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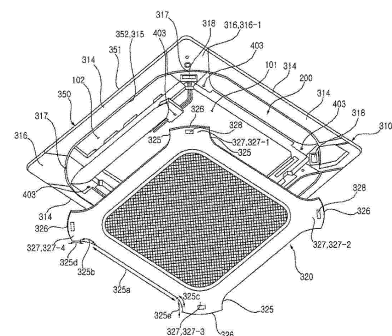
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(54) **CEILING-TYPE INDOOR UNIT OF AIR CONDITIONER**

(57) Disclosed is a ceiling type indoor unit of an air conditioner, the ceiling type indoor unit including a case housing installed at the ceiling of a room so as to be suspended therefrom, the case housing having an open lower surface, a front body configured to cover the lower surface of the case housing, the front body having a suction port and a discharge port formed so as to face downwards, a vane module separably coupled to the front body, the vane module being disposed so as to cover the discharge port, and a suction grill separably coupled to the front body, the suction grill being disposed so as to cover the suction port, wherein the vane module includes a first module body disposed at one side of the discharge port, the first module body being located at the lower side of the front body, the first module body being assembled to the front body so as to be separable downwards therefrom, a second module body disposed at the other side of the discharge port, the second module body being located at the lower side of the front body, the second module body being assembled to the front body so as to be separable downwards therefrom, at least one vane having one side and the other side coupled to the first module body and the second module body, respectively, the vane being configured to be rotated relative to the first module body and the second module body, a vane motor installed at at least one of the first module body or the second module body, the vane motor being configured to provide driving force to the vane, a first

fastening hole disposed at the first module body, the first fastening hole being disposed so as to face downwards, the first fastening hole being formed through the first module body, a first fastening member fastened to the front body through the first fastening hole, a second fastening hole disposed at the second module body, the second fastening hole being disposed so as to face downwards, the second fastening hole being formed through the second module body, and a second fastening member fastened to the front body through the second fastening hole, and when the first fastening member and the second fastening member are separated from the first fastening hole and the second fastening hole, respectively, the vane module is separated downwards from the front body.

Fig. 3



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**Description**

[Technical Field]

5 **[0001]** The present disclosure relates to a ceiling type indoor unit of an air conditioner, and more particularly a ceiling type indoor unit installed at the ceiling of a room.

[Background Art]

10 **[0002]** In general, an air conditioner includes a compressor, a condenser, an evaporator, and an expander, and supplies cool air or hot air to a building or a room using an air conditioning cycle.

**[0003]** Based on the structure thereof, the air conditioner is classified as a separable air conditioner configured such that a compressor is disposed outdoors or an integrated air conditioner configured such that a compressor is integrally manufactured.

15 **[0004]** In the separable air conditioner, an indoor heat exchanger is installed in an indoor unit, an outdoor heat exchanger and a compressor are installed in an outdoor unit, and the two separated units are connected to each other via a refrigerant pipe.

**[0005]** In the integrated air conditioner, an indoor heat exchanger, an outdoor heat exchanger, and a compressor are installed in a single case. Examples of the integrated air conditioner include a window type air conditioner installed at a window and a duct type air conditioner installed outside a room in the state in which a suction duct and a discharge duct are connected to each other.

**[0006]** The separable air conditioner is generally classified depending on the form in which the indoor unit is installed.

20 **[0007]** An air conditioner configured such that an indoor unit is vertically installed in a room is called a stand type air conditioner, an air conditioner configured such that an indoor unit is installed at the wall of a room is called a wall mounted air conditioner, and an air conditioner configured such that an indoor unit is installed at the ceiling of a room is called a ceiling type air conditioner.

**[0008]** In addition, there is a system air conditioner capable of providing air-conditioned air to a plurality of spaces as a kind of separable air conditioner.

25 **[0009]** The system air conditioner is classified as a type of air conditioner including a plurality of indoor units in order to air-condition rooms or a type of air conditioner capable of supplying air-conditioned air to respective spaces through ducts.

**[0010]** The plurality of indoor units provided in the system air conditioner may be stand type indoor units, wall mounted indoor units, or ceiling type indoor units.

30 **[0011]** A conventional ceiling type indoor unit includes a case installed at a ceiling so as to be suspended therefrom and a front panel configured to cover the lower surface of the case, the front panel being installed at the same surface as the ceiling.

**[0012]** A suction port is disposed at the center of the front panel, and a plurality of discharge ports is disposed outside the suction port, and a discharge vane is installed at each discharge port.

35 **[0013]** In the case in which the conventional discharge vane breaks down, however, the entirety of the front panel must be separated from the case in order to repair the discharge vane. That is, conventionally, even in the case in which one of the plurality of discharge vanes breaks down, the entirety of the front panel must be separated from the case in order to replace or repair the broken discharge vane.

[Prior Art Document]

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[Patent Document]

**[0014]** Korean Registered Patent No. 10-0679838 B1

50 [Disclosure]

[Technical Problem]

**[0015]** It is an object of the present disclosure to provide a ceiling type indoor unit of an air conditioner configured such that only a vane module can be separated or replaced without separation of a front panel.

55 **[0016]** It is another object of the present disclosure to provide a ceiling type indoor unit of an air conditioner configured such that only one of a plurality of vane modules can be separated in the state in which a front panel is coupled to a case housing.

**[0017]** It is another object of the present disclosure to provide a ceiling type indoor unit of an air conditioner configured such that all vane modules for controlling the discharge direction of air can be mounted to a front body at once.

**[0018]** It is a further object of the present disclosure to provide a ceiling type indoor unit of an air conditioner configured such that a discharge vane is modularized, whereby replacement time and replacement effort can be minimized at the time of breakdown.

**[0019]** Objects of the present disclosure are not limited to the aforementioned objects, and other unmentioned objects will be clearly understood by those skilled in the art based on the following description.

[Technical Solution]

**[0020]** The present disclosure is capable of separating or replacing only a vane module without separation of a front panel.

**[0021]** The present disclosure is capable of separating only one of a plurality of vane modules in the state in which a front panel is coupled to a case housing.

**[0022]** The present disclosure is capable of mounting all parts constituting a vane module to a front body at once.

**[0023]** The present disclosure is capable of modularizing a vane module, thereby minimizing replacement time and replacement effort at the time of breakdown.

**[0024]** The present disclosure is capable of securing reliability in assembly since a vane module is doubly coupled by a fastening member and a module hook.

**[0025]** A ceiling type indoor unit of an air conditioner according to the present disclosure includes a case housing installed at the ceiling of a room so as to be suspended therefrom, the case housing having an open lower surface, a front body configured to cover the lower surface of the case housing, the front body having a suction port and a discharge port formed so as to face downwards, a vane module separably coupled to the front body, the vane module being disposed so as to cover the discharge port, and a suction grill separably coupled to the front body, the suction grill being disposed so as to cover the suction port, wherein the vane module includes a first module body disposed at one side of the discharge port, the first module body being located at the lower side of the front body, the first module body being assembled to the front body so as to be separable downwards therefrom, a second module body disposed at the other side of the discharge port, the second module body being located at the lower side of the front body, the second module body being assembled to the front body so as to be separable downwards therefrom, at least one vane having one side and the other side coupled to the first module body and the second module body, respectively, the vane being configured to be rotated relative to the first module body and the second module body, a vane motor installed at at least one of the first module body or the second module body, the vane motor being configured to provide driving force to the vane, a first fastening hole disposed at the first module body, the first fastening hole being disposed so as to face downwards, the first fastening hole being formed through the first module body, a first fastening member fastened to the front body through the first fastening hole, a second fastening hole disposed at the second module body, the second fastening hole being disposed so as to face downwards, the second fastening hole being formed through the second module body, and a second fastening member fastened to the front body through the second fastening hole, and when the first fastening member and the second fastening member are separated from the first fastening hole and the second fastening hole, respectively, the vane module is separated downwards from the front body.

**[0026]** The suction grill may be located at the lower side of the first module body and the second module body.

**[0027]** The suction grill may be located at the lower side of the front body and may cover the first module body and the second module body, whereby the first module body and the second module body may be hidden by the suction grill when viewed from below.

**[0028]** The suction grill may include a grill body disposed at the lower side of the suction port, the grill body communicating with the suction port through a plurality of grill holes, the grill body being formed in a quadrangular shape, and a grill corner portion formed at corners of the grill body so as to extend in the diagonal direction, and the first module body and the second module body may be located at the upper side of the grill corner portion.

**[0029]** The lower surface of the vane and the lower surface of the grill body may define a continuous surface.

**[0030]** The suction grill may include a grill body disposed at the lower side of the suction port, the grill body communicating with the suction port through a plurality of grill holes, the grill body being formed in a quadrangular shape, and a first grill corner portion, a second grill corner portion, a third grill corner portion, and a fourth grill corner portion formed at corners of the grill body so as to extend in the diagonal direction, the vane module may include a first vane module disposed outside an edge of the suction grill, the first vane module being disposed between the first grill corner portion and the second grill corner portion, a second vane module disposed outside an edge of the suction grill, the second vane module being disposed between the second grill corner portion and the third grill corner portion, a third vane module disposed outside an edge of the suction grill, the third vane module being disposed between the third grill corner portion and the fourth grill corner portion, and a fourth vane module disposed outside an edge of the suction grill, the fourth vane module being disposed between the fourth grill corner portion and the first grill corner portion, the first module body

and the second module body disposed between the first vane module and the second vane module may be located at the upper side of the first grill corner portion and may be hidden by the first grill corner portion, the first module body and the second module body disposed between the second vane module and the third vane module may be located at the upper side of the second grill corner portion and may be hidden by the second grill corner portion, the first module body and the second module body disposed between the third vane module and the fourth vane module may be located at an upper side of the third grill corner portion and may be hidden by the third grill corner portion, and the first module body and the second module body disposed between the fourth vane module and the first vane module may be located at an upper side of the fourth grill corner portion and may be hidden by the fourth grill corner portion.

**[0031]** One of a permanent magnet and a magnetic force fixing portion may be disposed at the front body while the other of the magnetic force fixing portion and the permanent magnet may be disposed at the upper surface of each grill corner portion, and the permanent magnet and the magnetic force fixing portion may be hidden by each grill corner portion.

**[0032]** The vane module may further include a module hook disposed at the first module body and the second module body, the module hook and the front body being caught by each other.

**[0033]** The module hook may be disposed at the edge of the first module body and the second module body.

**[0034]** The module hook of the first module body and the module hook of the second module body may be disposed so as to face each other.

**[0035]** The front body may include a front frame coupled to the case housing, the suction port and the discharge port being formed in the front frame, a first side cover assembled to an edge of the front frame, the first side cover being located at the lower side of the front frame, the first side cover being exposed outside, the first side cover being disposed outside the first vane module, a second side cover assembled to an edge of the front frame, the second side cover being located at the lower side of the front frame, the second side cover being exposed outside, the second side cover being disposed outside the first vane module, a third side cover assembled to an edge of the front frame, the third side cover being located at the lower side of the front frame, the third side cover being exposed outside, the third side cover being disposed outside the first vane module, a fourth side cover assembled to an edge of the front frame, the fourth side cover being located at the lower side of the front frame, the fourth side cover being exposed outside, the fourth side cover being disposed outside the first vane module, assembled to a corner of the front frame, located at the lower side of the front frame, and exposed outside, a first corner cover assembled to a corner of the front frame, the first corner cover being located at the lower side of the front frame, the first corner cover being located between the first side cover and the second side cover, the first corner cover being exposed outside, a second corner cover assembled to a corner of the front frame, the second corner cover being located at the lower side of the front frame, the second corner cover being located between the second side cover and the third side cover, the second corner cover being exposed outside, a third corner cover assembled to a corner of the front frame, the third corner cover being located at the lower side of the front frame, the third corner cover being located between the third side cover and the fourth side cover, the third corner cover being exposed outside, and a fourth corner cover assembled to a corner of the front frame, the fourth corner cover being located at the lower side of the front frame, the fourth corner cover being located between the fourth side cover and the first side cover, the fourth corner cover being exposed outside, and the suction grill may define a continuous surface with the first side cover, the second side cover, the third side cover, the fourth side cover, the first corner cover, the second corner cover, the third corner cover, and the fourth corner cover.

**[0036]** The second module body of the first vane module and the first module body of the second vane module may be disposed at the upper side of the first grill corner portion, the second module body of the second vane module and the first module body of the third vane module may be disposed at the upper side of the second grill corner portion, the second module body of the third vane module and the first module body of the fourth vane module may be disposed at the upper side of the third grill corner portion, and the second module body of the fourth vane module and the first module body of the first vane module may be disposed at the upper side of the fourth grill corner portion.

**[0037]** The first grill corner portion may be located at the lower side of the first fastening hole and the second fastening hole formed in the first module body and the second module body, and the first fastening hole and the second fastening hole may be hidden by the first grill corner portion.

[Advantageous Effects]

**[0038]** The ceiling type indoor unit of the air conditioner according to the present disclosure has one or more of the following effects.

**[0039]** First, it is possible to separate only one of the plurality of vane modules in the state in which the front panel is coupled to the case housing.

**[0040]** Second, it is possible to mount all parts constituting the vane module to the front body at once.

**[0041]** Third, it is possible to modularize the vane module, thereby minimizing replacement time and replacement effort at the time of breakdown.

**[0042]** Fourth, the fastening hole necessary to mount the vane module is hidden by the suction grill, whereby it is

possible to prevent the fastening hole from being exposed outside.

**[0043]** Fifth, the vane module is fixed to the front body via the fastening member and the module hook, whereby it is possible to secure reliability in assembly.

**[0044]** Sixth, the fastening member is installed after the vane module is fixed to the front body via the module hook, whereby it is possible for a worker to easily install the vane module.

[Description of Drawings]

**[0045]**

FIG. 1 is a perspective view showing an indoor unit of an air conditioner according to an embodiment of the present disclosure.

FIG. 2 is a sectional view of FIG. 1.

FIG. 3 is an exploded perspective view showing a front panel of FIG. 1.

FIG. 4 is an exploded perspective view showing the upper part of the front panel of FIG. 1.

FIG. 5 is a perspective view of a vane module shown in FIG. 3.

FIG. 6 is a perspective view of FIG. 5 when viewed in another direction.

FIG. 7 is a perspective view of the vane module of FIG. 5 when viewed from above.

FIG. 8 is a front view of the vane module shown in FIG. 3.

FIG. 9 is a rear view of the vane module shown in FIG. 3.

FIG. 10 is a plan view of the vane module shown in FIG. 3.

FIG. 11 is a perspective view showing the operation structure of the vane module shown in FIG. 5.

FIG. 12 is a front view of a driving link shown in FIG. 11.

FIG. 13 is a front view of a first vane link shown in FIG. 11.

FIG. 14 is a front view of a second vane link shown in FIG. 11.

