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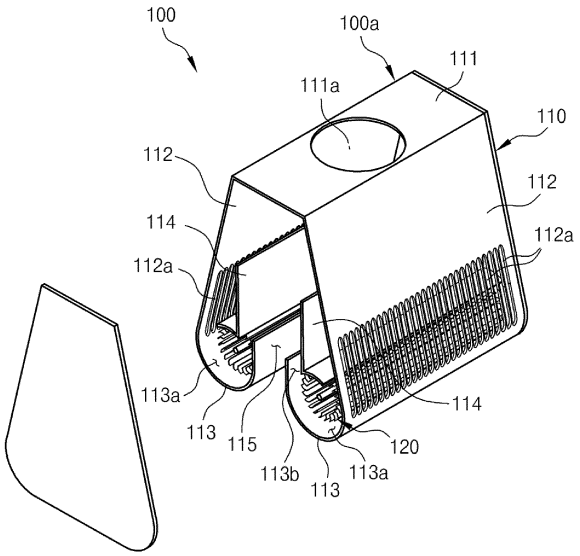
(54) AIR FLOW GENERATION DEVICE FOR HOME USE

(57) Disclosed is a device for generating airflow. According to one embodiment of the present invention, the device comprises a case for dividing inner space into a couple to be faced separately side by side in the length direction, wherein an inhalation hole and an outlet hole are formed in the space, respectively, and an opening connected to the outlet hole is formed between the space, and a couple of rotation units rotatably mounted in the space and emitting outside air from the inhalation hole to the outlet hole through mutual reverse rotation by power of a motor. In this case, airflow pulling air current between the opening holes is generated by making air pressure difference between the outlet hole and inhalation hole by the emitted air through the outlet hole.

Figure 1



EP 3 081 873 A1

Description

TECHNICAL FIELD

[0001] The present invention relates to a ceiling fan. Specifically, the present invention relates to a device for generating airflow indoor capable of increasing wind speed and air volume by pulling neighboring air current through making air pressure difference between the device and outdoor by reversely rotating two-row rotating blades facing each other in the opposite direction and applicable for a hood for kitchen, a ceiling fan, and a ventilator.

BACKGROUND ART

[0002] Devices for generating airflow for providing living convenience have been used in applications such fans, ceiling fans, hoods for kitchen, and ventilators.

[0003] Generally, electric fans for home use include a set of blades or vanes provided on a shaft and rotated around the shaft, and a drive unit rotating the blades to produce flow of air. The flow and circulation of air produces a breeze that cools for users as heat is dissipated from their skin by convection currents and evaporation.

[0004] Electric fans are divided by their types. Devices mounted on a ceiling is called as ceiling fans.

[0005] The ceiling fan is for the air circulation in indoor which mounted with the ventilator or indoor fans or mounted in the ceiling.

[0006] The ceiling fan is rotated at the center of motor axis, and a motor is fixed on a frame of a ceiling. The ceiling fan is rotated by motor's rotating to blow indoor to reduce temperature.

[0007] However, a conventional ventilator is operated when inner air temperature is higher than outer air temperature and mounted in high place and corner. Also, it is often operated for 24 hours rather than a specific time. As a result, the life thereof becomes shortened, and continuous injection of outer air makes inner air cool unnecessarily.

[0008] Additionally, hoods for kitchen performs a function to inhale smoke, vapor, and smell in cooking to emit them to the outside.

[0009] Typically, such hoods inhale polluted air such as smoke, vapor, and smell from cook utensils by a fan (not shown) to emit them through a duct (not shown) to the outside.

[0010] Mostly, the polluted air is widely spread over the kitchen than perpendicularly spread. Thus, there is an disadvantage not to effectively emit to the outside.

[0011] That is, since a conventional hood for kitchen is fixed and mounted to a sink and a distance between the hood and gas stove is far, only spread polluted air neighboring the hood is exhausted. Also, even though the hoods are operated for a long time, widely spread polluted air cannot be exhausted. As a result, smells such as food smell is continuously left and give users unpleasant feeling.

[0012] Due to long distance between the hood and the gas stove, high capacity of a rotation motor (not shown) of fans of hoods is required. Loud noise occurs when hoods are operated.

[0013] Ventilators are devices for exhausting and circulating inner air and have been widely used in factory, restaurant, parking a lot, bathe sauna, pen.

[0014] As shown in Fig.9, a conventional ventilator comprises a containing space 11 inflowing inner air, a casing scroll 10 including a guide 12 for inducing inflowed air to the outside and exhaust 13, a driving motor 20 mounted in the casing scroll 10, a rotation member 30 mounted on a rotation axis 21 of the driving motor 20 and receiving toque of the driving motor 20 to be rotated and inflowing inner air to outlet, a protecting cap 40 for protecting the rotation member 30, and a grill mounted under the casing scroll 10 and including a path 51 in which air move.

[0015] In specifically, a conventional ventilator employs a steering member 31 formed and bended with respect to a rotation direction of the rotation member 30 by the driving motor 20 as blades 31 of the rotation member 30.

[0016] Thus, the conventional rotation member 30 inflows inner air to exhaust it to the exhaust 13.

[0017] However, there is a problem that the steering member 31 of the rotation member 30 only rotates wind so that efficiency is reduced and noise is increased.

[0018] In other words, since wind quantity and wind pressure structure by rotation of the steering member 31 is far from reality, there is a limitation of capacity of power of the driving motor 20.

[0019] More concretely, wind pressure is increased in using the steering member, but efficiency according to wind pressure is reduced. Also, in order to generate a certain amount of wind quantity, the rotation member should be rotated in high speed, thereby increasing noise.

[0020] In addition, when the steering member 31 covers inflowed inner air to move it to the exhaust 13, lift force resistance is generated by rotation of the steering member. Wind power without lift force resistance from steering force is exhausted to the outside, so that wind quantity and wind pressure are reduced, thereby lowering efficiency of devices. Accordingly, there is a problem of noise increment in rotating in high speed.

SUMMARY OF THE INVENTION

[0021] It is therefore an object of the present invention to provide a device for generating airflow indoor capable of increasing wind speed and air volume by pulling neighboring air current through making air pressure difference between the device and outdoor by reversely rotating two-row rotating blades facing each other in the opposite direction.

[0022] It is another object of the present invention to

provide a device for generating airflow applied to a hood for kitchen so that polluted air therein can be emitted to the outside.

[0023] It is still another object of the present invention to provide a device for generating airflow applied to a ceiling fan to generate airflow strongly as well as vary temperature of airflow so that indoor cooling and heating can be selectively performed.

[0024] It is still another object of the present invention to provide a device for generating airflow applied to a ventilator so that polluted air therein can be emitted to the outside.

[0025] Pursuant to embodiments of the present invention, device for generating airflow comprising a case for dividing inner space into a couple to be faced separately side by side in the length direction, wherein an inhalation hole and an outlet hole are formed in the space, respectively, and an opening hole connected to the outlet hole is formed between the space and a couple of rotation units rotatably mounted in the space and emitting outside air from the inhalation hole to the outlet hole through mutual reverse rotation by power of a motor. In this case, airflow pulling air current between the opening holes is generated by making air pressure difference between the outlet hole and inhalation hole by the emitted air through the outlet hole.

[0026] Pursuant to embodiments of the present invention, the case comprises an upper unit contacting and fixed with an installation face of the device by bending rectangular board and including a duct hole thereon, a joint unit facing each other by bending both sides of the upper unit perpendicularly, a couple of space units formed toward an upper direction by curving and bending a lower part of the joint unit in a semicircle and including a space therein, and a finishing unit located on an upper part of the rotation unit mounted in the space to divide a space as well as guide airflow from the opening hole to an upper part of the joint unit.

