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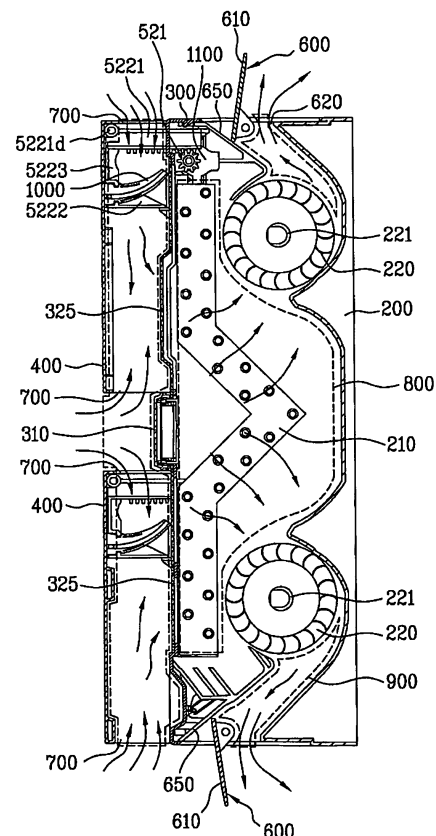
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(54) **Indoor unit of air conditioner with air inlet via movable front panel and air outlet via bottom/top towards rearside**

(57) An air conditioner is disclosed. The present invention is suitable for performing efficient heat exchange of indoor air in a manner that a front panel opens/closes a plurality of air inlets, securing a sufficient intake quantity of an indoor air, discharging a condensed water smoothly without interruption of an air introduction from a front, preventing dewdrop from falling, and facilitating air conditioner manufacturing. The present invention includes a case having a heat exchanger and a blowing fan, at least one front panel configured in front of the case to open/close at least one air inlet, at least one air outlet provided to a top and/or bottom of the case, and an outlet unit opening/closing the at least one air outlet to enable an air to be discharged toward a rear of the case along a backside of an outlet panel from an inside of the case.

FIG. 3



Description

TECHNICAL FIELD

[0001] The present invention relates to an air conditioner. Although the present invention is suitable for a wide scope of applications, it is particularly suitable for performing efficient heat exchange of indoor air in a manner that a front panel opens/closes a plurality of air inlets, securing a sufficient intake quantity of an indoor air, discharging a condensed water smoothly without interruption of an air introduction from a front, preventing dewdrop from falling, and facilitating air conditioner manufacturing.

BACKGROUND ART

[0002] Generally, an air conditioner cools or heats an indoor room to provide a user with a more pleasant indoor environment using a refrigerant cooling cycle including a compressor, a 4-way valve, an outdoor heat exchanger, an expansion mechanism, and an indoor heat exchanger. And, the above-configured air conditioner can be classified into a separate type and a single body type.

[0003] The separate type air conditioner and the single body type air conditioner are functionally equal to each other. In particular, the separate type air conditioner includes an indoor unit having a cooling and radiating device, an indoor fan, and an indoor fan motor and an outdoor unit having a radiating/cooling device, an outdoor fan, and an outdoor fan motor. And, the indoor and outdoor units separate from each other are connected together via a refrigerant pipe. Yet, the single body type air conditioner integrates the cooling and radiating functions and is directly installed at a hole or window of a house wall.

[0004] FIG. 15 is an exploded perspective diagram of an air conditioner according to a related art. And, FIG. 16 is a cross-sectional diagram of an assembled air conditioner according to a related art.

[0005] Referring to FIG. 15 and FIG. 16, an air conditioner according to a related art consists of a case 102, a front grill 110 assembled to a front side of the case 102 to have an air inlet 104, a top inlet grill 106, and an air outlet 108 provided to a lower front side or bottom of the front grill 110, a side inlet grill 112 rotatably connected to a front side of the front grill 110, a motor 114 loaded in the case 102, a blowing fan 116 connected to the motor 114, and a heat exchanger 118 provided between the blowing fan 116, the air inlet 104, and the top inlet grill 106.

[0006] The front air inlet 104 is provided to the front side of the front grill 110. The top inlet grill 106 is built in one body of a topside of the front grill 110. And, a pre-filter 105 is provided to the front grill 110 to filter off particles from the air sucked into the front air inlet 104.