FIG. 15 is a bottom view of the front panel in the state in which a suction grill is separated in FIG. 1.

FIG. 16 is an enlarged view showing the vane module in FIG. 15.

FIG. 17 is a bottom view showing a front body in the state in which the vane module is separated in FIG. 15.

[Best Mode]

**[0046]** Advantages and features of the present disclosure and a method of achieving the same will be more clearly understood from embodiments described below with reference to the accompanying drawings. However, the present disclosure is not limited to the following embodiments and may be implemented in various different forms. The embodiments are provided merely to complete the present disclosure and to fully provide a person having ordinary skill in the art to which the present disclosure pertains with the category of the present disclosure. The present disclosure is defined only by the category of the claims. Wherever possible, the same reference numerals will be used throughout the specification to refer to the same or like elements.

**[0047]** Hereinafter, the present disclosure will be described in detail with reference to the accompanying drawings.

**[0048]** FIG. 1 is a perspective view showing an indoor unit of an air conditioner according to an embodiment of the present disclosure. FIG. 2 is a sectional view of FIG. 1. FIG. 3 is an exploded perspective view showing a front panel of FIG. 1. FIG. 4 is an exploded perspective view showing the upper part of the front panel of FIG. 1. FIG. 5 is a perspective view of a vane module shown in FIG. 3. FIG. 6 is a perspective view of FIG. 5 when viewed in another direction. FIG. 7 is a perspective view of the vane module of FIG. 5 when viewed from above. FIG. 8 is a front view of the vane module shown in FIG. 3. FIG. 9 is a rear view of the vane module shown in FIG. 3. FIG. 10 is a plan view of the vane module shown in FIG. 3. FIG. 11 is a perspective view showing the operation structure of the vane module shown in FIG. 5. FIG. 12 is a front view of a driving link shown in FIG. 11. FIG. 13 is a front view of a first vane link shown in FIG. 11. FIG. 14 is a front view of a second vane link shown in FIG. 11. FIG. 15 is a bottom view of the front panel in the state in which a suction grill is separated in FIG. 1. FIG. 16 is an enlarged view showing the vane module in FIG. 15. FIG. 17 is a bottom view showing a front body in the state in which the vane module is separated in FIG. 15.

<Construction of indoor unit>

**[0049]** The indoor unit of the air conditioner according to this embodiment includes a case 100 having a suction port 101 and a discharge port 102, an indoor heat exchanger 130 disposed in the case 100, and an indoor blowing fan 140 disposed in the case 100 to blow air to the suction port 101 and the discharge port 102.

<Construction of case>

5 [0050] In this embodiment, the case 100 includes a case housing 110 and a front panel 300. The case housing 110 is installed at the ceiling of a room via a hanger (not shown) so as to be suspended therefrom, and the lower side of the case housing is open. The front panel 300 covers the open surface of the case housing 110, is disposed so as to face the floor of the room, is exposed in the room, and has the suction port 101 and the discharge port 102.

[0051] The case 100 may be variously realized depending on the form of manufacture, and construction of the case 100 does not limit the idea of the present disclosure.

10 [0052] The suction port 101 is disposed in the center of the front panel 300, and the discharge port 102 is disposed outside the suction port 101. The number of suction ports 101 or the number of discharge ports 102 is irrelevant to idea of the present disclosure. In this embodiment, a single suction port 101 is formed, and a plurality of discharge ports 102 is disposed.

15 [0053] In this embodiment, the suction port 101 is formed so as to have a quadrangular shape when viewed from below, and four discharge ports 102 are disposed so as to be spaced apart from edges of the suction port 101 by a predetermined distance.

<Construction of indoor heat exchanger>

20 [0054] The indoor heat exchanger 130 is disposed between the suction port 101 and the discharge port 102, and the indoor heat exchanger 130 partitions the interior of the case 100 into an inner interior and an outer interior. In this embodiment, the indoor heat exchanger 130 is disposed vertically.

[0055] The indoor blowing fan 140 is located inside the indoor heat exchanger 130.

[0056] When viewed in a top view or a bottom view, the indoor heat exchanger has an overall shape of "□", a portion of which may be separated.

25 [0057] The indoor heat exchanger 130 is disposed such that air discharged from the indoor blowing fan 140 perpendicularly enters the indoor heat exchanger.

[0058] A drain pan 132 is installed in the case 100, and the indoor heat exchanger 130 is held by the drain pan 132. Condensate water generated in the indoor heat exchanger 130 may flow to the drain pan 132 and then be stored. A drain pump (not shown) configured to discharge collected condensate water to the outside is disposed in the drain pan 132.

30 [0059] The drain pan 132 may be provided with an inclined surface having directivity in order to collect and store condensate water falling from the indoor heat exchanger 130 in one side.

<Construction of indoor blowing fan>

35 [0060] The indoor blowing fan 140 is located in the case 100, and is disposed at the upper side of the suction port 101. A centrifugal blower configured to suction air to the center thereof and discharging the air in the circumferential direction is used as the indoor blowing fan 140.

[0061] The indoor blowing fan 140 includes a bell mouth 142, a fan 144, and a fan motor 146.

40 [0062] The bell mouth 142 is disposed at the upper side of a suction grill 320, and is located at the lower side of the fan 144. The bell mouth 142 guides air that has passed through the suction grill 320 to the fan 144.

[0063] The fan motor 146 rotates the fan 144. The fan motor 146 is fixed to the case housing 110. The fan motor 146 is disposed at the upper side of the fan 144. At least a portion of the fan motor 146 is located higher than the fan 144.

[0064] A motor shaft of the fan motor 146 is disposed so as to face downwards, and the fan 144 is coupled to the motor shaft.

45 [0065] The indoor heat exchanger 130 is located outside the edge of the fan 144. The fan 144 and at least a portion of the indoor heat exchanger 130 are disposed on the same horizontal line. At least a portion of the bell mouth 142 is inserted into the fan 144. In the upward-downward direction, at least a portion of the bell mouth 142 overlaps the fan 144.

<Construction of channel>

50 [0066] The indoor heat exchanger 130 is disposed in the case housing 110, and partitions the space in the case housing 110 into an inner space and an outer space.

[0067] The inner space surrounded by the indoor heat exchanger 130 is defined as a suction channel 103, and the outer space outside the indoor heat exchanger 130 is defined as a discharge channel 104.

55 [0068] The indoor blowing fan 140 is disposed in the suction channel 103. The discharge channel 104 is located between the outside of the indoor heat exchanger 130 and the sidewall of the case housing 110.

[0069] When viewed in a top view or a bottom view, the suction channel 103 is an inside surrounded by "□" of the indoor heat exchanger, and the discharge channel 104 is an outside of "□" of the indoor heat exchanger.

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**[0070]** The suction channel 103 communicates with the suction port 101, and the discharge channel 104 communicates with the discharge port 103 .

**[0071]** Air flows from the lower side to the upper side of the suction channel 103, and flows from the upper side to the lower side of the discharge channel 104. The flow direction of air is changed 180 degrees based on the indoor heat exchanger 130.

**[0072]** The suction port 101 and the discharge port 102 are formed in the same surface of the front panel 300.

**[0073]** The suction port 101 and the discharge port 102 are disposed so as to face in the same direction. In this embodiment, the suction port 101 and the discharge port 102 are disposed so as to face the floor of the room.

**[0074]** In the case in which the front panel 300 is bent, the discharge port 102 may be formed so as to have a slight side inclination; however, the discharge port 102 connected to the discharge channel 104 is formed so as to face downwards.

**[0075]** A vane module 200 is disposed to control the direction of air that is discharged through the discharge port 102.

<Construction of front panel>

**[0076]** The front panel 300 includes a front body 310 coupled to the case housing 110, the front body having the suction port 101 and the discharge port 102, a suction grill 320 having a plurality of grill holes 321, the suction grill being configured to cover the suction port 101, a pre-filter 330 separably assembled to the suction grill 320, and a vane module 200 installed at the front body 310, the vane module being configured to control the air flow direction of the discharge port 102.

**[0077]** The suction grill 320 is installed so as to be separable from the front body 310. The suction grill 320 may be elevated from the front body 310 in the upward-downward direction. The suction grill 320 covers the entirety of the suction port 101.

**[0078]** In this embodiment, the suction grill 320 has a plurality of grill holes 321 formed in the shape of a lattice. The grill holes 321 communicate with the suction port 101.

**[0079]** The pre-filter 330 is disposed at the upper side of the suction grill 320. The pre-filter 330 filters air suctioned into the case 100. The pre-filter 330 is located at the upper side of grill holes 321, and filters air that has passed through the suction grill 320.

**[0080]** The discharge port 102 is formed along the edge of the suction port 101 in the form of a long slit. The vane module 200 is located on the discharge port 102, and is coupled to the front body 310.

**[0081]** In this embodiment, the vane module 200 may be separated downwards from the front body 310. That is, the vane module 200 may be disposed irrespective of the coupling structure of the front body 310, and may be separated independently from the front body 310. The structure thereof will be described in more detail.

<Construction of front body>

**[0082]** The front body 310 is coupled to the lower side of the case housing 110, and is disposed so as to face the room. The front body 310 is installed at the ceiling of the room, and is exposed in the room.

**[0083]** The front body 310 is coupled to the case housing 110, and the case housing 110 supports load of the front body 310. The front body 310 supports load of the suction grill 320 and the pre-filter 330.

**[0084]** When viewed in a top view, the front body 310 is formed so as to have a quadrangular shape. The shape of the front body 310 may be varied.

**[0085]** The upper surface of the front body 310 may be formed horizontally so as to be in tight contact with the ceiling, and the edge of the lower surface of the front body may be slightly curved.

**[0086]** A suction port 101 is disposed in the center of the front body 310, and a plurality of discharge ports 102 is disposed outside the edge of the suction port 101.

**[0087]** When viewed in a top view, the suction port 101 may be formed in a square shape, and each discharge port 102 may be formed in a rectangular shape. The discharge port 102 may be formed in a slit shape having a greater length than the width thereof.

**[0088]** The front body 310 includes a front frame 312, a side cover 314, and a corner cover 316.

**[0089]** The front frame 312 provides load and stiffness of the front panel 300, and is fixed to the case housing 110 by fastening. The suction port 101 and the four discharge ports 102 are formed in the front frame 312.

**[0090]** In this embodiment, the front frame 312 includes a side frame 311 and a corner frame 313.

**[0091]** The corner frame 313 is disposed at each corner of the front panel 300. The side frame 311 is coupled to two corner frames 313. The side frame 311 includes an inner side frame 311a and an outer side frame 311b.

**[0092]** The inner side frame 311a is disposed between the suction port 101 and the discharge port 102, and couples two corner frames 313 to each other. The outer side frame 311b is disposed outside the discharge port 102.

**[0093]** In this embodiment, four inner side frames 311a and four outer side frames 311b are provided.

**[0094]** The suction port 101 is located inside the four inner side frames 311a. The discharge port 102 is formed so as to be surrounded by two corner frames 313, the inner side frame 311a, and the outer side frame 311b.

**[0095]** The side cover 314 and the corner cover 316 are coupled to the lower surface of the front frame 312. The side cover 314 and the corner cover 316 are exposed to a user, and the front frame 312 is not visible to the user.

**[0096]** The side cover 314 is disposed at the edge of the front frame 312, and the corner cover 316 is disposed at the corner of the front frame 312.

**[0097]** The side cover 314 is made of a synthetic resin material, and is fixed to the front frame 312 by fastening. Specifically, the side cover 314 is coupled to the side frame 311, and the corner cover 316 is coupled to the corner frame 313.

**[0098]** In this embodiment, four side covers 314 and four corner covers 316 are provided. The side covers 314 and the corner covers 316 are coupled to the front frame 312 to form a single structure. The four side covers 314 and the four corner covers 316 form a single edge of the front panel 300.

**[0099]** The side cover 314 is disposed at the lower side of the side frame 311, and the corner cover 316 is disposed at the lower side of the corner frame 313.

**[0100]** The four side covers 314 and the four corner covers 316 are assembled to form a quadrangular frame. The four side covers 314 and the four corner covers 316 connected to each other are defined as a front decoration 350.

**[0101]** The front decoration 350 has a decoration outer border 351 and a decoration inner border 352.

**[0102]** When viewed in a top view or a bottom view, the decoration outer border 351 is formed in a quadrangular shape, and the decoration inner border 352 is generally formed in a quadrangular shape. However, the corner of the decoration inner border has predetermined curvature.

**[0103]** The suction grill 320 and four vane modules 200 are disposed inside the decoration inner border 352. The suction grill 320 and four vane modules 200 abut the decoration inner border 352.

**[0104]** In this embodiment, four side cover 314 are disposed, and each side cover 314 is coupled to the front frame 312. The outer edge of the side cover 314 defines a portion of the decoration outer border 351, and the inner edge of the side cover 314 defines a portion of the decoration inner border 352.

**[0105]** In particular, the inner edge of the side cover 314 defines the outer border of the discharge port 102. The inner edge of the side cover 314 is defined as a side decoration inner border 315.

**[0106]** In this embodiment, four corner covers 316 are disposed, and each corner cover 316 is coupled to the front frame 312. The outer edge of the corner cover 316 defines a portion of the decoration outer border 351, and the inner edge of the corner cover 316 defines a portion of the decoration inner border 352.

**[0107]** The inner edge of the corner cover 316 is defined as a corner decoration inner border 317.

**[0108]** The corner decoration inner border 317 may be disposed so as to contact the suction grill 320. In this embodiment, the inner edge of the corner cover 316 is disposed so as to face the suction grill 320, and is spaced apart therefrom by a predetermined distance to form a gap 317a.

**[0109]** The side decoration inner border 315 is also spaced apart from the vane module 200 to form a gap 315a, and is disposed so as to face the outer edge of the vane module 200.

**[0110]** Consequently, the decoration inner border 352 is spaced apart from the outer edges of the four vane modules 200 and the suction grill 320 to form a continuous gap.

**[0111]** A continuous gap defined by four side decoration inner border gaps 315a and four corner decoration inner border gaps 317a is defined as a front decoration gap 350a.

**[0112]** The front decoration gap 350a is formed at the inner edge of the front decoration 350. Specifically, the front decoration gap 350a is formed as the result of the outer edges of the vane module 200 and the suction grill 320 and the inner edge of the front decoration 350 being spaced apart from each other.

**[0113]** When the vane module 200 is not operated (when the indoor unit is stopped), the front decoration gap 350a allows the suction grill 320 and the vane module 200 to be seen as a single structure.

<Construction of suction grill>

**[0114]** The suction grill 320 is located at the lower side of the front body 310. The suction grill 320 may be moved downwards in the state of being in tight contact with the lower surface of the front body 310.

**[0115]** The suction grill 320 includes a grill body 322 and a plurality of grill holes 321 formed through the grill body 322 in the upward-downward direction.