[0027] Pursuant to embodiments of the present invention, the case comprises an upper unit perpendicularly fixed on a ceiling where the device is mounted, a space unit connected to the upper unit and forming a couple of arc-shaped spaces separated mutually therein, and a finishing unit jointed with the space unit toward a lower direction to guide the emitted air from the outlet hole to a lower part of the opening hole.

[0028] Pursuant to embodiments of the present invention, the case comprises an upper unit horizontally fixed on a surface of walls of a space where the device is mounted to connect indoor and outdoor, a space unit mounted in the upper unit and forming a couple of arc-shaped spaces separated mutually therein, and a finishing unit horizontally jointed with the space unit to guide the emitted air from the outlet hole to the opening hole.

[0029] Pursuant to embodiments of the present invention, the inhalation hole connected to the space is formed in the joint unit, and the outlet hole is formed between the finishing unit and space unit, an inlet hole is formed between the couple of space units, and the duct hole for connecting a duct is formed on the upper part.

[0030] Pursuant to embodiments of the present invention, a LED lamp is installed at the end of the finishing unit.

[0031] Pursuant to embodiments of the present invention, a heating wire is installed in the space to generate heat blow by the rotation unit.

[0032] Pursuant to embodiments of the present invention, the case includes a shield rotated by the motor to selectively open and close the opening hole.

[0033] Pursuant to embodiments of the present invention, wherein the finishing unit has a wide open inclination toward airflow.

[0034] Pursuant to embodiments of the present invention, a hood for kitchen, a ceiling fan, and a ventilator are applicable.

[0035] The foregoing summary is illustrative only and is not intended to be in any way limiting. In addition to the illustrative aspects, embodiments, and features described above, further aspects, embodiments, and features will become apparent by reference to the drawings and the following detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0036] A more complete appreciation of the invention, and many of the attendant advantages thereof, will be readily apparent as the same becomes better understood by reference to the following detailed description when considered in conjunction with the accompanying drawings in which like reference symbols indicate the same or similar components, wherein:

Fig. 1 is a perspective view of a device for generating airflow applied to a hood for kitchen according to the present invention;

Fig. 2 is a cross-sectional view of a device for generating airflow applied to a hood for kitchen according to the present invention;

Fig. 3 is an expanded sectional view of a device for generating airflow applied to a hood for kitchen according to the present invention;

Fig. 4 is a lower perspective view of a device for generating airflow applied to a ceiling fan according to the present invention;

Fig. 5 is an upper perspective view of a device for generating airflow applied to a ceiling fan according to the present invention;

Fig. 6 is a cross-sectional view of a device for generating airflow applied to a ceiling fan according to the present invention;

Fig. 7 is a perspective view of a device for generating airflow applied to a ventilator according to the present invention;

Fig. 8 is a cross-sectional view of a device for generating airflow applied to a ventilator according to the present invention; and

Fig. 9 is a cross-sectional view of a conventional fan.

DETAILED DESCRIPTION

[0037] Hereinafter, the present invention will be described in detail with reference to the drawings. In describing the present invention, detailed descriptions related to publicly known functions or configurations will be omitted in order not to obscure the gist of the present invention.

[0038] Fig. 1 is a perspective view of a device for generating airflow applied to a hood for kitchen according to the present invention. Fig. 2 is a cross-sectional view of a device for generating airflow applied to a hood for kitchen according to the present invention. Fig. 3 is an expanded sectional view of a device for generating airflow applied to a hood for kitchen according to the present invention. Fig. 4 is a lower perspective view of a device for generating airflow applied to a ceiling fan according to the present invention. Fig. 5 is an upper perspective view of a device for generating airflow applied to a ceiling fan according to the present invention. Fig. 6 is a cross-sectional view of a device for generating airflow applied to a ceiling fan according to the present invention. Fig. 7 is a perspective view of a device for generating airflow applied to a ventilator according to the present invention. Fig. 8 is a cross-sectional view of a device for generating airflow applied to a ventilator according to the present invention.

[0039] As shown in Figs. 1 to 3, a device for generating airflow 100 comprises a case 110 and a rotation unit 120.

[0040] In this case, the device for generating airflow 100 is applied to a hood for kitchen 100a and will be described.

[0041] The case 110 divides inner space 113a into a couple to be faced separately side by side in the length direction. A rotation unit 120 is installed in the space 113a to inflow outside air in the case 110 and then to emit it to the outside.

[0042] At this time, air current neighboring the case 100 is pulled by making air pressure difference between indoor and outdoor of the case 110, so that wind speed and air volume is improved.

[0043] In other words, the case 110 is formed by bending a board made by metal several times.

[0044] Concretely, the case 110 comprises an upper unit 111 contacting and fixed with an installation face of the device 100 by bending rectangular board and including a duct hole 111a thereon, a joint unit 112 facing each other by bending both sides of the upper unit perpendicularly, a couple of space 113 units formed toward an upper direction by curving and bending a lower part of the joint unit 112 in a semicircle and including a space 113a therein, and a finishing unit 114 located on an upper part of the rotation unit 120 mounted in the space 113a to divide a space as well as guide airflow from the opening hole 115 to an upper part of the joint unit 112.

[0045] The inhalation hole 112a connected to the space 113a is formed in the joint unit 112, and the outlet hole 113b is formed between the finishing unit 114 and space unit 113, an inlet hole 113b is formed between the couple of space units 113, and the duct hole 111a for connecting a duct is formed on the upper part.

[0046] Through driving of the rotation unit 120, polluted air inflows into the space 113a by the inhalation hole 112a of the case 110, and then emits it by the outlet hole 113b.

[0047] The air pressure difference between the outlet hole 113b and the opening hole 115 by the emitted air from the outlet hole 113b, and thereby having air current pulling neighboring air current between the opening holes 115.

[0048] In addition, the finishing unit 114 is located on an upper part of the space 113a and extends the opening hole 115 to guide air current to duct hole 111a.

[0049] The finishing unit 114 has a wide open inclination toward airflow.

[0050] The reason for this is that if air with velocity is emitted through the outlet hole 113b, the power of air acts from high pressure to low pressure. As a result, the air with improved wind speed and air volume pulling air neighboring the opening hole is introduced through the finishing unit having wide open inclination, and thereby more extending wind speed and air volume.

[0051] After that, polluted air is emitted to the duct hole 111a.

[0052] Furthermore, a plurality of blades 122 are mounted on a circumference of a central axis 121 having a predetermined length in equal interval in the rotation unit 120, which is mounted in the space 113a.

[0053] Also, a motor 123 is electromotively jointed with one end of the rotation unit 120.

[0054] As mentioned above, the device 100 for generating airflow applied to the hood for kitchen 100a will be described hereinafter.

[0055] If air flow is created through the blades 122 by driving the rotation unit 120 in the space 113a, outside air is inhaled through the inhalation holes 112a to the space 113a.

[0056] In this case, a couple of rotation units 120 is rotated in the opposite direction mutually.

[0057] Then, outside air inflowed into the inhalation hole 112a is introduced through the space 113a to the outlet hole 113b and then emitted to the opening hole 115.

[0058] At this time, air pressure difference between the space 113a where air current is generated and the opening hole 115 is made to pull air neighboring the opening hole 115 and pull air emitted to the outlet hole 113b and polluted air neighboring the opening hole 115. Then, the pulled air is meet to improve wind speed and air volume.

[0059] By introducing polluted air with improved wind speed and air volume through the finishing unit 114 to the duct hole 111a, the flow velocity of air current through inclination of the finishing unit 114 becomes fast, thereby speedily exhausting and circulating air.

[0060] Resultantly, according to the device for generating airflow 100 applied to the hood for kitchen 110a, air can flow by reversely rotating a couple of rotation unit

120 facing, and air flows from a lower direction to an upper direction, and thereby emitting polluted air to the outside.

[0061] As shown in Figs. 4 to 6, a device for generating airflow 100 comprises a case 110 and a rotation unit 120.

[0062] In this case, the device 100 is applied to a ceiling fan 110b and will be described.

