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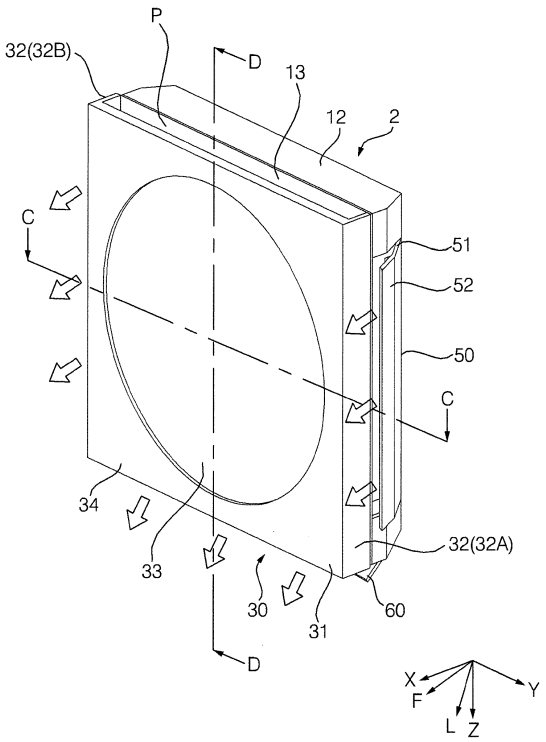
(54) Air conditioner

(57) An air conditioner according to the present invention includes: a main body having an air intake port at the front thereof and having a side air discharge port and a lower air discharge port; an intake port panel disposed to move forward/backward with respect to the main body and defining an air intake channel vertically opened in cooperation with the main body when moving forward; a lower discharge vane straight guiding air discharged to the lower air discharge port; and a side discharge vane guiding the air discharged to the side air discharge port to the intake port panel by changing the flow direction of the air. Therefore, it is possible to minimize the air flowing backward and sucked again into the air intake port after discharged into an indoor from the main body, and to three- dimensionally mix front airflow and lower airflow.

Fig. 2



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Description

[0001] The present invention relates to an air conditioner, and more particularly, to an air conditioner with a plurality of discharge vanes.

[0002] In general, an air conditioner is a device that is comprised of a compressor, a condenser, an expansion mechanism, an evaporator or the like to heat/cool a room, using a refrigeration cycle of a refrigerant or purify air using a filter, in order to create a more pleasant indoor environment for users.

[0003] The air conditioner has an air intake port through which indoor air is sucked and an air discharge port through which the air conditioned through the air conditioners is discharged to the outside thereof. The air conditioners may be provided therein with-a heat exchanger which makes heat be exchanged between a refrigerant and air. The air conditioner may be equipped with a filter that filters off foreign substances in the air.

[0004] Recently, there is a trend that a plurality of air discharge ports is formed in an air conditioners and the air discharged through the air discharge ports three-dimensionally air-conditions the indoor air.

[0005] The present invention has been made in an effort to provide an air conditioner that can make three-dimensional airflow of front air flow and downward airflow.

[0006] One aspect of the present invention provides an air conditioner including: a main body having an air intake port at the front thereof and having a side air discharge port and a lower air discharge port; an intake port panel disposed on the main body to move forward/backward and defining an air intake channel vertically open in cooperation with the main body, when moving forward; a lower discharge vane straight guiding air discharged to the lower air discharge port; and a side discharge vane guiding the air discharged to the side air discharge port to the intake port panel by changing the direction of the air.

[0007] The lower air discharge port may be open in parallel with the air intake channel, in the main body, and the side air discharge port may be open perpendicularly to the lower air discharge port, in the main body.

[0008] The intake port panel may include: a front body disposed ahead of the main body; and a shielding body shielding a portion of a gap between the front body and the main body.

[0009] When the air conditioner stops, the side discharge vane may close the side air discharge port and the intake port panel moves backward such that the shielding body may shield at least a portion of the side discharge vane.

[0010] When the air conditioner operates, the side discharge vane may open the side air discharge port and the intake port panel may move forward away from the side discharge vane.

[0011] The air conditioner may include: a side discharge vane driving mechanism turning the side discharge vane such that the side discharge vane makes front airflow, when the air conditioner operates; and a lower discharge vane driving mechanism turning the lower discharge vane such that the lower discharge vane makes downward airflow, when the air conditioner operates.

[0012] The side discharge vane may be larger in size than the side air discharge port.

[0013] The side discharge vane may include: a first vane part of which the vertical rotational center is positioned inside the main body; and a second vane part extending from the first vane part and having an inclination angle of an obtuse angle from the first vane part.

[0014] A first vane part receiving portion where the first vane part is rotatably received may be formed at the main body.

[0015] The first vane part receiving portion may be larger in size than the side air discharge port.

[0016] A second vane part receiving portion where the second vane part is rotatably received may be recessed on a side of the main body.

[0017] The air conditioner may further include a side discharge vane driving mechanism that turns the side discharge vane such that the second vane part faces a side of the intake port panel, when the air conditioner operates.

[0018] The side discharge vane driving mechanism may turn the side discharge vane such that an extension line of the second vane part makes an acute angle with an extension line extended from a side of the main body.

[0019] The side air discharge port may be formed behind the front-rear directional center of the main body.

[0020] The lower air discharge port may be formed behind the front-rear directional center of the main body.

[0021] The air conditioner according to the present invention has the advantage that it can minimize the air, which flows backward and is sucked again into the air intake port after discharged into an indoor and can make three dimensional mixed airflow of front airflow and lower airflow.

[0022] Further, it has the advantage that the intake port panel can protect the side discharge vane and the external appearance of the sides of the air conditioner is simple and excellent.

[0023] Further, it has the advantage that it can minimize foreign substances flowing into the gap between the side discharge vane and the main body, while the air conditioner stops, and it is possible to keep the air conditioner clean.

[0024] Further, it has the advantage that it is possible to protect the side discharge vane with a simple structure without disposing an external door or an external cover for shielding the side discharge vane.

[0025] Further, it has the advantage that it is possible to minimize backflow into the air intake channel of the air discharged to the side air discharge port and the air discharged to the lower air discharge port.

[0026] Features and advantages of the present inven-

tion will be further understood with reference to the accompanying drawings described below with the following detailed description of embodiments of the present invention, in which:

FIG. 1 is a perspective view showing an air conditioner when an operation of the air conditioner is stopped according to an embodiment of the present invention;

FIG. 2 is a perspective view showing the air conditioner when the air conditioner is operated according to an embodiment of the present invention;

FIG. 3 is a cross-sectional view taken along line A-A shown in FIG. 1;

FIG. 4 is a cross-sectional view taken along line B-B shown in FIG. 1;

FIG. 5 is a cross-sectional view taken along line C-C shown in FIG. 2;

FIG. 6 is a cross-sectional view taken along line D-D shown in FIG. 2;

FIG. 7 is a front view of the air conditioner when the air conditioner is operated according to an embodiment of the present invention;

FIG. 8 is an exploded perspective view of main parts of the air conditioner according to an embodiment of the present invention; and

FIG. 9 is a side view showing the main body of the air conditioner according to an embodiment of the present invention.

[0027] Hereinafter, embodiments of the present invention will be described with reference to the accompanying drawings.

[0028] FIG. 1 is a perspective view showing an air conditioner when the air conditioner according to an embodiment of the present invention is stopped and FIG. 2 is a perspective view showing the air conditioner when the air conditioner according to an embodiment of the present invention is operated.

[0029] Referring to FIGS. 1 and 2, the air conditioner includes a main body 2 that absorbs indoor air to air-condition it and then discharges it. An air intake port through which indoor air is absorbed into the main body 2 is formed in the main body 2. The air intake port may be formed to be opened in the forward and backward direction at the front side of the main body 2 or opened in the forward and backward direction at the rear side of the main body 2. An air discharge port through which the air conditioned in the main body 2 is discharged to the outside of the main body 2 is formed in the main body 2. A plurality of air discharge ports may be formed in the main body 2. The main body 2 may include a rear case 12 and a front case 13 disposed ahead of the rear case 12. The rear case 12 and the front case 13 may define the external appearance of the main body 2.

[0030] The air conditioner includes an intake port panel 30 defining an air intake channel P in cooperation with the main body 2. The intake port panel 30 is moved forward and backward on the main body 2. In the case where an air intake port is formed at the front of the main body 2, the intake port panel 30 may be disposed ahead of the main body 2 to be moved forward/backward relative to the main body 2 and the air intake channel P may be formed ahead of the air intake port. In the case where an air intake port is formed at the rear side of the main body 2, the intake port panel 30 may be disposed behind of the main body 2 to be moved forward/backward and the air intake channel P may be formed behind the air intake port.