[0007] The side inlet grill 112 is provided to protect the front air inlet 104 and the pre-filter 105. And, an upper

part of the side inlet grill 112 is rotatably connected to an upper part of the front grill 110.

[0008] An outlet grill 124, which is provided with a condensed water receiving part 119 receiving a condensed water falling from the indoor heat exchanger 118 and includes a louver 120 changing a right/left wind direction of an air blown out of the air outlet 108 and a vane 122 changing an up/down wind direction, is loaded in a lower part within the front grill 110.

[0009] In the above-configured air conditioner, if the blowing fan 116 is rotated by a drive of the motor 114, an indoor air in front of the side inlet grill 112 sequentially passes through the side inlet grill 112 and the front air inlet 104 to filter off particles by the filter 105 and is then sucked into a space between the front grill 110 and the case 102.

[0010] And, the indoor air above the front grill 110 passes through the top inlet grill 106 and is then sucked into the space between the front grill 110 and the case 102.

[0011] The indoor air sucked in the above manner passes through the indoor heat exchanger 118 to be cooled or heated by the refrigerant flowing through the indoor heat exchange 118, keeps passing through the blowing fan 116, and is then blown into an indoor space via the air outlet 108 by being guided by the louver 120 and the vane 122.

[0012] However, the related art air conditioner has the following problem.

[0013] First of all, air in an indoor space is sucked into the related art air conditioner via the front and top sides of the air conditioner, cooled/heated by the heat exchanger 118, and then blown into the indoor space via a bottom side of the air conditioner. If an installation height of the air conditioner is low, it takes a considerably long time for the cool air to expand all over the indoor space in a cooling operation mode. If the installation height is high, the heated air is blown to a user's face in a heating operation mode to raise unpleasantness.

SUMMARY OF INVENTION

[0014] Accordingly, the present invention is directed to an air conditioner that addresses one or more of the problems due to limitations and disadvantages of the related art.

[0015] It would be desirable to provide an air conditioner, by which an installation height of the air conditioner is not considerably restricted.

[0016] It would also be desirable to provide an air conditioner, by which a cooled air can be evenly spread all over an indoor space in a cooling operation mode.

[0017] It would also be desirable to provide an air conditioner, by which user's unpleasantness can be eliminated in a manner of blowing a warm air indirectly in a heating operation mode.

[0018] It would also be desirable to provide an air conditioner, by which a sufficient quantity of air can be secured by sucking an indoor air via a plurality of front air

inlets.

[0019] It would also be desirable to provide an air conditioner, in which front air introduction is not interrupted by a blown air.

[0020] It would also be desirable to provide an air conditioner, by which a condensed water can be smoothly discharged.

[0021] It would also be desirable to provide an air conditioner, by which a bearing unit can be conveniently locked.

[0022] It would also be desirable to provide an air conditioner, by which a falling of dewdrop is prevented to maintain a clean indoor space.

[0023] Additional features and advantages of the invention will be set forth in the description which follows, and in part will be apparent from the description, or may be learned by practice of the invention. The objectives and other advantages of the invention will be realized and attained by the structure particularly pointed out in the written description and claims thereof as well as the appended drawings.

[0024] To achieve these and other advantages and in accordance with the purpose of the present invention, as embodied and broadly described, an air conditioner according to the present invention includes a case having a heat exchanger and a blowing fan, at least one front panel configured in front of the case to open/close at least one air inlet, at least one air outlet provided to a top and/or bottom of the case, and an outlet unit opening/closing the at least one air outlet to enable an air to be discharged toward a rear of the case along a backside of an outlet panel from an inside of the case.

[0025] Preferably, the outlet panel is rotationally moved by drawing an arc.

[0026] Preferably, the outlet panel is rotationally moved in front of the at least one air outlet.

[0027] Preferably, the at least one air outlet is provided to a front portion of the top and/or bottom of the case.

[0028] Preferably, a sealing recess is formed by cutting a rear portion of the top and/or bottom of the case to enable the outlet panel to land on the sealing recess in case of closing the outlet panel.

[0029] Preferably, the outlet unit is provided with an outlet panel guide part cut to guide an end portion of the outlet panel.

[0030] More preferably, the outlet panel shields an inner space of the outlet panel guide part in case of being closed.

