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(54) INDOOR UNIT FOR AIR CONDITIONER

(57) An object of the present invention is to provide an indoor unit of an air conditioner capable of preventing occurrence of short circuit even when air is sucked in from the front side of a main body. An indoor unit (1) of an air conditioner includes a main body (2), a front panel (10), and a bottom short circuit prevention section (51). The main body (2) includes a front side opening (2a), a top discharge port (24), and a bottom discharge port (25). The front side opening (2a) is formed on the front side of the main body (2). The top discharge port (24) is formed above the front side opening (2a). The bottom discharge port (25) is formed below the front side opening (2a). The front panel (10) is flat and disposed in front of the front side opening (2a). The front panel (10) includes a top intake port (11a), a bottom intake port (11b), a first side intake port (11c), and a second side intake port (11d) respectively provided at four sides, i.e., top, bottom, left and right sides. The bottom short circuit prevention section (51) prevents short circuit of air flow between the bottom intake port (11b) and the bottom discharge port (25).

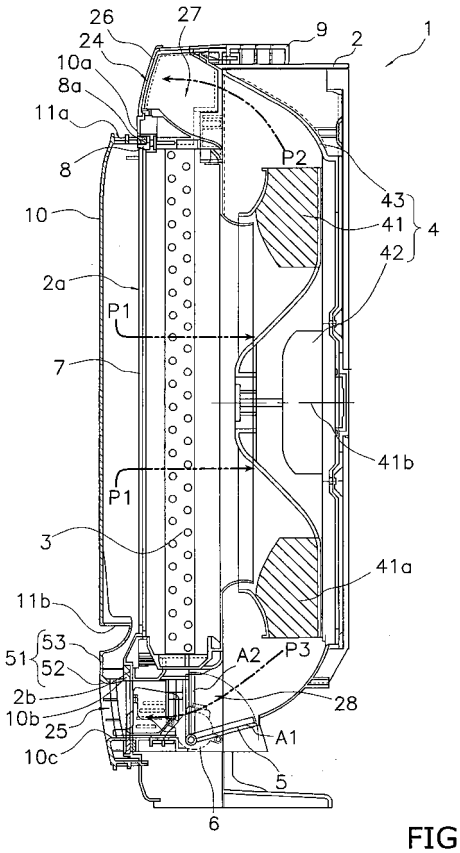

FIG. 3

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Description

TECHNICAL FIELD

[0001] The present invention relates to an indoor unit of an air conditioner having a plurality of discharge passages.

BACKGROUND ART

[0002] Conventionally, an indoor unit described in Patent Document 1 has been provided as an indoor unit of an air conditioner having a plurality of discharge passages. This indoor unit has a configuration in which the main body includes air intake ports each provided on both lateral sides and air discharge ports each provided on the top side and at the lower end of the front side, and is configured to perform cooling and heating operations by blowing out air in two directions (up and down).
<Patent Document 1>
Japanese Patent Application Publication No. 64-58965

DISCLOSURE OF THE INVENTION

<OBJECT TO BE ACHIEVED BY THE INVENTION>

[0003] However, with the indoor unit described in Patent Document 1, the air intake ports are each provided on the both lateral sides of the main body, i.e., at positions away from the air discharge ports. However, with such a configuration, the indoor unit has restrictions on installation because the indoor unit needs to be installed such that the air intake ports are not covered by the furniture or wall when the indoor unit is installed in a room.

[0004] Consequently, it is conceivable to provide the air intake port on the front side of the main body to avoid restrictions on installation of the indoor unit. However, in such a case, air blown out in both up and down directions is easily sucked into the air intake port, and thus short circuit easily occurs.

[0005] An object of the present invention is to provide an indoor unit of an air conditioner capable of preventing occurrence of short circuit even when air is sucked in from the front side of the main body.

<MEANS TO ACHIEVE THE OBJECT>

[0006] An indoor unit of an air conditioner according to a first aspect of the present invention includes a main body, a front panel, and a bottom short circuit prevention section. The main body includes a front side opening, a top discharge port, and a bottom discharge port. The front side opening is formed on the front side of the main body. The top discharge port is formed above the front side opening. The bottom discharge port is formed below the front side opening. The front panel is flat and is disposed in front of the front side opening. The front panel includes a top intake port, a bottom intake port, a first side intake port, and a second side intake port respectively provided at four sides, i.e., top, bottom, left and right sides. The bottom short circuit prevention section prevents short circuit of the air flow between the bottom intake port and the bottom discharge port.

[0007] Here, because the indoor unit is provided with the bottom short circuit prevention section, it is possible to prevent short circuit of the air flow between the bottom intake port and the bottom discharge port.

[0008] An indoor unit of an air conditioner according to a second aspect of the present invention is the indoor unit of an air conditioner according to the first aspect of the present invention, wherein the bottom short circuit prevention section includes a front edge and a projected portion. The front edge is disposed between the bottom intake port and the bottom discharge port. The front edge projects forward. The projected portion is provided at the top of the bottom discharge port.

[0009] Here, because the bottom short circuit prevention section has the front edge and the projected portion, air is blown out forwardly downward from the bottom discharge port in a state in which the space in front of the bottom intake port and the space in front of the bottom discharge port are divided by the front edge. Accordingly, it is possible to reliably prevent short circuit between the bottom intake port and the bottom discharge port.

[0010] An indoor unit of an air conditioner according to a third aspect of the present invention is the indoor unit of an air conditioner according to the second aspect of the present invention, wherein a width in the vertical direction of the front edge is equal to or greater than 10 mm.

[0011] Here, because the width in the vertical direction of the front edge is equal to or greater than 10 mm, a sufficient distance can be secured between the bottom intake port and the bottom discharge port. Thus, it is possible to more reliably prevent short circuit.

[0012] An indoor unit of an air conditioner according to a fourth aspect of the present invention is the indoor unit of an air conditioner according to the first aspect of the present invention, wherein the bottom intake port is disposed at a position hidden by the front panel in a front view.