[0031] When the air intake port is formed at the front of the main body 2, the intake port panel 30 may be moved backward to be closer to the main body 2 and moved forward to be away from the main body 2. The intake port panel 30 may define the air intake channel P in cooperation with the main body 2, when moving forward. The air intake channel P can be vertically open between the intake port panel 30 and the main body 2 and laterally open between the intake port panel 30 and the main body 2. In the case where the air intake channel P is vertically open, the air intake channel P may be open at the top and the bottom thereof, and the intake port panel 30 may be open at the top, the bottom, and the rear and at the same time closed at the front, the left side, and the right side. When the intake port panel 30 moves forward, the indoor air can be sucked into the air intake channel P while rising towards the air intake channel P from the lower side of the air intake channel P, and the indoor air can be sucked into the air intake channel P while moving down into the air intake channel P from the upper side of the air intake channel P. In the case where the air intake channel P is laterally open, the air intake channel P may be opened at the left and right sides, and the intake port panel 30 may be opened at the left and right sides and at the same time closed at the front, the top, and the bottom thereof. When the intake port panel 30 moves forward, the indoor air can be sucked into the air intake channel P while flowing into the air intake channel P from the left side of the air intake channel P, and the indoor air can be sucked into the air intake channel P while flowing into the air intake channel P from the right side of the air intake channel P.

[0032] In the case where the air intake port is formed at the rear of the main body 2, the intake port panel 30 may be moved forward to be closer to the main body 2 and moved backward to be away from the main body 2. The intake port panel 30 may define the air intake channel P in cooperation with the main body 2, when moving backward. The air intake channel P can be vertically opened between the intake port panel 30 and the main body 2 and laterally opened between the intake port panel 30 and the main body 2. In the case where the air intake channel P is vertically open, the air intake channel P may be opened at the top and the bottom, and the intake port panel 30 may be opened at the bottom and the rear and closed at the left side and the right side. When the intake port panel 30 moves backward, the indoor air can be

sucked into the air intake channel P while rising towards the air intake channel P from the lower side of the air intake channel P, and the indoor air can be sucked into the air intake channel P while moving down into the air intake channel P from the upper side the air intake channel P. In the case where the air intake channel P is laterally open, the air intake channel P may be opened at the left and right sides, and the intake port panel 30 may be opened at the left and right sides and the front and closed at the rear, the top, and the bottom. When the intake port panel 30 moves backward, the indoor air can be sucked into the air intake channel P while flowing into the air intake channel P from the left side of the air intake channel P, and the indoor air can be sucked into the air intake channel P while flowing into the air intake channel P from the right side of the air intake channel P.

[0033] FIG. 3 is a cross-sectional view taken along line A-A shown in FIG. 1, FIG. 4 is a cross-sectional view taken along line B-B shown in FIG. 1, FIG. 5 is a cross-sectional view taken along line C-C shown in FIG. 2, FIG. 6 is a cross-sectional view taken along line D-D shown in FIG. 2, FIG. 7 is a front view when the air conditioner according to an embodiment of the present invention is operated, FIG. 8 is an exploded perspective view of main parts of the air conditioner according to an embodiment of the present invention is stopped, and FIG. 9 is a side view showing the main body of the air conditioner according to an embodiment of the present invention.

[0034] An air intake port 4 may be formed at the front or the rear of the main body 2. A plurality of air discharge ports 6 and 8 may be formed at other parts, except the front of the main body 2. A plurality of air discharge ports 6 and 8 may be formed at other parts, except the rear of the main body 2. The air discharge ports 6 and 8 may be formed to discharge air in different directions. The air discharge ports 6 and 8 may be formed dispersively at a plurality of positions of the main body 2.

[0035] The air discharge ports 6 and 8 may include a first air discharge port spaced from the air intake channel P and open in parallel with the air intake channel P and a second air discharge port spaced from the air intake channel P and open perpendicularly relative to the first air discharge port. In the case where the air intake port 4 is formed at the front of the main body 2 and the air intake channel P is disposed ahead of the air intake port 4, the air discharge ports 6 and 8 may include a first air discharge port disposed behind the air intake channel P and opened in parallel with the air intake channel P and a second air discharge port disposed behind the air intake channel P and opened perpendicularly with respect to the first air discharge port. In the case where the air intake port 4 is formed at the rear of the main body 2 and the air intake channel P is disposed behind the air intake port 4, the air discharge ports 6 and 8 may include a first air discharge port disposed ahead of the air intake channel P and opened in parallel with the air intake channel P and a second air discharge port disposed ahead of the air intake channel P and opened perpendicularly relative to the first air discharge port.

[0036] The configuration with the air intake port 4 formed at the front of the main body 2 and the air intake channel P positioned ahead of the air intake port 4 will be exemplified in the following description.

[0037] When the air intake channel P is vertically opened, the first air discharge port can be vertically opened at a position behind the air intake channel P and the second air discharge port can be laterally opened at a position behind the air intake channel P. In the case where the air intake channel P is laterally open, the first air discharge port can be laterally opened at a position behind the air intake channel P and the second air discharge port can be vertically opened at a position behind the air intake channel P. The side air discharge port 6 may be formed at at least one of the left and right sides of the main body 2. A lower air discharge port 8 may be formed through the bottom of the main body 2. In the case where the air intake channel P is vertically open, the lower air discharge port 8 can be the first air discharge port and the side air discharge port 6 can be the second air discharge port. In the case where the air intake channel P is laterally open, the side air discharge port 6 can be the first air discharge port and the lower air discharge port 8 can be the second air discharge port. The side air discharge port 6 may be formed at the left and right sides of the main body 2. A left air discharge port 6A may be formed at the left side of the main body 2 and a right air discharge port 6B may be formed at the right side. The air conditioned in the main body 2 can be separately discharged in three directions through the left air discharge port 6A, the right air discharge port 6B, and the lower air discharge port 8. Hereinafter, in the case where the left air discharge port 6A and the right air discharge port 6B are separately described, they are referred to as the left air discharge port 6A and the right air discharge port 6B, but in the other cases, the left air discharge port 6A and the right air discharge port 6B are referred to as a side air discharge port 6.

[0038] A blower unit 14 and a heat exchanger 15 may be disposed in the main body 2. The blower unit 14 and the heat exchanger 15 may be disposed between the rear case 12 and the front case 13.

[0039] The rear case 12 may define a channel for air. The air sent by the blower unit 14 can be guided to the air discharge port by the rear case 12. The rear case 12 may define the rear external appearance of the main body 2. The rear case 12 may define the external appearance of four sides of the top, bottom, and left and right sides of the main body 2. The left air discharge port 6A may be formed at the left side of the rear case 12 and the right air discharge port 6B may be formed at the right side. The left air discharge port 6A may be laterally opened at the left side of the rear case 12. The right air discharge port 6B may be laterally opened at the right side of the rear case 12. The lower air discharge port 8 may be further formed at the lower portion of the rear case 12. The lower air discharge port 8 may be vertically opened at

the lower portion of the rear case 12.

[0040] The front case 13 may define the front external appearance of the main body 2. The air intake port 4 may be formed at the front case 13. The air intake port 4 may be formed so as to be opened in the front-rear direction at the front case 13. An intake grill 13a for protecting the inside of the main body 2 may be formed in the front case 13. The intake grill 13a may be positioned at the air intake port 4. The intake grill 13a may be arranged across the air intake port 4.

[0041] The blower unit 14 may absorb air into the air intake port 4 and discharge it to the air discharge ports 6 and 8 through the heat exchanger 15. The blower unit 14 may be a centrifugal blower unit that sucks air ahead and sends it in the circumferential direction. The blower unit 14 may include a motor 16 installed in the rear case 12 and a blower 17 installed on the rotary shaft of the motor 16. The blower unit 14 may further include an orifice 18 that guides air to the blower 17. The motor 16 may be arranged with the rotary shaft thereof directed forward. The blower 17 may be a centrifugal fan such as a turbo fan which sucks air ahead and sends it in the circumferential direction. The orifice 18 may define a channel for the air sent by the blower 17 in cooperation with the rear case 12. An air guide that guides the air sent by the blower 17 may be formed in the rear case 12. The rear case 12 may function as a fan housing covering the motor 16 and the blower 17. An air hole 19 through which air passes may be formed in the orifice 18. The air hole 19 may be positioned between the blower 17 and the heat exchanger 15.

[0042] The heat exchanger 15 may be disposed opposite the air intake port 4. The heat exchanger 15 may be positioned between the front case 13 and the orifice 18. The heat exchanger 15 may be disposed perpendicularly relative to at least one of the front case 13 and the orifice 18.

[0043] The air conditioner may include a filter 20 that purifies the air sucked into the air intake port 4. The filter 20 may be detachably mounted at the front side of the front case 13 to be slidable in the left and right directions. A sliding guide that guides the filter 20 sliding left and right may be formed on the front case 13.

[0044] The performance of the air conditioner may be deteriorated when the air sent out of the side air discharge port 6 directly flows backward to the air intake channel P. Further, the performance of the air conditioner may be deteriorated when the air sent out of the lower air discharge port 8 directly flows backward to the air intake channel P. It is preferable to form the side air discharge port 6 and the lower air discharge port 8 as away as possible from the air intake channel P. It is preferable to form the side air discharge port 6 and the lower air discharge port 8 behind the air intake channel P. The air intake channel P may be formed ahead of the front of the main body 2, and it is preferable that the side air discharge port 6 and the lower air discharge port 8 are formed behind the main body 2. The side air discharge port 6 may be formed behind the front-rear directional center E1 of the main body 2, as shown in FIG. 5. The side air discharge port 6 may be laterally opened behind the main body 2. The lower air discharge port 8 may be formed behind the front-rear directional center E2 of the main body 2, as shown in FIG. 6. The lower air discharge port 8 may be vertically opened behind the main body 2.