[0031] Preferably, the outlet unit is configured detachable in a direction vertical to the case.

[0032] Preferably, the at least one front panel moves back and forth to open/close the at least one air inlet.

[0033] Preferably, the air conditioner further includes a drain pan provided under the heat exchanger to handle a condensed water and at least one or more drain guide rails provided along a backside of the case to communicate with the inside of the case, the at least one or more drain guide rails vertically spaced apart from each other.

[0034] More preferably, the drain guide rail provided to an upper position is configured larger than the drain guide rail provided to a lower position.

[0035] More preferably, a drain hole is provided to an end portion of one side of the at least one drain guide rail to communicate with the inside of the case.

[0036] More preferably, a water splash preventing cover is provided to a drain hole provided to an end portion of one side of an upper one of the at least one or more drain guide rails to communicate with the inside of the case.

[0037] In this case, the water splash preventing cover is provided with a water splash preventing sill rounded and projected forward below the drain hole. And, the water splash preventing cover is provided with drain guide parts respectively projected downward from both side end portions of the drain hole.

[0038] Moreover, a gap between the drain guide parts is gradually reduced downwardly.

[0039] More preferably, the drain pan is formed in one body of the outlet unit provided to a lower part of the case.

[0040] Preferably, the outlet unit is provided with a bearing cover part loaded by pressurizing and fixing a bearing part for the blowing fan and an outlet part opening/closing the at least one air outlet.

[0041] More preferably, an accommodating recess is formed by cutting the bearing cover part to cover the bearing part.

[0042] More preferably, an elastic piece is provided to the bearing cover part to be assembled to the case.

[0043] In this case, a locking hole is provided to a portion of the case corresponding to the elastic piece. And, the elastic piece is provided with an insertion part inserted in the locking hole and a hanging sill part projected to land on an upper side of the locking hole.

[0044] Moreover, the elastic piece is further provided with a grip part extending forward from the hanging sill part.

[0045] Besides, a hanging part for fixing a cable thereto is provided to a cover part covering a driving motor for the blowing fan.

[0046] More preferably, the at least one front panel opens/closes the air inlet by moving back and forth.

[0047] Preferably, the outlet unit is provided with the outlet panel to open/close the at least one air outlet, a front side of the outlet panel is plain, and at least one or more dewdrop fall preventing recesses are provided to a backside of the outlet panel.

[0048] More preferably, the at least one or more dewdrop fall preventing recesses are plurally provided in a direction vertical to a course of the blown air.

[0049] In this case, the at least one or more dewdrop fall preventing recesses are plurally provided in a horizontal direction. And, the at least one or more dewdrop fall preventing recesses are configured to be gradually reduced downwardly in depth. Moreover, the at least one or more dewdrop fall preventing recesses are configured to be gradually reduced downwardly in width.

[0050] Besides, the at least one or more dewdrop fall preventing recesses are configured to be gradually reduced downwardly in both width and depth. A cross-section of each of the at least one or more dewdrop fall preventing recesses has a shape of an upper-side open quadrangle. A cross-section of each of the at least one or more dewdrop fall preventing recesses has a shape of an upper-side open semi-circle. The at least one or more dewdrop fall preventing recesses are provided to the backside of the outlet panel. And, the at least one front panel opens/closes the air inlet by moving back and forth.

[0051] It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

[0052] The present invention provides the following effects or advantages.

[0053] First of all, a quantity of indoor air for heat exchange can be sufficiently secured. An installation height of an air conditioner is not considerably restricted. Even spreading of air blown in a cooling/heating operation can be induced. A warm air can be indirectly discharged in a heating operation without interruption of front air introduction. And, a sufficient quantity of air can be sucked in via a plurality of air inlets.

[0054] Secondly, since an outlet panel is rotationally moved in front of an air outlet to open/close an outlet passage, air is blown out toward a rear of a case along a backside of the outlet panel. So, warm air is indirectly blown out without front air introduction to eliminate user's unpleasantness.

[0055] Thirdly, a plurality of drain guide rails are arranged along a backside of a case between a heat exchanger and a drain pan. And, a water splash preventing sill is rounded and projected under a drain hole. So, a condensed water discharged from the drain hole of an upper drain guide rail is not spread wide.