[0013] Here, the bottom intake port is disposed at a position hidden by the front panel in a front view, and thus the appearance improves.

[0014] An indoor unit of an air conditioner according to a fifth aspect of the present invention is the indoor unit of an air conditioner according to the first aspect of the present invention, further including a top short circuit prevention section. The top short circuit prevention section prevents short circuit of the air flow between the top discharge port and the top intake port.

[0015] Here, because the indoor unit includes the top short circuit prevention section, it is possible to prevent short circuit of the air flow between the top discharge port and the top intake port.

[0016] An indoor unit of an air conditioner according

to a sixth aspect of the present invention is the indoor unit of an air conditioner according to the fifth aspect of the present invention, wherein the top intake port is a slit opened at the front of the front panel. The top short circuit prevention section is a portion between the top intake port and the top discharge port at the top of the front panel.

[0017] Here, the top intake port comprising the slit and the top discharge port are separated by the top short circuit prevention section and air is sucked from the front to the top intake port comprising the slit. Thereby, it is possible to prevent short circuit of the air flow between the top intake port and the top discharge port.

<EFFECTS OF THE INVENTION>

[0018] According to the first aspect of the present invention, it is possible to prevent short circuit of the air flow between the bottom intake port and the bottom discharge port.

[0019] According to the second aspect of the present invention, it is possible to reliably prevent short circuit between the bottom intake port and the bottom discharge port.

[0020] According to the third aspect of the present invention, a sufficient distance can be secured between the bottom intake port and the bottom discharge port, and it is possible to more reliably prevent short circuit.

[0021] According to the fourth aspect of the present invention, the external appearance of the indoor unit improves.

[0022] According to the fifth aspect of the present invention, it is possible to prevent short circuit of the air flow between the top discharge port and the top intake port.

[0023] According to the sixth aspect of the present invention, the top intake port comprising the slit and the top discharge port are separated by the top short circuit prevention section and air is sucked from the front to the top intake port comprising the slit. Thereby, it is possible to prevent short circuit of the air flow between the top intake port and the top discharge port.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024]

Figure 1 is an elevation view of an indoor unit of an air conditioner according to an embodiment of the present invention.

Figure 2 is a lateral view of the indoor unit in Figure 1.

Figure 3 is a longitudinal sectional view of the indoor unit in Figure 1.

Figure 4 is an enlarged view of the vicinity of a shutter in Figure 3.

Figure 5 is an enlarged view of a bottom short circuit prevention section in Figure 3.

Figure 6 is an enlarged view of a top short circuit prevention section of an indoor unit according to an alternative embodiment of the present invention.

Figure 7 is an enlarged view of a top short circuit prevention section of an indoor unit according to another alternative embodiment of the present invention.

DESCRIPTION OF THE REFERENCE SYMBOLS

[0025]

1	Indoor unit
2	Main body
3	Indoor heat exchanger
4	Fan
5	Shutter
6	Stepping motor
7	Filter
8	Front grille
10	Front panel
24	Top discharge port
25	Bottom discharge port
27	Top space
28	Bottom space
29	Inner wall
30	Depressed portion
51	Bottom short circuit prevention section
52	Projected portion
53	Front edge
60, 65	Top short circuit prevention section

BEST MODE FOR CARRYING OUT THE INVENTION

[0026] Below, an indoor unit of an air conditioner according to an embodiment of the present invention is described with reference to the drawings.

[0027] An indoor unit 1 of an air conditioner shown in Figures 1 to 5 is a floor standing type indoor unit, which includes a main body 2, an indoor heat exchanger 3, a fan 4, a shutter 5, a stepping motor 6, a filter 7, a front grille 8, a front panel 10, and a bottom short circuit prevention section 51. The front panel 10 disposed in front of the main body 2 has a flat shape.

[0028] The main body 2 houses the indoor heat exchanger 3, the fan 4, the shutter 5, the stepping motor 6, the filter 7, and the front grille 8.

[0029] The indoor unit 1 is used in a state of being placed on a floor of a room. The indoor unit 1 can be mounted not only in a manner that the main body 2 is placed in contact against a wall surface of a room and but also in a state in which a back portion A (see Figure 2) of the main body 2 is entirely or partially embedded in a wall of a room. The indoor unit 1 further includes a cover 9 provided in a freely attachable/detachable manner so as to cover both lateral sides and a portion of the top side of the back portion A of the main body 2. Therefore, the cover 9 can be attached or detached according to the length of the back portion A of the main body 2 to be

embedded in the wall.

<STRUCTURE OF MAIN BODY 2>

[0030] As shown in Figure 3, the main body 2 comprises a hollow case made of synthetic resin. The inside of the main body 2 includes the filter 7, the indoor heat exchanger 3, and the fan 4 disposed in that order from a front side opening 2a formed in the front side to the back.

[0031] The front grille 8 is attached at the peripheral edge of the front side opening 2a of the main body 2. The filter 7 is fitted into the front grille 8.

[0032] The flat front panel 10 is disposed spaced apart from the front side opening 2a in front of the front side opening 2a of the main body 2.

[0033] The front panel 10 has a top intake port 11 a, a bottom intake port 11b, a first side intake port 11c, and a second side intake port 11d disposed respectively at four sides, i.e., top, bottom, left and right sides. Specifically, the front panel 10 is disposed forwardly spaced apart from the main body 2, thus forming the top intake port 11a, the first side intake port 11c, and the second side intake port 11d (see Figure 1) on three sides, i.e., top, left, and right sides of the front panel 10. In addition, the slit-shaped bottom intake port 11b is formed at a position at the bottom of the front panel 10 and slightly higher than a bottom discharge port 25. The intake ports 11a, 11b, 11c, and 11d are thereby respectively disposed in four directions (top, bottom, left, and right) of the front panel 10.