[0045] The intake port panel 30 may be larger in size than the air intake port 4. The intake port panel 30 may cover the air intake port 4 such that it cannot be seen from the forward area of the air conditioner. The intake port panel 30 may include a front body 31 and a shielding body 32. The front main body 31 may be positioned ahead of the main body 2. The shielding main body 32 may shield a portion of the gap between the front body 31 and the main body 2. The shielding body 32 may move backward to cover at least a portion of a side discharge vane 50 when the air conditioner stops. The shielding body 32 can move backward to at least a portion of the side of the side discharge vane 50 and the portion at the side of the side discharge vane 50 can cover the side discharge vane 50, such that at least a portion of the side discharge vane 50 can be protected. The shielding body 32 may be formed in a plate like shape. The shielding body 32 may be formed in a rectangle shape that is vertically long. The shielding body 32 may move forward so as to be away from the side discharge vane 50 when the air conditioner operates. The shielding body 32 can move away from the side discharge vane 50 before the side discharge vane 50 moves to guide air to be discharged, such that the side discharge vane 50 can smoothly rotate without an interference with the shielding body 32. At least one shielding body 32 may be formed at the front body 31. The shielding body 32 may include a left shielding body 32A and a right shielding body 32B in the case where the air intake channel P is vertically open. The left shielding body 32A and the right shielding body 32B may be formed at each of the sides of the front body 31. The left shielding body 32A and the right shielding body 32B may be formed perpendicularly with respect to the front body 31, respectively. The shielding body 32 may include an upper shielding body (not shown) and a lower shielding body (not shown) in the case where the air intake channel P is laterally open. In the case where the shielding body 32 includes the left shielding body 32A and the right shielding body 32B, the air intake channel P may be formed between the left shielding body 32A and the right shielding body 32B when the intake port panel 30 moves forward. The left shielding body 32A may shield the left gap S1 between the front body 31 and the main body 2. The right shielding body 32B may shield the right gap S2 between the front body 31 and the main body 2. Hereinafter, in the case where the left shielding body 32A and the right shielding body 32B are separately described, they are referred to as the left shielding body 32A and the right shielding body 32B, but in the other cases, the left shielding body 32A and the right shielding body 32B are referred to as the shielding body 32.

[0046] The air conditioner may include an intake port panel driving mechanism 40 that moves the intake port panel 30 forward/backward.

[0047] The intake port panel 30 may include a panel body 33 connected with the intake port panel driving mechanism 40 and a front cover 34 detachably attached the panel body 33 and the front cover 34 may include the front body 31, the left shielding body 32A, and the right shielding body 32B At least one LED (not shown) may be mounted on the panel body 33 and the panel body 33 may function as a decoration for improving the aesthetic appearance or a display that displays the information on the air conditioner. At least a portion of the panel body 33 may be exposed to the outside. In the case where the intake port panel 30 includes both of the panel body 33 and the front cover 34 and the panel body 33 includes an LED, a light through-hole through which the light from the LED can pass may be formed at the front cover 34. In the intake port panel 30, the air intake channel P may be defined between the panel body 33 and the main body 2 when the rear of the panel body 33 moves away from the front of the main body 2. When the intake port panel 30 moves forward, the air intake channel P may be defined by the front of the main body 2, the right side of the left shielding body 32A of the intake port panel 30, the left side of the right shielding body 32B of the intake port panel 30, and the rear of the panel body 33.

[0048] On the other hand, the intake port panel 30 may include the front body 31, the left shielding body 32A, and the right shielding body 32B without the panel body 33, in which the intake port panel driving mechanism 40 may be connected to the front body 31. In the intake port panel 30, the air intake channel P may be defined between the front body 31 and the main body 2 when the rear of the front body 31 moves away from the front of the main body 2. When the intake port panel 30 moves forward, the air intake channel P may be defined by the front of the main body 2, the right side of the left shielding body 32A of the intake port panel 30, the left side of the right shielding body 32B of the intake port panel 30, and the rear of the front body 31. The front body 31 can be moved forward/backward by the intake port panel driving mechanism 40. In the case where the intake port panel 30 includes both of the panel body 33 and the front cover 34, the front body 31 may be combined with the panel body 33.

[0049] The intake port panel driving mechanism 40 may include a motor 42, a pinion 44, and a rack 46. A plurality of intake port panel driving mechanisms 40 may be disposed between the intake port panel 30 and the main body 20. In the intake port panel driving mechanism 40, the motor 42 may be disposed in the main body 2, the pinion 44 may be disposed on the rotary shaft of the motor, and the rack 46 may be disposed on the intake port panel 30. When the intake port panel 30 includes the panel body 33, the rack 46 may be disposed on the panel body 33, and when the intake port panel 30 does not include the panel body 33, the rack 46 may be disposed on the front body 31. In the intake port panel driving mechanism 40, the motor 42 may be disposed on the intake port panel 30, the pinion 44 may be disposed on the rotary shaft of the motor, and the rack 46 may be disposed in the main body 2. In the case where the intake port panel 30 includes the panel body 33, the motor 42 may be disposed on the panel body 33, and in the case where the intake port panel 30 does not include the panel body 33, the motor 42 may be disposed on the front body 31. The intake port panel driving mechanism 40 can move the intake port panel 30 forward when the air conditioner is operated. The intake port panel driving mechanism 40 can move the intake port panel 30 backward when the air conditioner is in a stop state.

[0050] The air conditioner may include a first discharge vane that straightly guides the air discharged to the first air discharge port and a second discharge vane that guides the air discharged to the second air discharge port, changing the direction of the air. The first discharge vane and the second discharge vane may be disposed on the main body 2.

[0051] In the case where the air intake channel P is vertically open, the air conditioner may include a side discharge vane 50 that guides the air discharged to the side air discharge port 6 while changing the flow direction of the air and a lower discharge vane 60 that straightly guides the air discharged to the lower air discharge port 8. In this case, the lower discharge vane 60 may be a first discharge vane and the side discharge vane 50 may be a second discharge vane.

[0052] In the case where the air intake channel P is laterally open, the air conditioner may include a side discharge vane that straightly guides the air discharged to the side air discharge port 6 and a lower discharge vane that guides the air discharged to the lower air discharge port 8 while changing the flow direction of the air. In this case, the side discharge vane may be the first discharge vane and the lower discharge vane may be the second discharge vane.

[0053] It is exemplified in the following description that the air intake channel P is vertically open, the lower discharge vane 60 is the first discharge vane that straightly guides air, and the side discharge vane 50 is the second discharge vane that guides air while changing the flow direction of the air.

[0054] The side discharge vane 50 may include a left discharge vane 50A that guides the air discharged to the left air discharge port 6A while changing the flow direction of the air, and a right discharge vane 50B that guides the air discharged to the right air discharge port 6B. The left discharge vane 50A may be disposed at the left side of the body 2 to be able to turn to the left and right about the vertical rotational center, and when it turns out from the left of the body 2, it can guide the air discharged to the left air discharge port 6A while changing the flow direction of the air. The right discharge vane 50B may be disposed at the right side of the body 2 to be able to turn to the left and right about the vertical rotational center,

and when it turns out from the right of the body 2, it can guide the air discharged to the right air discharge port 6B while changing the flow direction of the air. The left discharge port 50A and the right discharge port 50B may turn in the opposite directions each other during operation of the air conditioner, other configuration and operation except the turning direction may be the same, and when the left discharge port 50A and the right discharge port 50B are separately described below, they will be referred to as the left discharge port 50A and the right discharge port 50B, and in other common configuration, they will be referred to as the side discharge vane 50 together.

[0055] The side discharge vane 50 may be larger in size than the side air discharge port 6. The side discharge vane 50 can open/close the side air discharge port 6 in a way of covering the side air discharge port 6 from the outside of the side air discharge port 6.

[0056] The side discharge vane 50 may include a first vane part with the rotational center positioned inside the main body 2 and a second vane part 52 extending from the first vane part 51 and having an inclination angle that is an obtuse angle $\theta 1$ from the first vane part 51. The first vane part 51 may have the vertical rotational center positioned inside the main body 2. The first vane part 51 and the second vane part 52 may be formed in the plate like shape and can straightly guide air, in which the air guide directions of the first vane part 51 and the second vane part 52 are different, such that air can be guided with the flow direction thereof being changed. The air guided first by the first vane part 51 can be secondarily guided by the second vane part 52, such that the side discharge vane 50 can convert in several steps in the flow direction of the air.