[0063] The above-mentioned device 100 is mounted on ceiling in the space 113a.

[0064] In other words, a pipe-shaped upper part having a predetermined length 111 is perpendicularly mounted with respect to the ceiling.

[0065] The device 100 is supported on the upper part 111 to be mounted separating from the ceiling.

[0066] And, a device for generating airflow comprises a case 110 and a rotation unit 120.

[0067] The case 110 has a predetermined length and is formed in a streamlined-framed shape.

[0068] That is, the case divides inner space 113a into a couple to be faced separately side by side in the length direction, and the inhalation hole 112a and the outlet hole 113b are formed in the space 113a, respectively, and the opening 115 connected to the outlet hole is formed between the space 113a.

[0069] The rotation unit 120 is prepared as a couple and rotatably mounted in the space 113a and emitting outside air from the inhalation hole 112a to the outlet hole 113b through mutual reverse rotation by power of the motor 123.

[0070] Through this, air pressure difference between the space 113a where air current is generated and the opening hole 115 is made to pull air neighboring the opening hole 115 and pull air emitted to the outlet hole 113b and polluted air neighboring the opening hole 115. Then, the pulled air is meet to improve wind speed and air volume.

[0071] The concrete construction of the case 110 will be described hereinafter.

[0072] The case comprises an upper unit 111 perpendicularly fixed on a ceiling where the device is mounted, a space unit 113 connected to the upper unit 111 and forming a couple of arc-shaped spaces 113a separated mutually therein, and a finishing unit 114 jointed with the space unit 113 toward a lower direction to guide the emitted air from the outlet hole 113b to a lower part of the opening hole115.

[0073] The finishing unit 114 has wide open inclination toward a lower part.

[0074] The reason for this is that if air with velocity is emitted through the outlet hole 113b, the power of air acts from high pressure to low pressure. As a result, the air with improved wind speed and air volume pulling air neighboring the opening hole is introduced through the finishing unit having wide open inclination, and thereby more extending wind speed and air volume.

[0075] Furthermore, a plurality of blades 122 are mounted on a circumference of a central axis 121 having a predetermined length in equal interval in the rotation unit 120, which is mounted in the space 113a.

[0076] Also, a motor 123 is electromotively jointed with one end of the rotation unit 120.

[0077] As mentioned above, the device 100 for generating airflow applied to the ceiling fan 100b will be described hereinafter.

[0078] In advance, if the rotation unit 120 is driven in the space 113a to generate airflow by blades 122, outer air is inhaled through inhalation hole 112a to the space 113a.

[0079] The pair of rotation units 120 is rotated conversely.

[0080] In this case, outer air inflowed to the inhalation hole 112a is induced via the space 113a to the outlet hole 113b to be emitted to the opening hole 115.

[0081] At this time, air pressure difference between the space 113a where air current is generated and the opening hole 115 is made to pull air neighboring the opening hole 115 and pull air emitted to the outlet hole 113b and polluted air neighboring the opening hole 115. Then, the pulled air is meet to improve wind speed and air volume.

[0082] By introducing polluted air with improved wind speed and air volume through the finishing unit 114, the flow velocity of air current through inclination of the finishing unit 114 becomes fast, thereby speedily exhausting and circulating air.

[0083] Resultantly, the device for generating airflow applied to the ceiling fan 100b generates airflow strongly as well as vary temperature of airflow so that indoor cooling and heating can be selectively performed.

[0084] In addition, a LED lamp is mounted on circumference of a lower part of the case 110.

[0085] This performs cooling effect through the household device for generating airflow 100 in indoor space as well as lighting fixtures at the same time.

[0086] A heating wire 140 is installed in the space 113a to generate heat blow by the rotation unit 120.

[0087] In lowering temperature indoors, airflow is created by rotation of the rotation unit 120 to circulate cool air, thereby obtaining cooling effect.

[0088] To the contrary, in increasing temperature indoors, the heating wire 140 is heated by electrical resistance of the heating wire 140 by applying current. As a result, when air inflows through the opening hole 115 by rotation of the rotation unit 120 to the lower part, temperature is varied by warm air to circulate warm current of air indoors.

[0089] As shown in Figs. 7 and 8, a device for generating airflow 100 comprises a case 110 and a rotation unit 120.

[0090] In this case, the device for generating airflow 100 is applied to a ventilator 100c and will be described.

[0091] The device 100 is mounted on a surface of walls.

[0092] The case divides inner space 113a into a couple to be faced separately side by side in the length direction, and the inhalation hole 112a and the outlet hole 113b are formed in the space 113a, respectively, and the opening 115 connected to the outlet hole is formed between the

space 113a.

[0093] The rotation unit 120 is prepared as a couple and rotatably mounted in the space 113a and emitting outside air from the inhalation hole 112a to the outlet hole 113b through mutual reverse rotation by power of the motor 123. Through this, air pressure difference between the space 113a where air current is generated and the opening hole 115 is made to pull air neighboring the opening hole 115 and pull air emitted to the outlet hole 113b and polluted air neighboring the opening hole 115. Then, the pulled air is meet to improve wind speed and air volume.

[0094] The case comprises an upper unit 111 perpendicularly fixed on a ceiling where the device is mounted, a space unit 113 connected to the upper unit 111 and forming a couple of arc-shaped spaces 113a separated mutually therein, and a finishing unit 114 jointed with the space unit 113 toward a lower direction to guide the emitted air from the outlet hole 113b to a lower part of the opening hole115.

[0095] The case 110 includes a shield 150 rotated by the motor 123 in the end of the opening hole 115 to selectively open and close the opening hole 115.

[0096] And, the finishing unit 114 has wide open inclination toward a airflow direction.

[0097] The reason for this is that if air with velocity is emitted through the outlet hole 113b, the power of air acts from high pressure to low pressure. As a result, the air with improved wind speed and air volume pulling air neighboring the opening hole is introduced through the finishing unit having wide open inclination, and thereby more extending wind speed and air volume.

[0098] As mentioned above, the device 100 for generating airflow applied to the ventilator 100c will be described hereinafter.

[0099] In advance, if the rotation unit 120 is driven in the space 113a to generate airflow by blades 122, outer air is inhaled through inhalation hole 112a to the space 113a.

[0100] The pair of rotation units 120 is rotated conversely.

[0101] In this case, outer air inflowed to the inhalation hole 112a is induced via the space 113a to the outlet hole 113b to be emitted to the opening hole 115.

[0102] At this time, air pressure difference between the space 113a where air current is generated and the opening hole 115 is made to pull air neighboring the opening hole 115 and pull air emitted to the outlet hole 113b and polluted air neighboring the opening hole 115. Then, the pulled air is meet to improve wind speed and air volume.

[0103] By introducing polluted air with improved wind speed and air volume through the finishing unit 114, the flow velocity of air current through inclination of the finishing unit 114 becomes fast, thereby speedily exhausting and circulating air.

[0104] Resultantly, the device for generating airflow applied to the ceiling fan 100b generates airflow strongly as well as vary temperature of airflow so that indoor cooling and heating can be selectively performed.

[0105] Resultantly, according to the device for generating airflow 100 applied to the hood for kitchen 110a, air can flow by reversely rotating a couple of rotation unit 120 facing, and air flows from a lower direction to an upper direction, and thereby emitting polluted air to the outside.

[0106] According to the present invention, the device for generating airflow comprises a case for dividing inner space into a couple to be faced separately side by side in the length direction, wherein an inhalation hole and an outlet hole are formed in the space, respectively, and an opening hole connected to the outlet hole is formed between the space, and a couple of rotation units rotatably mounted in the space and emitting outside air from the inhalation hole to the outlet hole through mutual reverse rotation by power of a motor. In this case, a couple of rotation units are rotated in the opposite direction to flow air and pull neighboring air current to increase wind quantity and wind speed so that effective blowing distance and wind quantity can be increased according to increment of lift force of air current.