**[0116]** The suction grill 320 includes a grill body 322 disposed at the lower side of the suction port 101, the grill body communicating with the suction port 101 through a plurality of grill holes 321, the grill body being formed in a quadrangular shape, and a grill corner portion 327 formed at the corners of the grill body 322 so as to extend in the diagonal direction.

**[0117]** The lower surface of the grill body 322 and the lower surface of a first vane 210 may define a continuous surface. In addition, the lower surface of the grill body 322 and the lower surface of the corner cover 316 may define a continuous surface.

**[0118]** A plurality of grills 323 is disposed inside the grill body 322 in the shape of a lattice. The lattice-shaped grills 323 define quadrangular grill holes 321. The portion at which the grills 323 and the grill holes 321 are formed is defined as a suction portion.

5 **[0119]** The grill body 322 includes a suction portion configured to communicate with air and a grill body portion 324 disposed so as to surround the suction portion. When viewed in a top view or a bottom view, the suction portion is generally formed in a quadrangular shape.

**[0120]** Each corner of the suction portion is disposed so as to face a corresponding corner of the front panel 300, and more specifically is disposed so as to face the corner cover 316.

**[0121]** When viewed in a bottom view, the grill body 322 is formed in a quadrangular shape.

10 **[0122]** The outer edge of the grill body portion 324 is disposed so as to face the discharge port 102 or the front decoration 350.

**[0123]** The outer edge of the grill body portion 324 includes a grill corner border 326 disposed so as to face the corner cover 316 and a grill side border 325 defining the discharge port 102, the grill side border being disposed so as to face the side cover 314.

15 **[0124]** The grill corner border 326 may have curvature formed about the inside of the suction grill 320, and the grill side border 325 may have curvature formed about the outside of the suction grill 320,

**[0125]** The grill body portion 324 further includes a grill corner portion 327 surrounded by the grill corner border 326 and two grill side borders 325. The grill corner portion 327 is formed at the grill body portion 324 so as to protrude toward the corner cover 316.

20 **[0126]** The grill corner portion 327 is disposed at each corner of the grill body 322. The grill corner portion 327 extends toward each corner of the front panel 300.

**[0127]** In this embodiment, four grill corner portions 327 are disposed. For convenience of description, the four grill corner portions 327 are defined as a first grill corner portion 327-1, a second grill corner portion 327-2, a third grill corner portion 327-3, and a fourth grill corner portion 327-4.

25 **[0128]** The grill side border 325 is formed so as to be concave from the outside to the inside.

**[0129]** The discharge port 102 is formed between the side cover 314 and the suction grill 320. More specifically, one discharge port 102 is formed between the side decoration inner border 315 of the side cover 314 and the grill side border 325 of the grill body 322. Discharge ports 102 are formed between side decoration inner borders 315 and grill side borders 325 disposed in four directions of the suction grill 320.

30 **[0130]** In this embodiment, the length of the grill corner border 326 is equal to the length of the corner decoration inner border 317. That is, the width of the corner cover 316 is equal to the width of the grill corner portion 327.

**[0131]** In addition, the width of the inside of the side cover 314 is equal to the width of the grill side border 325.

**[0132]** The grill side border 325 will be described in more detail.

35 **[0133]** The grill side border 325 defines the inner border of the discharge port 102. The side decoration inner border 315 and the corner decoration inner border 317 define the outer border of the discharge port 102.

40 **[0134]** The grill side border 325 includes a long straight section 325a extending long in the longitudinal direction of the discharge port 102, the long straight section being formed in a straight line, a first curved section 325b connected to one side of the long straight section 325a, the first curved section having the center of curvature outside the suction grill 320, a second curved section 325c connected to the other side of the long straight section 325a, the first curved section having the center of curvature outside the suction grill 320, a first short straight section 325d connected to the first curved section, and a second short straight section 325e connected to the second curved section 325c.

<Construction of vane module>

45 **[0135]** The vane module 200 is installed in the discharge channel 104, and controls the flow direction of air that is discharged through the discharge port 102.

**[0136]** The vane module 200 includes a module body 400, a first vane 210, a second vane 220, a vane motor 230, a driving link 240, a first vane link 250, and a second vane link 260. The first vane 210, the second vane 220, the vane motor 230, the driving link 240, the first vane link 250, and the second vane link 260 are all installed at the module body 400. The module body 400 is installed integrally at the front panel 300. That is, all of the components of the vane module 200 are modularized and are installed at the front panel 300 at once.

**[0137]** Since the vane module 200 is modularized, it is possible to reduce assembly time and to achieve easy replacement at the time of trouble.

55 **[0138]** In this embodiment, a stepper motor is used as the vane motor 230.

<Construction of module body>

**[0139]** The module body 400 may be constituted by a single body. In this embodiment, the module body is manufactured

using two separate parts in order to minimize installation space and to minimize manufacturing cost.

**[0140]** In this embodiment, the module body 400 includes a first module body 410 and a second module body 420.

**[0141]** The first module body 410 and the second module body 420 are formed in horizontal symmetry. In this embodiment, the first module body 410 is described by way of example.

**[0142]** Each of the first module body 410 and the second module body 420 is fastened to the front body 310. Specifically, each of the first module body 410 and the second module body 420 is installed at the corner frame 313.

**[0143]** In the horizontal direction, the first module body 410 is installed at the corner frame 313 disposed at one side of the discharge port 102, and the second module body 420 is installed at the corner frame 313 disposed at the other side of the discharge port 102.

**[0144]** In the vertical direction, each of the first module body 410 and the second module body 420 is in tight contact with the lower surface of the corner frame 313, and is fastened thereto via a fastening member 401.

**[0145]** Consequently, the first module body 410 and the second module body 420 are disposed at the lower side of the front body 310. In the state in which the indoor unit is installed, the direction in which the first module body 410 and the corner frame 313 are fastened to each other is disposed so as to be directed from the lower side to the upper side, and the direction in which the second module body 420 and the corner frame 313 are fastened to each other is also disposed so as to be directed from the lower side to the upper side.

**[0146]** In the above structure, the entirety of the vane module 200 may be easily separated from the front body 310 during repair.

**[0147]** The vane module 200 includes a first module body 410 disposed at one side of the discharge port 102, the first module body being located at the lower side of the front body 310, the first module body being assembled to the front body 310 so as to be separable downwards therefrom, a second module body 420 disposed at the other side of the discharge port 102, the second module body being located at the lower side of the front body 310, the second module body being assembled to the front body 310 so as to be separable downwards therefrom, at least one vane 210 and 220 having one side and the other side coupled to the first module body 410 and the second module body 420, respectively, the vane being configured to be rotated relative to the first module body 410 and the second module body 420, a vane motor 230 installed at at least one of the first module body 410 or the second module body 420, the vane motor being configured to provide driving force to the vane, a first fastening hole 403-1 disposed at the first module body 410, the first fastening hole being disposed so as to face downwards, the first fastening hole being formed through the first module body 410, a first fastening member 401-1 fastened to the front body 310 through the first fastening hole 403-1, a second fastening hole 403-2 disposed at the second module body 420, the second fastening hole being disposed so as to face downwards, the second fastening hole being formed through the second module body 420, and a second fastening member 401-2 fastened to the front body through the second fastening hole 403-2.

**[0148]** In particular, since the first module body 410 and the second module body 420 are located at the lower side of the front body 310, only the main module 200 may be separated from the front body 310 in the state in which the front body 310 is installed at the case housing 110. This is commonly applied to all of the four vane modules 200.

**[0149]** In the case in which the module body 400 is separated from the front body 310, the entirety of the vane module 200 is separated downwards from the front body 310.

**[0150]** The first module body 410 includes a module body portion 402 coupled to the front body 310 and a link installation portion 404 protruding upwards from the module body portion 402.

**[0151]** The module body portion 402 is fastened to the front body 310 via a fastening member 401 (not shown). Unlike this embodiment, the module body portion 402 may be coupled to the front body 310 by hook coupling or interference fitting.

**[0152]** In this embodiment, the module body portion 402 is securely fastened to the front body 310 in order to minimize generation of vibration or noise due to the first vane 210, the second vane 220, the vane motor 230, the driving link 240, the first vane link 250, and the second vane link 260.

**[0153]** The fastening member 401 provided to fix the module body portion 402 is in the state of being fastened from the lower side to the upper side, and may be separated from the upper side to the lower side.

**[0154]** A fastening hole 403, through which the fastening member 401 is inserted, is formed in the module body portion 402.

**[0155]** In the case in which it is necessary to distinguish between the fastening hole formed in the first module body 410 and the fastening hole formed in the second module body 420 for convenience of description, the fastening hole formed in the first module body 410 is referred to as a first fastening hole 403-1, and the fastening hole formed in the second module body 420 is referred to as a second fastening hole 403-1.

**[0156]** Also, in the case in which it is necessary to distinguish between the fastening members 401, the fastening member 401 installed in the first fastening hole 403-1 is defined as a first fastening member 401-1, and the fastening member 401 installed in the second fastening hole 403-1 is defined as a second fastening member 401-2.

**[0157]** The first fastening member 401-1 is fastened to the front body 310 through the first fastening hole. The second fastening member 401-2 is fastened to the front body 310 through the second fastening hole.

**[0158]** Before fixing the module body 400 by fastening, a module hook 405 configured to temporarily fix the position

of the module body 400 is disposed.

**[0159]** The module hook 405 is coupled to the front panel 300, specifically the front body 310. Specifically, the module hook 405 and the front body 310 are caught by each other.

**[0160]** A plurality of module hooks 405 may be disposed at one module body. In this embodiment, module hooks are disposed at the outer edge and the front edge of the module body portion 402. That is, module hooks 405 are disposed outside the first module body 410 and the second module body 420, and the module hooks 405 are symmetrical with each other in the leftward-rightward direction.

**[0161]** The vane module 200 may be temporarily fixed to the frame body 310 by the module hook 405 of the first module body 410 and the module hook 405 of the second module body 420.

**[0162]** In the case of fixing using the module hooks 405, a slight gap may be generated due to the coupling structure thereof. The fastening member 401 securely fixes the temporarily fixed module body 400 to the front body 310.

**[0163]** The fastening hole 403, in which the fastening member 401 is installed, may be located between the module hooks 405. The fastening hole 403 of the first module body 410 and the fastening hole 403 of the second module body 420 are disposed between one module hook 405 and the other module hook 405.

**[0164]** In this embodiment, the module hooks 405 and the fastening holes 403 are disposed in a line.

**[0165]** Even when the fastening members 401 are removed, the state in which the vane module 200 is coupled to the frame body 310 may be maintained by the module hooks 405.

**[0166]** When it is necessary to separate the vane module at the time of repair or trouble, the state in which the vane module 200 is coupled to the frame panel 300 is maintained even when the fastening member 401 is removed. As a result, a worker does not need to separately support the vane module 200 at the time of removing the fastening member 401.

**[0167]** Since the vane module 200 is primarily fixed by the module hook 405 and is secondary fixed by the fastening member 401, it is possible to greatly improve work convenience at the time of repair.

**[0168]** The module body portion 402 is disposed horizontally, and the link installation portion 404 is disposed vertically. In particular, the link installation portion 404 protrudes upwards from the module body portion 402 in the state of being installed.

**[0169]** The link installation portion 404 of the first module body 410 and the link installation portion 404 of the second module body 420 are disposed so as to face each other. The first vane 210, the second vane 220, the driving link 240, the first vane link 250, and the second vane link 260 are installed between the link installation portion 404 of the first module body 410 and the link installation portion 404 of the second module body 420. The vane motor 230 is disposed outside the link installation portion 404 of the first module body 410 or the link installation portion 404 of the second module body 420.

**[0170]** The vane motor 230 may be installed at only one of the first module body 410 and the second module body 420. In this embodiment, the vane motor 230 may be installed at each of the first module body 410 and the second module body 420.

**[0171]** The first vane 210, the second vane 220, the driving link 240, the first vane link 250, and the second vane link 260 are coupled between the first module body 410 and the second module body 420, whereby the vane module 200 is integrated.

**[0172]** In order to install the vane motor 230, a vane motor installation portion 406 protruding outside the link installation portion 404 is disposed. The vane motor 230 is fixed to the vane motor installation portion 406 by fastening. The vane motor installation portion 406 is formed in the shape of a boss, and the vane motor 230 is fixed to the vane motor installation portion 406. By the provision of the vane motor installation portion 406, the link installation portion 404 and the vane motor 230 are spaced apart from each other by a predetermined distance.

**[0173]** A driving link coupling portion 407 to which the driving link 240 is assembled and which provides the center of rotation to the driving link 240, a first vane link coupling portion 408 to which the first vane link 250 is assembled and which provides the center of rotation to the first vane link 250, and a second vane coupling portion 409 which is coupled with the second vane 220 and which provides the center of rotation to the second vane 220 are disposed at the link installation portion 404.

**[0174]** In this embodiment, each of the driving link coupling portion 407, the first vane link coupling portion 408, and the second vane coupling portion 409 is formed in the shape of a hole. Unlike this embodiment, the same may be formed in the shape of a boss, and may be realized as any of various forms that provide a rotary shaft.

**[0175]** Meanwhile, a stopper 270 configured to limit the rotational angle of the driving link 240 is disposed at the link installation portion 404. The stopper 270 is disposed so as to protrude toward the opposite link installation portion 404.

**[0176]** In this embodiment, the stopper 270 interferes with the driving link 240 at a specific position at the time of rotation thereof, and limits rotation of the driving link 240. The stopper 270 is located within the radius of rotation of the driving link 240.

**[0177]** In this embodiment, the stopper 270 is manufactured integrally with the link installation portion 404. In this embodiment, the stopper 270 defines the installation position of the driving link 240, remains in contact with the driving

link 240 at the time of rotation thereof, and inhibits vibration or free movement of the driving link 240.

**[0178]** In this embodiment, the stopper 270 is formed in the shape of an arc.

<Construction of driving link>

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**[0179]** The driving link 240 is directly connected to the vane motor 230. A motor shaft (not shown) of the vane motor 230 is directly coupled to the driving link 240, and the rotation amount of the driving link 240 is determined based on the rotational angle of the rotary shaft of the vane motor 230.

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**[0180]** The driving link 240 is assembled to the vane motor 230 through the link installation portion 404. In this embodiment, the driving link 240 extends through the driving link coupling portion 407.

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**[0181]** The driving link 240 includes a driving link body 245, a first driving link shaft 241 disposed at the driving link body 245, the first driving link shaft being rotatably coupled to the first vane 210, a core link shaft 243 disposed at the driving link body 245, the core link shaft being rotatably coupled to the link installation portion 404 (specifically, the driving link coupling portion 407), and a second driving link shaft 242 disposed at the driving link body 245, the second driving link shaft being rotatably coupled to the second vane link 260.

