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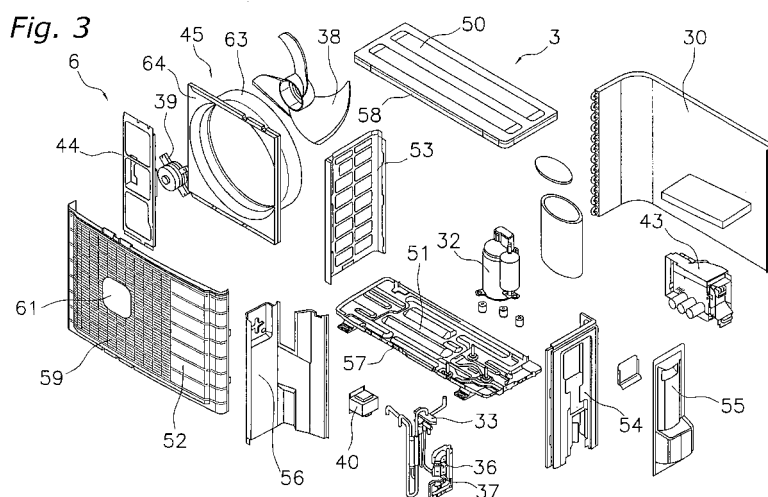
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(54) **OUTDOOR UNIT OF AIR CONDITIONER**

(57) The present invention provides an outdoor unit of an air conditioner that can improve wind performance. The outdoor unit (3) of the air conditioner is disposed with an outdoor unit casing, a blower fan (38), a bellmouth (45), a fan motor (39) and a fan motor base (44). The outdoor unit casing includes a top panel (50) disposed on a top side, a bottom panel (51) disposed on a bottom side, and a front panel (52) that is disposed on a front side and in which air blowout holes (59) are disposed. The blower fan (38) is housed in the outdoor unit casing

and generates an airflow that is blown out through the blowout holes (59) in the front panel (52). The bellmouth (45) guides the airflow generated by the blower fan (38). The fan motor (39) rotatably drives the blower fan (38). The fan motor (39) is fixed to the fan motor base (44), and the fan motor base (44) includes an upper portion that is fixed to a top panel front portion (58) and a lower portion that is fixed to a bottom panel front portion (57), and is disposed on a front side of the blower fan (38). The bellmouth (45) and the fan motor base (44) are positioned with the front panel (52) as a reference.



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Description

Technical Field

[0001] The present invention relates to an outdoor unit of an air conditioner.

Background Art

[0002] An outdoor unit of an air conditioner is usually disposed with a fan motor that rotatably drives a blower fan, and the fan motor is attached to the outdoor unit via a fan motor base. It is preferable for the fan motor base to be fixed to a top panel and a bottom panel in order to ensure strength. Conventionally, there are many instances where the fan motor base fixed to the top panel and the bottom panel is disposed upstream of the blower fan, and the fan motor base is disposed between an outdoor heat exchanger and the blower fan and fixed to the top panel and the bottom panel.

[0003] There are also many instances where the outdoor unit of the air conditioner is disposed with a bellmouth. The bellmouth is a member that guides the airflow generated by the blower fan and is disposed such that it covers the periphery of the blower fan. Also, because the bellmouth is disposed from the vicinity of the blower fan to downstream of the blower fan in order to guide the air, there are many instances where the bellmouth is fixed to a front panel that is downstream of the blower fan and disposed on the front side of the outdoor unit (see Patent Document 1).

<Patent Document 1 >

[0004] Japanese Patent Application Publication (JP-A) No. 2003-124649

Disclosure of the Invention

[0005] In an outdoor unit of an air conditioner disposed with a fan motor base that is fixed to the top panel and the bottom panel in this manner, there are many instances where the fan motor base and the bellmouth are disposed apart from each other. However, in an attachment structure where the fan motor base and the bellmouth are disposed apart from each other, it is difficult to reduce the clearance between the bellmouth and the blower fan. That is, because the fan motor base and the bellmouth are disposed apart from each other, it is difficult to reduce dimensional error in the disposition of the fan motor base and the bellmouth, and it is necessary to additionally ensure clearance in view of some error. In order to improve the wind performance of the bellmouth, it is preferable to reduce the clearance between the bellmouth and the blower fan, but in an attachment structure such as described above, it is difficult to reduce this clearance and difficult to improve the wind performance.

[0006] It is an object of the present invention to provide

an outdoor unit of an air conditioner that can improve wind performance.

[0007] An outdoor unit of an air conditioner pertaining to a first invention is disposed with an outdoor unit casing, a blower fan, a bellmouth, a fan motor and a fan motor base. The outdoor unit casing includes a top panel disposed on a top side, a bottom panel disposed on a bottom side, and a front panel that is disposed on a front side and in which air blowout holes are disposed. The blower fan is housed in the outdoor unit casing and generates an airflow that is blown out through the blowout holes in the front panel. The bellmouth guides the airflow generated by the blower fan. The fan motor rotatably drives the blower fan. The fan motor is fixed to the fan motor base, and the fan motor base includes an upper portion that is fixed to a front portion of the top panel and a lower portion that is fixed to a front portion of the bottom panel, and is disposed on a front side of the blower fan. The bellmouth and the fan motor base are positioned with the front panel as a reference.

[0008] In the outdoor unit of this air conditioner, the fan motor and the fan motor base are strongly attached to the outdoor unit casing because the upper portion and lower portion of the fan motor base are respectively fixed to the top panel front portion and the bottom panel front portion. Also, error in the dimension of the disposition of the fan motor base and the bellmouth can be reduced because the fan motor base and the bellmouth are both positioned with the front panel as a reference. Consequently, in the outdoor unit of the air conditioner, it is easy to reduce the clearance between the bellmouth and the blower fan, and wind performance can be improved.

[0009] An outdoor unit of an air conditioner pertaining to a second invention is the outdoor unit of the air conditioner of the first invention, wherein the fan motor base and the bellmouth are disposed along an inner surface of the front panel.

[0010] In the outdoor unit of this air conditioner, the fan motor base and the bellmouth are easily positioned with the front panel as a reference because the fan motor base and the bellmouth are disposed along the inner surface of the front panel. Thus, in the outdoor unit of this air conditioner, it is easy to reduce the clearance between the bellmouth and the blower fan, and wind performance can be improved.

[0011] An outdoor unit of an air conditioner pertaining to a third invention is the outdoor unit of the air conditioner of the second invention, wherein the fan motor base is disposed between the bellmouth and the front panel and internally touches the bellmouth and the front panel.

[0012] In the outdoor unit of this air conditioner, the positioning of the fan motor and the bellmouth is easier because the fan motor base is disposed between the bellmouth and the front panel and internally touches the bellmouth and the front panel. For this reason, in the outdoor unit of this air conditioner, it is easier to reduce the clearance between the bellmouth and the blower fan, and wind performance can be easily improved.

[0013] An outdoor unit of an air conditioner pertaining to a fourth invention is the outdoor unit of the air conditioner of any of the first to third inventions, wherein the front panel is a member made of resin.

