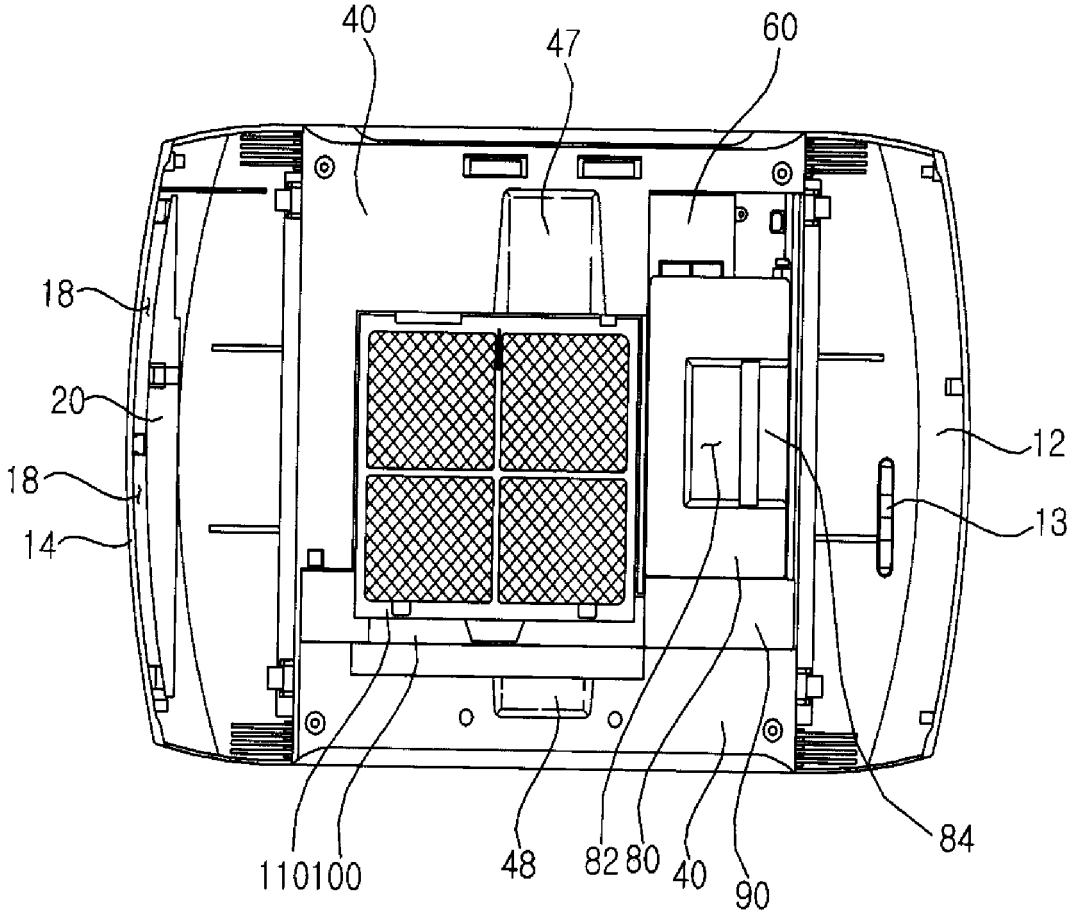
[Fig. 1]