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**[0182]** The driving link body 245 includes a first driving link body 246, a second driving link body 247, and a core body 248.

**[0183]** The core link shaft 243 is disposed at the core body 248, the first driving link shaft 241 is disposed at the first driving link body 246, and the core link shaft 243 is disposed at the second driving link body 247.

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**[0184]** The core body 248 connects the first driving link body 246 and the second driving link body 247 to each other. The shape of each of the first driving link body 246 and the second driving link body 247 is not particularly restricted. In this embodiment, however, each of the first driving link body 246 and the second driving link body 247 is generally formed in the shape of a straight line.

**[0185]** The first driving link body 246 is longer than the second driving link body 247.

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**[0186]** The core link shaft 243 is rotatably assembled to the link installation portion 404. The core link shaft 243 is assembled to the driving link coupling portion 407 formed at the link installation portion 404. The core link shaft 243 may be rotated relative to the driving link coupling portion 407 in the state of being coupled thereto.

**[0187]** The first driving link shaft 241 is rotatably assembled to the first vane 210. The second driving link shaft 242 is rotatably assembled to the second vane link 260.

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**[0188]** The first driving link shaft 241 and the second driving link shaft 242 protrude in the same direction. The core link shaft 243 protrudes in the direction opposite the first driving link shaft 241 and the second driving link shaft 242.

**[0189]** The first driving link body 246 and the second driving link body 247 have a predetermined angle therebetween. An imaginary straight line joining the first driving link shaft 241 and the core link shaft 243 to each other and an imaginary straight line joining the core link shaft 243 and the second driving link shaft 242 to each other have a predetermined angle E therebetween. The angle E is greater than 0 degrees and less than 180 degrees.

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**[0190]** The first driving link shaft 241 has a structure in which the driving link body 245 and the first vane 210 can be rotated relative thereto. In this embodiment, the first driving link shaft 241 is formed integrally with the driving link body 245. Unlike this embodiment, the first driving link shaft 241 may be manufactured integrally with the first vane 210 or a joint 214.

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**[0191]** The core link shaft 243 has a structure in which the driving link body 245 and the module body (specifically, the link installation portion 404) can be rotated relative thereto. In this embodiment, the core link shaft 243 is formed integrally with the driving link body 245.

**[0192]** The second driving link shaft 242 has a structure in which the second vane link 260 and the driving link 240 can be rotated relative thereto. In this embodiment, the second driving link shaft 242 is formed integrally with the driving link body 245. Unlike this embodiment, the second driving link shaft 242 may be manufactured integrally with the second vane link 260.

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**[0193]** In this embodiment, the second driving link shaft 242 is disposed at the second driving link body 247. The second driving link shaft 242 is disposed opposite the first driving link shaft 241 on the basis of the core link shaft 243.

**[0194]** An imaginary straight line joining the first driving link shaft 241 and the core link shaft 243 to each other and an imaginary straight line joining the core link shaft 243 and the second driving link shaft 242 to each other have a predetermined angle E therebetween. The angle E is greater than 0 degrees and less than 180 degrees.

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<Construction of first vane link>

**[0195]** In this embodiment, the first vane link 250 is made of a strong material, and is formed in the shape of a straight line. Unlike this embodiment, the first vane link 250 may be curved.

**[0196]** The first vane link 250 includes a first vane link body 255, a 1-1 vane link shaft 251 disposed at the first vane link body 255, the 1-1 vane link shaft being assembled to the first vane 210, the 1-1 vane link shaft being configured to

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be rotated relative to the first vane 210, and a 1-2 vane link shaft 252 disposed at the first vane link body 255, the 1-2 vane link shaft being assembled to the module body 400 (specifically, the link installation portion 404), the 1-2 vane link shaft being configured to be rotated relative to the module body 400.

5 **[0197]** The 1-1 vane link shaft 251 protrudes toward the first vane 210. The 1-1 vane link shaft 251 may be assembled to the first vane 210, and may be rotated relative to the first vane 210.

**[0198]** The 1-2 vane link shaft 252 is assembled to the link installation portion 404 of the module body 400. Specifically, the 1-2 vane link shaft 252 may be assembled to the first vane link coupling portion 408, and may be rotated relative to the first vane link coupling portion 408.

10 <Construction of second vane link>

**[0199]** In this embodiment, the second vane link 260 is made of a strong material, and is formed in the shape of a straight line. Unlike this embodiment, the first vane link 250 may be curved.

15 **[0200]** The second vane link 260 includes a second vane link body 265, a 2-1 vane link shaft 261 disposed at the second vane link body 265, the 2-1 vane link shaft being assembled to the second vane 220, the 2-1 vane link shaft being configured to be rotated relative to the second vane 220, and a 2-2 vane link journal 262 disposed at the second vane link body 265, the 2-2 vane link journal being assembled to the driving link 240 (specifically, the second driving link shaft 242), the 2-2 vane link journal being configured to be rotated relative to the driving link 240.

20 **[0201]** In this embodiment, the 2-2 vane link journal 262 is formed in the shape of a hole formed through the second vane link body 265. Since the 2-2 vane link journal 262 and the second driving link shaft 242 have relative structures, one is formed in the shape of a shaft and the other is formed in the shape of a hole having the center of rotation. Unlike this embodiment, therefore, the 2-2 vane link journal 262 may be formed in the shape of a shaft, and the second driving link shaft may be formed in the shape of a hole.

25 **[0202]** In all constructions that can be coupled to the driving link, the first vane link, and the second vane link so as to be rotated relative thereto, substitution of the above construction is possible, and therefore a description of modifiable examples thereof will be omitted.

<Construction of vane>

30 **[0203]** For description, the direction in which air is discharged is defined as the front, and the direction opposite thereto is defined as the rear. In addition, the ceiling side is defined as the upper side, and the floor is defined as the lower side.

35 **[0204]** In this embodiment, the first vane 210 and the second vane 220 are disposed in order to control the flow direction of air that is discharged from the discharge port 102. The relative disposition and relative angle between the first vane 210 and the second vane 220 are changed according to steps of the vane motor 230. In this embodiment, the first vane 210 and the second vane 220 provide six discharge steps P1, P2, P3, P4, P5, and P6 in pairs according to steps of the vane motor 230.

40 **[0205]** The discharge steps P1, P2, P3, P4, P5, and P6 are defined as states in which the first vane 210 and the second vane 220 are stationary, rather than moved. In this embodiment, on the other hand, moving steps may be provided. The moving steps result from a combination of the six discharge steps P1, P2, P3, P4, P5, and P6, and are defined as a current of air provided by the operation of the first vane 210 and the second vane 220.

<Construction of first vane>

45 **[0206]** The first vane 210 is disposed between the link installation portion 404 of the first module body 410 and the link installation portion 404 of the second module body 420.

**[0207]** When the indoor unit is not operated, the first vane 210 covers most of the discharge port 210. Unlike this embodiment, the first vane 210 may be manufactured so as to cover the entirety of the discharge port 210.

**[0208]** The first vane 210 is coupled to the driving link 240 and the first vane link 250.

50 **[0209]** The driving link 240 and the first vane link 250 are disposed at one side and the other side of the first vane 210, respectively.

**[0210]** The first vane 210 is rotated relative to the driving link 240 and the first vane link 250.

55 **[0211]** When it is necessary to distinguish between the positions of the driving link 240 and the first vane link 250, the driving link 240 coupled to the first module body 410 is defined as a first driving link, and the first vane link 250 coupled to the first module body 410 is defined as a 1-1 vane link. The driving link 240 coupled to the second module body 420 is defined as a second driving link, and the first vane link 250 coupled to the second module body 420 is defined as a 1-2 vane link.

**[0212]** The first vane 210 includes a first vane body 212 formed so as to extend long in the longitudinal direction of the discharge port 102 and a joint 214 protruding upwards from the first vane body 212, the driving link 240 and the first

vane link 250 being coupled to the joint.

**[0213]** The first vane body 212 may be formed so as to have a gently curved surface.

**[0214]** The first vane body 212 controls the direction of air that is discharged along the discharge channel 104. The discharged air collides with the upper surface or the lower surface of the first vane body 212, whereby the flow direction thereof may be guided.

**[0215]** The flow direction of the discharged air and the longitudinal direction of the first vane body 212 are perpendicular to each other or intersect each other.

**[0216]** The joint 214 is an installation structure for coupling between the driving link 240 and the first vane link 250. The joint 214 is disposed at each of one side and the other side of the first vane 210.

**[0217]** The joint 214 is formed so as to protrude upwards from the upper surface of the first vane body 212. The joint 214 is formed in the flow direction of discharged air, and minimizes resistance to the discharged air. Consequently, the joint 214 is perpendicular to or intersects the longitudinal direction of the first vane body 212.

**[0218]** The joint 214 is formed such that the air discharge side (the front) of the joint is low and the air entrance side (the rear) of the joint is high. In this embodiment, the joint 214 is formed such that the side of the joint to which the driving link 240 is coupled is high and the side of the joint to which the first vane link 250 is coupled is low.

**[0219]** The joint 214 has a first joint portion 216 rotatably coupled with the driving link 240 and a second joint portion 217 rotatably coupled with the first vane link 250.

**[0220]** In this embodiment, each of the first joint portion 216 and the second joint portion 217 is formed in the shape of a hole, and is formed through the joint 214.

**[0221]** Each of the first joint portion 216 and the second joint portion 217 is a structure in which axial coupling or hinge coupling is possible, and may be changed into any of various forms.

**[0222]** When viewed from the front, the first joint portion 216 is located higher than the second joint portion 217.

**[0223]** The first joint portion 216 is located further rearwards than the second joint portion 217. The first driving link shaft 241 is assembled to the first joint portion 216. The first joint portion 216 and the first driving link shaft 241 are assembled so as to be rotatable relative to each other. In this embodiment, the first driving link shaft 241 is assembled through the first joint portion 216.

**[0224]** The 1-1 vane link shaft 251 is assembled to the second joint portion 217.

**[0225]** The second joint portion 217 and the 1-1 vane link shaft 251 are assembled so as to be rotatable relative to each other. In this embodiment, the 1-1 vane link shaft 251 is assembled through the second joint portion 217.

**[0226]** When viewed in a top view, the driving link 250 and the first vane link 250 are disposed between the joint 214 and the link installation portion 404.

<Construction of second vane>

**[0227]** The second vane 220 includes a second vane body 222 formed so as to extend long in the longitudinal direction of the discharge port 102, a joint 224 protruding upwards from the second vane body 222, the joint 224 being coupled to the second vane link 260 so as to be rotatable relative thereto, and a second vane shaft 221 formed at the second vane body 222, the second vane shaft being rotatably coupled to the link installation portion 404.

**[0228]** The joint 224 is a structure in which axial coupling or hinge coupling is possible, and may be changed into any of various forms.

**[0229]** In the case in which it is necessary to distinguish between the joint 214 of the first vane and the joint 224 of the second vane, the joint of the first vane is defined as a first joint 214, and the joint of the second vane is defined as a second joint 224.

**[0230]** The second vane 220 may be rotated about the second joint 224, and may also be rotated about the second vane shaft 221. That is, the second vane 220 may be rotated relative to each of the second joint 224 and the second vane shaft 221.

**[0231]** When viewed in a top view, the second joint 224 is located further forwards than the second vane shaft 221. The second joint 224 is moved along a predetermined orbit about the second vane shaft 221.

**[0232]** The second vane body 222 may be formed so as to have a gently curved surface.

**[0233]** The second vane body 222 controls the direction of air that is discharged along the discharge channel 104. The discharged air collides with the upper surface or the lower surface of the second vane body 222, whereby the flow direction thereof is guided.

**[0234]** The flow direction of the discharged air and the longitudinal direction of the second vane body 222 are perpendicular to each other or intersect each other.

**[0235]** When viewed in a top view, at least a portion of the second vane body 222 may be located between the first joint portions 212 of the first vane 210.

**[0236]** This is necessary to prevent interference when the second vane 220 is located at the upper side of the first vane 210. The front end of the second vane body 222 is located between the first joint portions 214. That is, the front

length of the second vane body 222 is less than the length between the first joint portions 214.

**[0237]** The second joint 224 is an installation structure for assembly with the second vane link 260. The second joint 224 is disposed at each of one side and the other side of the second vane body 222.

**[0238]** The second joint 224 is coupled to the second vane link 260 so as to be rotatable relative thereto.

5 **[0239]** The second joint 224 is formed so as to protrude upwards from the upper surface of the second vane body 222. The second joint 224 is preferably formed in the flow direction of discharged air. Consequently, the second joint 224 is disposed so as to perpendicular to or intersect the longitudinal direction of the second vane body 222.

**[0240]** The second vane 220 is rotated about the second vane shaft 221. The second vane shaft 221 is formed at each of one side and the other side of the second vane body 222.

10 **[0241]** One second vane shaft 221 protrudes toward the link installation portion 404 disposed at one side, and the other second vane shaft 221 protrudes toward the link installation portion 404 disposed at the other side.

**[0242]** The second vane coupling portion 411 rotatably coupled to the second vane shaft 221 is disposed at the module body 400. In this embodiment, the second vane coupling portion 411 is formed in the shape of a hole formed through the module body 400.

15 **[0243]** The second vane shaft 221 is located further rearwards than the second joint 224. The second vane link 260, the driving link 240, and the first vane line 250 are sequentially disposed in front of the second vane shaft 221.

**[0244]** In addition, the driving link coupling portion 407 and the first vane link coupling portion 408 are sequentially disposed in front of the second vane coupling portion 411 .

20 <Disposition of vane module and suction grill>

**[0245]** The coupling structure and the separation structure of the vane module will be described in more detail with reference to FIGS. 1 to 4 and 15 to 17.

25 **[0246]** When the suction grill 320 is separated in the state of FIG. 1, four vane modules 200 are exposed, as shown in FIG. 15. The suction grill 320 is separably assembled to the front body 310.

**[0247]** The suction grill 320 may be separated from the front body 310 using various methods.

30 **[0248]** The suction grill 320 may be separated using a method of separating and rotating one edge of the suction grill on the basis of the other edge of the suction grill. In another method, the suction grill 320 may be separated from the front body 310 through release of catching in the state of being caught by the front body. In a further method, coupling between the suction grill 200 and the front body 310 may be maintained by magnetic force.

**[0249]** In this embodiment, the suction grill 320 may be moved in the upward-downward direction by an elevator 500 installed at the front body 310. The elevator 500 is connected to the suction grill 320 via a wire (not shown). The wire may be wound or unwound by operation of the elevator 500, whereby the suction grill 320 may be moved downwards or upwards.

35 **[0250]** A plurality of elevators 500 is disposed, and the elevators 500 simultaneously move opposite sides of the suction grill 320.

**[0251]** When the suction grill 320 is moved downwards, the first module body 410 and the second module body 420, hidden by the suction grill 320, are exposed.