[0034] Fitting protrusions 10a and 10b are formed at the top and bottom of the front panel 10, respectively. The Fitting protrusions 10a and 10b are fitted, respectively, in a fitting concavity 8a of the front grille 8 and a fitting hole 2b in the vicinity of the lower end on the front side of the main body 2, whereby the front panel 10 is fixed in a state of being spaced apart from the front side opening 2a of the main body 2.

[0035] An intake passage P1, a top discharge passage P2, and a bottom discharge passage P3 are formed in the main body 2.

[0036] The intake passage P1 is a passage that passes through any of the four intake ports of the front panel 10, i.e., the top intake port 11a, the bottom intake port 11b, the first side intake port 11c, and the second side intake port 11d; then enters the main body 2 through the front side opening 2a, and passes through the filter 7, an indoor heat exchanger 3, and the fan 4 in the that order.

[0037] The top discharge passage P2 is a passage that runs from the fan 4 through a top space 27 to a top discharge port 24. The top discharge port 24 is formed above the front side opening 2a of the main body 2. A movable plate 26 capable of opening and closing is placed over the top discharge port 24.

[0038] The bottom discharge passage P3 is a passage that runs from the fan 4 through a bottom space 28 to the bottom discharge port 25. The bottom discharge port 25 is formed below the front side opening 2a of the main body 2. The shutter 5 capable of opening and closing is placed over the bottom space 28. Further, a stopper 37 that is in contact with the shutter 5 in the closed state is formed inside the bottom space 28. In addition, the front panel 10 has a plurality of horizontally extending slits 10c formed at the forward side of the bottom discharge port 25.

[0039] In addition, as shown in Figure 4, a plurality of vertical louvers 31 for adjusting the horizontal direction of air that is blown out from the bottom discharge port 25; a connection bar 32 that connects each of the vertical louvers 31; and a manually-operated lever 33 connected to the connection bar 32 are disposed in the bottom space 28.

<STRUCTURE OF FAN 4>

[0040] The fan 4 is a turbofan, which is a type of centrifugal fan that blows air out in the centrifugal direction, and includes a fan rotor 41, a motor 42, and a fan casing 43, as shown in Figure 3. The fan rotor 41 has a plurality of blades 41 a (portions by hatched by diagonal lines in Figure 3) disposed so as to extend away from a center 41b in a helical formation.

[0041] The fan casing 43 is a casing that houses the fan rotor 41 and the motor 42. The top of the fan casing 43 communicates with the top space 27 of the main body 2. The bottom of the fan casing 43 communicates with the bottom space 28 of the main body 2.

[0042] The air flow that is generated by the fan 4 and blown out in the centrifugal direction diverges up and down from the fan casing 43 and passes through the top discharge passage P2 and the bottom discharge passage P3, respectively, and is then discharged to the outside of the main body 2 from the top discharge port 24 and the bottom discharge port 25, respectively.

<DESCRIPTION OF BOTTOM SHORT CIRCUIT PREVENTION SECTION 51>

[0043] As shown in Figures 3 and 5, the bottom short circuit prevention section 51 prevents short circuit of the air flow between the bottom intake port 11b formed in the vicinity of the lower end of the front panel 10 and the bottom discharge port 25.

[0044] The bottom short circuit prevention section 51 is formed integrally with the front panel 10 by a synthetic resin or the like.

[0045] The bottom short circuit prevention section 51 includes a projected portion 52 and a front edge 53. The front edge 53 is disposed between the bottom intake port 11b and the bottom discharge port 25, and has a shape that projects forward. The projected portion 52 is disposed at the top of the bottom discharge port 25. Specifically, the projected portion 52 projects downward from the upper surface of the inner wall of the bottom discharge port 25 such that an air flow B1 blows out forwardly downward from the bottom discharge port 25.

[0046] As shown in Figure 5, an air flow S1 to be sucked into the bottom intake port 11b flows from the front of the front panel 10 and then is sucked into the bottom intake port 11b facing downward. At this time, in a state in which the space in front of the bottom intake port 11b and the space in front of the bottom discharge port 25 are divided by the front edge 53, the air flow B1 whose direction is changed by the projected portion 52 blows out forwardly downward from the bottom discharge port 25. As a result, it is possible to reliably prevent short circuit between the bottom intake port 11b and the bottom discharge port 25.

[0047] It is preferable that a width W in the vertical direction (see Figure 5) of the front edge 53 is wide. It is preferable that the width W is equal to or greater than 10 mm. When the width W is as wide as at least 10 mm, a sufficient distance can be secured between the bottom intake port 11b and the bottom discharge port 25 and thus it is possible to more reliably prevent short circuit. In addition, it is preferable that the length of the front edge 53 that projects forward from the bottom discharge port 25 is long. Also in this case, it is possible to more reliably prevent short circuit.

[0048] The bottom intake port 11b is disposed at a position hidden by the front panel 10 in a front view, and thus the appearance improves.

<STRUCTURE OF SHUTTER 5>

[0049] As shown in Figures 3 and 4, the shutter 5 is provided in the bottom space 28 of the bottom discharge passage P3. The shutter 5 is a member having a rectangular plate-like shape in accordance with the cross-sectional shape of the bottom space 28. The shutter 5 has a fitting tubular portion 5a into which an output shaft 6a is fitted such that the shutter 5 can integrally rotate with the output shaft 6a of the stepping motor 6.

[0050] When the shutter 5 is closed, the shutter 5 is maintained in the closed stated by utilizing pressure of the air flow generated by the fan 4. Thereby the sealing performance improves.

[0051] In the closed state, the shutter 5 is positioned at a second position A2 (see Figure 4) where the shutter 5 is in the vertical position or in a position leaning against the stopper 37. Therefore, the shutter 5 can be maintained in the closed state regardless the strength of the wind from the fan 4 or whether air is blown from the fan 4. In addition, it is possible to reduce the load imposed on the stepping motor 6 in the closed state.