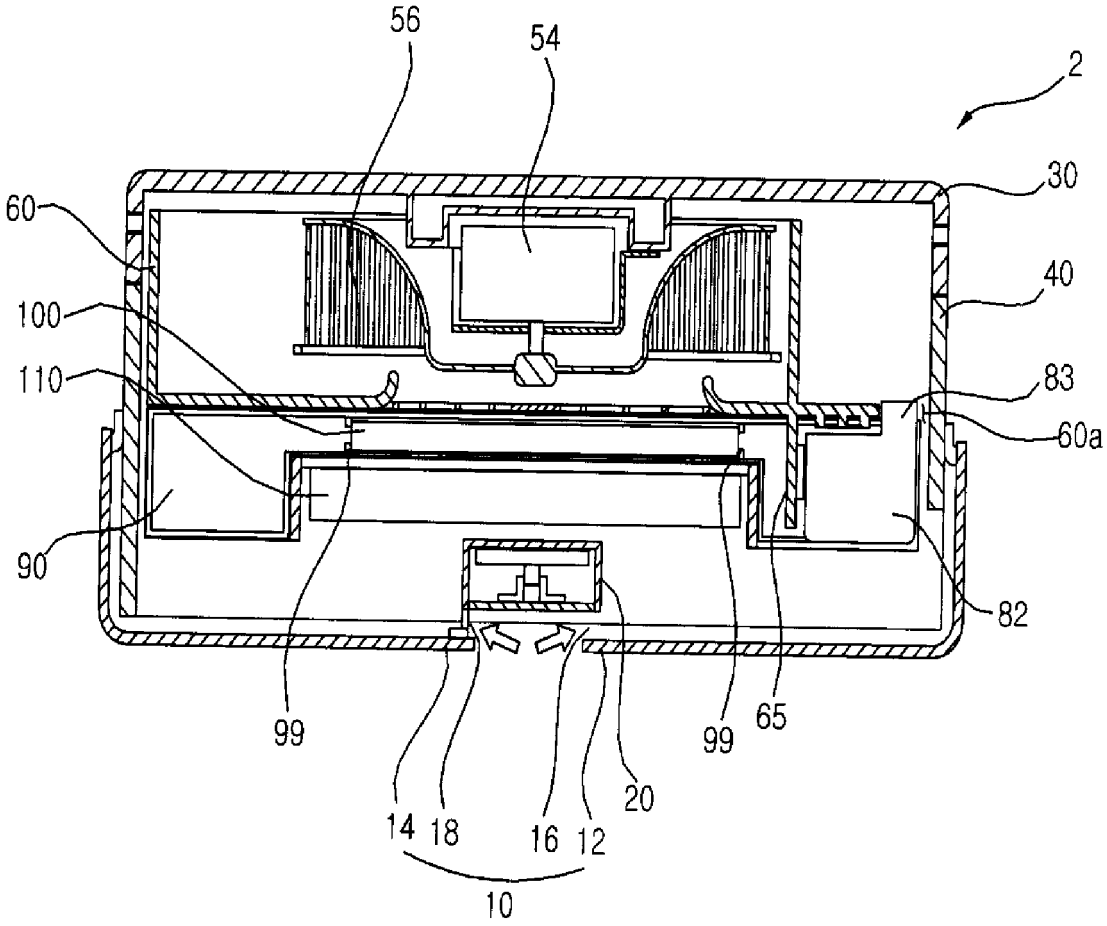
[Fig. 2]


30
54
56
60
64
65
67
70
72
74
80
82
83
84
85
85a
85b
90
90a
90b
91
92
93
94
95
96
97
98
99
100
110
160
4
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10
12
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47
48
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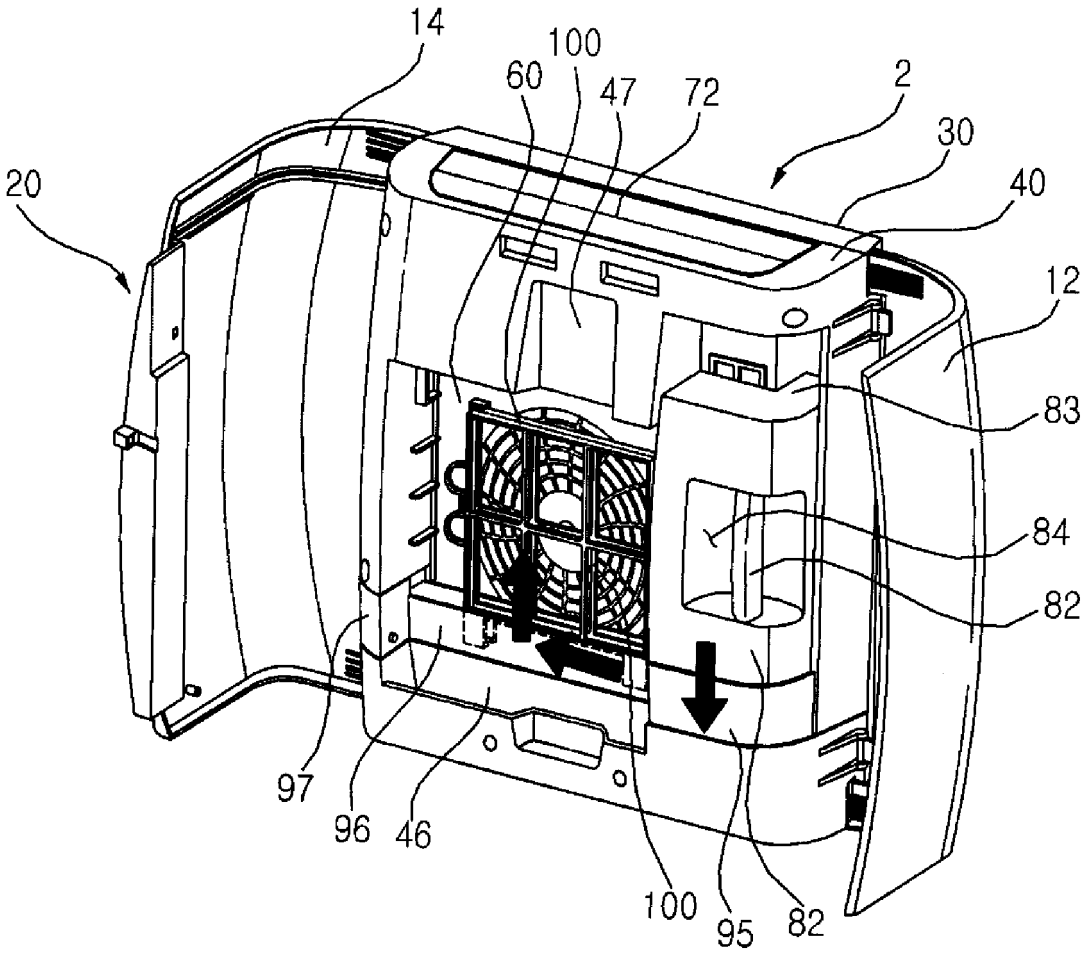
[Fig. 3]