[0014] In the outdoor unit of this air conditioner, the manufacturing cost can be reduced in comparison to a case where the front panel is manufactured by plate metal or the like because the front panel is a member made of resin. Also, when the front panel is a member made of resin when the fan motor base is to be attached to the front panel, the strength of the portion to which the fan motor base is to be attached becomes a problem, but in the outdoor unit of this air conditioner, strength is also ensured because the upper portion of the fan motor base is fixed to the top panel front portion and the lower portion is fixed to the bottom panel front portion.

[0015] An outdoor unit of an air conditioner pertaining to a fifth invention is the outdoor unit of the air conditioner of any of the first to fourth inventions, wherein the blowout holes in the front panel are configured by plural slits partitioned by a grating. Also, the fan motor base and the grating are disposed such that the blowout resistance of the airflow is reduced.

[0016] Usually, when the fan motor base is disposed in the flow of the airflow resulting from the blower fan, there is the potential for the blowout resistance of the air to increase due to the fan motor base and for the wind performance to drop.

[0017] However, in the outdoor unit of this air conditioner, the fan motor base and the grating are disposed such that the blowout resistance of the airflow is reduced. For this reason, an increase in the blowout resistance of the air can be suppressed and wind performance can be improved.

[0018] An outdoor unit of an air conditioner pertaining to a sixth invention is the outdoor unit of the air conditioner of the fifth invention, wherein the fan motor base includes vertical members. The vertical members are disposed such that they extend in a vertical direction when seen in front view and overlap the grating.

[0019] In the outdoor unit of this air conditioner, the vertical members of the fan motor base are disposed such that they extend in the vertical direction when seen in front view and overlap the grating. For this reason, an increase in the blowout resistance of the airflow due to the fan motor base can be suppressed. For this reason, an increase in the blowout resistance of the air can be suppressed and wind performance can be improved.

[0020] An outdoor unit of an air conditioner pertaining to a seventh invention is the outdoor unit of the air conditioner of any of the first to sixth inventions, wherein the front panel, the bellmouth, the blower fan, the fan motor and the fan motor base are modularized.

[0021] In the outdoor unit of this air conditioner, productivity is improved and positioning of the fan motor base and the bellmouth with the front panel as a reference is easy because the front panel, the bellmouth, the blower fan, the fan motor and the fan motor base are modularized.

Brief Description of the Drawings

[0022]

- 5 <FIG. 1> An external view of an air conditioner.
- <FIG. 2> A configurational diagram of a refrigerant circuit.
- <FIG. 3> A perspective view showing the configuration of an outdoor unit.
- 10 <FIG. 4> A perspective view of part of the outdoor unit.
- <FIG. 5> A front view of part of the outdoor unit.
- <FIG. 6> A top view of part of the outdoor unit.
- <FIG. 7> An enlarged front view of a front panel.

15 Description of the Reference Numerals

[0023]

- 1 Air Conditioner
- 20 3 Outdoor Unit
- 5 Outdoor Unit Casing
- 38 Blower Fan
- 39 Fan Motor
- 44 Fan Motor Base
- 25 45 Bellmouth
- 50 Top Panel
- 51 Bottom Panel
- 52 Front Panel
- 59 Blowout Holes
- 30 60 Grating
- 65 Vertical Members

Best Mode for Implementing the Invention

35 <Overall Configuration of Air Conditioner>

[0024] FIG. 1 shows an external view of an air conditioner 1 in which an embodiment of the present invention has been adopted.

40 [0025] The air conditioner 1 is disposed with an indoor unit 2, which is attached to an indoor wall surface or the like, and an outdoor unit 3, which is disposed outdoors.

[0026] An indoor heat exchanger 70 is housed inside the indoor unit 2, an outdoor heat exchanger 30 is housed inside the outdoor unit 3, and a refrigerant circuit is configured as a result of the heat exchangers 30 and 70 being connected by a refrigerant pipe 4.

50 <Schematic Configuration of Refrigerant Circuit of Air Conditioner>

[0027] FIG. 2 shows the configuration of the refrigerant circuit of the air conditioner 1. The refrigerant circuit is mainly configured by the indoor heat exchanger 70, an accumulator 31, a compressor 32, a four-way switch valve 33, the outdoor heat exchanger 30 and an electric expansion valve 34.

[0028] The indoor heat exchanger 70 disposed in the

indoor unit 2 conducts heat exchange with the air contacting it. A cross-flow fan 71 for taking in indoor air and discharging, to the indoors, air after heat exchange has been conducted through the indoor heat exchanger 70 is disposed in the indoor unit 2. The cross-flow fan 71 is configured in a long and narrow circular cylinder shape and is disposed such that its center axis is parallel to the horizontal direction. The cross-flow fan 71 is rotatably driven by an indoor fan motor 72 disposed inside the indoor unit 2.

[0029] Disposed in the outdoor unit 3 are the compressor 32, the four-way switch valve 33 connected to the discharge side of the compressor 32, the accumulator 31 connected to the intake side of the compressor 32, the outdoor heat exchanger 30 connected to the four-way switch valve 33, and the electric expansion valve 34 connected to the outdoor heat exchanger 30. The electric expansion valve 34 is connected to a pipe 41 via a filter 35 and a liquid closure valve 36, and is connected to one end of the indoor heat exchanger 70 via the pipe 41. The four-way switch valve 33 is connected to a pipe 42 via a gas closure valve 37, and is connected to the other end of the indoor heat exchanger 70 via the pipe 42. The pipes 41 and 42 correspond to the refrigerant pipe 4 of FIG 1. A blower fan 38 for discharging, to the outside, air after heat exchange by the outdoor heat exchanger 30 is disposed in the outdoor unit 3. The blower fan 38 is rotatably driven by a fan motor 39.

[0030] The configuration of the outdoor unit will be described in detail below.

<Configuration of Outdoor Unit>

[0031] As shown in FIG. 3, the outdoor unit 3 is disposed with an outdoor unit casing 5 (see FIG 1), the compressor 32, the four-way switch valve 33, the electric expansion valve 34 (see FIG. 2), the closure valves 36 and 37, a reactor 40, an electrical component box 43, the outdoor heat exchanger 30, the blower fan 38, the fan motor 39, a fan motor base 44, and a bellmouth 45.

[0032] The outdoor unit casing 5 mainly includes a top panel 50, a bottom panel 51, a front panel 52, a left side panel 53, a right side panel 54, a closure valve cover 55, and a partition panel 56.

[0033] The top panel 50 is disposed on the top side of the outdoor unit 3 and covers the top side of the interior space of the outdoor unit 3. The top panel 50 is formed by plate metal. The edge of the top panel 50 is bent downward in the vertical direction, and a screw hole is disposed, as fixing means for fixing a later-described front panel assembly 6, in a top panel front portion 58 positioned at the front side of the bent portion.

[0034] The bottom panel 51 is disposed on the bottom side of the outdoor unit 3 and covers the bottom of the interior space of the outdoor unit 3. The bottom panel 51 is formed by plate metal. The edge of the bottom panel 51 is bent upward in the vertical direction, and a screw hole is disposed, as fixing means for fixing the front panel

assembly 6, in a bottom panel front portion 57 positioned at the front side of the bent portion.

[0035] The front panel 52 is disposed on the front side of the outdoor unit 3 and covers the front side of the interior space of the outdoor unit 3. Blowout holes 59, through which air is blown out, are disposed in the front panel such that the air to be blown out passes from the inside of the outdoor unit 3 to the outside. The front panel 52 will be described in greater detail later.