[0052] As shown in Figure 4, the shutter 5 can change from the open state to the closed state by rotating to the side far from the fan 4 in the bottom discharge passage P3, specifically, in a direction R2 shown in Figure 4. Therefore, when the shutter 5 changes from the open state to the closed state, the shutter 5 can reliably move toward the position where the closed state is maintained by utilizing wind pressure generated by the fan 4.

[0053] As shown in Figure 4, the shutter 5 is positioned at a first position A1 (see Figure 4) in the open state, where the pressure is not exerted on the shutter 5 in the direction to close the shutter 5, specifically, in the direction R2. The first position A1 is the inside of a depressed portion 30 formed in an inner wall 29 that defines the bottom space 28 of the bottom discharge passage P3.

<STRUCTURE OF STEPPING MOTOR 6>

[0054] The stepping motor 6 is a motor for rotationally driving the shutter 5. In the closed state, the stepping motor 6 stops rotationally driving the shutter 5 so as not to apply a torque to the shutter 5.

[0055] Specifically, the indoor unit 1 in this embodiment is provided with a limit switch 36 (see Figure 4) for controlling rotational driving of the stepping motor 6. Therefore, when the shutter 5 is in the closed state, the limit switch 36 is actuated and can stop rotational driving of the stepping motor 6. At this time, because the shutter 5 in the closed state maintains the closed state by utilizing pressure of the air flow, there is no danger of air leakage around the periphery of the shutter 5.

<DESCRIPTION OF THE OPERATION>

[0056] During a heating operation, the shutter 5 of the bottom discharge passage P3 is opened to the first position A1 by a rotational driving force of the stepping motor 6. At the same time, the movable plate 26 of discharge passage P2 is also opened by a stepping motor (not shown). The air flow generated by the upper fan 4 is heated by the indoor heat exchanger 3. The heated air can pass through the top discharge passage P2 via the fan 4 and be blown out from the top discharge port 24, and can also pass through the bottom discharge passage P3 via the fan 4 and be blown out from the bottom discharge port 25. Therefore, as the heated air is blown out from the indoor unit 1 to the upper and lower portions of the room, it is possible to quickly heat a room.

[0057] On the other hand, during a cooling operation, the shutter 5 is closed to the second position A2 where the shutter 5 is in the vertical position or in a position leaning against the stopper 37 by a rotational driving force of the stepping motor 6. On the other hand, the movable plate 26 of the discharge passage P2 is set to the open state. As the shutter 5 is rotated to the second position A2, rotational driving of the stepping motor 6 is stopped by the limit switch 36. When the shutter 5 is closed, the shutter 5 is maintained in the closed state by utilizing pressure of the air flow generated by the fan 4. The air flow generated by the fan 4 is cooled by the indoor heat exchanger 3. The cooled air passes through the top discharge passage P2 via the fan 4 and is blown out upward from the top discharge port 24. Thereby the cooled air can cool a room.

<CHARACTERISTICS>

(1)

[0058] With the indoor unit 1 in this embodiment, because the bottom short circuit prevention section 51 is provided between the bottom intake port 11b and the bottom discharge port 25, it is possible to prevent short circuit of the air flow between the bottom intake port 11b and the bottom discharge port 25.

[0059] In addition, by preventing short circuit of the air flow between the bottom intake port 11b and the bottom discharge port 25, it is possible to ensure the performance of the indoor unit. At the same time, it is also possible to prevent condensation on the surface of the indoor unit 1.

(2)

[0060] With the indoor unit 1 in this embodiment, the bottom short circuit prevention section 51 includes the projected portion 52 disposed at the top of the bottom discharge port 25 and the front edge 53 disposed between the bottom intake port 11b and the bottom discharge port 25. Therefore, in a state in which the space in front of the bottom intake port 11b and the space in front of the bottom discharge port 25 are divided by the front edge 53, the air flow B1 whose direction is changed by the projected portion 52 is blown out forwardly downward from the bottom discharge port 25. Thereby it is possible to reliably prevent short circuit between the bottom intake port 11b and the bottom discharge port 25.

(3)

[0061] With the indoor unit 1 in this embodiment, the bottom intake port 11b is disposed at a position hidden by the front panel 10 in a front view, and thus the appearance improves.

<ALTERNATIVE EMBODIMENT>

(A)

[0062] Although the above embodiment is described by taking the indoor unit 1 having the bottom short circuit prevention section 51 as an example, the indoor unit 1 may further include a top short circuit prevention section 65 shown in Figure 6 in order to prevent short circuit at the top.

[0063] As shown in Figure 6, the top short circuit prevention section 65 prevents short circuit of the air flow between the top intake port 11 a formed at the upper end of the front panel 10 and the top discharge port 24

[0064] The top short circuit prevention section 65 is formed integrally with the main body 2 by a synthetic resin or the like.

[0065] The top short circuit prevention section 65 includes a projected portion 66 and a front edge 67. The front edge 67 is disposed between the top intake port 11a and the top discharge port 24, and has a shape that projects forward. The projected portion 66 is disposed at the bottom of the top discharge port 24. Specifically, the projected portion 66 projects upward from the lower surface of the inner wall of the top discharge port 24.

[0066] As shown in Figure 6, an air flow S2 to be sucked into the top intake port 11a flows from the front or above the front panel 10 and then is sucked into the top intake port 11a facing upward. At this time, in a state in which the space in front of the top intake port 11a and the space in front of the top discharge port 24 are divided by the front edge 67, an air flow B2 whose direction is changed by the projected portion 66 blows out forwardly upward from the top discharge port 24. As a result, it is possible to reliably prevent short circuit between the top intake port 11a and the top discharge port 24.

[0067] In addition, by preventing short circuit of the air flow between the top intake port 11a and the top discharge port 24, it is possible to ensure the performance of the indoor unit. At the same time, it is also possible to prevent condensation on the surface of the indoor unit 1.

(B)

[0068] Note that the top short circuit prevention section 65 shown in Figure 6 may have the same configuration as the bottom short circuit prevention section 51 (see Figure 5) in the above embodiment. In this case, the external appearance of the indoor unit 1 becomes vertically symmetric and well balanced, and thus the appearance improves.