[0057] The first vane part 51 can guide the air discharged to the side air discharge port 6. The first vane part 51 may be larger in size than the side air discharge port 6 and the side discharge vane 50 can open/close the side air discharge port 6 with the first vane part 51. The side discharge vane 50 may further include pivot portions 53 disposed in the main body 2 and pivot connectors 54 connecting the pivot portions 53 to one side of the first vane part 51. The pivot portions 53 may be the vertical pivots of the side discharge vane 50. The pivot portion 53 may be connected to a side discharge vane driving mechanism 70 to be described below and can be rotated by the side discharge vane driving mechanism 70, in the state being positioned inside the main body 2. The pivot connector 54 may protrude from the side, which faces the side air discharge port 6, of both sides of the first vane part 51. When the pivot portion 53 is turned by the side discharge vane driving mechanism 70, it can function as a link turning the first vane part 51.

[0058] The second vane part 52 can guide the air discharged to the side air discharge port 6 to the side of the intake port panel 30. The second vane part 52 can make the air guided by the first vane part 51 changed in the direction of flowing forward. The air guided by the second vane part 52 can be guided to the side of the shielding body 32 of the intake port panel 30.

[0059] The lower discharge vane 60 can control the vertical direction of the air discharged to the lower air discharge port 8 while turning up/down about a horizontal rotational center. The rotational center of the lower discharge vane 60 may be disposed in the main body 2. The lower discharge vane 60 may further include a vane part 61, pivot portions 63 disposed in the main body 2 and pivot connectors 64 connecting the pivot portions 61 to one side of the vane part 61. The vane part 61 can close the lower air discharge port 8 when disposed horizontally under the main body 2, and it can open the lower air discharge port 8 and guide the air discharged to the lower air discharge port 8 when disposed vertically or at an angle under the main body 2. The vane part 61 may be formed in the plate like shape and can guide air in a straight direction. The pivot portions 63 may be the horizontal pivots of the side discharge vane 60. The pivot portion 63 may be connected to a lower discharge vane driving mechanism 80 to be described below and can be rotated by the lower discharge vane driving mechanism 80 in the state of being positioned inside the main body 2. The pivot connector 64 may protrude from the side, which faces the lower air discharge port 8, of both sides of the vane part 61. When the pivot portion 63 is turned by the lower discharge vane driving mechanism 80, it can function as a link turning the vane part 61.

[0060] Further, a first vane part receiving portion 22 where the first vane part 51 is rotatably received may be formed at the main body 2. The first vane part receiving portion 22 may be larger in size than the side air discharge port 6. The first vane part receiving portion 22 may be formed outside further than the side air discharge port 6. The first vane part receiving portion 22 may have a space where the first vane part 51 turns. The first vane part receiving portion 22 may be a first vane part receiving portion that receives a portion of the first vane part 51 when the air conditioner is operated, and receives the entire first vane part 51 when the air conditioner is in the stop state. The pivot connector 64 of the side discharge vane 50 may turn, in the state of being positioned inside the first vane part receiving portion 22. The first vane part 51 may be partially positioned in the first vane part receiving portion 22 and the other portion may be positioned outside the main body 2 when the air conditioner is operated. The first vane part 51 can cover the first vane part receiving portion 22 when the air conditioner is stopped, and the side air discharge port 6 can be covered by the first vane part 51 when the first vane part 51 covers the first vane part receiving portion 22.

[0061] A second vane part receiving portion 24 where the second vane part 52 is inserted and received may be recessed on the side 3 of the main body 2. The second vane part receiving portion 24 may extend from the first vane part receiving portion 22. The second vane part receiving portion 24 may be stepped on the side 3 of the main body 2. When the air conditioner is operated, the

second vane part 52 can be drawn out of the second vane part receiving portion 24, , and when the air conditioner is stopped, it can be inserted and held in the second vane part receiving portion 24.

[0062] The air conditioner includes a side discharge vane driving mechanism 70 turning the side discharge vane 50 and a lower discharge vane driving mechanism 80 turning the lower discharge vane 60.

[0063] The side discharge vane driving mechanism 70 may be disposed in the main body 2 and the side discharge vane 50 may be connected to the side discharge vane driving mechanism 70. The side discharge vane driving mechanism 70 may include a side discharge vane driving motor installed in the main body 2. The side discharge vane driving motor of the side discharge vane driving mechanism 70 is directly connected to the side discharge vane 50 such that it can turn the side discharge vane 50. The side discharge vane driving mechanism 70 can turn the side discharge vane 50, using at least one power transmission member connecting the side discharge vane driving motor and the side discharge vane 50. The side discharge vane driving mechanism 70 can turn the side discharge vane 50 so that the side discharge vane 50 makes front airflow when the air conditioner is in operation. The side discharge vane driving mechanism 70 can turn the side discharge vane 50 so that the side discharge vane 50 closes the side air discharge port 6 when the air conditioner is stopped. The side discharge vane driving mechanism 70 can turn the side discharge vane 50 such that the second vane part 52 faces the side of the intake port panel 30 while the air conditioner operates. The side discharge vane driving mechanism 70 can turn the side discharge vane 6 such that the extension line V of the second vane part 54 is at an acute angle $\theta 2$ with the extension line W extended from the side 3 of the main body 2. The side discharge vane driving mechanism 70 may include a left discharge vane driving mechanism 70A turning the left discharge vane 50A and a right discharge vane driving mechanism 70B turning the right discharge vane 50B. Hereinafter, in the case where the left discharge vane driving mechanism 70A and the right discharge vane driving mechanism 70B are separately described, they will be referred to as the left discharge vane driving mechanism 70A and the right discharge vane driving mechanism 70B, and in other common configuration, they will be referred to as the side discharge vane driving mechanism 70.

[0064] The lower discharge vane driving mechanism 80 may be disposed in the main body 2 and the lower discharge vane 60 may be connected to the lower discharge vane driving mechanism 80. The lower discharge vane driving mechanism 80 may include a lower discharge vane driving motor installed in the main body 2. The lower discharge vane driving motor of the lower discharge vane driving mechanism 80 is directly connected to the lower discharge vane 60 such that it can turn the lower discharge vane 60. The lower discharge vane driving mechanism 80 can turn the lower discharge vane 60 via at least one power transmission member connecting the lower discharge vane driving motor and the lower discharge vane 60.

[0065] The lower discharge vane driving mechanism 80 can turn the lower discharge vane 60 so that the lower discharge vane 60 allows air to flow downward when the air conditioner is operated. The lower discharge vane driving mechanism 80 can turn the lower discharge vane 60 such that the lower discharge vane 60 is positioned at an angle closer to the vertical direction than the horizontal direction. The lower discharge vane driving mechanism 80 can turn the lower discharge vane 60 so that the lower discharge vane 60 closes the lower air discharge port 8 when the air conditioner is stopped.

[0066] The air conditioner may further include a control unit that controls the blower unit 14, the intake port panel driving mechanism 40, the side discharge vane driving mechanism 70, and the lower discharge vane driving mechanism 80.

[0067] The side discharge vane 50 can close the side air discharge port 6 when the air conditioner is stopped. The side discharge vane 50 can open the side air discharge port 6 when the air conditioner is operated.

[0068] The intake port panel 30 can move backward when the air conditioner stops. The intake port panel 3 can move backward such that the shielding body 32 shields at least a portion of the side discharge vane 50, when the air conditioner stops. The left shielding body 32A can shield at least a portion of the left discharge vane 50A. The right shielding body 32B can shield at least a portion of the right discharge vane 50B. The shielding body 32 can shield the front portion of the side discharge vane 50 when moving backward. The shielding body 32 can shield the second vane part 52 by moving to the side of the second vane part 52 of the side discharge vane 50 when moving backward. The left shielding body 32A can move to the side of the second vane part 52 of the left discharge vane 50A, when moving backward, and the second vane part 52 of the left discharge vane 50A can be protected by the left shielding body 32A between the main body 2 and the left shielding body 32A. The right shielding body 32B can move to the side of the second vane part 52 of the right discharge vane 50B when moving backward, and the second vane part 52 of the right discharge vane 50B can be protected by the right shielding body 32B between the main body 2 and the right shielding body 32B. The intake port panel 30 can move forward, when the air conditioner operates. The intake port panel 30 can move forward such that the shielding body 32 moves forward away from the side discharge vane 50, when the air conditioner operates. When the intake port panel 30 moves forward, the left shielding body 32A can move forward ahead of the left discharge vane 50A, and the left shielding body 32A and the left discharge vane 50A cannot be interfered. When the intake port panel 30 moves forward, the right shielding body 32B can move forward ahead of the right discharge vane 50B, and the right shielding body 32B and the right dis-

charge vane 50B cannot be interfered.

[0069] The control unit, during operation of the air conditioner, can drive the blower unit 14, drive the intake port panel driving mechanism 40 in a forward movement mode, and drive the side discharge vane driving mechanism 70 and the lower discharge vane driving mechanism 80 in an open mode. When the air conditioner stops, the control unit can stop the blower unit 14, drive the side discharge vane driving mechanism 70 and the lower discharge vane driving mechanism 80 in a closing mode, and drive the intake port panel driving mechanism 40 in a backward mode.