40 **[0252]** In the state in which the suction grill 320 is assembled to the front body 310, at least one of the first vane 210 or the second vane 220 of the vane module 200 may be exposed.

**[0253]** When the indoor unit is not operated, only the first vane 210 is exposed to the user. When the indoor unit is operated and air is discharged, the second vane 220 may be selectively exposed to the user.

**[0254]** In the state in which the suction grill 320 is assembled to the front body 310, the first module body 410 and the second module body 420 of the vane module 200 are hidden by the suction grill 320.

45 **[0255]** Since the fastening holes 403 are disposed at the first module body 410 and the second module body 420, the fastening holes 403 are hidden by the suction grill 320 so as not to be visible to the user.

**[0256]** Since the first module body 410 and the second module body 420 are located at the upper side of the grill corner portion 327 constituting the suction grill 320, the grill corner portion 327 prevents the first module body 410 and the second module body 420 from being exposed outside.

50 **[0257]** The grill corner portion 327 also prevents the fastening holes 403 formed in the first module body 410 and the second module body 420 from being exposed outside. Since the grill corner portion 327 is located at the lower side of the fastening holes 403, the fastening holes 403 are hidden by the grill corner portion 327.

55 **[0258]** More specifically, the suction grill 320 includes a grill body 322 disposed at the lower side of the suction port 101, the grill body communicating with the suction port 101 through a plurality of grill holes 321, the grill body being formed in a quadrangular shape, and a first grill corner portion 327-1, a second grill corner portion 327-2, a third grill corner portion 327-3, and a fourth grill corner portion 327-4 formed at the corners of the grill body 322 so as to extend in the diagonal direction.

**[0259]** The vane module 200 includes a first vane module 201 disposed outside one edge of the suction grill 320, the

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first vane module being disposed between the first grill corner portion 327-1 and the second grill corner portion 327-2, a second vane module 202 disposed outside one edge of the suction grill 320, the second vane module being disposed between the second grill corner portion 327-2 and the third grill corner portion 327-3, a third vane module 203 disposed outside one edge of the suction grill 320, the third vane module being disposed between the third grill corner portion 327-3 and the fourth grill corner portion 327-4, and a fourth vane module 204 disposed outside one edge of the suction grill 320, the fourth vane module being disposed between the fourth grill corner portion 327-4 and the first grill corner portion 327-1.

**[0260]** The first module body 410 and the second module body 420 disposed between the first vane module 201 and the second vane module 202 are located at the upper side of the first grill corner portion 327-1, and are hidden by the first grill corner portion 327-1. Specifically, the second module body of the first vane module and the first module body of the second vane module are disposed at the upper side of the first grill corner portion.

**[0261]** The first module body and the second module body disposed between the second vane module 202 and the third vane module 203 are located at the upper side of the second grill corner portion 327-2, and are hidden by the second grill corner portion 327-2. Specifically, the second module body of the second vane module and the first module body of the third vane module are disposed at the upper side of the second grill corner portion.

**[0262]** The first module body and the second module body disposed between the third vane module 203 and the fourth vane module 204 are located at the upper side of the third grill corner portion 327-3, and are hidden by the third grill corner portion 327-3. Specifically, the second module body of the third vane module and the first module body of the fourth vane module are disposed at the upper side of the third grill corner portion.

**[0263]** The first module body and the second module body disposed between the fourth vane module 204 and the first vane module 201 are located at the upper side of the fourth grill corner portion 327-4, and are hidden by the fourth grill corner portion 327-4. Specifically, the second module body of the fourth vane module and the first module body of the first vane module are disposed at the upper side of the fourth grill corner portion.

**[0264]** Referring to FIG. 15, the vane module 200 disposed in the 12 o'clock direction is defined as a first vane module 201, the vane module 200 disposed in the 3 o'clock direction is defined as a second vane module 202, the vane module 200 disposed in the 6 o'clock direction is defined as a third vane module 203, and the vane module 200 disposed in the 9 o'clock direction is defined as a fourth vane module 204.

**[0265]** The first vane module 201, the second vane module 202, the third vane module 203, and the fourth vane module 204 are disposed at intervals of 90 degrees about the center C of the front panel 300.

**[0266]** The first vane module 201 and the third vane module 203 are disposed parallel to each other, and the second vane module 202 and the fourth vane module 204 are disposed parallel to each other.

**[0267]** Four side covers 314 are disposed at the front body 310. For convenience of description, the side cover 314 disposed outside the first vane module 201 is defined as a first side cover 314-1, the side cover 314 disposed outside the second vane module 202 is defined as a second side cover 314-2, the side cover 314 disposed outside the third vane module 203 is defined as a third side cover 314-3, and the side cover 314 disposed outside the fourth vane module 204 is defined as a fourth side cover 314-4.

**[0268]** Each side cover 314 is assembled to one edge of the front frame 312, is located at the lower side of the front frame 312, is exposed outside, and is disposed outside a corresponding vane module 202.

**[0269]** The corner cover 316 disposed between the first vane module 201 and second vane module 202 is defined as a first corner cover 316-1. The corner cover 316 disposed between the second vane module 202 and the third vane module 203 is defined as a second corner cover 316-2. The corner cover 316 disposed between the third vane module 203 and the fourth vane module 204 is defined as a third corner cover 316-3. The corner cover 316 disposed between the fourth vane module 204 and the first vane module 201 is defined as a fourth corner cover 316-4.

**[0270]** The first corner cover 316-1 is assembled to one corner of the front frame 312, is located at the lower side of the front frame 312, is located between the first side cover 314-1 and the second side cover 314-2, and is exposed outside.

**[0271]** The second corner cover 316-2 is assembled to one corner of the front frame 312, is located at the lower side of the front frame 312, is located between the second side cover 314-2 and the third side cover 314-3, and is exposed outside.

**[0272]** The third corner cover 316-3 is assembled to one corner of the front frame 312, is located at the lower side of the front frame 312, is located between the third side cover 314-3 and the fourth side cover 314-4, and is exposed outside.

**[0273]** The fourth corner cover 316-4 is assembled to one corner of the front frame 312, is located at the lower side of the front frame 312, is located between the fourth side cover 314-4 and the first side cover 314-1, and is exposed outside.

**[0274]** The first corner cover 316-1 and the third corner cover 316-3 are disposed about the center C of the front panel 300 in the diagonal direction, and are disposed so as to face each other. The second corner cover 316-2 and the fourth corner cover 316-4 are disposed about the center C of the front panel 300 in the diagonal direction, and are disposed so as to face each other.

**[0275]** Imaginary diagonal lines passing through the center of the front panel 300 are defined as P1 and P2. P1 is an imaginary line joining the first corner cover 316-1 and the third corner cover 316-3 to each other, and P2 is an imaginary

line joining the second corner cover 316-2 and the fourth corner cover 316-4 to each other.

**[0276]** A first grill corner portion 327-1, a second grill corner portion 327-2, a third grill corner portion 327-3, and a fourth grill corner portion 327-4 formed so as to extend towards corners are disposed at the suction panel 320.

**[0277]** On the basis of the grill corner portions, the first vane module 201 is disposed outside one edge of the suction grill 320, and is disposed between the first grill corner portion 327-1 and the second grill corner portion 327-2.

**[0278]** The second vane module 202 is disposed outside one edge of the suction grill, and is disposed between the second grill corner portion 327-2 and the third grill corner portion 327-3.

**[0279]** The third vane module 203 is disposed outside one edge of the suction grill, and is disposed between the third grill corner portion 327-3 and the fourth grill corner portion 327-4.

**[0280]** The fourth vane module 204 is disposed outside one edge of the suction grill, and is disposed between the fourth grill corner portion 327-4 and the first grill corner portion 327-1.

**[0281]** The first grill corner portion 327-1 is formed so as to extend toward the first corner cover 316-1, and has a surface continuously connected to the outer surface of the first corner cover 316-1.

**[0282]** The grill corner border 326 of the first grill corner portion 327-1 is opposite the corner decoration inner border 317 of the first corner cover 316-1, and defines a corner decoration inner border gap 317a.

**[0283]** The grill corner borders 326 of the other grill corner portions 327 are opposite the corner decoration inner borders 317 of the other corner cover 316, and define corner decoration inner border gaps 317a.

**[0284]** The first module body 410 and the second module body 420 are located inside the corner cover 316 (specifically, at the center C side of the front panel). In particular, the first module body 410 and the second module body 420 are disposed so as to face each other on the basis of the imaginary diagonal lines P1 and P2.

**[0285]** Specifically, the first module body 410 of the first vane module 201 and the second module body 420 of the fourth vane module 204 are disposed so as to face each other on the basis of the imaginary diagonal line P2.

**[0286]** The first module body 410 of the second vane module 202 and the second module body 420 of the first vane module 201 are disposed so as to face each other on the basis of the imaginary diagonal line P1.

**[0287]** The first module body 410 of the third vane module 201 and the second module body 420 of the second vane module 202 are disposed so as to face each other on the basis of the imaginary diagonal line P2.

**[0288]** The first module body 410 of the fourth vane module 204 and the second module body 420 of the third vane module 203 are disposed so as to face each other on the basis of the imaginary diagonal line P1.

**[0289]** Meanwhile, the suction grill 320 is located at the lower side of the first module bodies 410 and the second module bodies 420, and conceals the first module bodies 410 and the second module bodies 420 so as not to be exposed. That is, in the case in which the suction grill 320 is in tight contact with the front body 310, the first module bodies 410 and the second module bodies 420 are hidden by the suction grill 320 and thus are not exposed to the user.

**[0290]** Since the first module bodies 410 and the second module bodies 420 are hidden, the fastening holes 403 formed in the first module bodies 410 and the second module bodies 420 are hidden by the suction grill 320 and thus are not exposed to the user.

**[0291]** The suction grill 320 has four grill corner portions 327 disposed so as to face the respective corner covers 316. Each grill corner portion 327 is disposed so as to be opposite a corresponding one of the corner covers 316.

**[0292]** The grill corner portion 327 disposed so as to be opposite the first corner cover 316-1 is defined as a first grill corner portion 327-1, the grill corner portion 327 disposed so as to be opposite the second corner cover 316-2 is defined as a second grill corner portion 327-2, the grill corner portion 327 disposed so as to be opposite the third corner cover 316-3 is defined as a third grill corner portion 327-3, and the grill corner portion 327 disposed so as to be opposite the fourth corner cover 316-4 is defined as a fourth grill corner portion 327-4.

**[0293]** When viewed in a bottom view, the plurality of module bodies 400 is located at the upper side of the grill corner portion 327, and is hidden by the grill corner portion 327.

**[0294]** In particular, the grill side border 325 defining the edge of the grill corner portion 327 is disposed so as to face the corner decoration inner border 317 defining the inner edge of the corner cover 316, and the curved shapes thereof correspond to each other.

**[0295]** In the same manner, the grill corner border 326 defining the edge of the grill corner portion 327 is disposed so as to face the inner edge of the first vane 210, and the curved shapes thereof correspond to each other.

**[0296]** Meanwhile, in this embodiment, a permanent magnet 318 and a magnetic force fixing portion 328 are disposed in order to maintain the state in which the suction grill 320 is in tight contact with the front body 310.

**[0297]** One of the permanent magnet 318 and the magnetic force fixing portion 328 may be disposed at the front body 310, and the other of the magnetic force fixing portion 328 and the permanent magnet 318 may be disposed at the upper surface of each grill corner portion 327.

**[0298]** The permanent magnet 318 and the magnetic force fixing portion 328 are located at the upper side of each grill corner portion 327, and are hidden by each grill corner portion 327. Since the permanent magnet 318 and the magnetic force fixing portion 328 are located outside each corner of the suction grill 320, the distance between the suction grill 320 and the front body 310 may be minimized.



(continued)

5	102 : Discharge port	103: Suction channel
	104: Discharge channel	110: Case housing
	120: Front panel	130: Indoor heat exchanger
	140: Indoor blowing fan	200: Vane module
	210: First vane	220: Second vane
	230: Vane motor	240: Driving link
10	250: First vane link	260: Second vane link
	300: Front panel	310: Front body
	320: Suction grill	330: Pre-filter
	400: Module body	410: First module body
15	420: Second module body	500: Elevator

**Claims**

1. A ceiling type indoor unit of an air conditioner, the ceiling type indoor unit comprising:

20 a case housing installed at a ceiling of a room so as to be suspended therefrom, the case housing having an open lower surface;  
a front body configured to cover the lower surface of the case housing, the front body having a suction port and a discharge port formed so as to face downwards;  
25 a vane module separably coupled to the front body, the vane module being disposed so as to cover the discharge port; and  
a suction grill separably coupled to the front body, the suction grill being disposed so as to cover the suction port, wherein  
the vane module comprises:

30 a first module body disposed at one side of the discharge port, the first module body being located at a lower side of the front body, the first module body being assembled to the front body so as to be separable downwards therefrom;  
a second module body disposed at the other side of the discharge port, the second module body being  
35 located at the lower side of the front body, the second module body being assembled to the front body so as to be separable downwards therefrom;  
at least one vane having one side and the other side coupled to the first module body and the second module body, respectively, the vane being configured to be rotated relative to the first module body and the second module body;  
40 a vane motor installed at at least one of the first module body or the second module body, the vane motor being configured to provide driving force to the vane;  
a first fastening hole disposed at the first module body, the first fastening hole being disposed so as to face downwards, the first fastening hole being formed through the first module body;  
a first fastening member fastened to the front body through the first fastening hole;  
45 a second fastening hole disposed at the second module body, the second fastening hole being disposed so as to face downwards, the second fastening hole being formed through the second module body; and  
a second fastening member fastened to the front body through the second fastening hole, and

50 when the first fastening member and the second fastening member are separated from the first fastening hole and the second fastening hole, respectively, the vane module is separated downwards from the front body.

2. The ceiling type indoor unit according to claim 1, wherein the suction grill is located at a lower side of the first module body and the second module body.

55 3. The ceiling type indoor unit according to claim 1, wherein the suction grill is located at the lower side of the front body and covers the first module body and the second module body, whereby the first module body and the second module body are hidden by the suction grill when viewed from below.

4. The ceiling type indoor unit according to claim 1, wherein the suction grill comprises:

5 a grill body disposed at a lower side of the suction port, the grill body communicating with the suction port through a plurality of grill holes, the grill body being formed in a quadrangular shape; and  
a grill corner portion formed at corners of the grill body so as to extend in the diagonal direction, and the first module body and the second module body are located at an upper side of the grill corner portion.

- 10 5. The ceiling type indoor unit according to claim 4, wherein a lower surface of the vane and a lower surface of the grill body define a continuous surface.