(C)

[0069] In addition, as another alternative embodiment, as shown in Figure 7, a top intake port 111a may comprise slits opened at the front side of the front panel 10. In this case, a top short circuit prevention section 60 is formed by a portion between the top intake port 111a at the tope of the front panel 10 and the top discharge port 24. Also in this case, the portion between the slit-like top intake port 111a and the top discharge port 24 is separated by the top short circuit prevention section 60 and also air is sucked from the front to the slit-like top intake port 111a. Thereby it is possible to prevent short circuit of the air flow between the top intake port 111a and the top discharge port 24.

[0070] In addition, by preventing short circuit of the air flow between the top intake port 111a and the top discharge port 24, it is possible to ensure the performance of the indoor unit. At the same time, it is also possible to prevent condensation on the surface of the indoor unit 1.

(D)

[0071] In addition, as still another alternative embodi-

ment, the top short circuit prevention section may be formed in a fin shape. Also in this case, it is possible to prevent short circuit of the air flow between the top intake port 11a and the top discharge port 24.

(E)

[0072] The embodiment is described by taking the floor standing type indoor unit as an example. However, the present invention is not limited thereto. The present invention can be applied to an indoor unit as long as it is an indoor unit having top and bottom discharge passages and intake passages at four sides, i.e., top, bottom, left and right sides. For example, the present invention can be applied to a ceiling embedded type indoor unit. Note that, when mounting the indoor unit, the indoor unit may be mounted in an appropriate direction according to the mounting surface (for example, ceiling, wall, and the like).

INDUSTRIAL APPLICABILITY

[0073] The present invention can be applied to an indoor unit having top and bottom discharge passages and intake passages at four sides, i.e., top, bottom, left, and right sides.

Claims

1. An indoor unit (1) of an air conditioner, comprising:

a main body (2) including a front side opening (2a) formed on the front side, a top discharge port (24) formed above the front side opening (2a), and a bottom discharge port (25) formed below the front side opening (2a);
a flat front panel (10) disposed in front of the front side opening (2a) and having a top intake port (11a, 111a), a bottom intake port (11b), a first side intake port (11c), and a second side intake port (11d) respectively provided at four sides, i.e., top, bottom, left and right sides; and
a bottom short circuit prevention section (51) configured to prevent short circuit of air flow between the bottom intake port (11b) and the bottom discharge port (25).

2. The indoor unit (1) according to claim 1, wherein the bottom short circuit prevention section (51) includes
a front edge (53) disposed between the bottom intake port (11b) and the bottom discharge port (25) and projecting forward, and
a projected portion (52) provided at the top of the bottom discharge port (25).

3. The indoor unit (1) according to claim 2, wherein
a width W in the vertical direction of the front edge (53) is equal to or greater than 10 mm.

4. The indoor unit (1) according to claim 1, wherein the bottom intake port (11b) is disposed at a position hidden by the front panel (10) in a front view.

5. The indoor unit (1) according to claim 1 further comprising a top short circuit prevention section (60, 65) configured to prevent short circuit of air flow between the top discharge port (24) and the top intake port (11 a, 111 a).

6. The indoor unit (1) according to claim 5, wherein
the top intake port (111a) is a slit opened at the front side of the front panel (10), and
the top short circuit prevention section (60) is a portion between the top intake port (111a) at the top of the front panel (10) and the top discharge port (24).