[0107] Also, the device for generating airflow applied to a hood for kitchen is capable of emitting polluted air to the outside.

[0108] In addition, the device for generating airflow applied to the ceiling fan can generate airflow strongly as well as vary temperature of airflow so that indoor cooling and heating can be selectively performed.

[0109] And, the device for generating airflow applied to the ventilator is capable of emitting polluted air the outside.

[0110] Further, the device for generating airflow applied to the ventilator rotates two rotation units in the length direction instead of a conventional ventilator as plural for circulating more air, so that it is possible to reduce installation and management expenses.

[0111] Furthermore, the device for generating airflow applied to the ventilator can selectively open and close the opening hole through the shield according to use or not, and thereby improving aesthetic.

[0112] As described above, the exemplary embodiments have been described and illustrated in the drawings and the specification. The exemplary embodiments were chosen and described in order to explain certain principles of the invention and their practical application, to thereby enable others skilled in the art to make and utilize various exemplary embodiments of the present invention, as well as various alternatives and modifications thereof. As is evident from the foregoing description, certain aspects of the present invention are not limited by the particular details of the examples illustrated herein, and it is therefore contemplated that other modifications and applications, or equivalents thereof, will occur to those skilled in the art. Many changes, modifications, variations and other uses and applications of the present construction will, however, become apparent to those skilled in the art after considering the specification and

the accompanying drawings. For instance, in some embodiment of the present invention, the patterns of the sensor electrodes are embossed in the sensor layer and conductive materials may be filled in the embossed pattern, but the patterns of the sensor electrodes may be engraved in the sensor layers.

[0113] All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention which is limited only by the claims which follow.

Claims

1. A device for generating airflow comprising:

a case for dividing inner space into a couple to be faced separately side by side in the length direction, wherein an inhalation hole and an outlet hole are formed in the space, respectively, and an opening hole connected to the outlet hole is formed between the space; and
a couple of rotation units rotatably mounted in the space and emitting outside air from the inhalation hole to the outlet hole through mutual reverse rotation by power of a motor,

wherein airflow pulling air current between the opening holes is generated by making air pressure difference between the outlet hole and inhalation hole by the emitted air through the outlet hole.

2. The device of claim 1, wherein the case comprises:

an upper unit contacting and fixed with an installation face of the device by bending rectangular board and including a duct hole thereon;
a joint unit facing each other by bending both sides of the upper unit perpendicularly;
a couple of space units formed toward an upper direction by curving and bending a lower part of the joint unit in a semicircle and including a space therein; and
a finishing unit located on an upper part of the rotation unit mounted in the space to divide a space as well as guide airflow from the opening hole to an upper part of the joint unit.

3. The device of claim 1, wherein the case comprises:

an upper unit perpendicularly fixed on a ceiling where the device is mounted;
a space unit connected to the upper unit and forming a couple of arc-shaped spaces separated mutually therein; and
a finishing unit jointed with the space unit toward a lower direction to guide the emitted air from the outlet hole to a lower part of the opening hole.

4. The device of claim 1, wherein the case comprises:

an upper unit horizontally fixed on a surface of walls of a space where the device is mounted to connect indoor and outdoor;
a space unit mounted in the upper unit and forming a couple of arc-shaped spaces separated mutually therein; and
a finishing unit horizontally jointed with the space unit to guide the emitted air from the outlet hole to the opening hole.

5. The device of claim 2, wherein the inhalation hole connected to the space is formed in the joint unit, and the outlet hole is formed between the finishing unit and space unit, an inlet hole is formed between the couple of space units, and the duct hole for connecting a duct is formed on the upper part.

6. The device of claims 3, wherein a LED lamp is installed at the end of the finishing unit.

7. The device of claim 3, wherein a heating wire is installed in the space to generate heat blow by the rotation unit.

8. The device of claim 4, wherein the case includes a shield rotated by the motor to selectively open and close the opening hole.