[0056] Fourthly, an elastic piece provided to a bearing cover part of an outlet unit pressurizes and elastically fixes a blowing fan bearing unit thereto. So, a locking member for supporting the bearing unit is reduced to facilitate air conditioner manufacturing.

[0057] Fifthly, a plurality of dewdrop fall preventing recesses are formed by cutting a backside of an outlet panel to be spaced apart from each other in a horizontal direction. So, dewdrops are received in the dewdrop fall preventing recesses and then evaporate, whereby an inner space can be maintained clean.

DESCRIPTION OF DRAWINGS

[0058] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description serve to explain the principles of the invention.

[0059] In the drawings:

FIG. 1 is an exploded perspective diagram of an air conditioner according to the present invention;
 FIG. 2 is an assembled perspective diagram of an air conditioner according to the present invention;
 FIG. 3 is an assembled cross-sectional diagram of an air conditioner according to the present invention;
 FIG. 4 is a perspective diagram of a driving unit of an air conditioner according to the present invention;
 FIGs. 5 to 7 are cross-sectional diagrams of a driving unit of an air conditioner according to the present invention;
 FIGs. 8 to 10 are perspective diagrams of an outlet unit of an air conditioner according to the present invention;
 FIG. 11 is a cross-sectional diagram of an assembly of a bearing unit and an outlet unit in an air conditioner according to the present invention;
 FIG. 12 is a cross-sectional diagram of an outlet panel of an air conditioner according to the present invention;
 FIG. 13 is a perspective diagram of a drain guide rail of an air conditioner according to the present invention;
 FIG. 14 is a perspective diagram of a drain pan of an air conditioner according to the present invention;
 FIG. 15 is an exploded perspective diagram of an air conditioner according to a related art; and
 FIG. 16 is a cross-sectional diagram of an assembled air conditioner according to a related art.

DETAILED DESCRIPTION

[0060] Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

[0061] First of all, an air conditioner according to the present invention, as shown in FIGs. 1 to 3, includes an inlet passage 700, a heat exchange passage 800, and an outlet passage 900 which are configured by a case 200, a front frame 300, a front panel 400, a driving unit 500, and an outlet unit 600.

[0062] An inner part, a front side, an upper side, and a lower side are open in part. A heat exchanger 210 is vertically provided within the case 200 to be arranged parallel with a front side of the case 200. And, a pair of blowing fans 220 are provided in rear of the heat exchanger 210 within the case 200 to be vertically spaced apart from each other.

[0063] A middle part of the heat exchanger 210 is preferably configured to have a shape for inducing an inclined direction movement of air by reducing flowing resistance of an air introduced from the indoor space. Alternatively, the middle part of the heat exchanger 210 can be configured to have a straight-line shape, as shown in FIG. 5, for convenience of manufacturing.

[0064] A pair of the front frames 300 are assembled to

the front side of the case 200 to be vertically spaced apart from each other. And, a display unit 310 is horizontally provided between a pair of the front frames 300.

[0065] An air inlet 320 is provided to a front side of the front frame 300 to suck an air from a front in the indoor space. And, a filter 325 is loaded in the air inlet 320.

[0066] The front panel 400 moves back and forth to open/close the air inlet 320 provided to the front side of the front frame 300. And, a pair of the front panels 400 are provided in correspondence to a pair of the front frames 300 to be vertically spaced apart from each other.

[0067] The front panel 400 includes a plane part 410 forming the front side and a bent part 420 forming both lateral sides. The bent part 420 is bent backward from both sides of the plane part 410 and extends to move along both of the inclined lateral sides of the front frame 300.

[0068] According to another embodiment of the present invention, in case that a pair of the front panels 400 are horizontally spaced apart from each other, it is preferable that the display unit 310 is configured vertically long between a pair of the left and right front panels 400.

[0069] The driving unit 500, as shown in FIGs. 4 to 7, is provided to horizontally move the front panel 400 back and forth from the front frame 300. And, the driving unit 500 includes a driving source unit 510 and a power transfer unit 520.

[0070] Preferably, a pair of the driving units 500 are provided to both lateral corners of a pair of the front panels 400 vertically spaced apart from each other, respectively.