6. The ceiling type indoor unit according to claim 1, wherein the suction grill comprises:

15 a grill body disposed at a lower side of the suction port, the grill body communicating with the suction port through a plurality of grill holes, the grill body being formed in a quadrangular shape; and  
a first grill corner portion, a second grill corner portion, a third grill corner portion, and a fourth grill corner portion formed at corners of the grill body so as to extend in a diagonal direction,

20 the vane module comprises:

a first vane module disposed outside an edge of the suction grill, the first vane module being disposed between the first grill corner portion and the second grill corner portion;

25 a second vane module disposed outside an edge of the suction grill, the second vane module being disposed between the second grill corner portion and the third grill corner portion;

a third vane module disposed outside an edge of the suction grill, the third vane module being disposed between the third grill corner portion and the fourth grill corner portion; and

30 a fourth vane module disposed outside an edge of the suction grill, the fourth vane module being disposed between the fourth grill corner portion and the first grill corner portion,

35 the first module body and the second module body disposed between the first vane module and the second vane module are located at an upper side of the first grill corner portion and are hidden by the first grill corner portion, the first module body and the second module body disposed between the second vane module and the third vane module are located at an upper side of the second grill corner portion and are hidden by the second grill corner portion,  
the first module body and the second module body disposed between the third vane module and the fourth vane module are located at an upper side of the third grill corner portion and are hidden by the third grill corner portion, and  
the first module body and the second module body disposed between the fourth vane module and the first vane module are located at an upper side of the fourth grill corner portion and are hidden by the fourth grill corner portion.

- 40 7. The ceiling type indoor unit according to claim 6, wherein one of a permanent magnet and a magnetic force fixing portion is disposed at the front body while the other of the magnetic force fixing portion and the permanent magnet is disposed at an upper surface of each grill corner portion, and  
45 the permanent magnet and the magnetic force fixing portion are hidden by each grill corner portion.

8. The ceiling type indoor unit according to claim 1, wherein the vane module further comprises a module hook disposed at the first module body and the second module body, the module hook and the front body being caught by each other.

- 50 9. The ceiling type indoor unit according to claim 8, wherein the module hook is disposed at an edge of the first module body and the second module body.

10. The ceiling type indoor unit according to claim 8, wherein the module hook of the first module body and the module hook of the second module body are disposed so as to face each other.

- 55 11. The ceiling type indoor unit according to claim 6, wherein the front body comprises:

a front frame coupled to the case housing, the suction port and the discharge port being formed in the front frame;

a first side cover assembled to an edge of the front frame, the first side cover being located at a lower side of the front frame, the first side cover being exposed outside, the first side cover being disposed outside the first vane module;

5 a second side cover assembled to an edge of the front frame, the second side cover being located at the lower side of the front frame, the second side cover being exposed outside, the second side cover being disposed outside the first vane module;

a third side cover assembled to an edge of the front frame, the third side cover being located at the lower side of the front frame, the third side cover being exposed outside, the third side cover being disposed outside the first vane module ;

10 a fourth side cover assembled to an edge of the front frame, the fourth side cover being located at the lower side of the front frame, the fourth side cover being exposed outside, the fourth side cover being disposed outside the first vane module;

assembled to a corner of the front frame, located at the lower side of the front frame, and exposed outside ;

15 a first corner cover assembled to a corner of the front frame, the first corner cover being located at the lower side of the front frame, the first corner cover being located between the first side cover and the second side cover, the first corner cover being exposed outside;

a second corner cover assembled to a corner of the front frame, the second corner cover being located at the lower side of the front frame, the second corner cover being located between the second side cover and the third side cover, the second corner cover being exposed outside;

20 a third corner cover assembled to a corner of the front frame, the third corner cover being located at the lower side of the front frame, the third corner cover being located between the third side cover and the fourth side cover, the third corner cover being exposed outside; and

a fourth corner cover assembled to a corner of the front frame, the fourth corner cover being located at the lower side of the front frame, the fourth corner cover being located between the fourth side cover and the first side cover, the fourth corner cover being exposed outside, and

25 the suction grill defines a continuous surface with the first side cover, the second side cover, the third side cover, the fourth side cover, the first corner cover, the second corner cover, the third corner cover, and the fourth corner cover.

30 **12.** The ceiling type indoor unit according to claim 11, wherein  
the second module body of the first vane module and the first module body of the second vane module are disposed at an upper side of the first grill corner portion,  
the second module body of the second vane module and the first module body of the third vane module are disposed at an upper side of the second grill corner portion,  
35 the second module body of the third vane module and the first module body of the fourth vane module are disposed at an upper side of the third grill corner portion, and  
the second module body of the fourth vane module and the first module body of the first vane module are disposed at an upper side of the fourth grill corner portion.

40 **13.** The ceiling type indoor unit according to claim 11, wherein the first grill corner portion is located at a lower side of the first fastening hole and the second fastening hole formed in the first module body and the second module body, and the first fastening hole and the second fastening hole are hidden by the first grill corner portion.