9. The device of any one of claims 2, 3, and 4, wherein the finishing unit has a wide open inclination toward airflow.

10. The device of claim 1, wherein a hood for kitchen, a ceiling fan, and a ventilator are applicable.

Figure 1

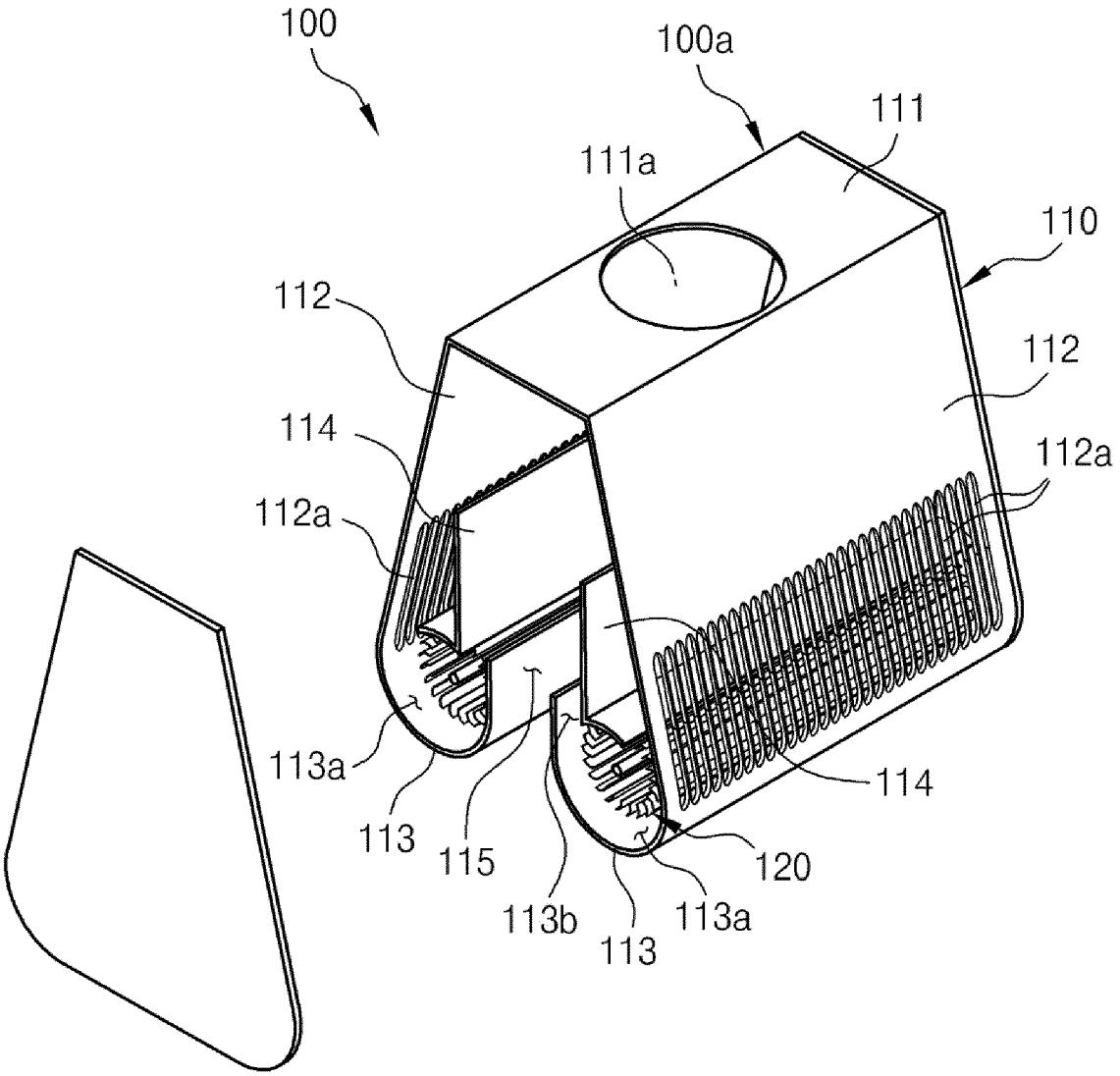

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Figure 2

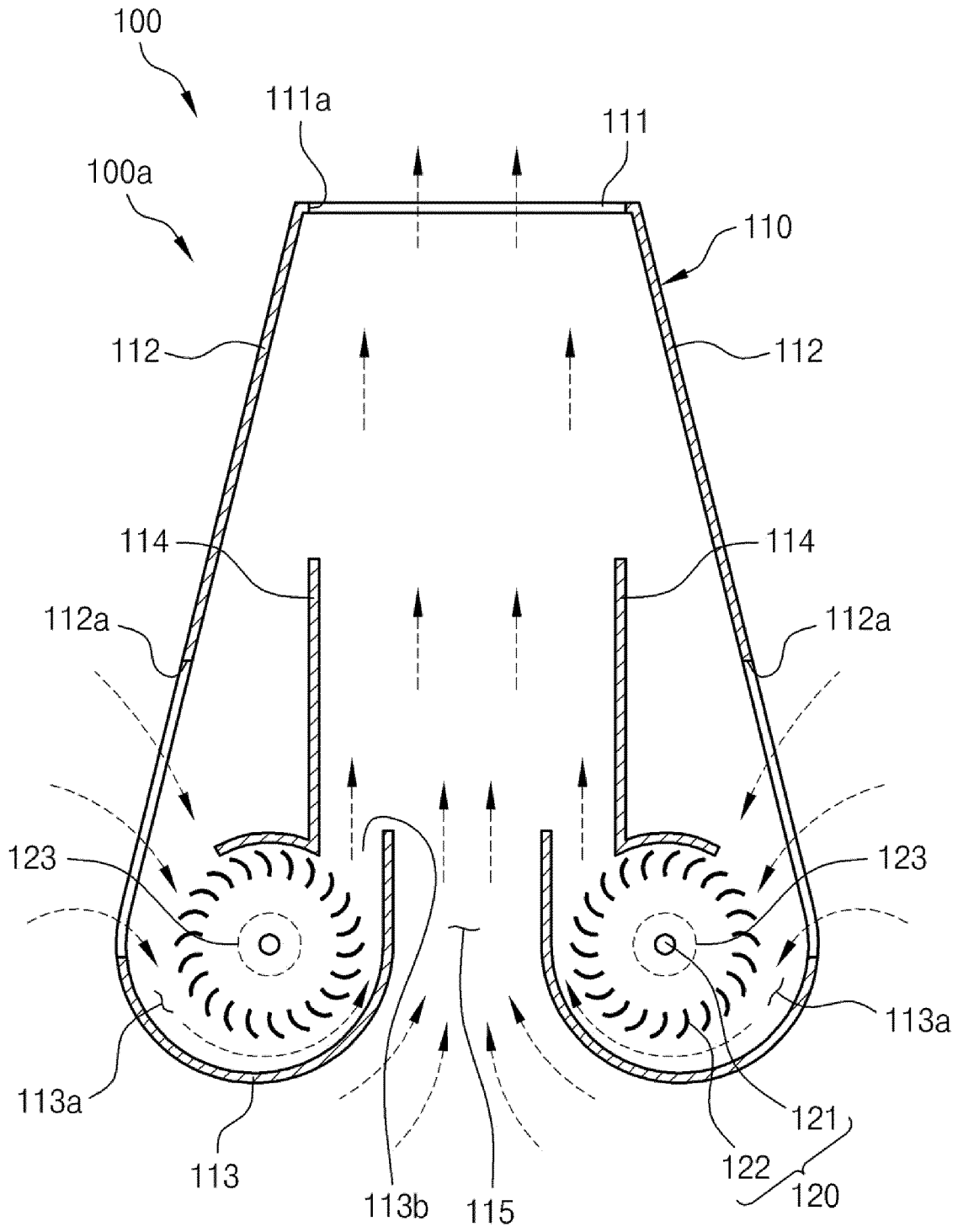
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Figure 3