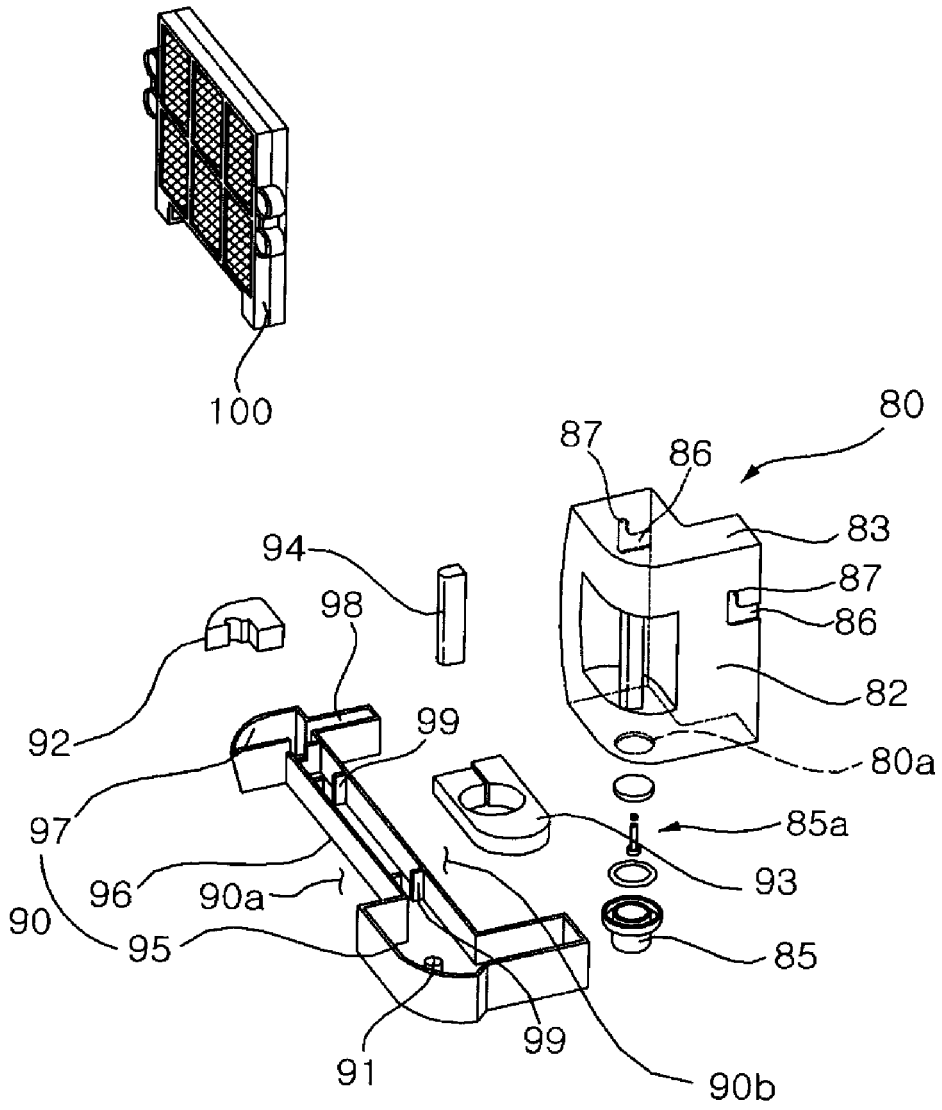
[Fig. 4]