FIG. 1

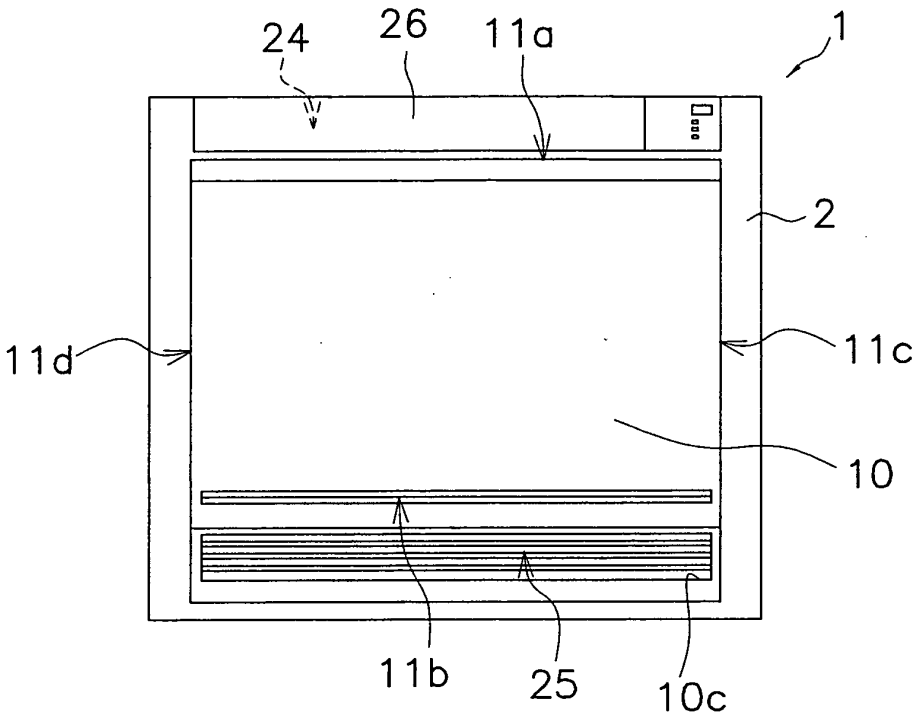
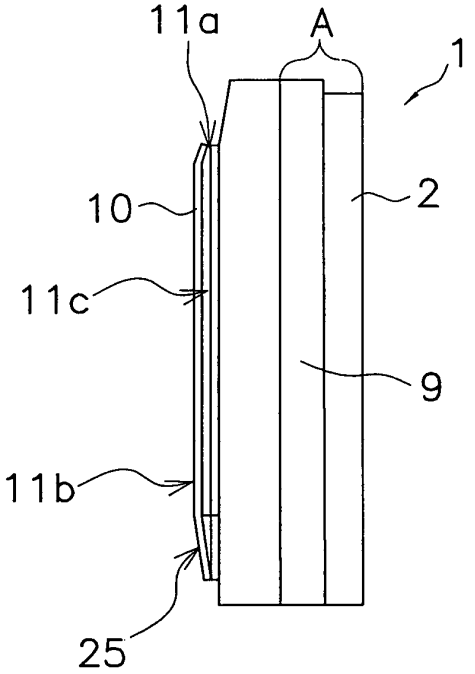
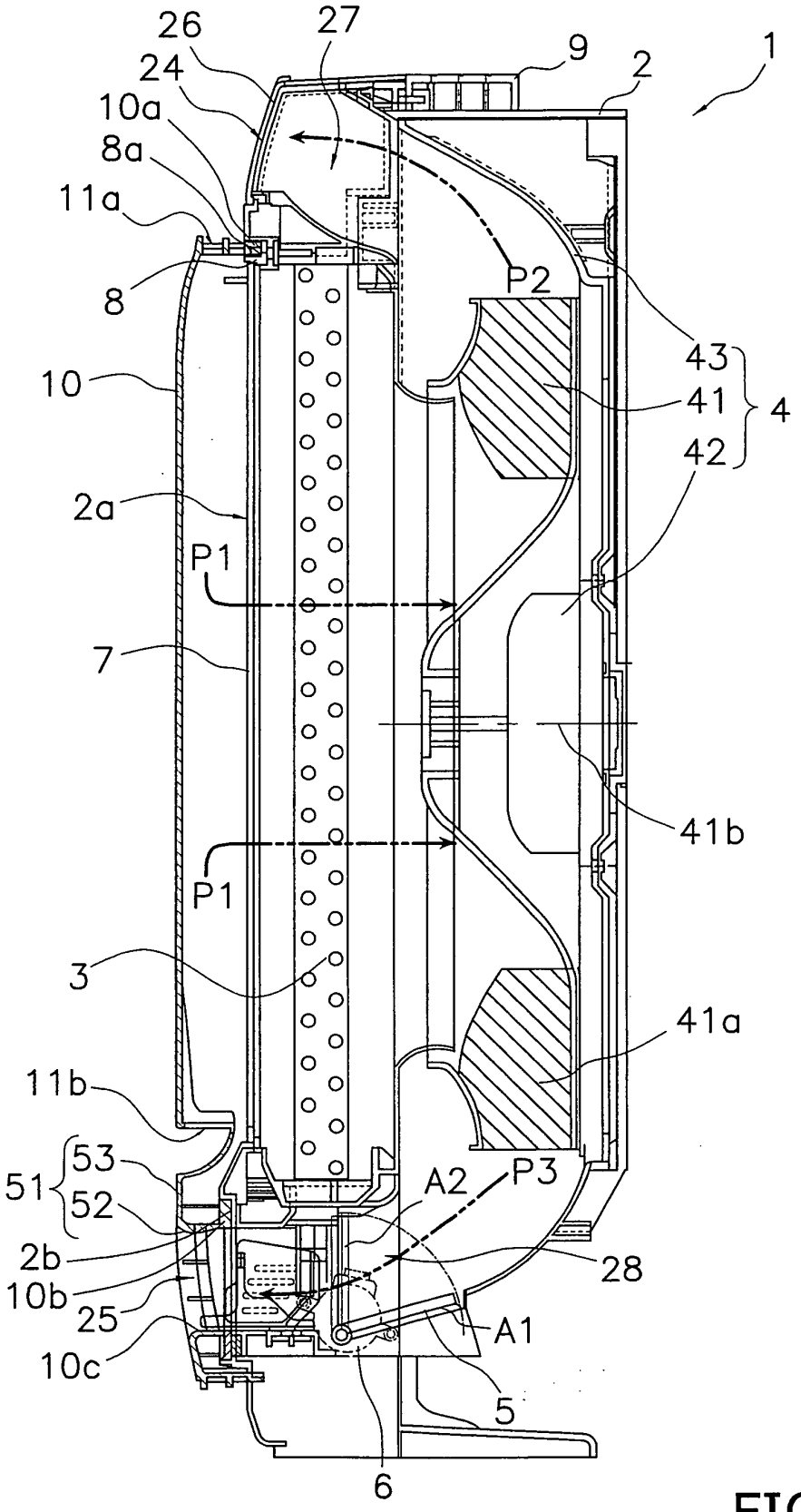


FIG. 2

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10c
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6