[0036] The left side panel 53 is disposed on the left side of the outdoor unit 3 and covers the left side of the interior space of the outdoor unit 3. The left side panel 53 is formed by plate metal.

[0037] The right side panel 54 covers the right side of the interior space of the outdoor unit 3. The right side panel 54 is formed by plate metal. The closure valve cover 55, which is made of resin, is attached to the right side, i.e., the outer side, of the right side panel 54.

[0038] As shown in FIG. 4, the partition panel 56 is disposed perpendicular to the bottom panel 51 and partitions the interior space of the outdoor unit 3 into two spaces at the left and right. The space positioned at the left side of the partition panel 56 serves as a ventilation chamber and is a space through which passes air that is taken in from the outside of the outdoor unit 3, passes through the outdoor heat exchanger 30 and is to be discharged to the outdoors. The space positioned at the right side of the partition panel 56 serves as a machine chamber and is a space that is blocked off to a certain extent from the ventilation chamber. Most of the machine parts are housed in the machine chamber. FIG. 4 is a schematic perspective view showing part of the configuration of the outdoor unit 3, and the front panel 52 and other members have been omitted in order to facilitate understanding.

[0039] The compressor 32 is disposed in the machine chamber and is fixed to the bottom panel 51. The four-way switch valve 33 is disposed in front of the compressor 32. The electric expansion valve 34 (see FIG. 2) is disposed in the machine chamber similarly to the compressor 32 and is disposed at the side of the compressor 32. The closure valves 36 and 37 are disposed below the right side panel 54. The reactor 40 is disposed in the side wall of the partition panel 56 in the machine chamber. The electrical component box 43 is disposed in the upper portion of the machine chamber. Control circuits such as a microcomputer chip for conducting control of various devices and a memory in which a control program, and other circuit components are stored are housed in the electrical component box 43 and are connected by a harness or the like to the compressor 32, the four-way switch valve 33, the electric expansion valve 34 and the reactor 40.

[0040] The outdoor heat exchanger 30 is disposed in the ventilation chamber and conducts heat exchange with the air passing therethrough. The outdoor heat exchanger 30 is disposed along the left side portion from the rear portion of the ventilation chamber and has a sub-

stantially L-shaped shape.

[0041] The blower fan 38, the fan motor 39, the fan motor base 44 and the bellmouth 45 are disposed in the ventilation chamber and configure the front panel assembly 6, which is modularized together with the front panel 52. The configuration of the front panel assembly 6 will be described in detail below.

<Configuration of Front Panel Assembly>

[0042] As shown in FIG. 3, the front panel assembly 6 is configured as a result of the front panel 52, the blower fan 38, the fan motor 39, the fan motor base 44 and the bellmouth 45 being modularized with the front panel 52 as a reference.

<Front Panel>

[0043] The front panel 52 is formed from a resin such as polypropylene and disposed on the front side of the outdoor unit 3. The front panel 52 is disposed on the front side of the bellmouth 45 and the fan motor base 44. Screw holes are respectively disposed in the upper end and the lower end of the front panel 52. When the front panel assembly 6 is to be fixed to the outdoor unit 3, screws are passed through the screw holes in the front panel 52 and the screw holes disposed in the top panel front portion 58 and the bottom panel front portion 57, so that the front panel 52 and the top panel 50, and the front panel 52 and the bottom panel 51, are screwed together. A grating 60 (see FIG. 7) extending in the vertical direction and the horizontal direction and the plural slit-like blowout holes 59 partitioned by the partition panel 60 are disposed in the front panel 52. The airflow that is generated by the blower fan 38 and taken into the ventilation chamber from the rear side of the outdoor unit 3 passes through the blowout holes 59 and is discharged to the outside of the outdoor unit 3. A circular solid portion 61, in which the blowout holes 59 are not disposed, is disposed in the vicinity of the center of the portion in which the blowout holes 59 are disposed. The solid portion 61 is disposed at a position that overlaps the fan motor 39 when seen in front view.

<Blower Fan>

[0044] The blower fan 38 is a propeller fan including plural blades and is positioned downstream of the outdoor heat exchanger 30. As shown in FIG. 5, the blower fan 38 is disposed in the substantial center of the ventilation chamber when seen in front view. FIG. 5 is a front view showing part of the configuration of the outdoor unit 3, and the bellmouth 45 and other members have been omitted in order to facilitate understanding. Also, as shown in FIG. 4, a fan motor housing 62 is disposed in the center of the blower fan 38. The fan motor housing 62 has a hollow circular cylinder shape whose bottom side is open, and in a state where the blower fan 38 is

housed in the outdoor unit 3, this opening faces the front side, i.e., downstream. The fan motor 39 is inserted from the front side and housed in the fan motor housing 62. The blower fan 38 is fixed to a rotating shaft of the fan motor 39 and is rotatably driven by the fan motor 39 around an axis parallel to the front-rear direction. The airflow generated by the blower fan 38 is taken into the ventilation chamber from the rear side of the outdoor unit 3, passes through the outdoor heat exchanger 30, the bellmouth 45 and the blowout holes 59 in the front panel 52, and is discharged to the outside of the outdoor unit 3.

<Bellmouth>

[0045] The bellmouth 45 shown in FIG. 3 and FIG. 6 is formed from a resin such as polypropylene and forms an air path that guides the airflow generated by the blower fan 38 and blown out to the outdoors. The bellmouth 45 is fixed to the inner surface of the front panel 52 along the inner surface of the front panel 52 and disposed such that it covers the periphery of the blower fan 38. The airflow generated by the blower fan 38 is taken into the ventilation chamber from the outside through the rear side of the outdoor unit 3, passes through the outdoor heat exchanger 30, passes through the opening in the bellmouth 45 and the blowout holes 59 in the front panel 52, and is blown out to the outside of the outdoor unit 3. As shown in FIG. 3, the bellmouth 45 includes a circular cylinder portion 63 and a planar portion 64.

[0046] The circular cylinder portion 63 has a thin, hollow, circular cylinder shape. The circular cylinder portion 63 is disposed on the rear portion of the bellmouth 45 and configures a circular opening through which passes the airflow generated by the blower fan 38. The circular cylinder portion 63 is disposed such that the center of the opening coincides with the rotational axis of the blower fan 38. Part of the front side of the blower fan 38 is inserted inside the circular cylinder portion 63 (see FIG. 6).

[0047] The planar portion 64 is a thin member having a rectangular outer shape when seen in front view and is provided to the front portion of the bellmouth 45. The majority of the area of the planar portion 64 is occupied by a circular opening. The edge of this opening is continuous with the circular cylinder portion 63, such that the air generated by the blower fan 38 passes therethrough. Screw holes are disposed in the upper end and the lower end of the planar portion 64, and the planar portion 64 is fixed to the inner surface of the front panel 52 as a result of screwing. Consequently, the bellmouth 45 is attached to the inner surface of the front panel 52 and positioned with the front panel 52 as a reference.

<Fan Motor>

[0048] The fan motor 39 is inserted into the circular cylinder portion 63 of the blower fan 38 from the front side and attached to the blower fan 38. The fan motor 39

is disposed such that its rotational axis is positioned parallel to the front-rear direction of the outdoor unit 3. The rotating shaft of the fan motor 39 is fixed to the rotational center of the blower fan 38, and the fan motor 39 rotatably drives the blower fan 38.