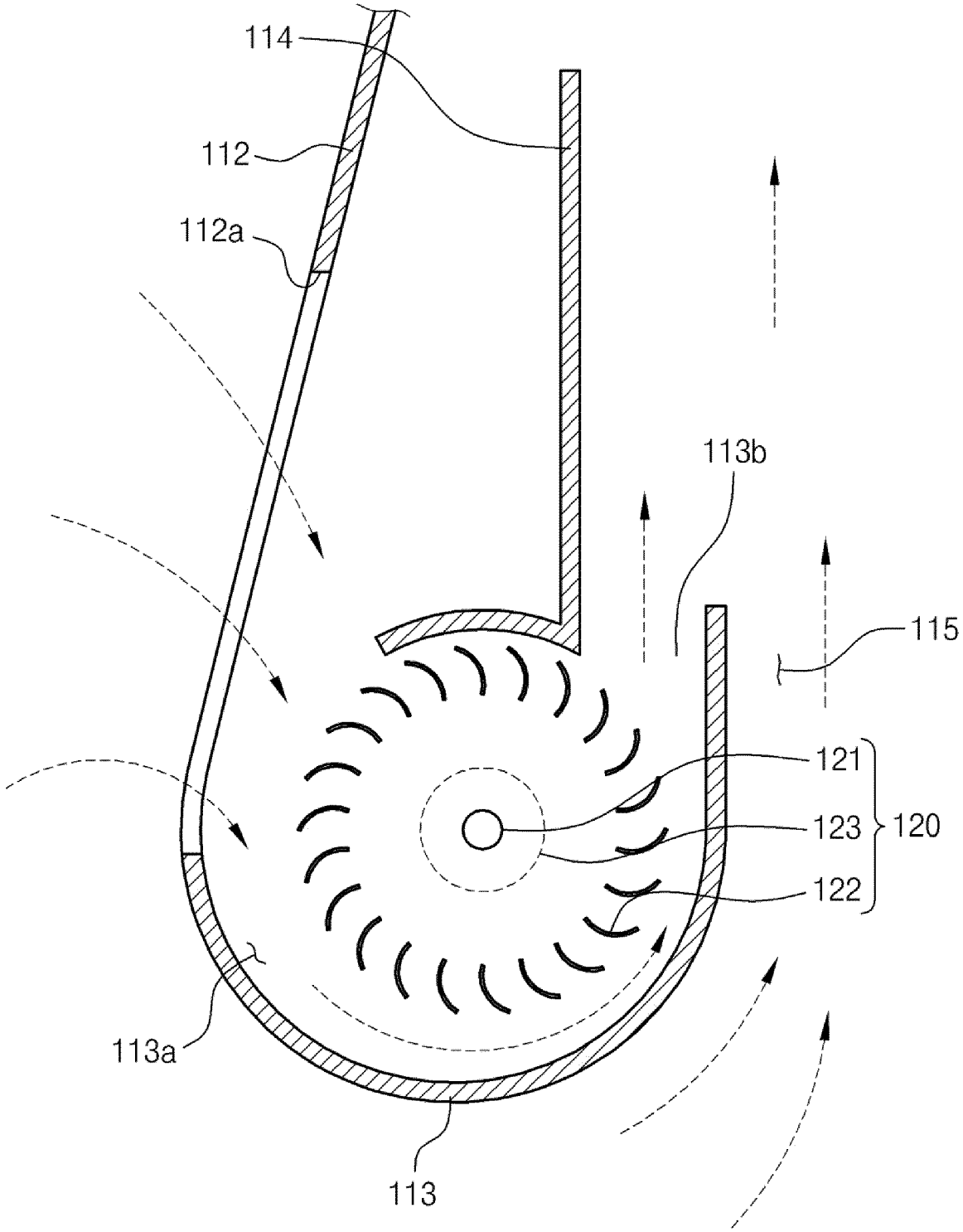
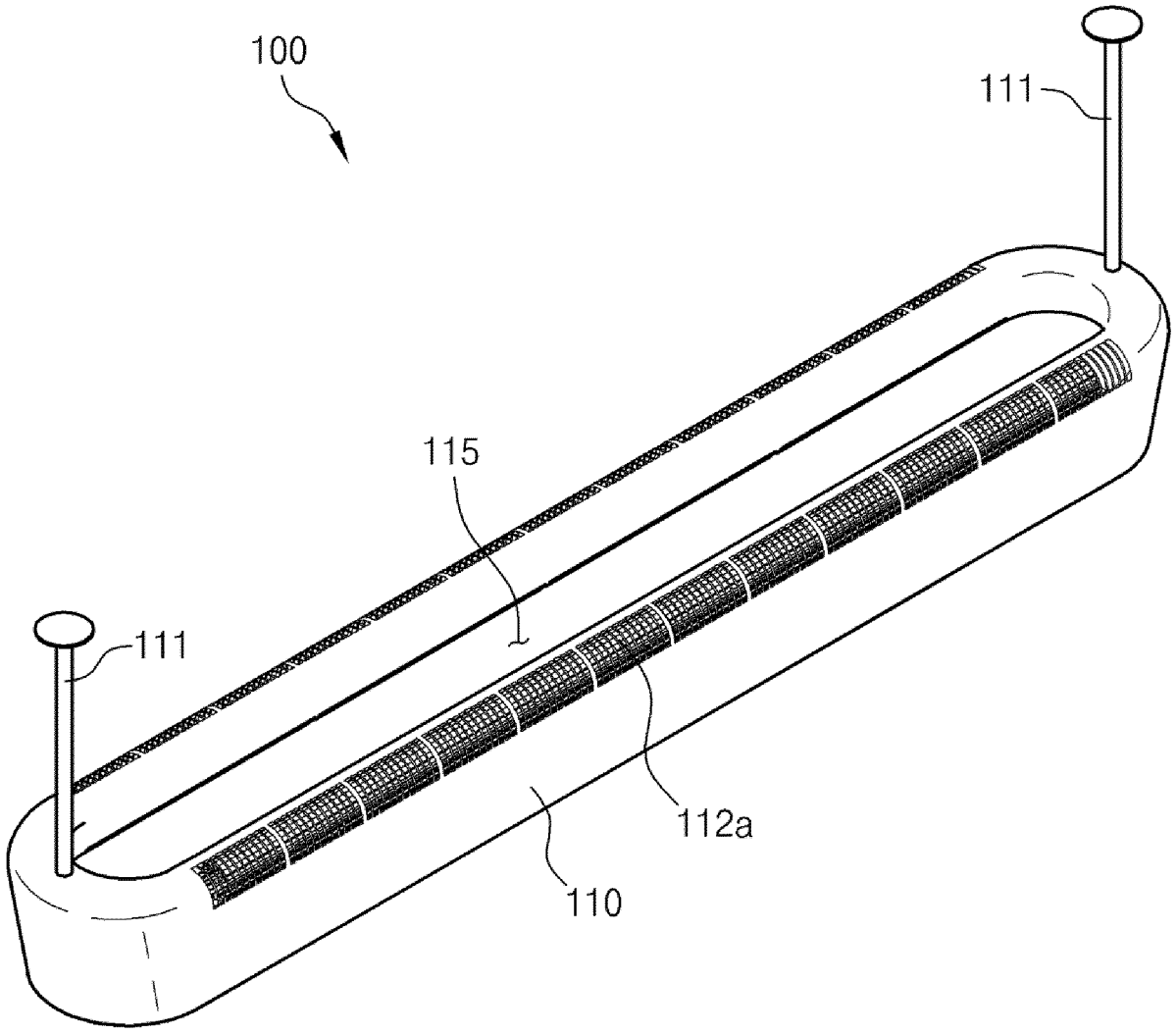


Figure 4



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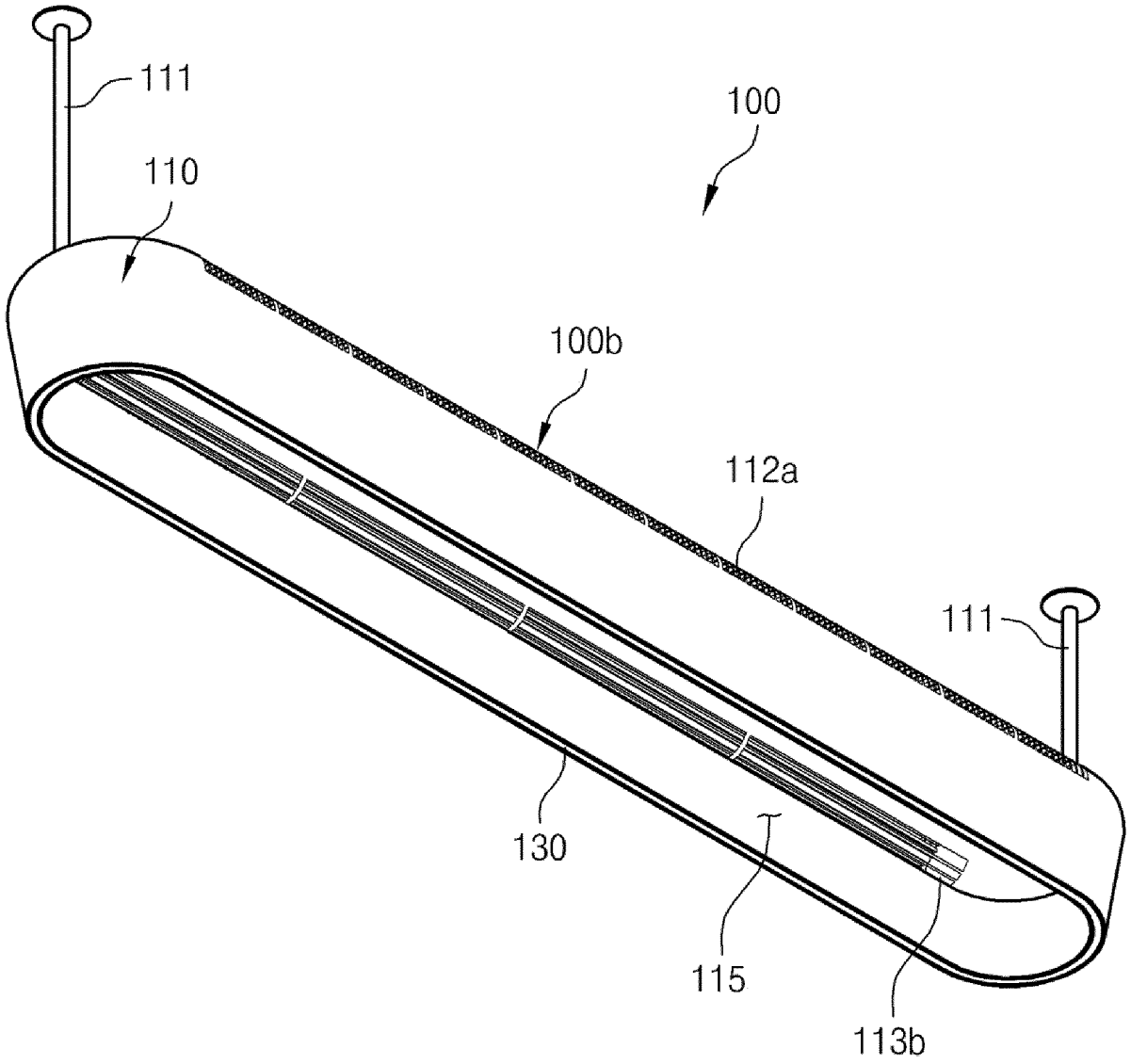
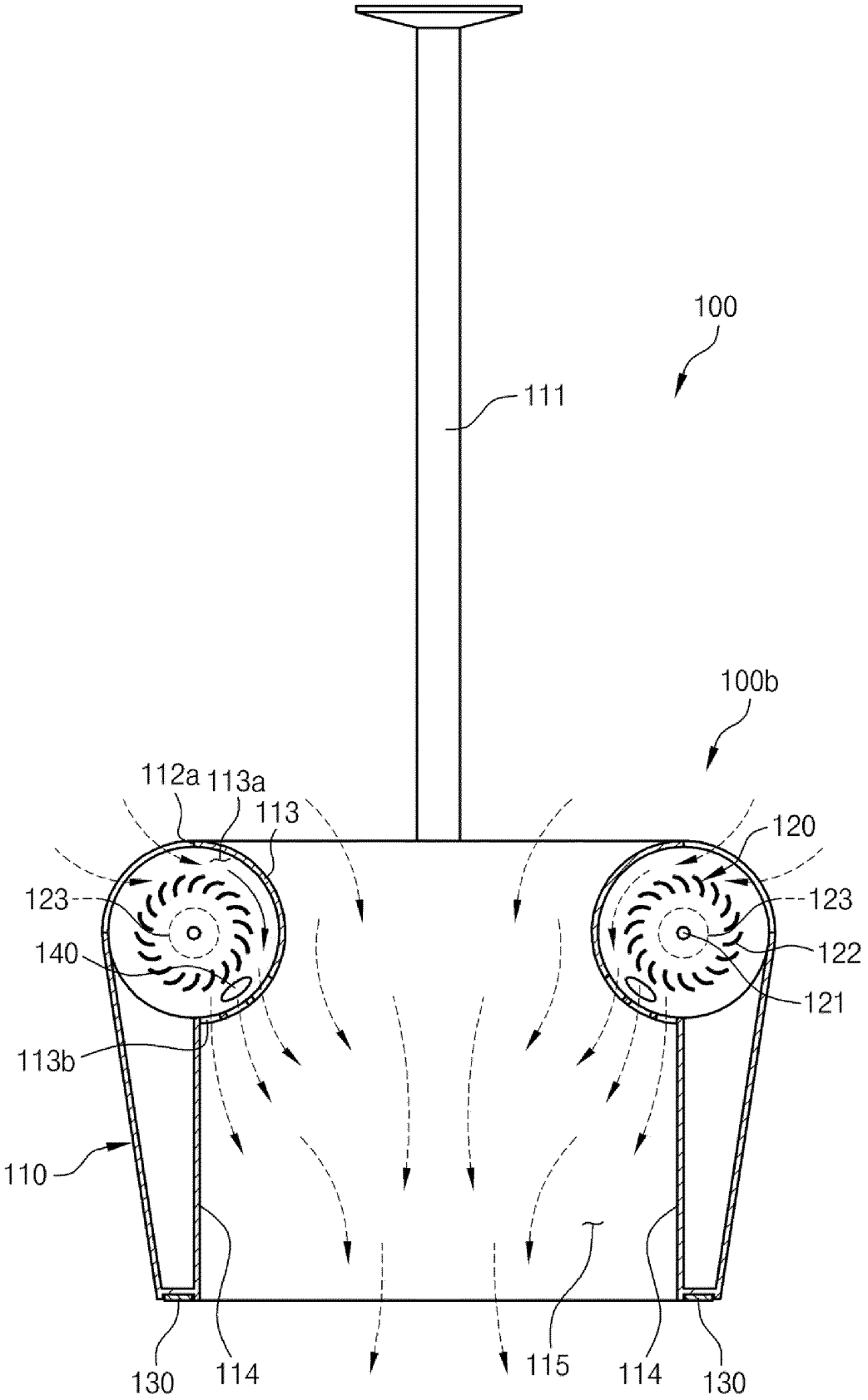