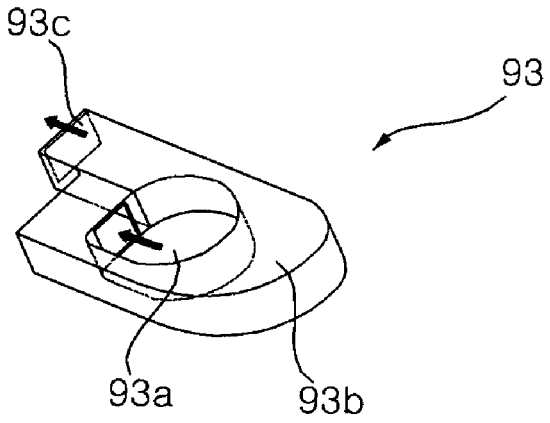
[Fig. 5]



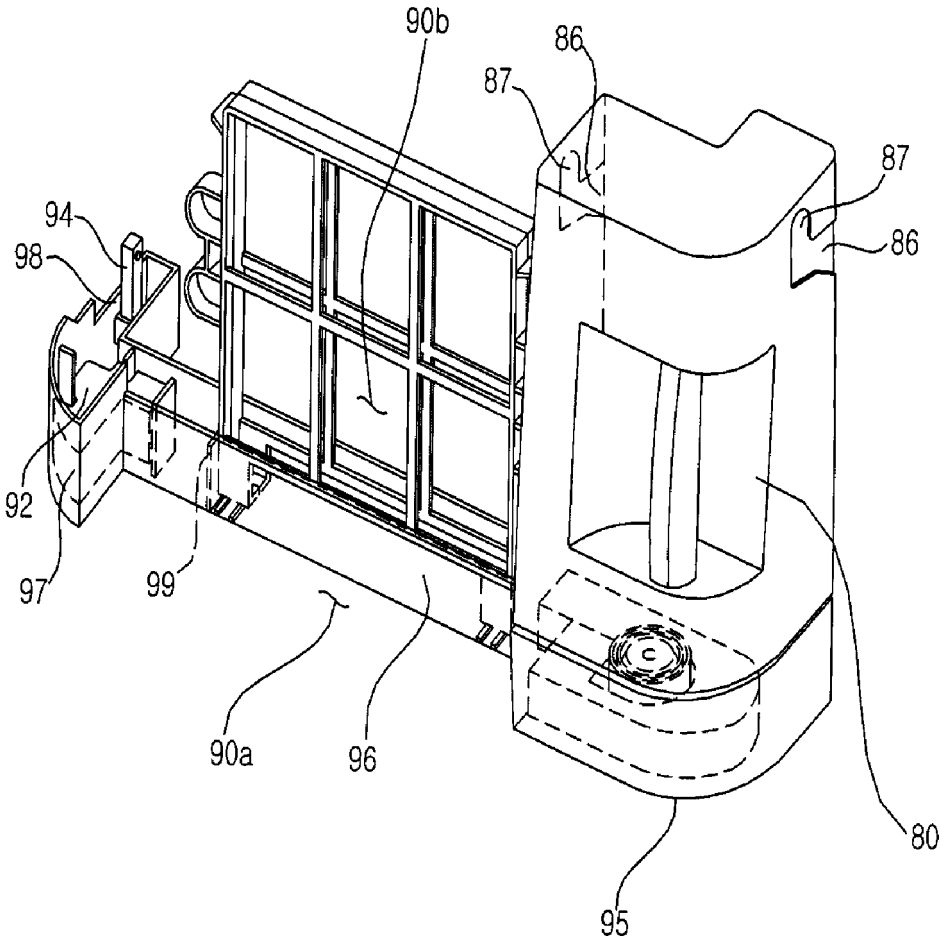
[Fig. 6]


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83
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82
80a
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85a
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90a
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90b