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Fig. 1

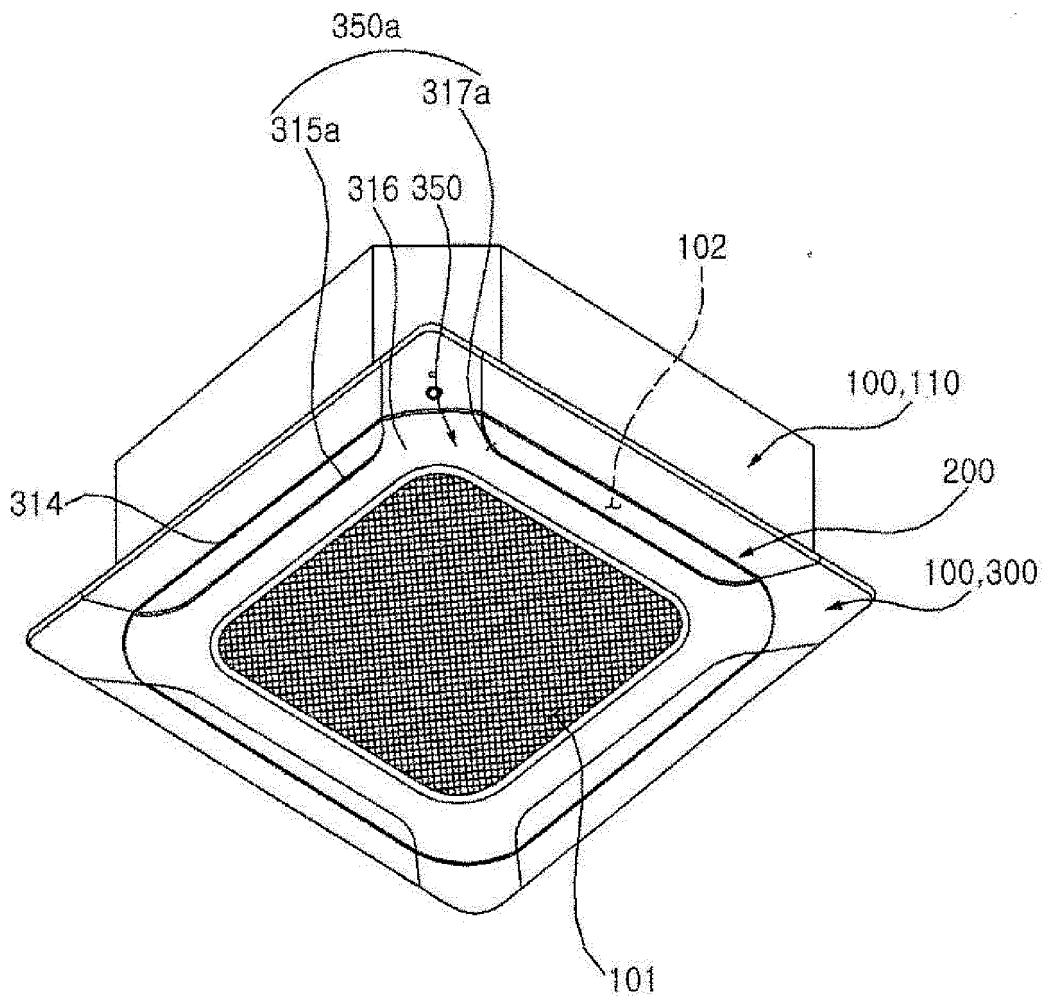


Fig. 2

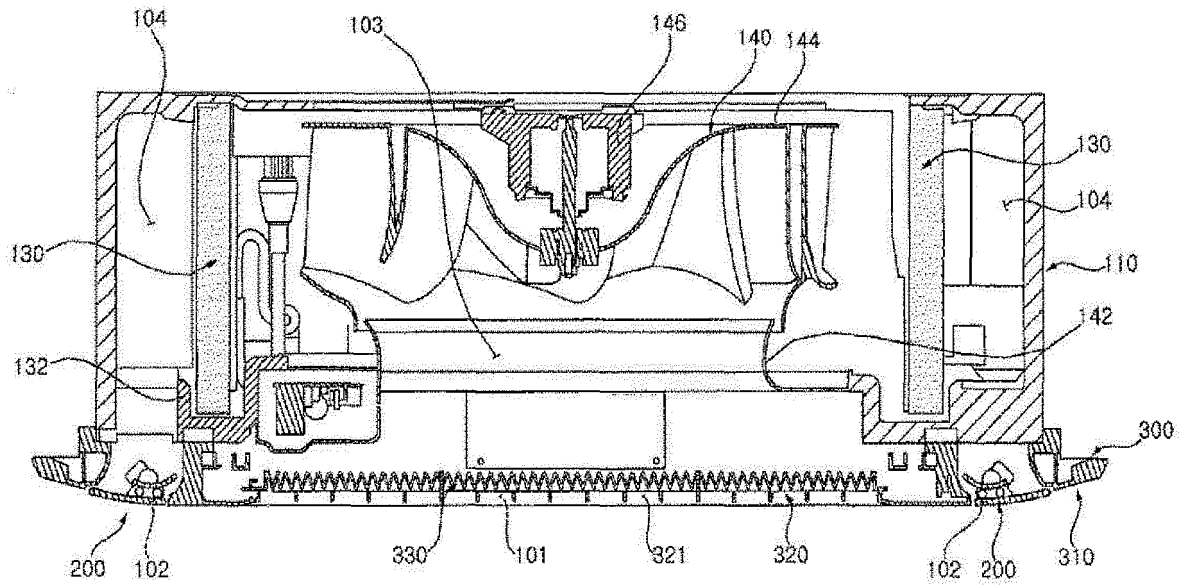




Fig. 4

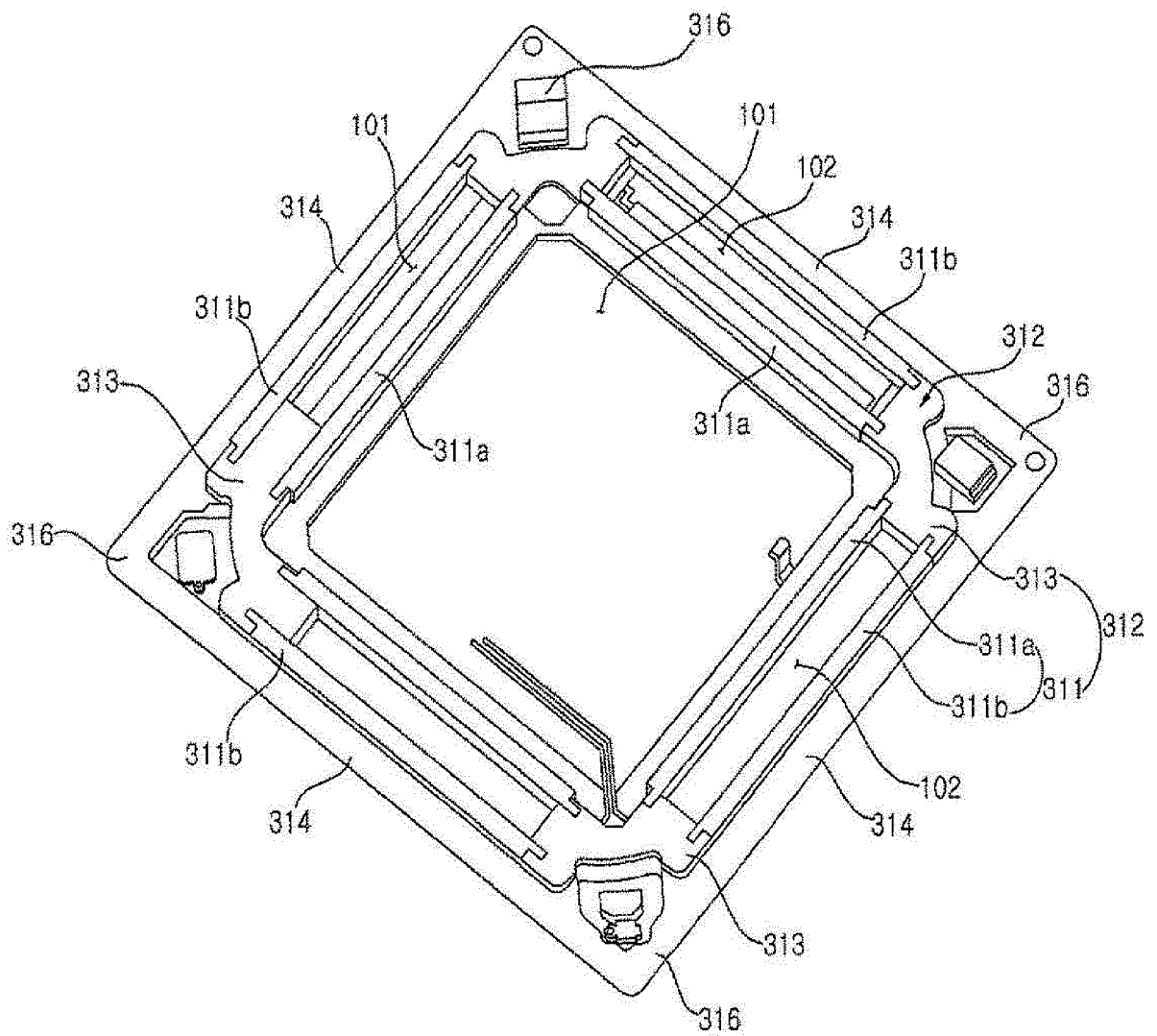


Fig. 5

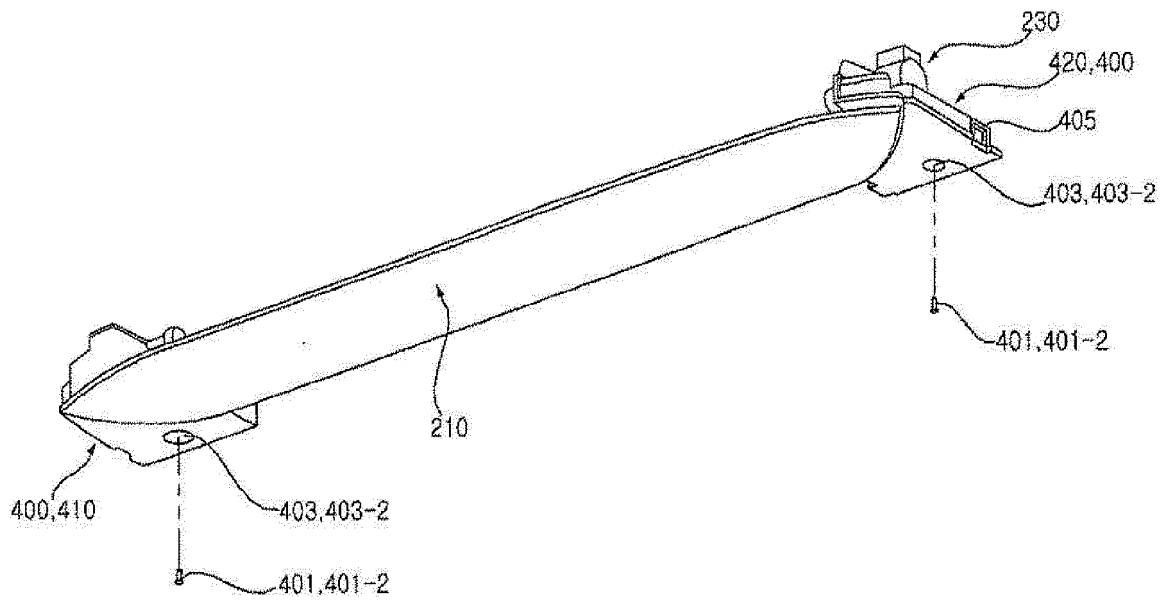


Fig. 6

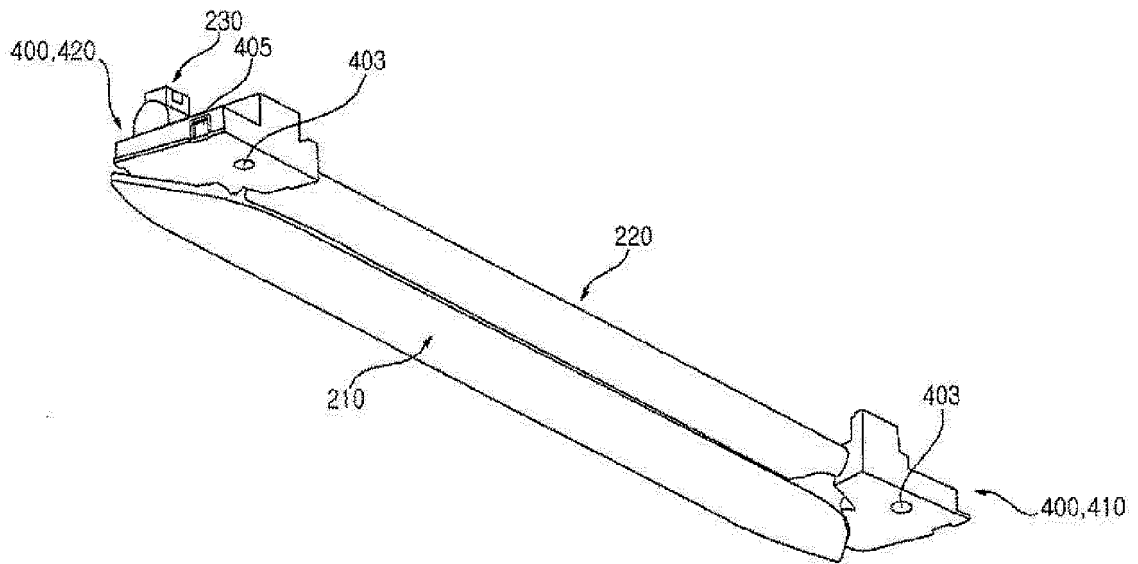


Fig. 7

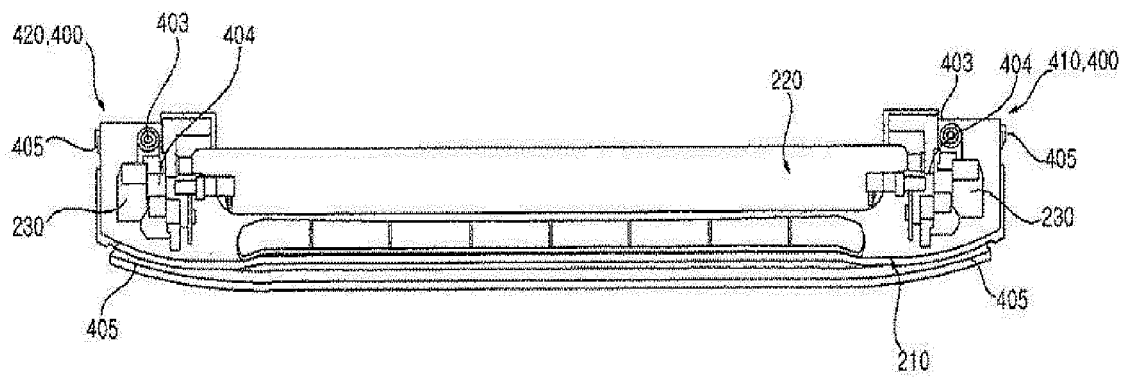


Fig. 8

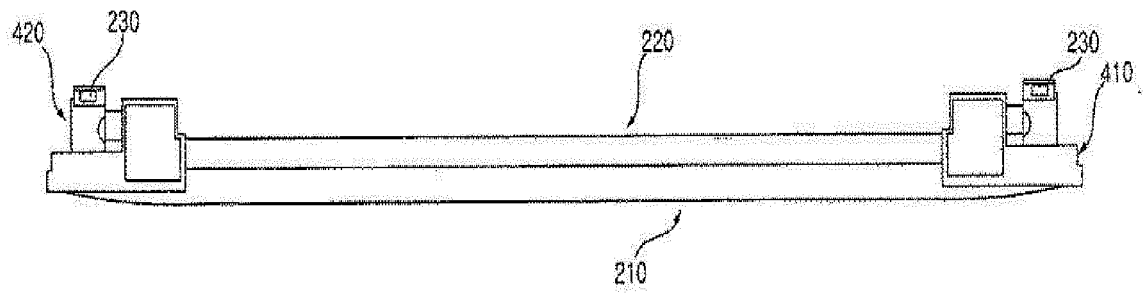


Fig. 9

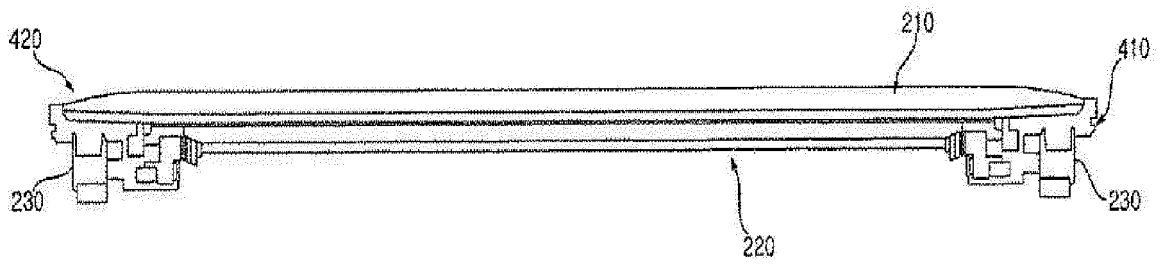


Fig. 10

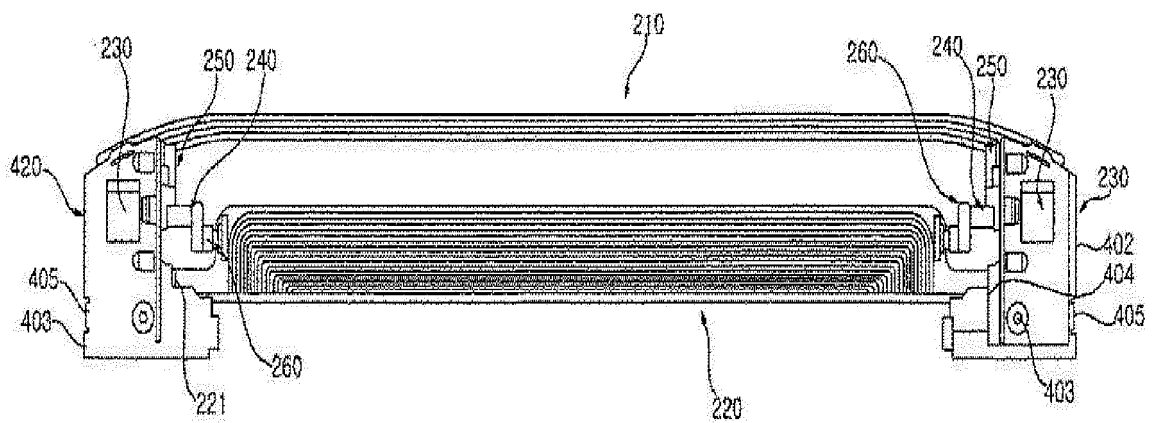


Fig. 11

200

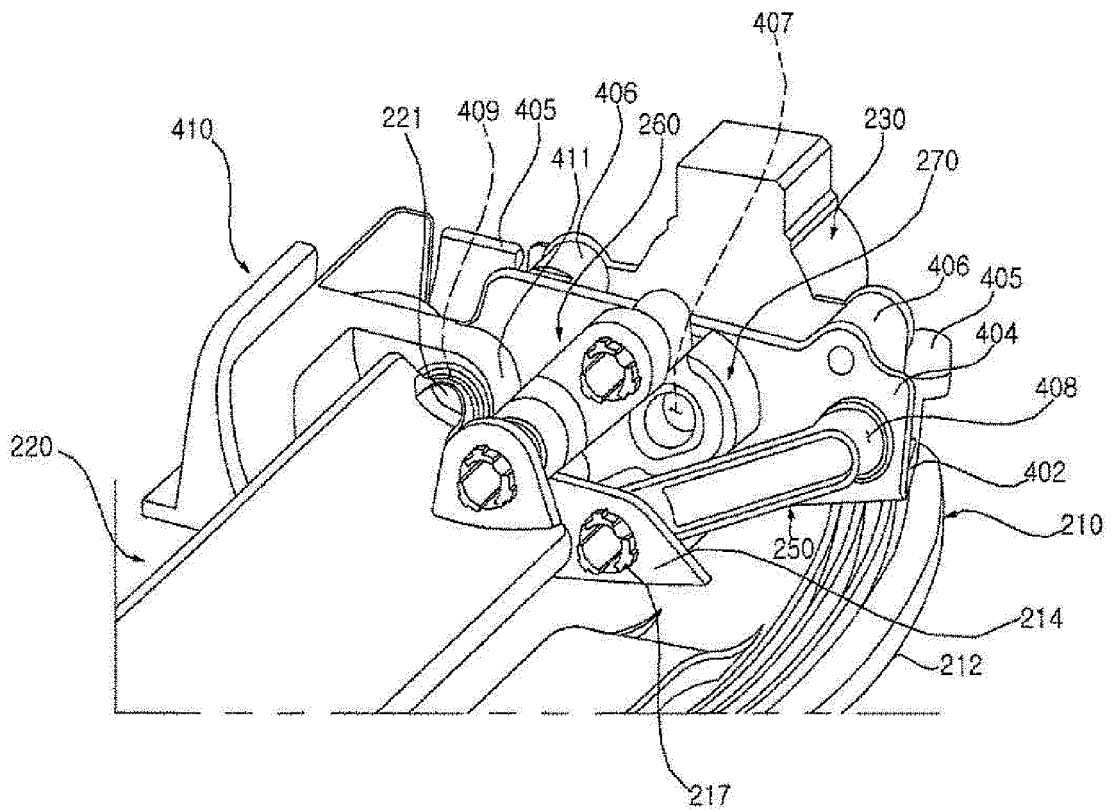


Fig. 12

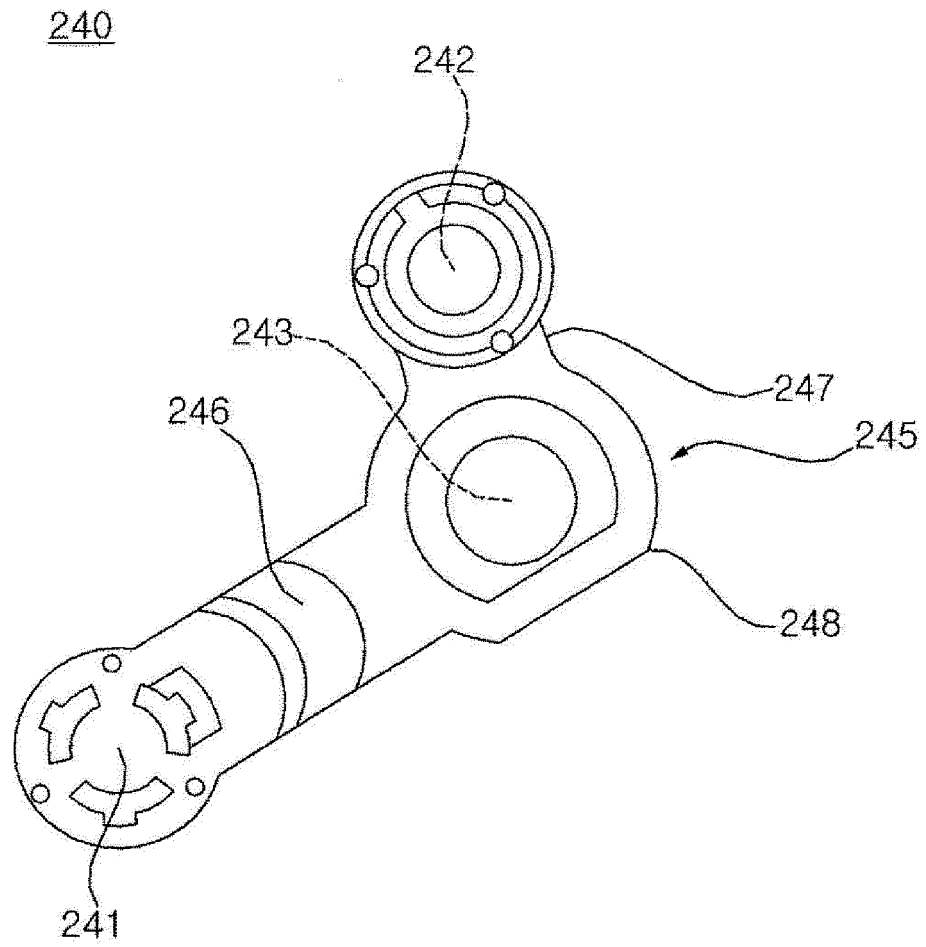


Fig. 13

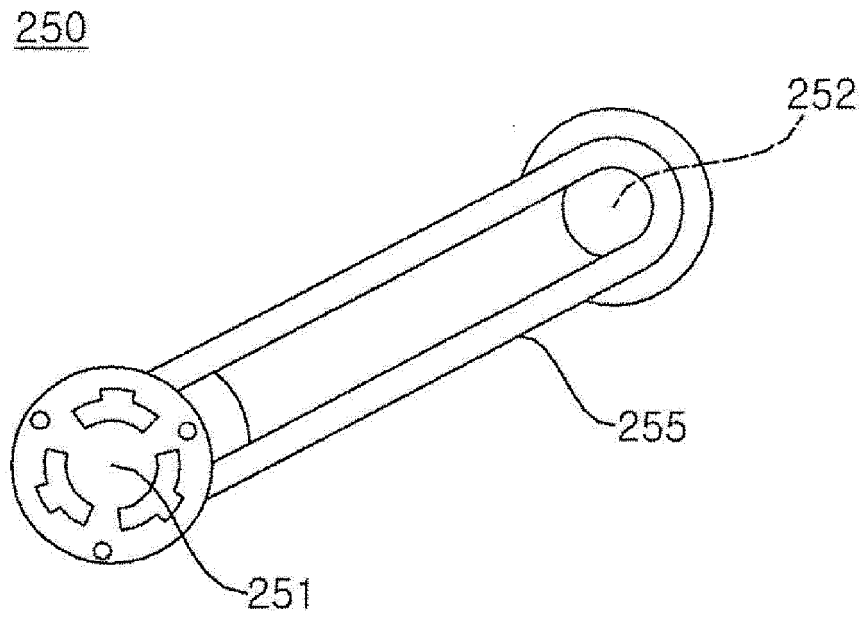


Fig. 14

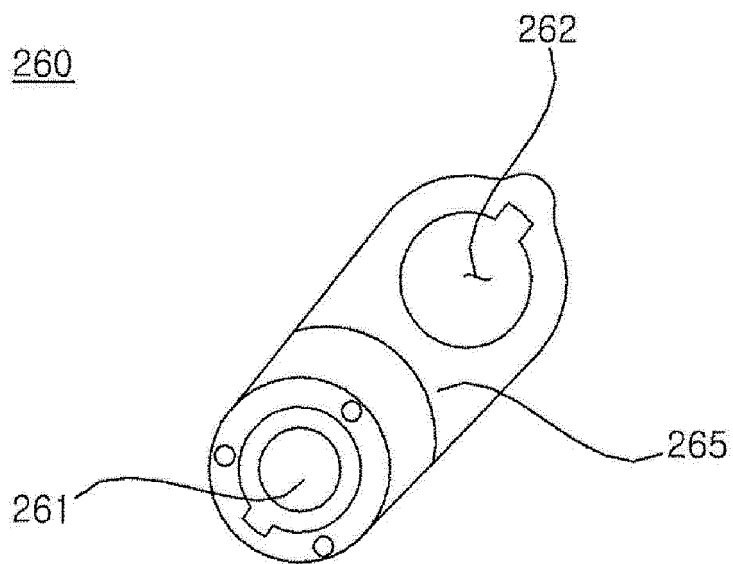


Fig. 15

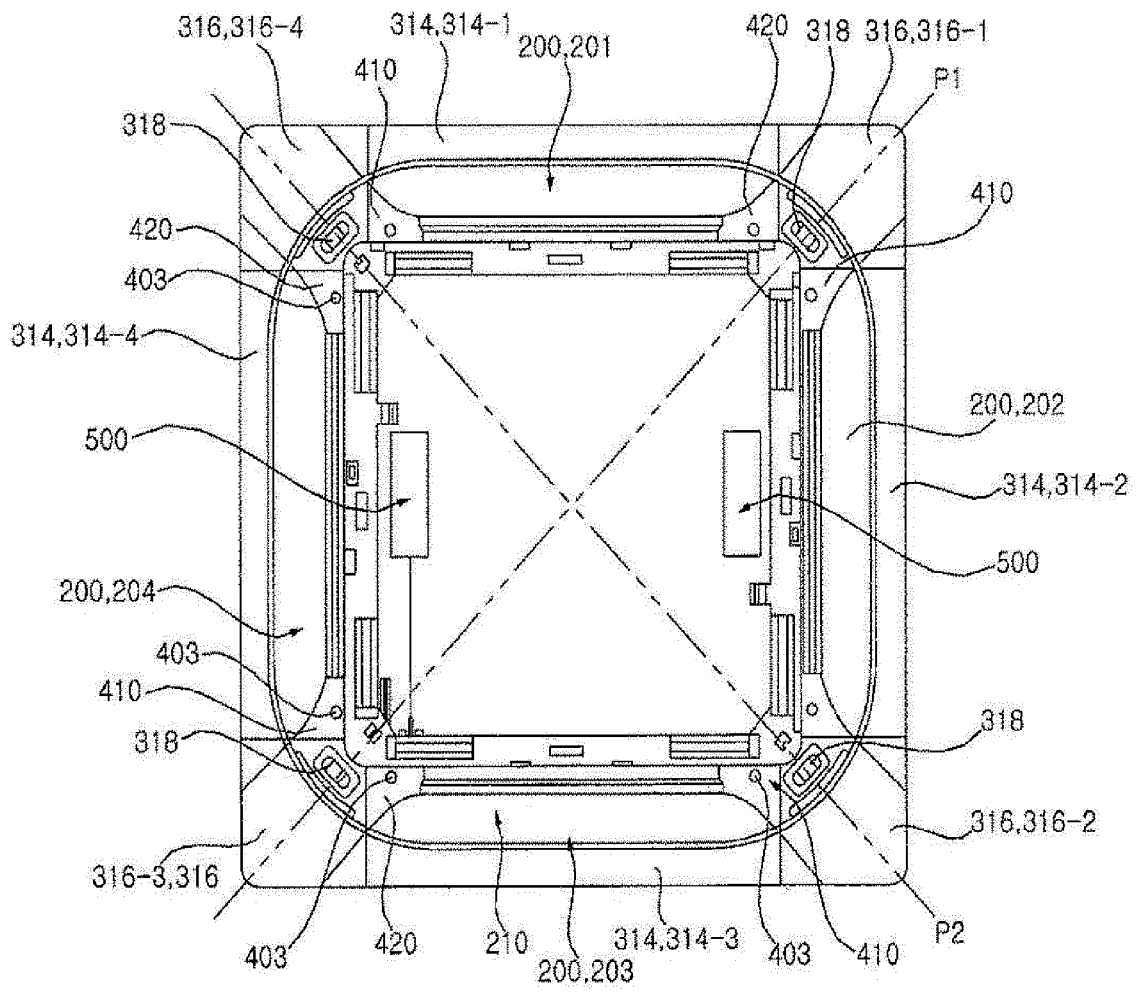


Fig. 16

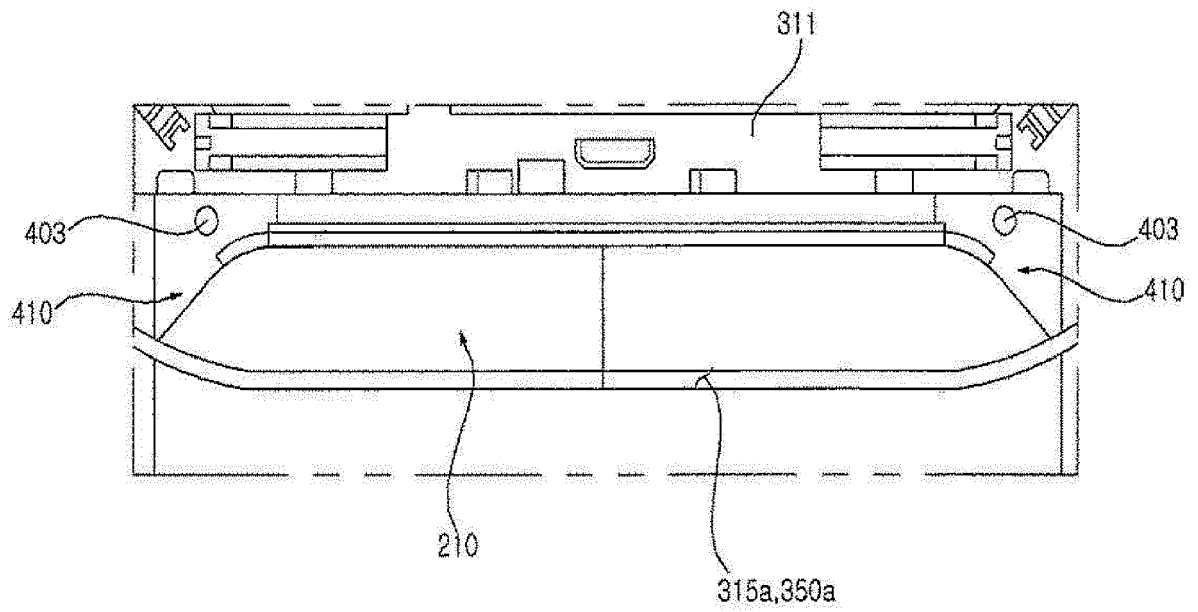
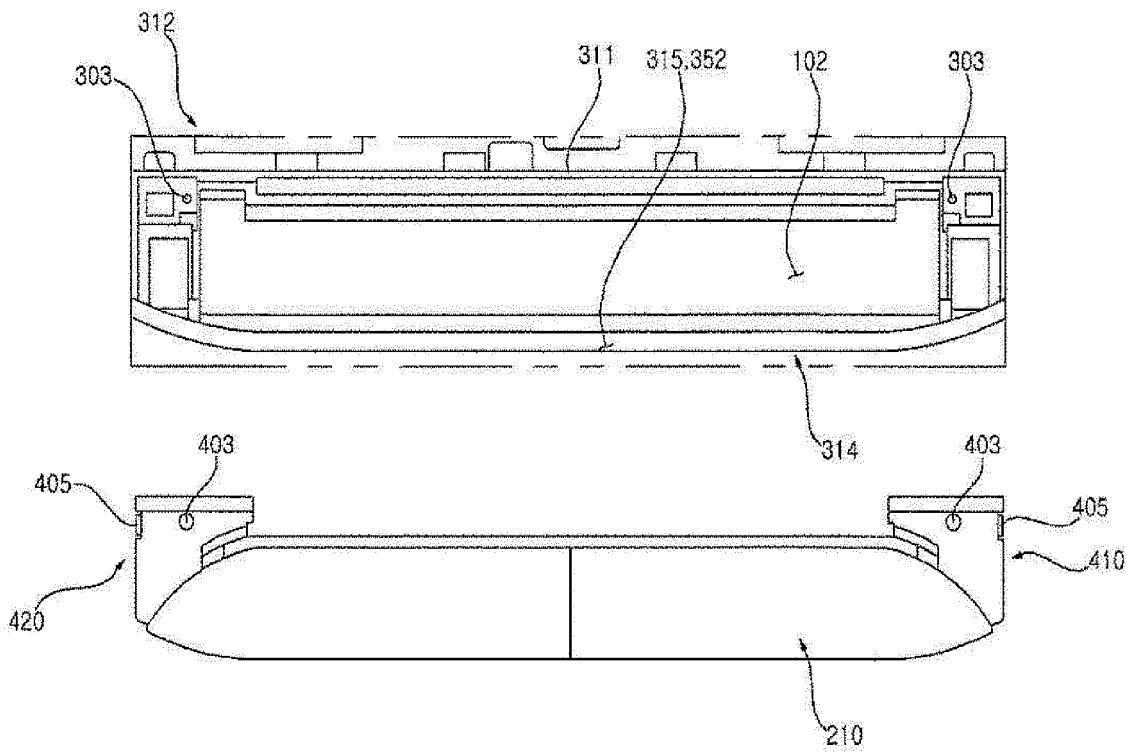



Fig. 17



INTERNATIONAL SEARCH REPORT

International application No.  
PCT/KR2018/010443

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<p>A. CLASSIFICATION OF SUBJECT MATTER <i>F24F 13/14(2006.01)i, F24F 1/00(2011.01)i</i></p> <p>According to International Patent Classification (IPC) or to both national classification and IPC</p>																				
<p>B. FIELDS SEARCHED</p> <p>Minimum documentation searched (classification system followed by classification symbols) F24F 13/14; F24F 1/00; F24F 13/00; F24F 13/08</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Korean Utility models and applications for Utility models: IPC as above Japanese Utility models and applications for Utility models: IPC as above</p> <p>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) eKOMPASS (KIPO internal) &amp; Keywords: ceiling, case housing, intake hole, outlet, front body, separation, vane module, intake grill, module body, vane motor</p>																				