<Fan Motor Base>

[0049] The fan motor base 44 is a member to which the fan motor 39 is fixed and which supports the fan motor 39, and is formed from plate metal. As shown in FIG. 5 and FIG. 6, the fan motor base 44 is disposed in front of the blower fan 38, and is disposed in front of the fan motor 39 and in front of the bellmouth 45. The fan motor base 44 is disposed along the inner surface of the front panel 52 and fixed to the inner surface of the front panel 52. Consequently, the fan motor base 44 is positioned with the front panel 52 as a reference. In a state where the front panel assembly 6 has been assembled, the fan motor base 44 is positioned between the front panel 52 and the bellmouth 45 and internally touches the front panel 52 and the bellmouth 45. As shown in FIG. 5, the fan motor base 44 has a thin shape having a rectangular outer contour that is long in the vertical direction when seen in front view and extends to a height that is substantially the same as the top side and the bottom side of the outdoor unit 3. That is, both the upper and lower ends of the fan motor base 44 extend to the same height as both the upper and lower ends of the front panel 52. Screw holes are respectively disposed in the upper end and the lower end of the fan motor base 44. The screw holes are disposed such that in a state where the front panel assembly 6 has been assembled, they coincide with the screw holes disposed in the upper end and lower end of the front panel 52. When the front panel assembly 6 is to be fixed to the outdoor unit 3, the upper end of the front panel 52 and the upper end of the fan motor base 44 are screwed to the top panel front portion 58 by a common screw. Also, the lower end of the front panel 52 and the lower end of the fan motor base 44 are fixed to the bottom panel front portion 57 by a common screw.

[0050] Plural rectangular openings are arranged in the vertical direction when seen in front view and disposed in the fan motor base 44. These openings have a left-right width that is slightly smaller than the left-right width of the fan motor 44, and are disposed in proximity in the vertical direction. Consequently, the fan motor base 44 is configured by two vertical members 65 in long and narrow shape that extend in the vertical direction and by plural horizontal members 66 that have narrow shapes and extend in the left-right direction, such that the fan motor base 44 has a shape where the horizontal members 66 connect the vertical members 65 disposed apart from each other. For this reason, the surface area of the fan motor base 44 when seen in front view is small and the airflow resistance resulting from the blower fan 38 is reduced. Also, as shown in FIG. 7, the fan motor base 44 is disposed such that in a state where the front panel

assembly 6 has been assembled, the vertical members 65 of the fan motor base 44 and part of the grating 60 of the front panel 52 overlap. For this reason, the airflow resistance resulting from the blower fan 38 is further reduced.

<Characteristics>

(1)

[0051] Conventionally, in the outdoor unit 3 of the air conditioner 1 including the structure where the fan motor base 44 is fixed to the top panel 50 and the bottom panel 51 in order to ensure strength, there are many instances where the fan motor base 44 is disposed between the fan motor 38 and the outdoor heat exchanger 30. In this case, at the time of the assembly of the outdoor unit 3 of the air conditioner 1, the fan motor base 44, the fan motor 39 and the blower fan 38 are sequentially fixed from the rear side b and the lower end of the fan motor base 44 is fixed to the bottom panel 51. Then, the front panel 52 and the bellmouth 45 are fixed separately from these. Thereafter, the blower fan is inserted into the opening in the bellmouth 45 and the front panel 52 is fixed to the bottom panel 51. In this case, whereas the blower fan 38 is positioned with the bottom panel 51 as a reference via the fan motor base 44, the bellmouth 45 is positioned with the front panel 52 as a reference. For this reason, it is difficult to improve the dimensional precision of the position of the blower fan 38 and the bellmouth 45, and it is difficult to reduce the clearance between the inner peripheral surface of the opening in the bellmouth 45 and the outer periphery of the blower fan 38. In order to improve wind performance in the outdoor unit 3, it is preferable to reduce the clearance between the bellmouth 45 and the blower fan 38, but in the conventional outdoor unit 3 of the air conditioner 1, it has been difficult to reduce this clearance while ensuring the strength of the attachment portion of the fan motor base 44.

[0052] In the outdoor unit 3 of this air conditioner 1, the fan motor base 44, the bellmouth 45 and the front panel 52 are integrally combined with the front panel 52 as a reference. For this reason, the fan motor base 44 and the bellmouth 45 are respectively positioned with the front panel 52 as a reference. Consequently, the dimensional precision of the position of the blower fan 38 and the bellmouth 45 is improved, and it is easy to center the blower fan 38 and the bellmouth 45. Thus, it is easy to reduce the clearance between the inner peripheral surface of the opening in the bellmouth 45 and the outer periphery of the blower fan 38, and an improvement in the wind performance and a reduction of variations in the wind performance are possible.

(2)

[0053] In the outdoor unit 3 of the air conditioner 1, the dimensional precision of the position of the blower fan

38 and the bellmouth 45 is improved. For this reason, it is easy to overlap the grating 60 of the front panel 52 and the vertical members 65 of the fan motor base 44 at the same position when seen in front view. For this reason, the airflow resistance of the airflow that passes through the ventilation chamber and the front panel 52 and is blown out can be reduced.

(3)

[0054] In the outdoor unit 3 of the air conditioner 1, the blower fan 38, the fan motor 39, the fan motor base 44, the bellmouth 45 and the front panel 52 are modularized, and these constituent parts for ventilation are compactly consolidated. For this reason, a reduction in cost is possible. Also, the wiring procedure of connecting these constituent parts can be simplified. Thus, in the outdoor unit 3 of the air conditioner 1, productivity is improved.

<Other Embodiments>

(1)

[0055] In the preceding embodiment, the front panel 52 is formed by resin, but the front panel 52 may also be formed by plate metal. However, from the standpoints of cost reduction and weight reduction, it is preferable for the front panel 52 to be formed by resin. Also, in the present invention, because the fan motor base 44 is fixed not only to the front panel 52 but also to the bottom panel 51 and the top panel 50, it is easy to ensure the necessary strength even if the front panel 52 is formed by resin.

(2)

[0056] In the preceding embodiment, airflow resistance is reduced as a result of the grating 60 of the front panel 52 and the vertical members 65 of the fan motor base 44 being positioned such that they overlap when seen in front view, but airflow resistance may also be reduced by other dispositions. For example, the grating 60 and the horizontal members 66 may be positioned such that they overlap when seen in front view, and a reduction in airflow resistance is also possible even if the slits and the fan motor base are symmetrically disposed when seen in front view. Also, in the present invention, the dimensional precision of the disposition is improved because the fan motor base 44 is positioned with the front panel 52 as a reference, and the outdoor unit 3 of the above-described disposition can be manufactured more precisely.

Industrial Applicability

[0057] The present invention is suited for improving wind performance in an outdoor unit of an air conditioner because it is easy to reduce the clearance between the bellmouth and the blower fan.