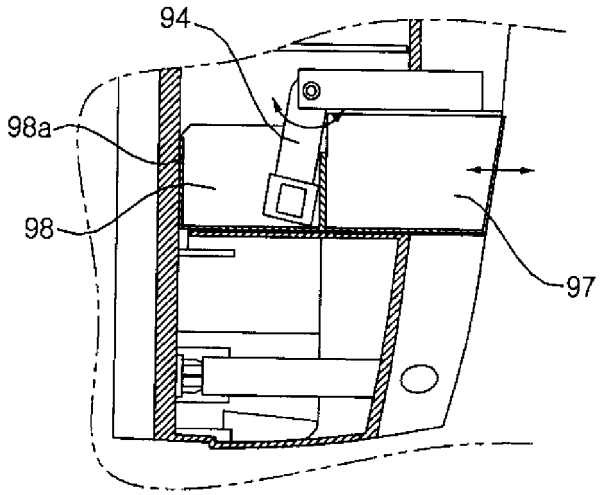
[Fig. 7]

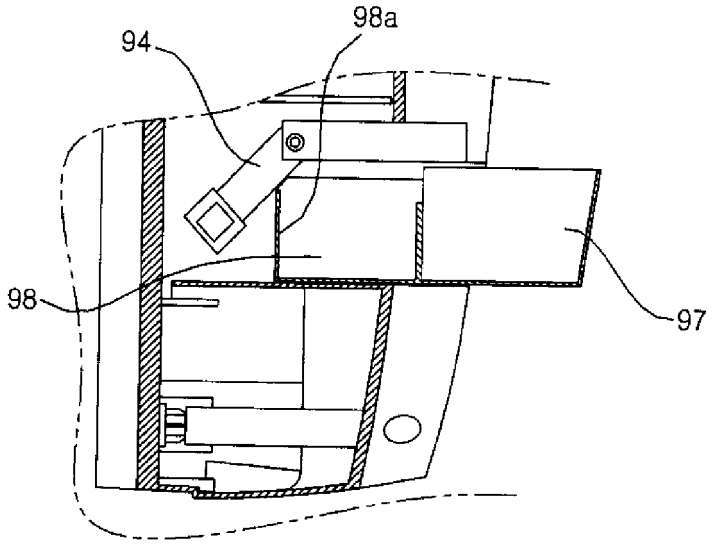

93c
93
93a
93b

[Fig. 8]