[0071] The driving source unit 510 can include a driving motor 511 to generate a driving force for example. And, the power transfer unit 520 can include a pinion gear 521 and a rack rail 522 to transfer the driving force generated from the driving source unit 510 to the front panel 400.

[0072] The pinion gear 521 is interoperable by being connected to a rotational shaft 512 of the driving motor to receive a rotational force of the driving motor 511. And, the rack rail 522 includes a body part 5221, a guide part 5222, and a connecting part 5223 to transform a rotational force of the pinion gear 521 into a straight reciprocation movement.

[0073] The body part 5221 is provided with a rack gear 5221a engaging with the pinion gear 521 along its bottom side. The guide part 5222 is provided under the body part 5221 in parallel. And, the connecting part 5223 connects side end portions of the body part 5221 and the guide part 5222 together.

[0074] In particular, the rack rail 522 including the body part 5221, the guide part 5222, and the connecting part

5223 configures a 'U' shape overall.

[0075] In order for the rack rail 522 to move in or out of the front frame 300 in correspondence to a rotation of the pinion gear 521, a leading hole (not shown in the drawings) is formed by perforating the case 200 to accommodate the rack rail 522.

[0076] In particular, an end sill 5221b is provided to a topside of the body part 5221. The end sill 5221b comes into contact with a body part support 240 provided to an upper part of the case 200 to smoothly move back and forth.

[0077] A hinge hole 5221c is provided to an upper part of a front end of the body part 5221 to be hinged to the front panel 400 by a hinge pin 5221d. So, the body part 5221 can move back and forth together with the front panel 400.

[0078] In order to guide the whole rack rail 522, a lower surface of the guide part 5222 smoothly moves back and forth by coming into contact with the guide part support 245 downwardly spaced apart from a lower part of the body part support 240 of the case 200.

[0079] Meanwhile, a stopper 5221e is provided as a hook shape to a rear end portion of the body part 5221. The stopper 5221e is held by a holding part 250 provided to an upper part of the case 200 to prevent the rack rail 522, which is moved to a front limit position, from proceeding farther.

[0080] In the outlet unit 600, as shown in FIGs. 8 to 10, the outlet panel 610, which is placed at an upper and/or lower part of the case 200, is rotationally moved to open/close the air outlet 620 configured by the case 200 and the front frame 300.

[0081] In the outlet unit 600, the air outlet 620 is opened/closed to enable an air to be indirectly blown to a user without interrupting the front air introduction. In this case, the outlet panel 610 rotates at a prescribed angle against the lower surface of the case 200 toward a front/rear.

[0082] In particular, the outlet unit 600 includes a main frame 630, a bearing cover part 680, and an outlet part. In the present invention, the outlet part includes the outlet panel 610. Alternatively, the outlet part can include a vane or the like in various ways.

[0083] The main frame 630 is loaded in an upper and/or lower part of the case 200 in a horizontal direction. And, a panel motor 640 is provided to one side of the main frame 630 to rotate the outlet panel 610.

[0084] An outlet panel guide part 650 is formed by cutting an inside of the main frame 630 to accommodate and guide an upper end portion of the outlet panel 610. The outlet panel 610 adheres closely to an inside of the outlet panel guide part 650 in case of being rotated by the driven panel motor 640.

[0085] In this case, since the outlet unit 600 is provided to a front portion of the air outlet 620, the outlet panel 610 is rotationally moved at a front portion of the case 200.

[0086] The air outlet 620 is provided to a front portion of an upper and/or lower side of the case 200. And, air within the case 200 is blown out along a backside of the outlet panel 610 from an inside of the case 200 by a rotational movement of the front panel 610.

[0087] In particular, a sealing recess 260 is formed by cutting a rear portion of the upper and/or lower side of

the case 200 in a horizontal direction. So, the outlet panel 610 is loaded in the sealing recess 260 to prevent leakage of air within the case 200 when the outlet panel 610 is closed.

[0088] Preferably, the outlet unit 600 is configured detachable in a direction vertical to the case 200 to facilitate assembly and disassembly.

[0089] For this, the bearing cover part 680 is provided to the outlet unit 600 to pressurize an upper side of the bearing part 221, which covers the bearing for the blowing fan, to fix the bearing part to the case 200.

[0090] And, an accommodating recess 660 is formed to cover the bearing part 221 by cutting the bearing cover part 680, which is provided to one side of the outlet unit 600, inwardly in an elliptic shape.