[0070] The intake port panel driving mechanism 40 can be driven in a first mode in which the shielding body 32 is moved away from the side discharge vane 50 and a second mode in which the shielding body 32 is brought in contact with the side discharge vane 50. The first mode may be a forward mode in which the intake port panel driving mechanism 40 allows the intake port panel 30 to move forward and the second mode may be a backward mode in which the intake port panel driving mechanism 40 allows the intake port panel 30 to move backward.

[0071] When the air conditioner operates, the control unit can control the intake port panel driving mechanism 40 in the forward mode and then control the side discharge vane driving mechanism 70 in the opening mode of the side air discharge port. When the air conditioner stops, the control unit can control the side discharge vane driving mechanism 70 in the closing mode of the side air discharge port and then control the intake port panel driving mechanism 40 in the backward mode.

[0072] Hereinafter, the operation of the configuration of the present invention will be described.

[0073] First, when the air conditioner operates, the intake port panel driving mechanism 40 can move forward the intake port panel 30 and the entire intake port panel 30 can be moved forward. When the intake port panel 30 is moved forward, the air intake channel P opened at the top and the bottom thereof can be formed between the intake port panel 30 and the main body 2.

[0074] When the air conditioner operates, the side discharge vane driving mechanism 70 turns the side discharge vane 50 such that the side discharge vane 50 protrudes outward from the side of the main body 2, in which the side discharge vane 50 turns in a side direction centered on the vertical rotational center and can turn to a position where air discharged to the side air discharge port 6 can be guided to a side of the intake port panel 30. When the side discharge vane 50 turns, the first vane part 51 can be partially positioned in the main body 2 and the other portion can be positioned outside the main body 2. When the side discharge vane 50 turns, the second vane part 52 as a whole can be positioned outside the main body 2.

[0075] When the air conditioner operates, the lower discharge vane driving mechanism 80 turns the lower discharge vane 60 so that it protrudes outward from the bottom of the main body 2, in which the lower discharge vane 60 turns down centered on the horizontal rotational center and can turn to a position where air discharged to the side air discharge port 8 is guided to the bottom of the main body 2.

[0076] When the air conditioner operates, the blower unit 14 can be driven, and when the blower unit 14 is driven, the indoor air can be sucked to the upper portion and the lower portion of the air intake channel P. The indoor air may be sucked down into the air intake channel P from above the air intake channel P and may be sucked up into the air intake channel P from under the air intake channel P. The air sucked in the air intake channel P can pass the air intake port 4 from the air intake channel P and can be sucked into the main body 2. The air sucked in the main body 2 can flow to the blower unit 14 after exchanging heat with the heat exchanger 15 and can be sent to the side air discharge port 6 and the lower air discharge port 8 by the blower unit 14. The air discharged to the side air discharge port 6 can be discharged to the side of the main body 2 through the first vane part receiving portion 22. The air sent to the lower air discharge port 8 can be discharged under the main body 2 through the lower air discharge port 8.

[0077] The air discharge to the side of the main body 2 is guided to the first vane part 51 and can be guided straight in the direction defined by the first vane part 51, and then the flow direction can be changed to the front by the second vane part 52 and the air can be guided straight in the direction defined by the second vane part 52. The air discharged to the side of the main body 2 can be finally guided to the discharged in the direction defined by the second vane part 52 and then the air guided to the second vane part 52 can be guided to the side of the intake port panel 30. Assuming that the X-direction is the front direction, the Y-direction is the side direction and the Z-direction is the downward direction in FIG. 2, the air passing through the side air discharge port 6 is discharged in the Y-direction, but can be guided to be discharged in the direction F that is closest to the X-direction while sequentially guided in multi-step by the first vane part 51 and the second vane part 52, such that the air conditioner allows air to flow in the front direction, using the side discharge vane 50. The air guided to the side of the intake port panel 30 by the side discharge vane 50 can be diffused into the indoor without flowing backward to the air intake channel P by being blocked by the shielding body 32 of the intake port panel 30.

[0078] The air discharged under the main body 2 can be guided to the vane part 61 of the lower discharge vane 60 and guided straight in the direction defined by the vane part 61 of the lower discharge vane 60. The air passing through the lower air discharge port 8 is sent in the Z-direction shown in FIG. 2 when passing through the lower air discharge port 8, but it is can be discharged in the inclined direction between the Z-direction and the X-direction in FIG. 2 while guided to the vane part 61 of the lower discharge vane 60. That is, the air discharged to the lower air discharge port 8 can be guided to be

discharged in the inclined direction towards the lower front of the lower air discharge port 8 with respect to the lower air discharge port 8. The air guided to be discharged in the inclined direction toward the lower front area of the lower air discharge port 8 by the lower discharge vane 60 can be guided straight to the lower front of the main body 2. The lower discharge vane driving mechanism 80 can turn the lower discharge vane 60 in the inclined direction closer to the Z-direction of the inclined directions between the Z-direction and the X-direction, and the air directly sucked again into the air intake channel P of the air discharged to the lower air discharge port 8 can be minimized.

[0079] On the other hand, the blower unit 14 can stop when the air conditioner stops.

[0080] When the air conditioner stops, the side discharge vane driving mechanism 70 turns the side discharge vane 50 in close contact with the side of the main body 2, in which the side discharge vane 50 can be turned centered on the vertical rotational center in the opposite direction to that when the air conditioner operates. The first vane part 51 of the side discharge vane 50 can cover the first vane part receiving portion 22 and the side air discharge port 6 can be covered by the first vane part 51. The second vane part 52 of the side discharge vane 50 can be inserted into the second vane part receiving portion 24 of the second vane part 52 and held in the side of the main body 2 without being stepped.

[0081] When the air conditioner stops, the lower discharge vane driving mechanism 80 turns the lower discharge vane 60 in parallel with the bottom of the main body 2, in which the lower discharge vane 60 can turn upward centered on the horizontal rotational center to close the air discharge port 8.

[0082] When the air conditioner stops, the intake port panel driving mechanism 40 allows the intake port panel 30 to move backward and the intake port panel 30 as a whole can be moved backward. As the intake port panel 30 moves backward, the shielding body 32 can move to the side of the side discharge vane 50. The shielding body 32 can move to the side of the second vane part 52 when moving backward, and it can shield the second vane part 52 at the side of the second vane part 52. As the intake port panel 30 moves backward, the shielding body 32 can cover the gap between the front body 31 and the main body 2 and the second vane part 52 can be protected by the shielding body 32.

[0083] When the air conditioner is in a stop state, in the case where the shielding body 32 does not shield the second vain part 52 and a gap is seen between the shielding body 32 and the second vane part 52, the external appearance of the air conditioner is not excellent, and if foreign substances are inserted into the gap, the side of the air conditioner cannot be kept clean. However, when the air conditioner stops, if the shielding body 32 shields the second vane part 52, the external appearance of the air conditioner is excellent and the air conditioner can be kept clean.

Claims

1. An air conditioner comprising:

   a main body (2) having an air intake port (4) formed at a front side thereof and having a side air discharge port (6) and a lower air discharge port (8) formed therein;
   an intake port panel (30) disposed to move forward/backward with respect to the main body (2), and defining an air intake channel (P) vertically opened in cooperation with the main body (2), when moving forward;
   a lower discharge vane (60) straight guiding air discharged to the lower air discharge port (8); and
   a side discharge vane (50) guiding the air discharged to the side air discharge port (6) to a side of the intake port panel (30) while changing the flow direction of the air.

2. The air conditioner of claim 1, wherein the lower air discharge port (8) is configured to be opened in parallel with the air intake channel in the main body (2), and
   the side air discharge port (6) is configured to be opened in a perpendicular direction to the lower air discharge port (8) in the main body (2).

3. The air conditioner of claim 1 or 2, wherein the intake port panel (30) includes:

   a front body (31) disposed ahead of the main body (2); and
   a shielding body (32) shielding a portion of a gap between the front body (31) and the main body (2).

4. The air conditioner of claim 3, wherein, when the air conditioner stops, the side discharge vane (50) closes the side air discharge port (6), and the intake port panel (30) moves backward such that the shielding body (32) shields at least a portion of the side discharge vane (50).

5. The air conditioner of claim 4, wherein, when the air conditioner operates, the side discharge vane (50) opens the side air discharge port (6), and the intake port panel (30) moves forward away from the side discharge vane (50).

6. The air conditioner of any one of claims 1 to 3, comprising:

   a side discharge vane driving mechanism (70) configured to turn the side discharge vane (50) such that the side discharge vane (50) allows air to flow in a front direction when the air con-

ditioner operates, and
a lower discharge vane driving mechanism (80) configured to turn the lower discharge vane (60) such that the lower discharge vane (60) allows air to flow downward when the air conditioner operates.

7. The air conditioner of any one of claims 1 to 6, wherein the side discharge vane (50) is larger in size than the side air discharge port (6).

8. The air conditioner of claim 1, wherein the side discharge vane (50) includes:

a first vane part (51) of which the vertical rotational center is positioned inside the main body (2); and
a second vane part (52) extending from the first vane part (51) and having an inclination angle of an obtuse angle with the first vane part (51).