Figure 6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113a
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140
122
121
113b
110
130
114
115
114
130

Figure 7

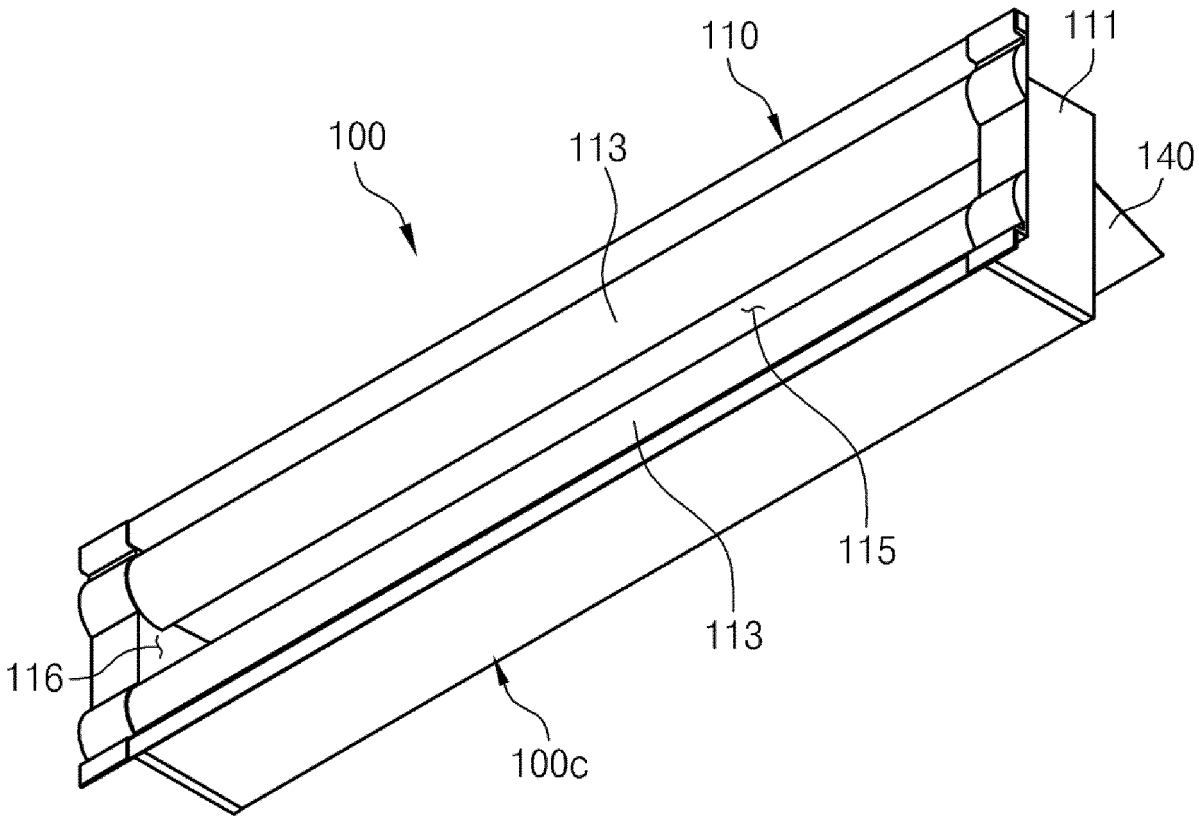
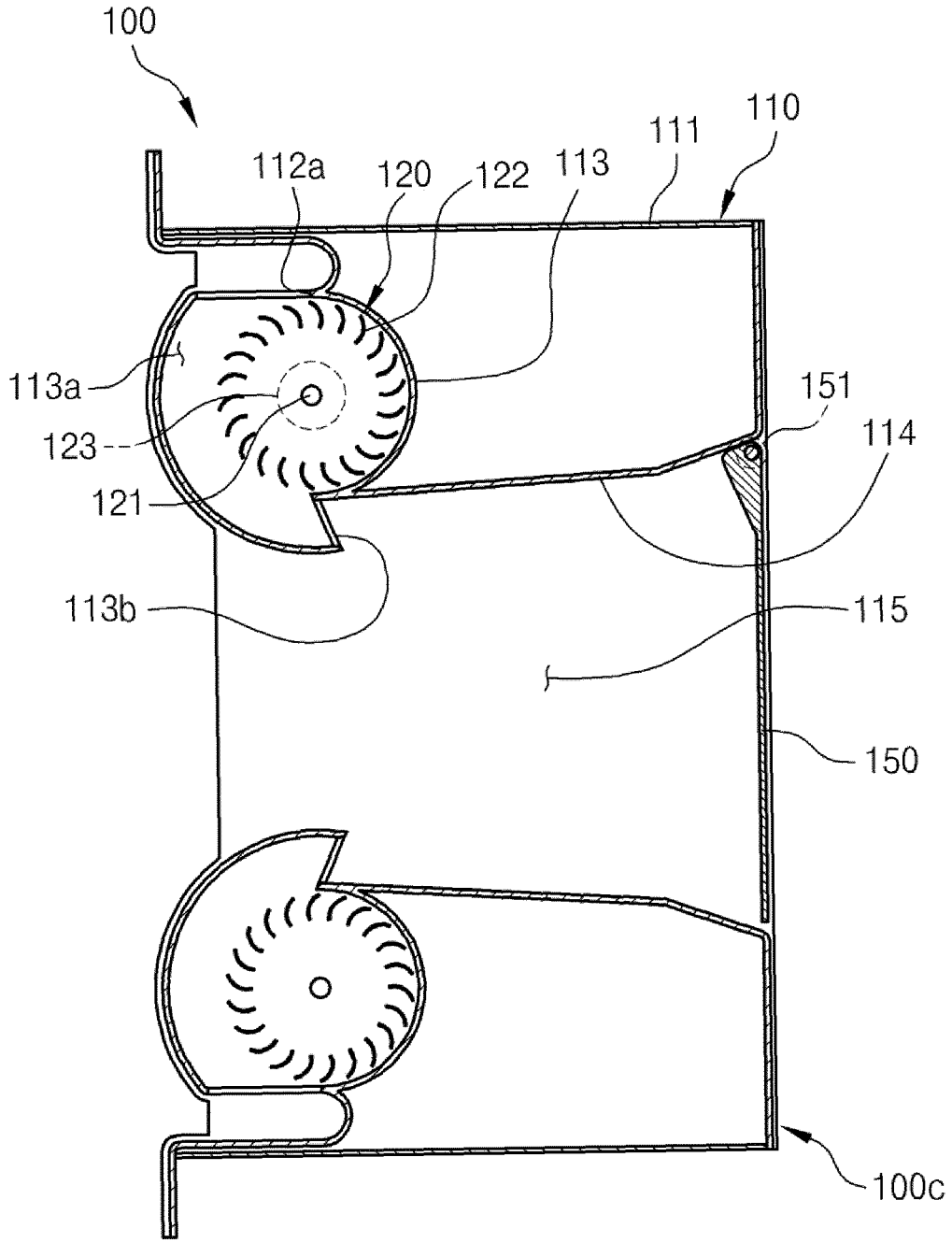