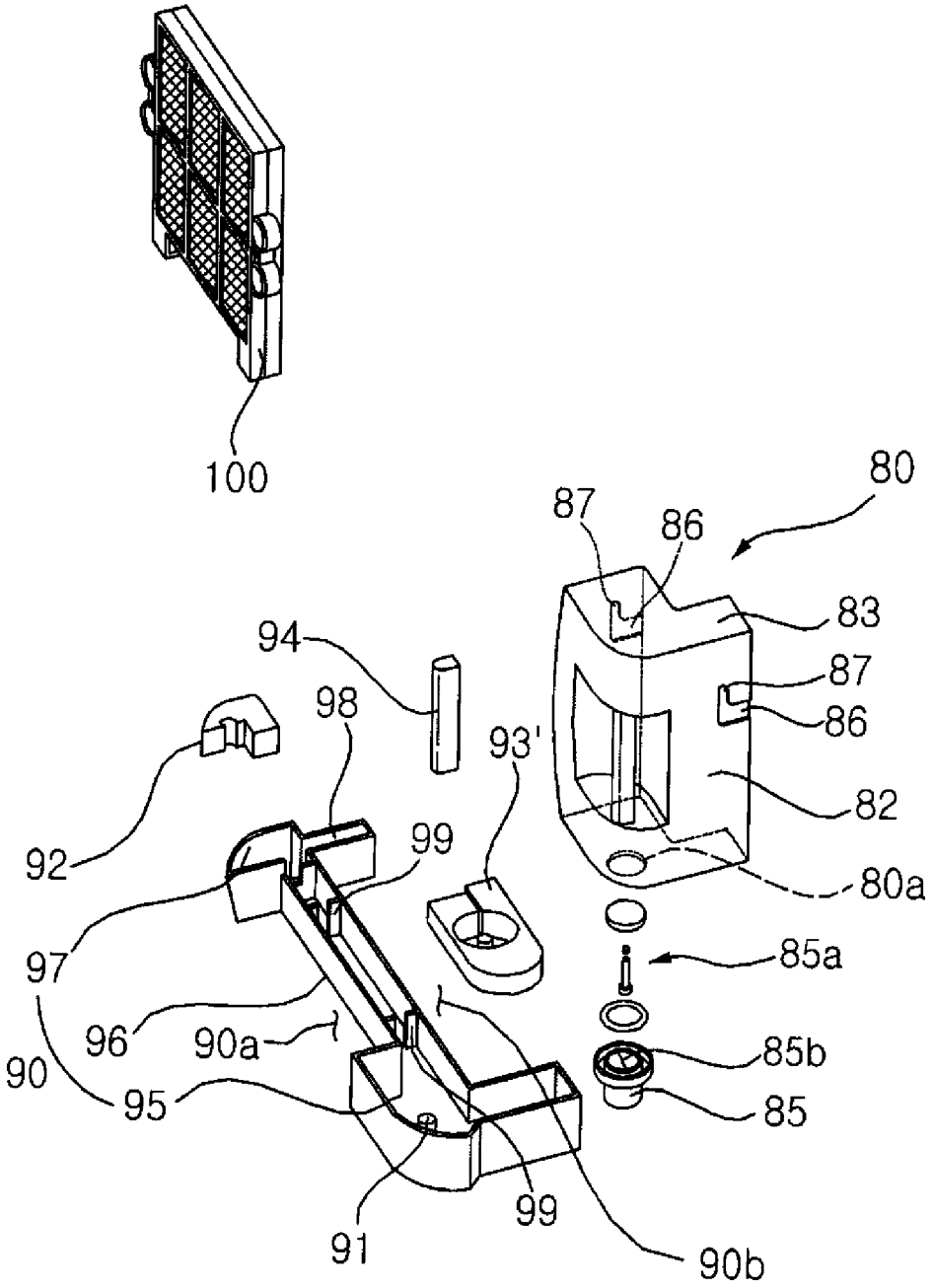


[Fig. 9]

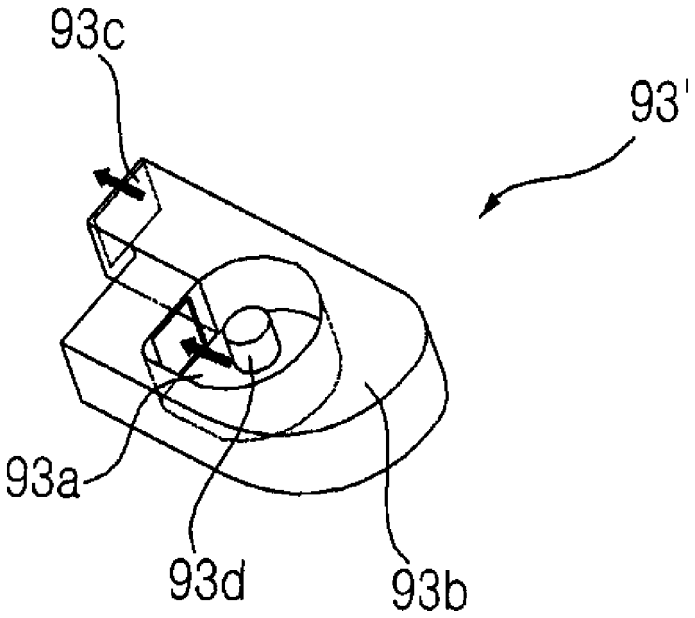




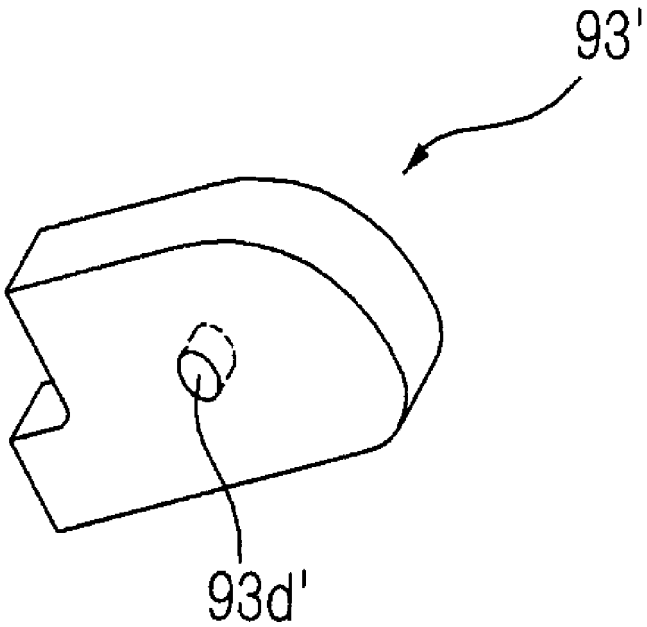
[Fig. 10]


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80a
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85a
96
90a
85b
90
95
85
99
91
90b

[Fig. 11]



[Fig. 12]



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2008035998 A **[0008]**