9. The air conditioner of claim 8, wherein a first vane part receiving portion (22) where the first vane part (51) is rotatably received is formed in the main body (2).

10. The air conditioner of claim 9, wherein the first vane part receiving portion (22) is larger in size than the side air discharge port (6).

11. The air conditioner of claim 8, wherein a second vane part receiving portion (24) where the second vane part (52) is rotatably received is recessed on a side of the main body (2).

12. The air conditioner of claim 8, further comprising a side discharge vane driving mechanism (70) that turns the side discharge vane (50) such that the second vane part (52) faces a side of the intake port panel (30) when the air conditioner operates.

13. The air conditioner of claim 12, wherein the side discharge vane driving mechanism (70) turns the side discharge vane (50) such that an extension line of the second vane part (52) is at an acute angle with an extension line extended from a side of the main body (2).

14. The air conditioner of any one of claims 1 to 13, wherein the side air discharge port (6) is formed behind the front-rear directional center of the main body (2).

15. The air conditioner of claim 1, wherein the lower air discharge port (8) is formed behind the front-rear directional center of the main body (2).

Fig. 1

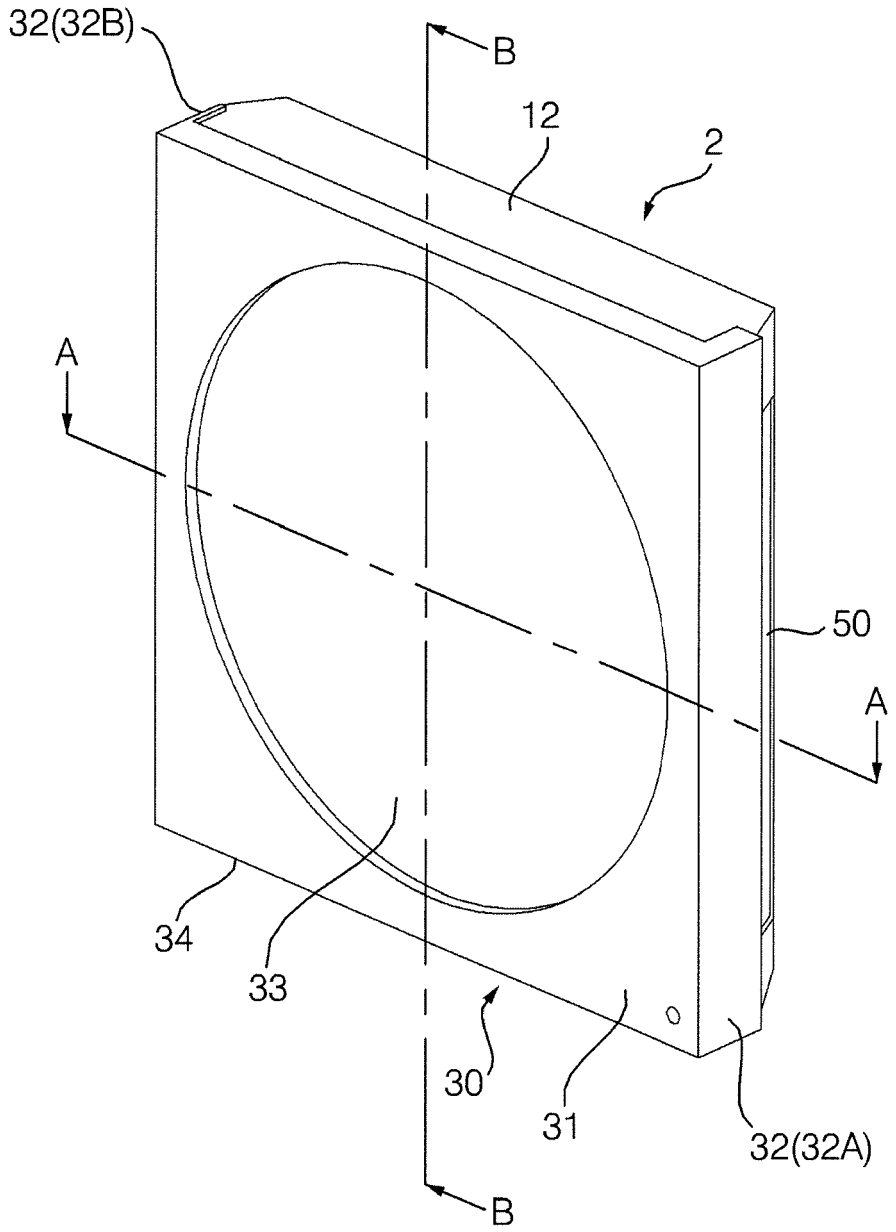

Fig. 2

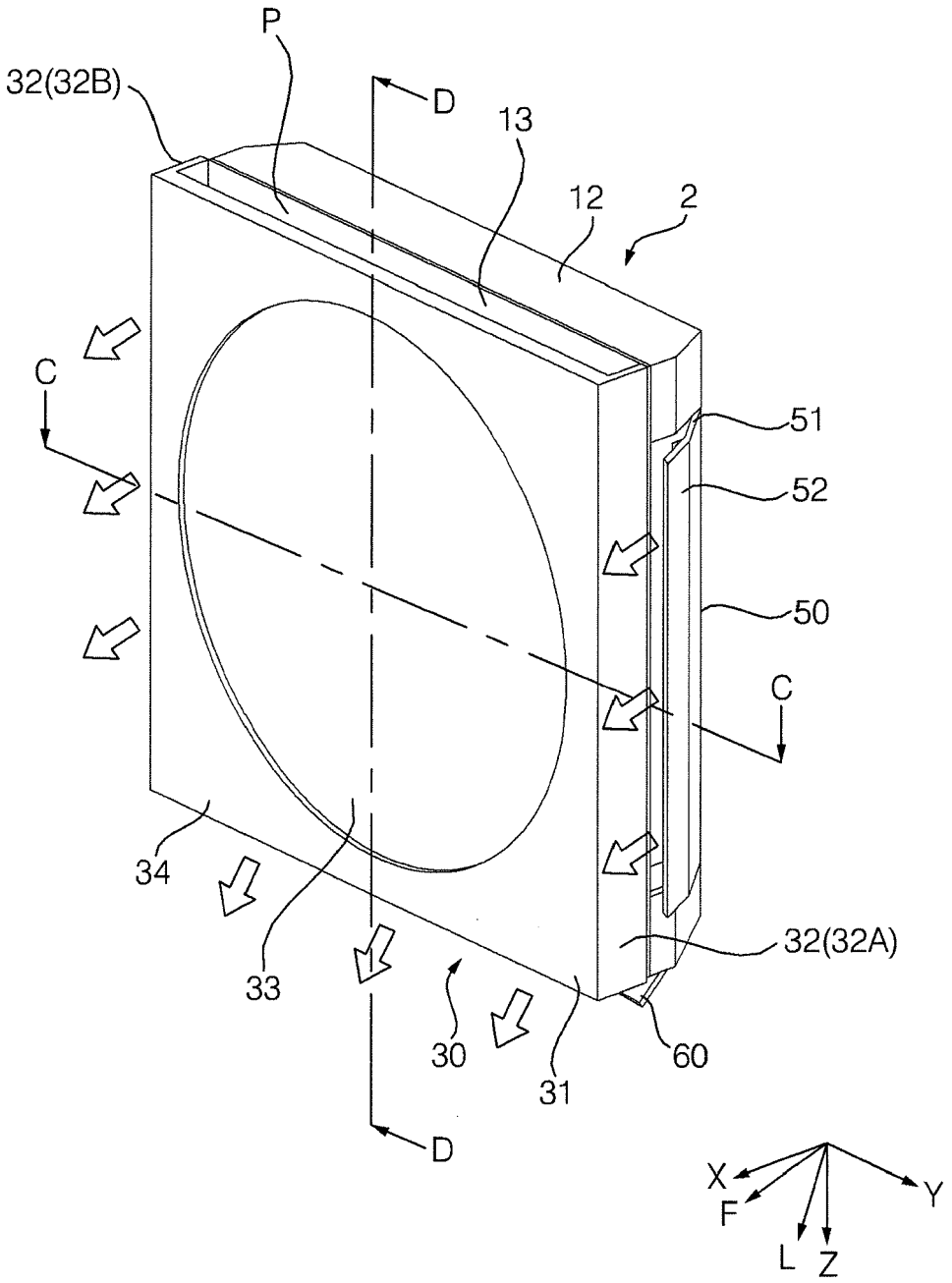

Fig. 3

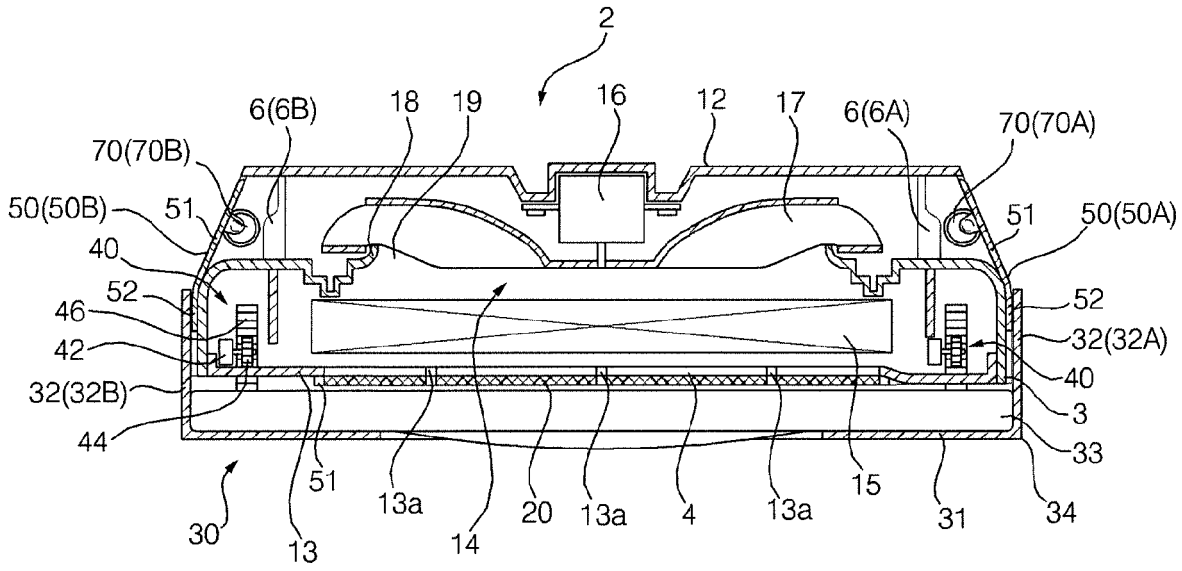
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Fig. 4

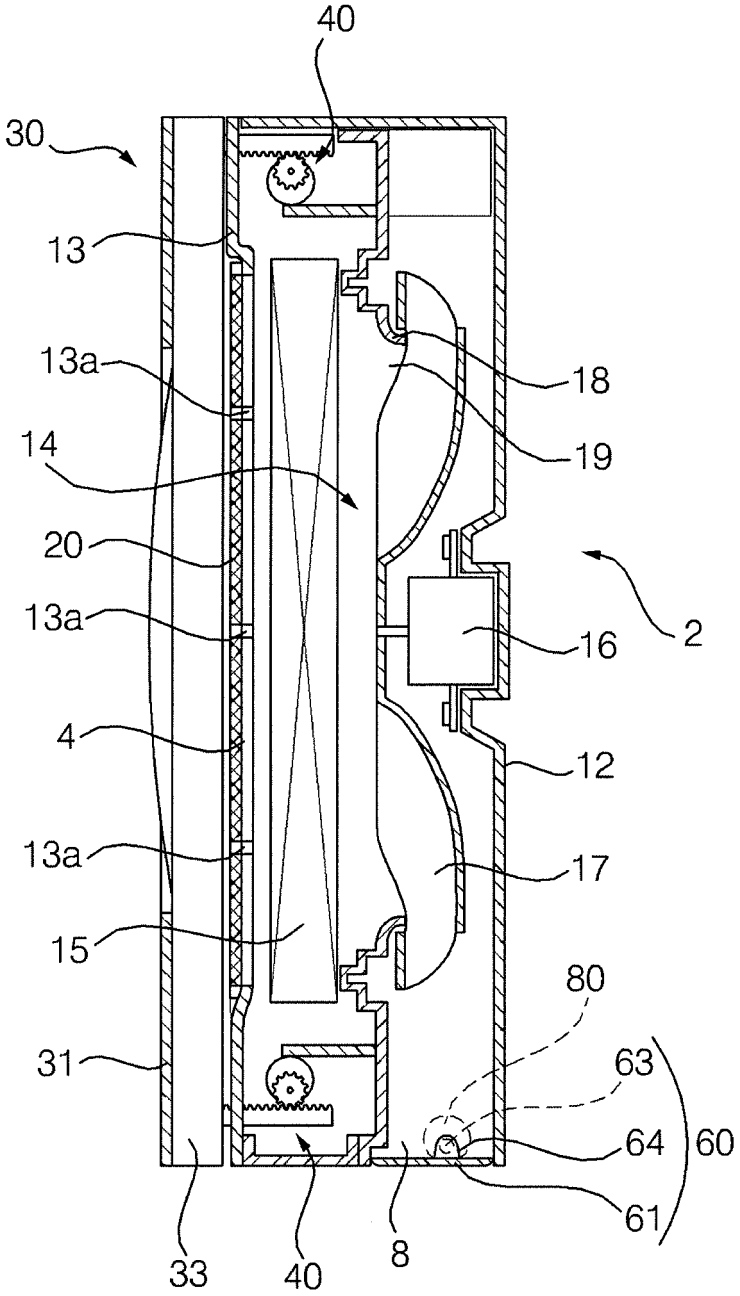
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Fig. 5

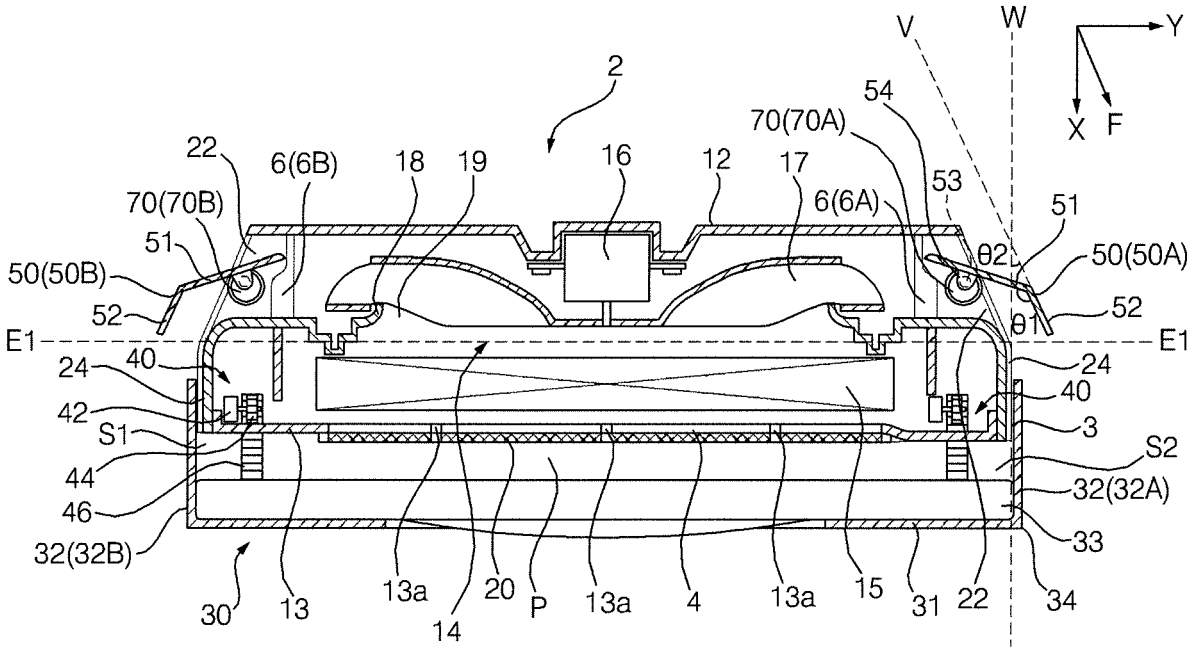
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Fig. 6