FIG. 3

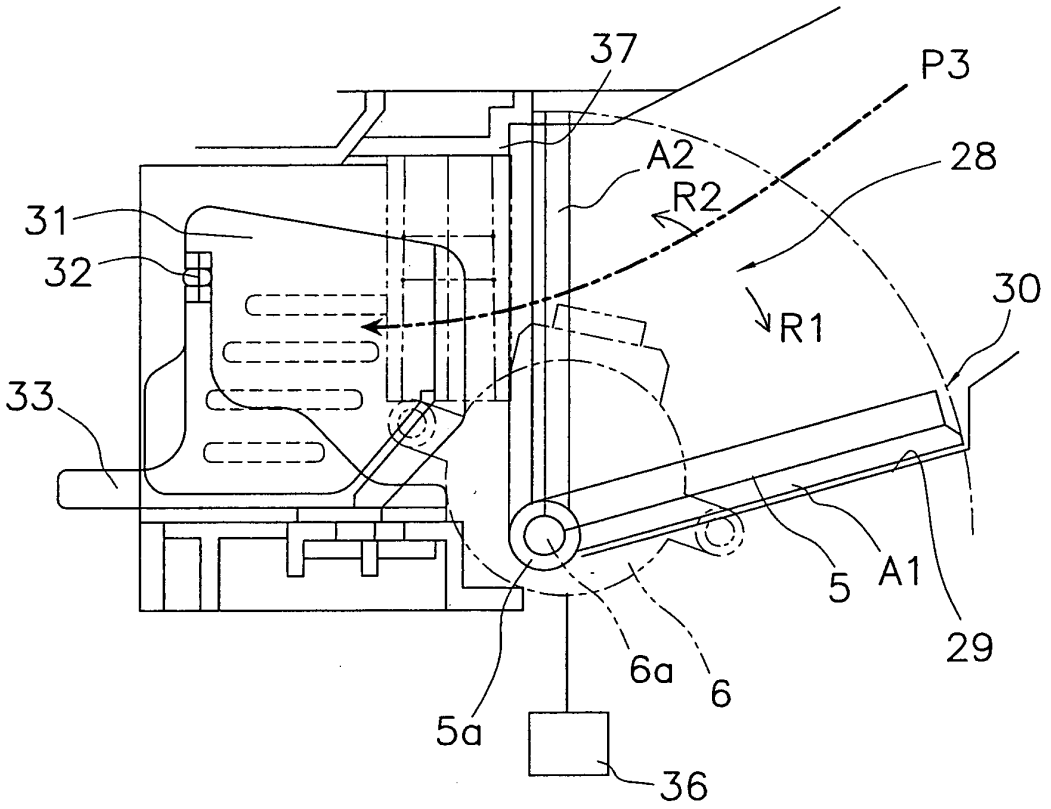

FIG. 4

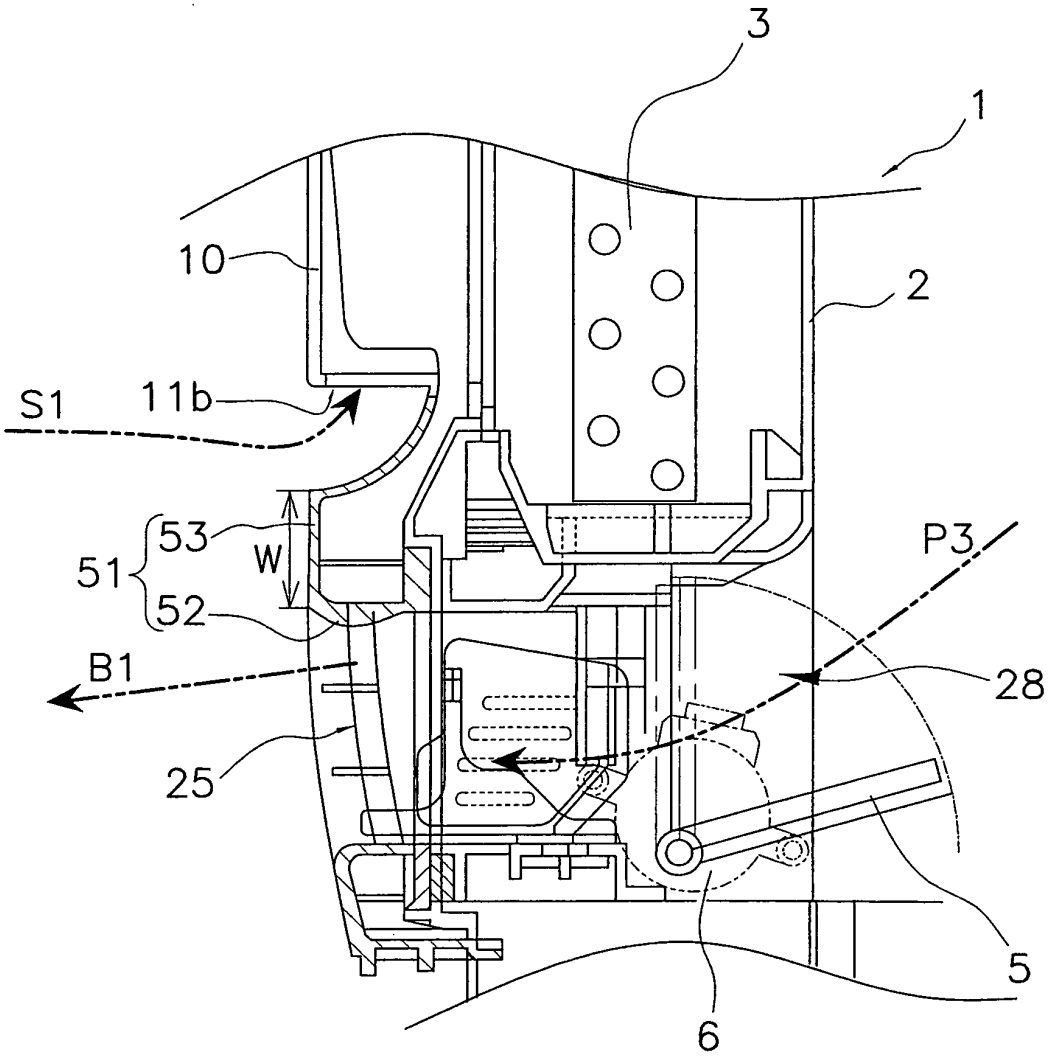

FIG. 5

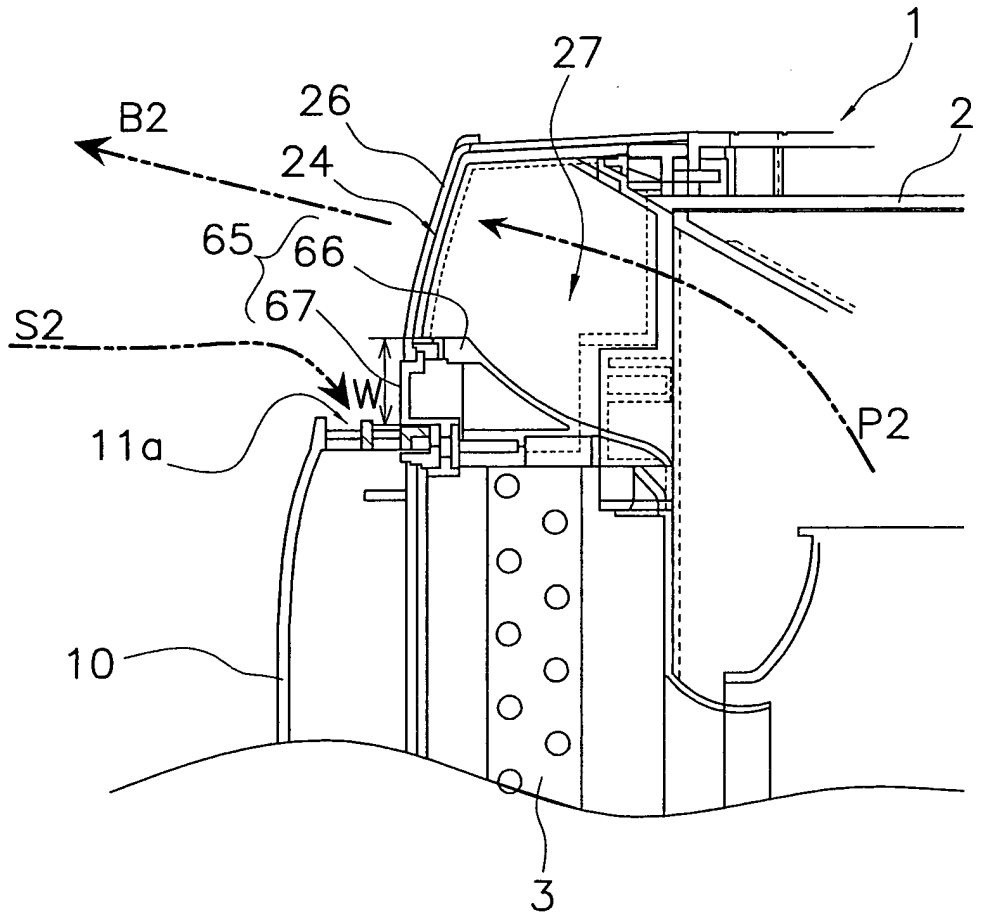

FIG. 6

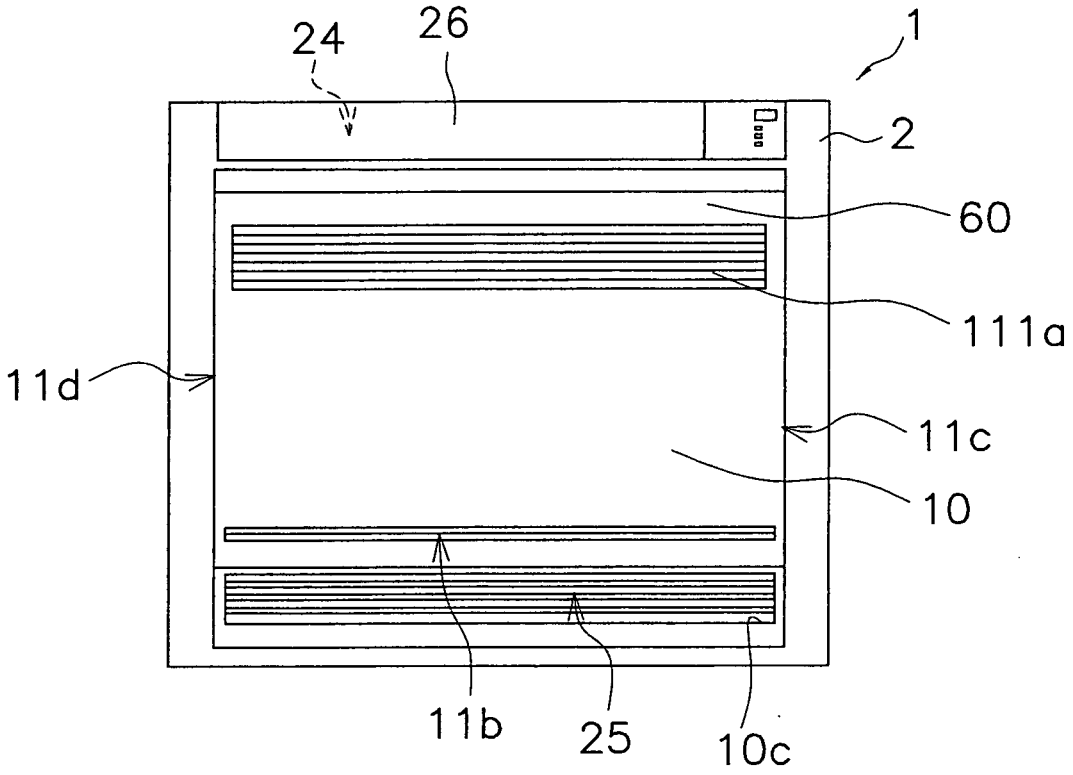

FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2006/325719

A. CLASSIFICATION OF SUBJECT MATTER
F24F1/00(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)
F24F1/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2007
Kokai Jitsuyo Shinan Koho 1971-2007 Toroku Jitsuyo Shinan Koho 1994-2007

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 11-94348 A (Daikin Industries, Ltd.), 09 April, 1999 (09.04.99), Par. No. [0016]; Fig. 3 (Family: none)	1-6
Y	JP 2005-188768 A (Sanyo Electric Co., Ltd.), 14 July, 2005 (14.07.05), Par. No. [0009] (Family: none)	1-6

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
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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
22 January, 2007 (22.01.07)	13 February, 2007 (13.02.07)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2006/325719

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 99009/1984(Laid-open No. 15425/1986) (Mitsubishi Electric Corp.), 29 January, 1986 (29.01.86), Page 2, line 9 to page 3, line 1 (Family: none)	1-6

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 6458965 B **[0002]**