<p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p> <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>Y</td> <td>KR 10-2017-0000386 A (LG ELECTRONICS INC.) 02 January 2017 See paragraphs [0001]-[0112]; and figures 2-13, 15.</td> <td>1-13</td> </tr> <tr> <td>Y</td> <td>KR 10-2007-0044342 A (LG ELECTRONICS INC.) 27 April 2007 See paragraph [0171]; and figures 9-10.</td> <td>1-13</td> </tr> <tr> <td>Y</td> <td>KR 10-2011-0031391 A (DAIKIN INDUSTRIES, LTD.) 25 March 2011 See paragraph [0139]; and figure 17.</td> <td>1-13</td> </tr> <tr> <td>A</td> <td>US 2015-0176856 A1 (MITSUBISHI ELECTRIC CORPORATION) 25 June 2015 See claim 1; and figures 1-2.</td> <td>1-13</td> </tr> <tr> <td>A</td> <td>KR 10-2015-0103581 A (SAMSUNG ELECTRONICS CO., LTD.) 11 September 2015 See paragraphs [0045]-[0046]; and figures 4-5.</td> <td>1-13</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	Y	KR 10-2017-0000386 A (LG ELECTRONICS INC.) 02 January 2017 See paragraphs [0001]-[0112]; and figures 2-13, 15.	1-13	Y	KR 10-2007-0044342 A (LG ELECTRONICS INC.) 27 April 2007 See paragraph [0171]; and figures 9-10.	1-13	Y	KR 10-2011-0031391 A (DAIKIN INDUSTRIES, LTD.) 25 March 2011 See paragraph [0139]; and figure 17.	1-13	A	US 2015-0176856 A1 (MITSUBISHI ELECTRIC CORPORATION) 25 June 2015 See claim 1; and figures 1-2.	1-13	A	KR 10-2015-0103581 A (SAMSUNG ELECTRONICS CO., LTD.) 11 September 2015 See paragraphs [0045]-[0046]; and figures 4-5.	1-13
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<p>Date of the actual completion of the international search 29 JANUARY 2019 (29.01.2019)</p>		<p>Date of mailing of the international search report 29 JANUARY 2019 (29.01.2019)</p>																		
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