Claims

1. An outdoor unit (3) of an air conditioner (1) comprising:

an outdoor unit casing (5) including a top panel (50) disposed on a top side, a bottom panel (51) disposed on a bottom side, and a front panel (52) that is disposed on a front side and in which air blowout holes (59) are disposed;
a blower fan (38) that is housed in the outdoor unit casing (5) and generates an airflow that is blown out through the blowout holes (59) in the front panel (52);
a bellmouth (45) that guides the airflow generated by the blower fan (38);
a fan motor (39) that rotatably drives the blower fan (38); and
a fan motor base (44) to which the fan motor (39) is fixed, includes an upper portion that is fixed to a front portion of the top panel (50) and a lower portion that is fixed to a front portion of the bottom panel (51), and which is disposed on a front side of the blower fan (38),
wherein the bellmouth (45) and the fan motor base (44) are positioned with the front panel (52) as a reference.

2. The outdoor unit (3) of the air conditioner (1) of claim 1, wherein the fan motor base (44) and the bellmouth (45) are disposed along an inner surface of the front panel (52).

3. The outdoor unit (3) of the air conditioner (1) of claim 2, wherein the fan motor base (44) is disposed between the bellmouth (45) and the front panel (52) and internally touches the bellmouth (45) and the front panel (52).

4. The outdoor unit (3) of the air conditioner (1) of any of claims 1 to 3, wherein the front panel (52) is a member made of resin.

5. The outdoor unit (3) of the air conditioner (1) of any of claims 1 to 4, wherein
the blowout holes (59) in the front panel (52) are configured by plural slits partitioned by a grating (60), and
the fan motor base (44) and the grating (60) are disposed such that the blowout resistance of the airflow is reduced.

6. The outdoor unit (3) of the air conditioner (1) of claim 5, wherein the fan motor base (44) includes vertical members (65) disposed such that they extend in a vertical direction and overlap the grating (60) when seen in front view.

7. The outdoor unit (3) of the air conditioner (1) of any of claims 1 to 6, wherein the front panel (52), the bellmouth (45), the blower fan (38), the fan motor (39) and the fan motor base (44) are modulized.

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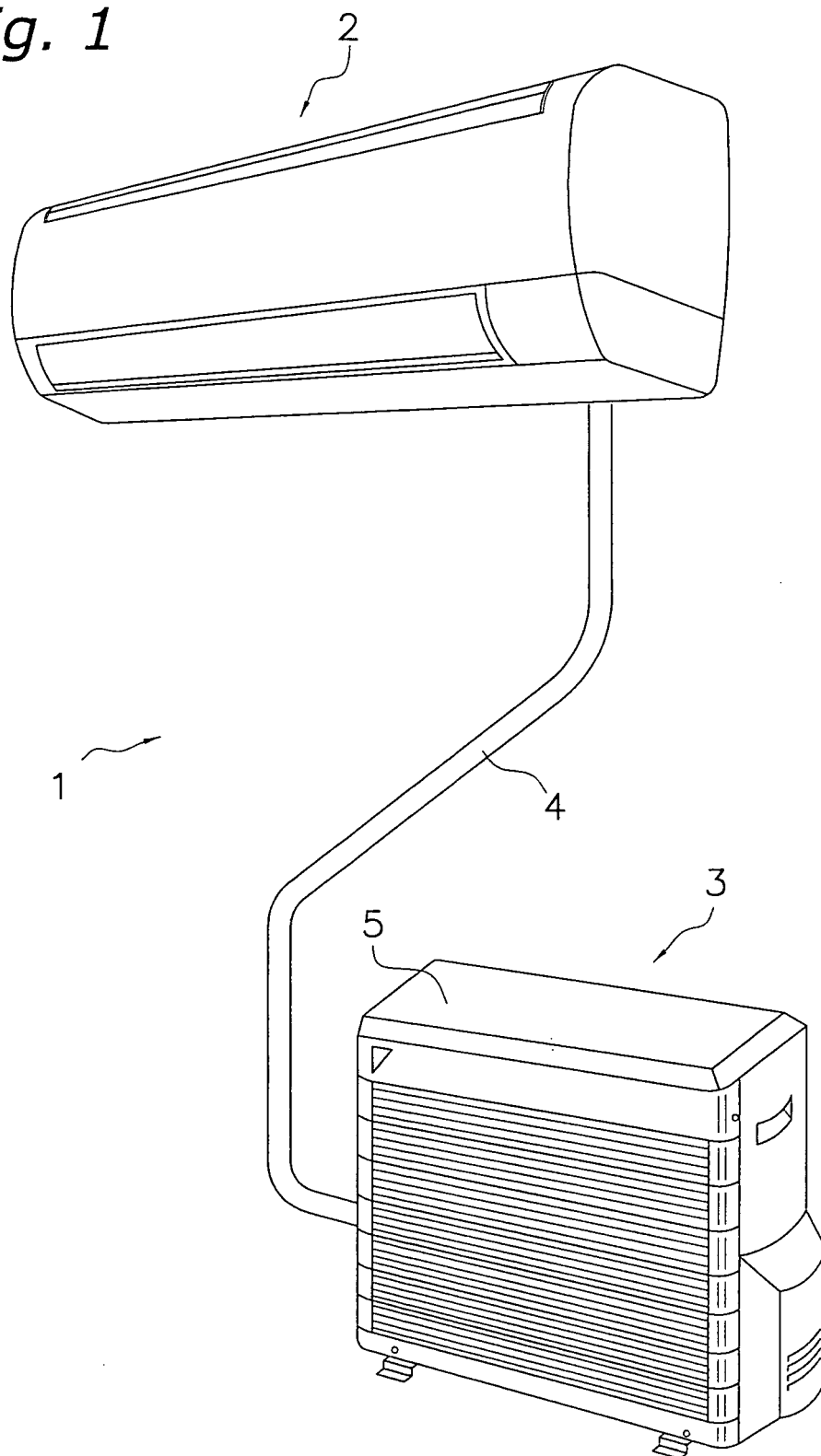
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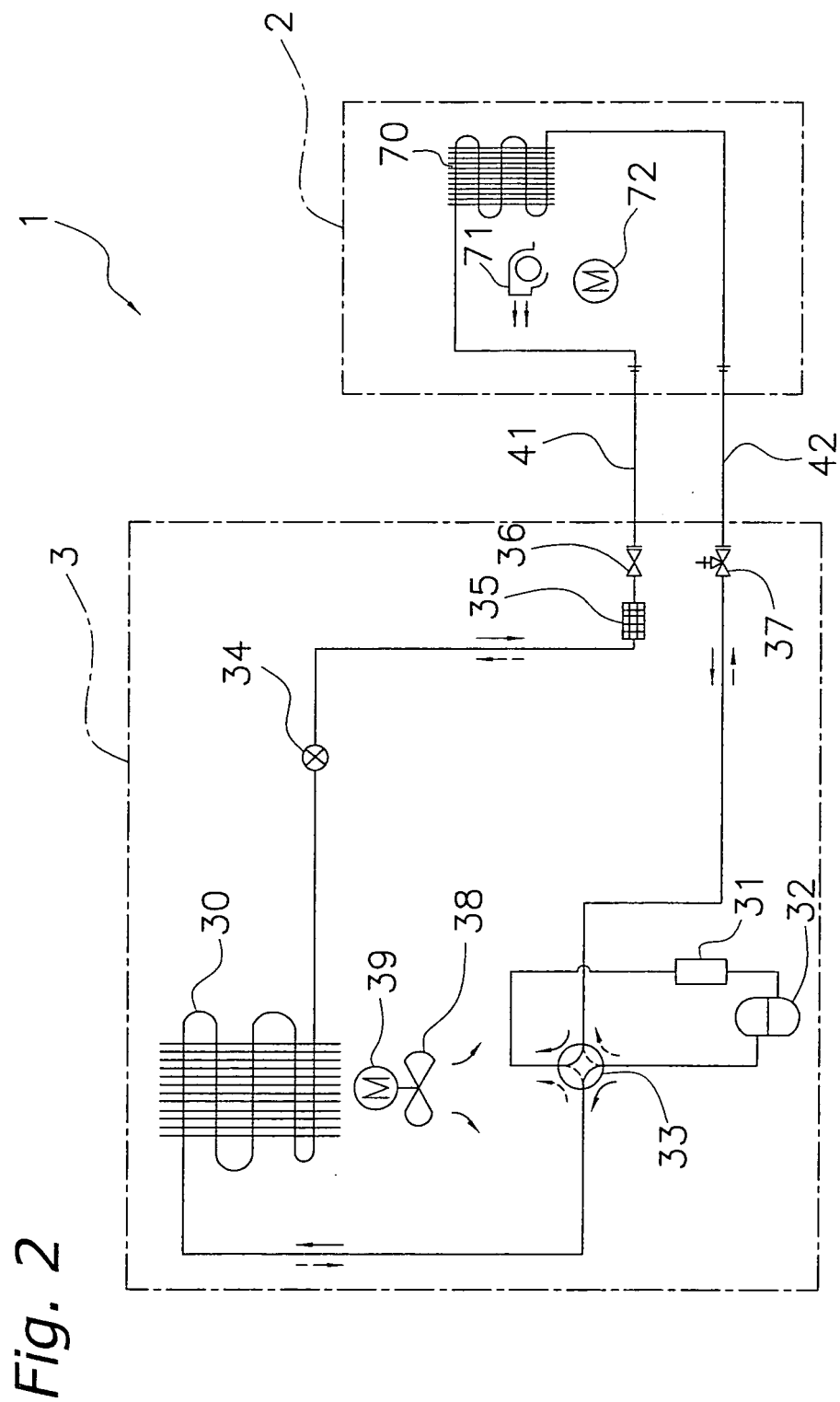
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Fig. 1