Figure 8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113a
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121
151
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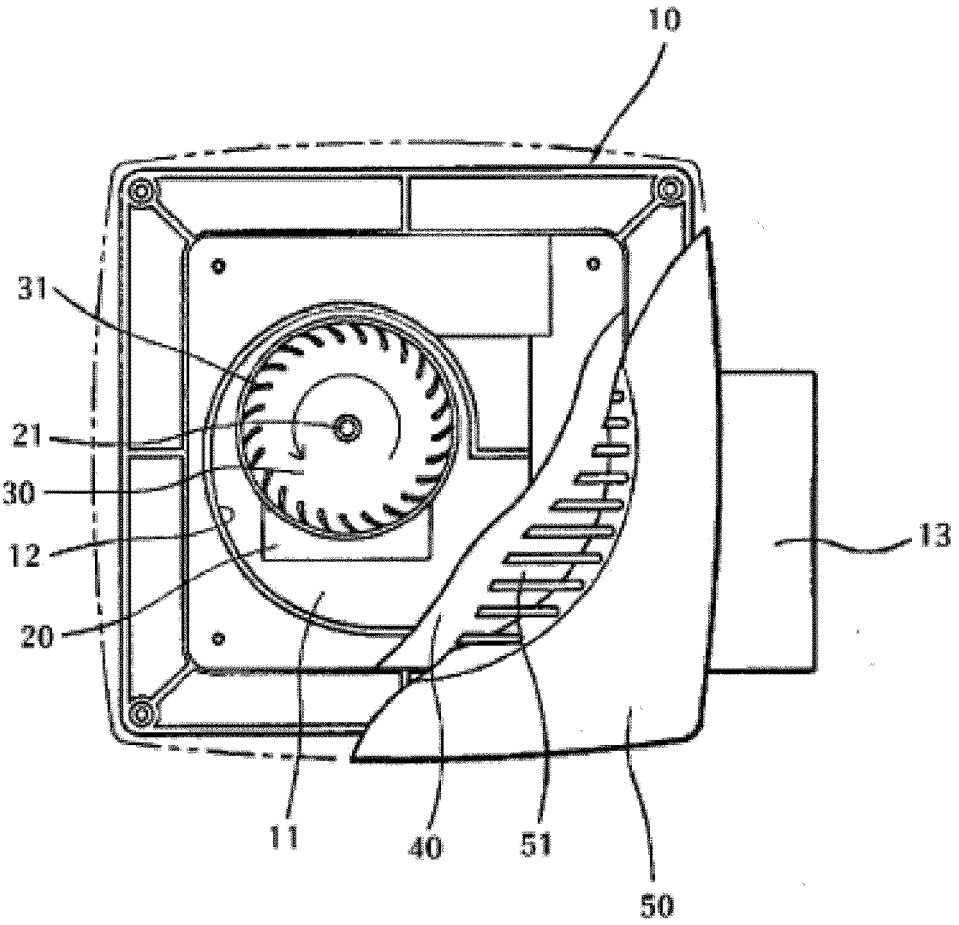
113b
115
150
100c

Figure 9



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2014/009511

A. CLASSIFICATION OF SUBJECT MATTER

F24F 7/06(2006.01)i, F24F 7/10(2006.01)i, F24F 13/20(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

F24F 7/06; F24F 7/00; F24F 1/02; F24F 7/08; F24F 7/10; F24F 13/20

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean Utility models and applications for Utility models: IPC as above
Japanese Utility models and applications for Utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & Keywords: mutual, reverse rotation, motor, air discharge

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 20-0234091 Y1 (LEE, Choong Hoon) 10 October 2001 See claim 1 and figures 2, 4.	1-10
A	JP 06-028522 U (SHARP CO., LTD.) 15 April 1994 See claims 1-2 and figure 1.	1-10
A	KR 20-2009-0005186 U (SAMSUNG ELECTRONICS CO., LTD.) 29 May 2009 See paragraphs [0030], [0031] and figures 1-2.	1-10
A	JP 06-213474 A (GOLDSTAR CO., LTD.) 02 August 1994 See claims 1-2 and figures 1-2.	1-10

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
16 FEBRUARY 2015 (16.02.2015)	**16 FEBRUARY 2015 (16.02.2015)**
Name and mailing address of the ISA/**KR** Korean Intellectual Property Office Government Complex-Daejeon, 189 Seonsa-ro, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/KR2014/009511

Patent document cited in search report	Publication date	Patent family member	Publication date
KR 20-0234091 Y1	10/10/2001	NONE	
JP 06-028522 U	15/04/1994	NONE	
KR 20-2009-0005186 U	29/05/2009	NONE	
JP 06-213474 A	02/08/1994	JP 3515148 B2 KR 20-1994-0007838 Y1 US 05396783 A	05/04/2004 24/10/1994 14/03/1995

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