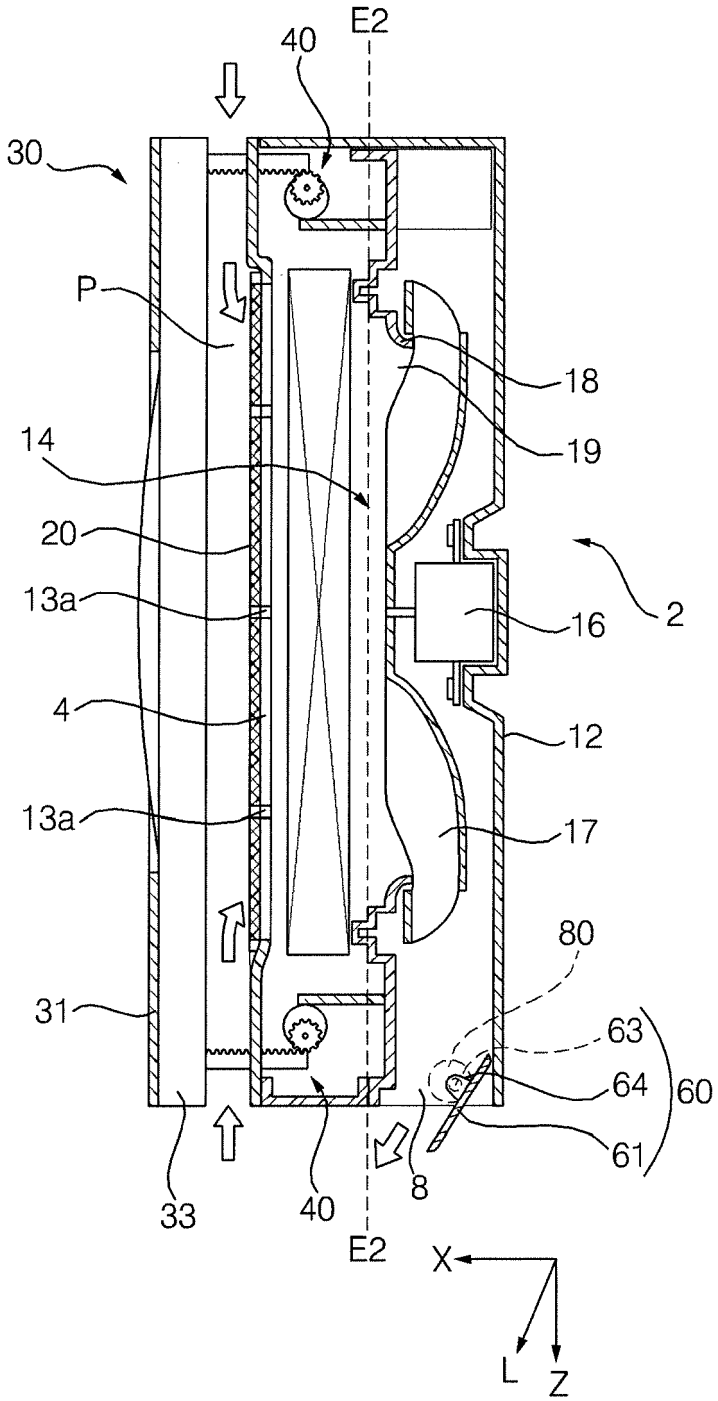
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Fig. 7

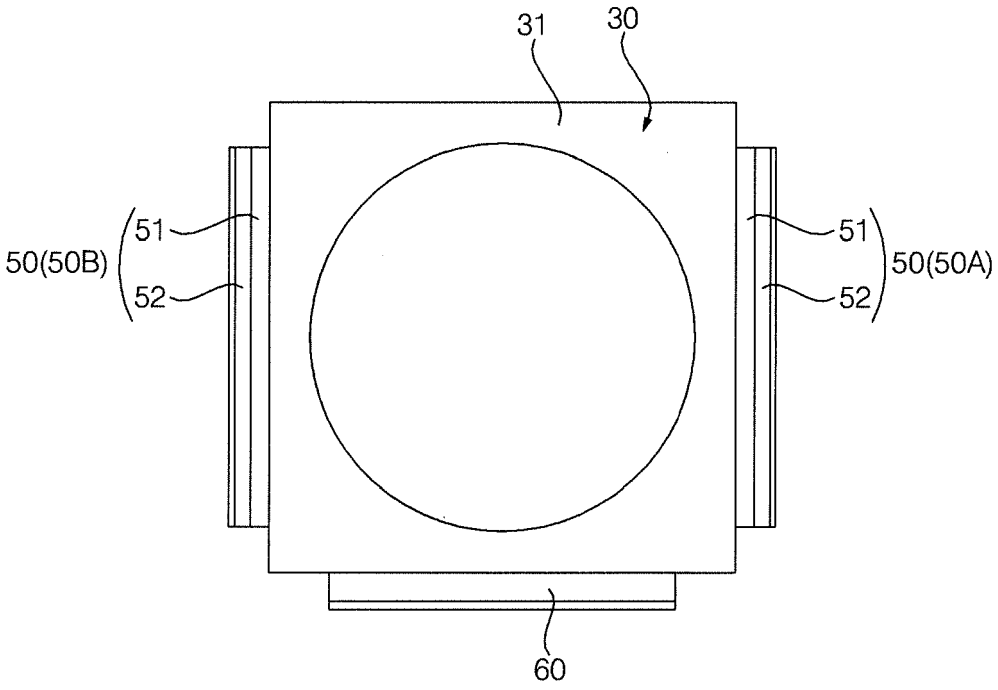

Fig. 8

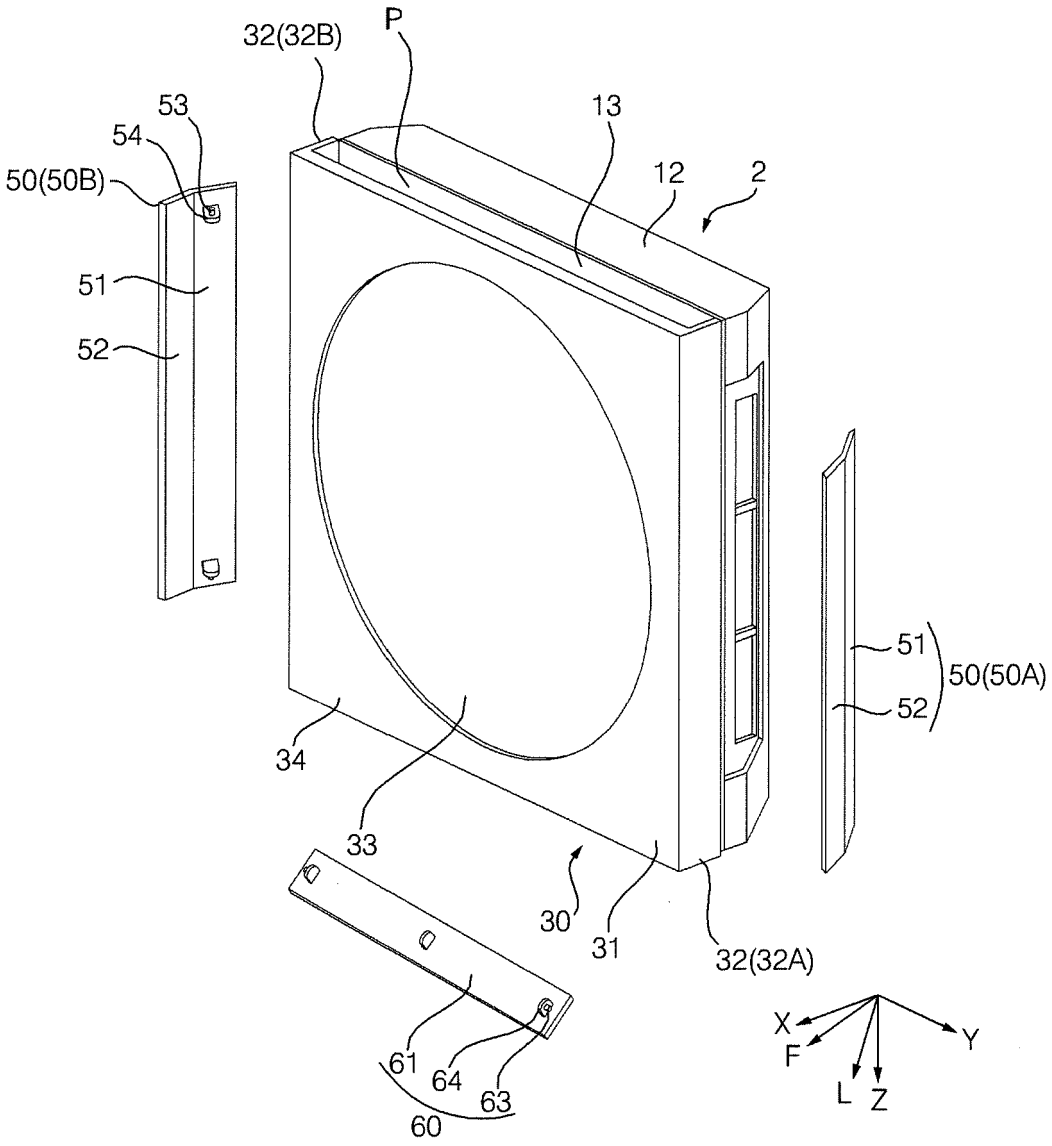
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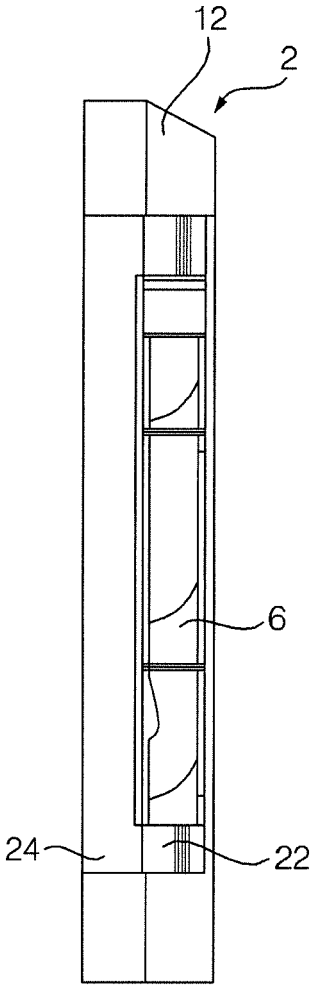
Fig. 9



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EUROPEAN SEARCH REPORT

Application Number
EP 14 15 2131

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	3 July 2014	Decking, Oliver

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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