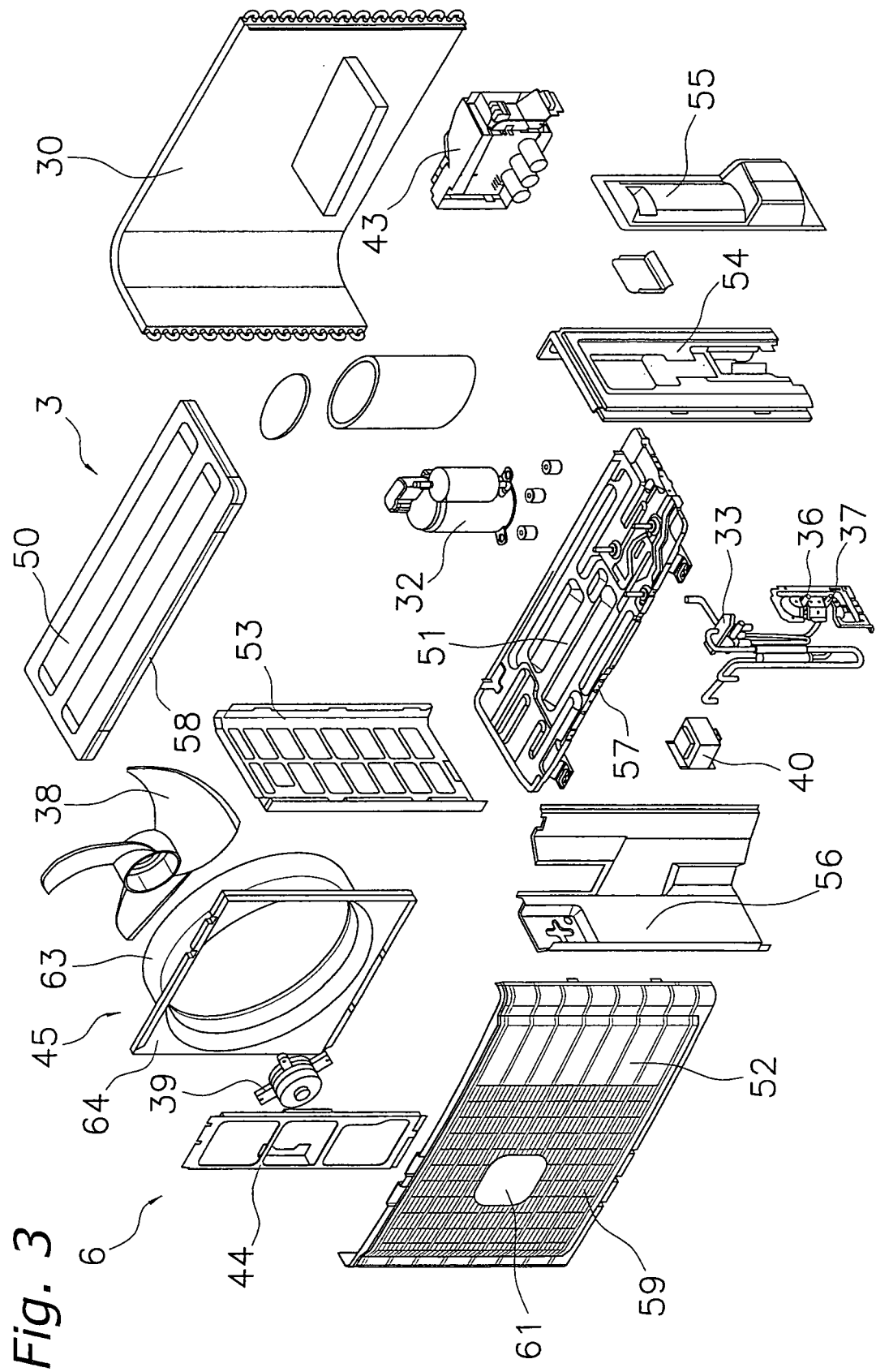
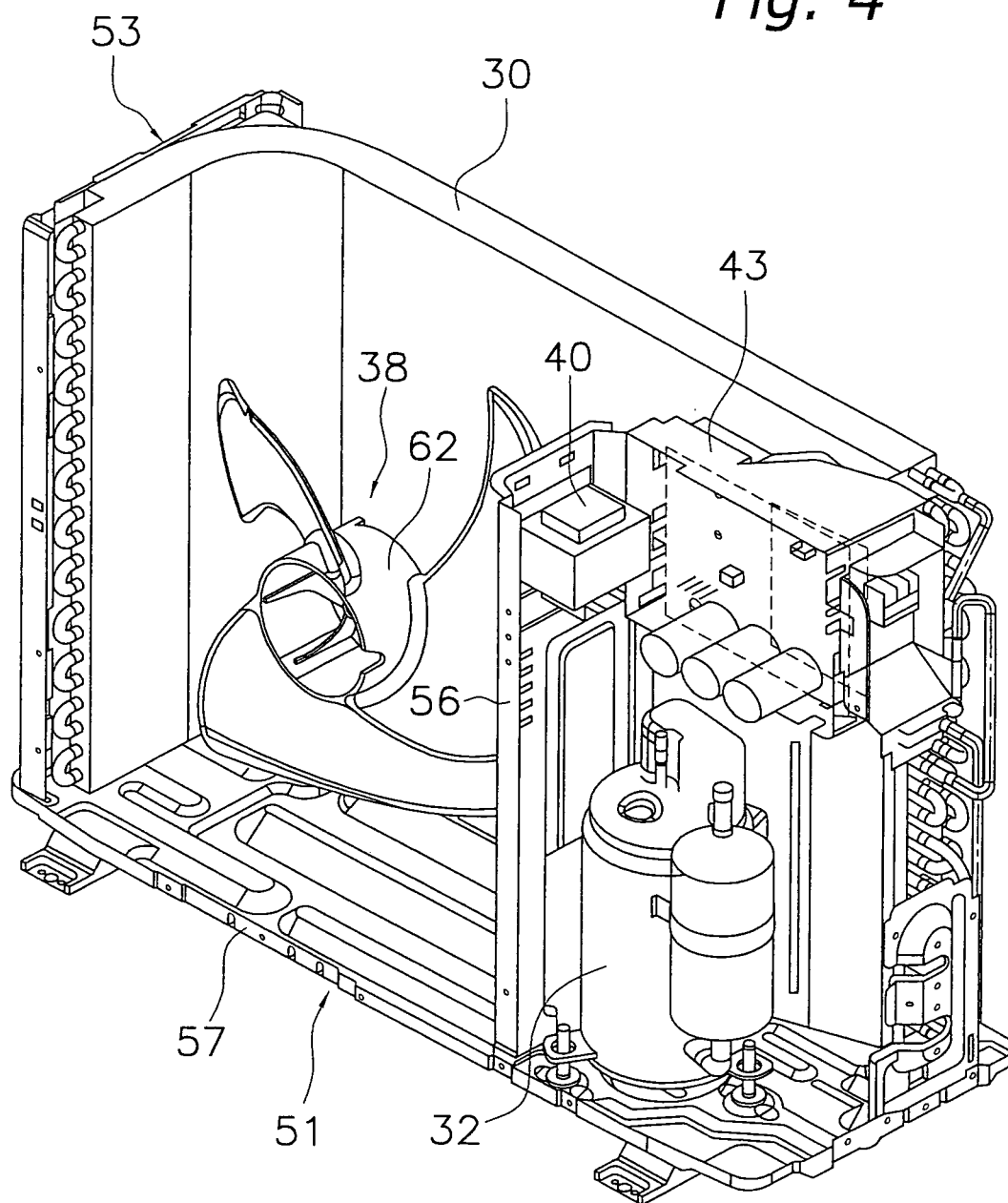


Fig. 4



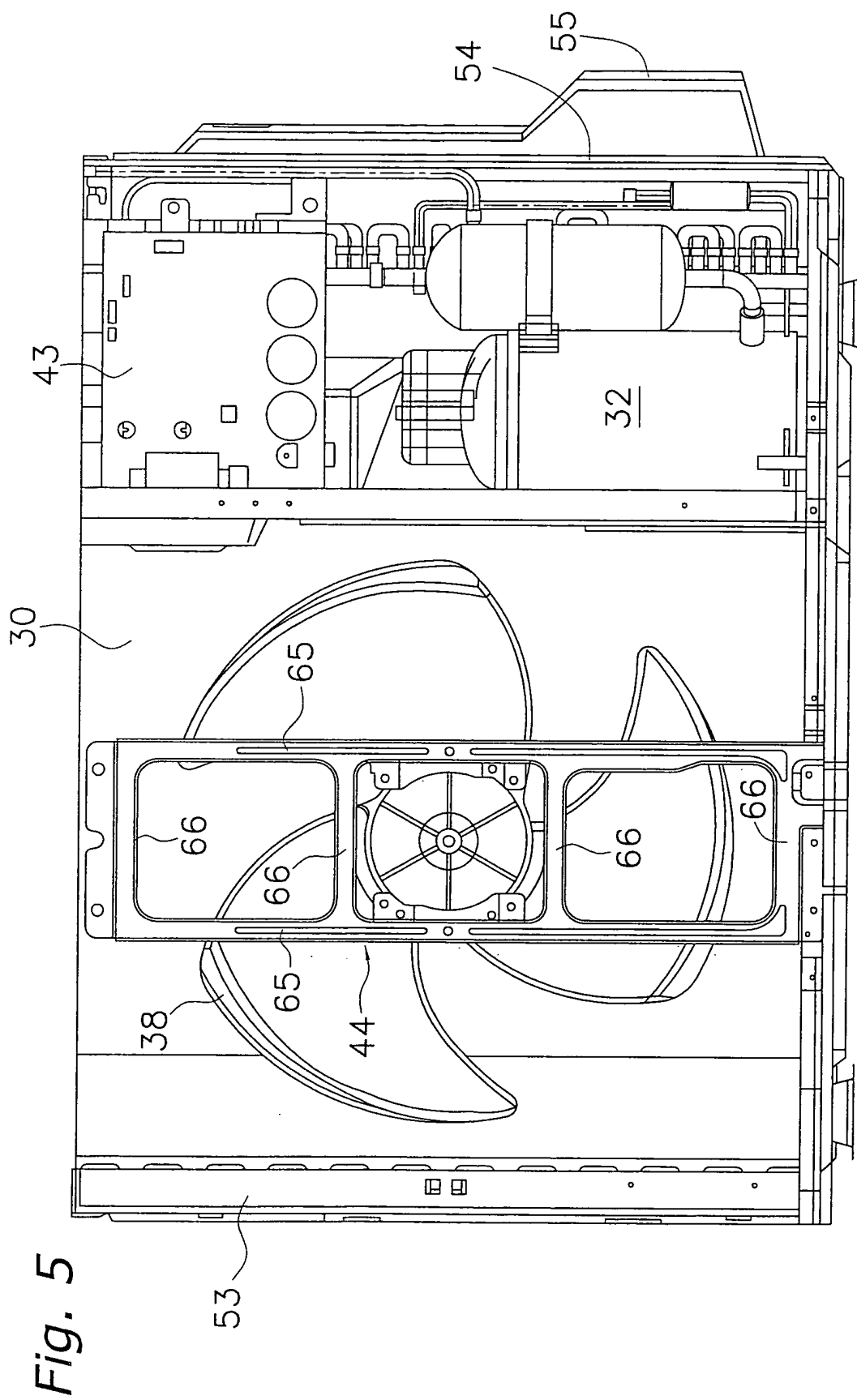


Fig. 6

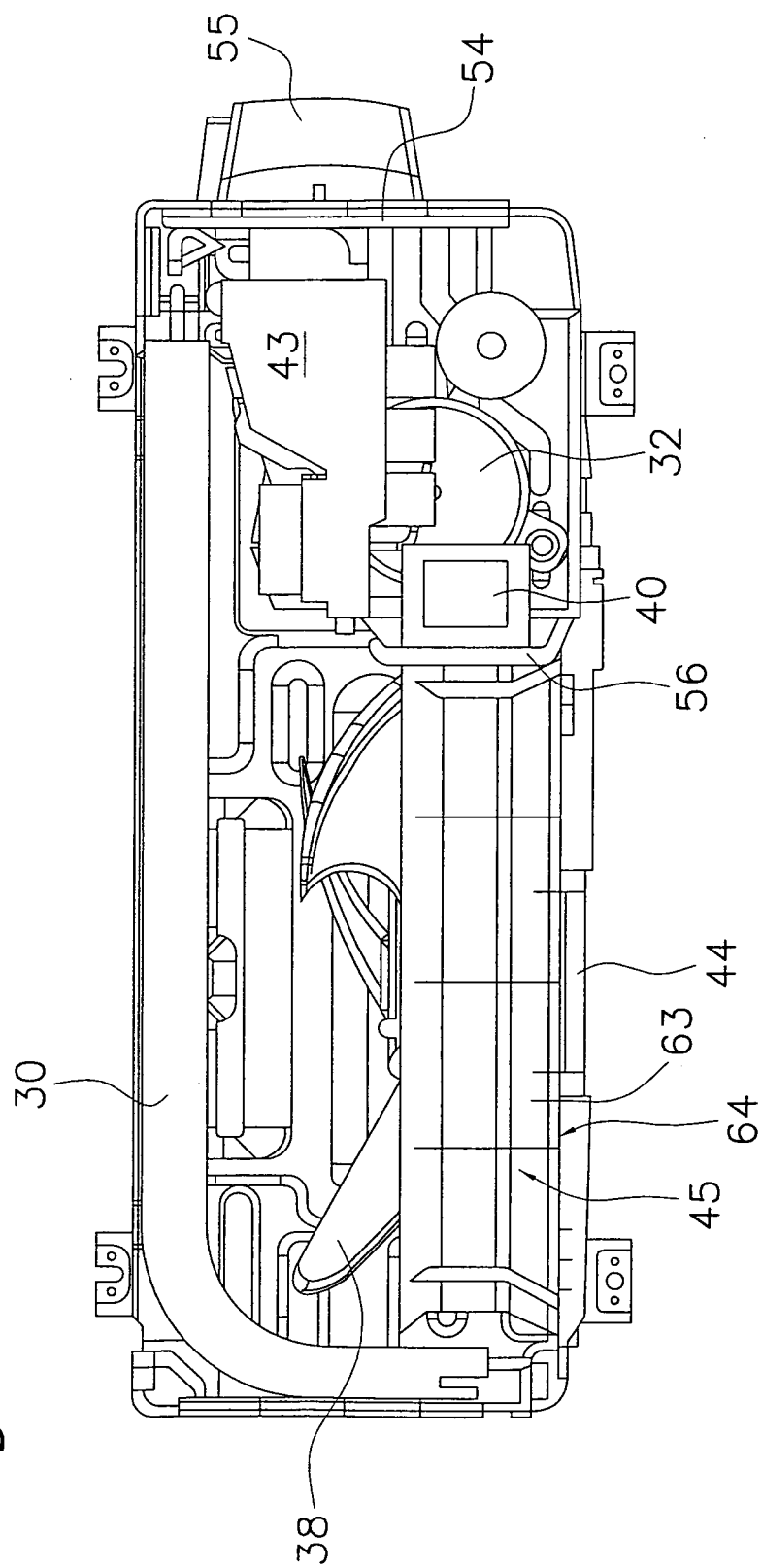
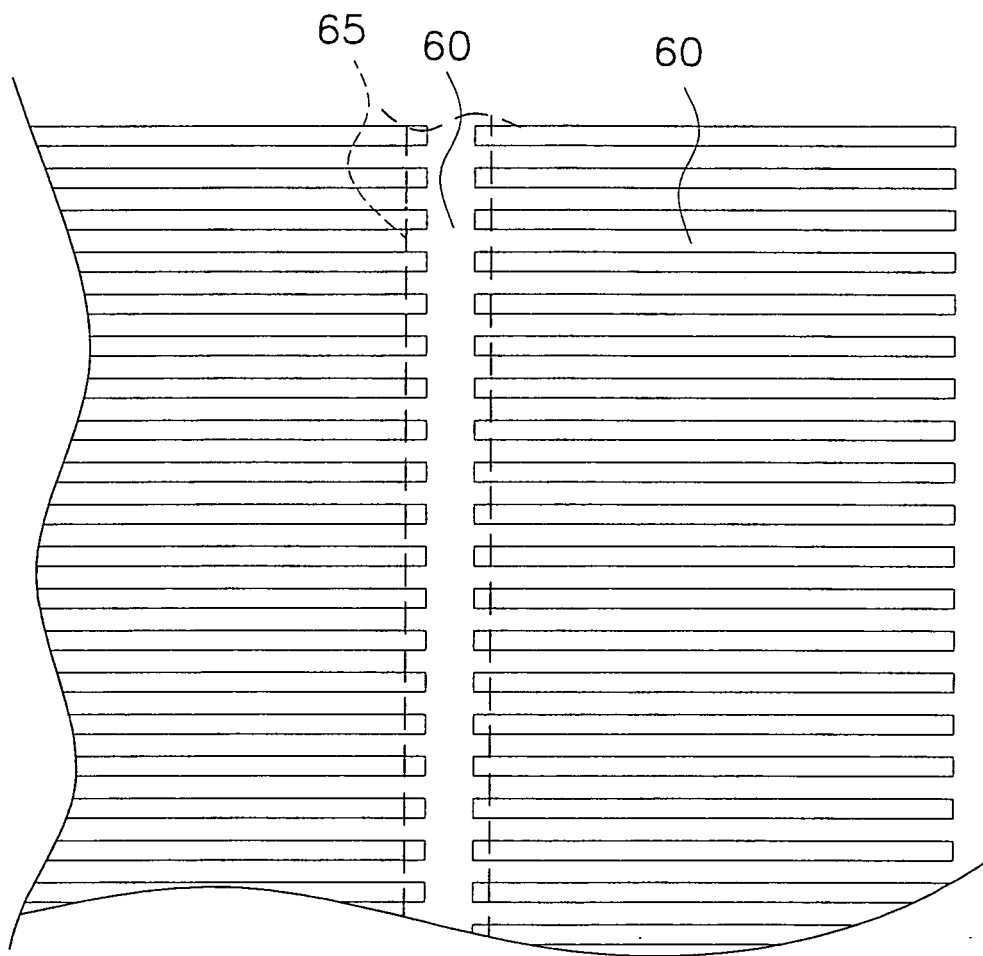


Fig. 7



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2004/011060

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl.⁷ F24F5/00

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)

Int.Cl.⁷ F24F5/00

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	1996-2004
Kokai Jitsuyo Shinan Koho	1971-2004	Toroku Jitsuyo Shinan Koho	1994-2004

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.
X Y	JP 5-87366 A (Mitsubishi Electric Corp.), 06 April, 1993 (06.04.93), Full text; all drawings (Family: none)	1-3, 5-7 4
Y	JP 9-96425 A (Daikin Industries, Ltd.), 08 April, 1997 (08.04.97), Full text; all drawings (Family: none)	4

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

* Special categories of cited documents:

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"&" document member of the same patent family

Date of the actual completion of the international search
01 September, 2004 (01.09.04)Date of mailing of the international search report
21 September, 2004 (21.09.04)Name and mailing address of the ISA/
Japanese Patent Office

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