[0091] An elastic piece 670 is provided to the bearing cover part 680 to be assembled to the case 200. And, the elastic piece includes an insertion part 671 and a hanging sill part 672.

[0092] A locking hole 270 is formed by perforating a portion of the case 200 corresponding to the elastic piece 670. The insertion part 671 is inserted into the locking hole 270. And, the hanging sill part 672 is projected to land on an upper side of the locking hole 270.

[0093] In this case, a width of the insertion part 671 in a slackened state is configured slightly greater than that of the locking hole 270. So, the insertion part 671 is contracted inward to be elastically fitted in the locking hole 210 in case of being inserted into the locking hole 270.

[0094] Preferably, the elastic piece 670 further includes a grip part 673 extending from the elastic piece 670 in a front direction to facilitate the elastic piece 670 to be inserted/separated in/from the locking hole 270 of the case 200.

[0095] Meanwhile, the driving motor provided to a side opposite to the blowing fan bearing part 221 is converted by the cover part 280. And, a hanging part 281 is projected from the cover part 280 to fix a cable thereto.

[0096] A plurality of dewdrop fall preventing recesses 611, as shown in FIG. 12, are formed to prevent dewdrops from falling in a cooling operation by cutting a backside of the outlet panel 610 to be spaced apart from each other in a direction (horizontal direction in the drawing) vertical to a course of a blown air.

[0097] The dewdrop fall preventing recesses 611 can be configured to gradually reduce their depths downwardly by considering a considerable quantity of dewdrops on the outlet panel 610 without weakening rigidity of the outlet panel 610 considerably.

[0098] Alternatively, the dewdrop fall preventing recesses 611 are configured to be gradually reduced in depth or in depth and width downwardly without weakening rigidity of the outlet panel 610 considerably.

[0099] A cross-section of each of the dewdrop fall preventing recesses 611 can have a shape of an upper-side open quadrangle to enable dewdrops to stay and evaporate. Alternatively, a cross-section of each of the dewdrop fall preventing recesses 611 can have a shape of

an upper-side open semi-circular shape to enable dewdrops to stay and evaporate.

[0100] In the present invention, the air within the case 200 is blown out from the inside of the case 200 along the backside of the outlet panel 610, it is preferable that the dewdrop fall preventing recesses 611 are provided to the backside of the outlet panel 610.

[0101] The present invention includes a drain pan 1700 and a drain guide rail 1800 shown in FIG. 13 and FIG. 14. The drain pan 1700 is provided under the heat exchanger 210 to handle the condensed water generated from the heat exchanger 210.

[0102] Preferably, the drain pan 1700 is formed in one body of the air outlet unit 600 provided to the lower part of the case 200.

[0103] The drain guide rail 1800 has an upper-side open type cross-section. The drain guide rail 1800 is configured along the backside of the case 200 to communicate with the inside of the case 200. And, a plurality of the drain guide rails 1800 are arranged to be vertically spaced apart from each other between the heat exchanger 210 and the drain pan 1700.

[0104] Considering that a considerable quantity of the condensed water is generated in the vicinity of the heat exchanger 210, it is preferable that the drain guide rail 1810 provided to a lower position is formed larger than the drain guide rail 1820 provided to a lower position.

[0105] A drain hole 1811/1821 is provided to one side end portion of the upper/lower drain guide rail 1810/1820. In this case, the drain hole 1811/1821 is projected forward to communicate with the inside of the case 200.

[0106] A water splash preventing cover 1830 is provided to the drain hole 1811 provided to the drain guide rail 1810 provide to the upper position. And, a passing hole 181 is formed to correspond to the drain hole 1811 by perforating the water splash preventing cover 1830.

[0107] The water splash preventing cover 1830 is locked to the case 200 by inserting locking members such as screws in locking holes 1832 formed by perforating upper and lower end portions of the water splash preventing cover 1830.

[0108] A water splash preventing sill 1833 is rounded and projected forward from the water splash preventing cover 1830 below the drain hole 1811 in order for the condensed water discharged via the drain hole 1811 of the drain guide rail 1830 not to spread far away.

[0109] Preferably, the water splash preventing sill 1822 is projected by drawing an arch to enable the condensed water to smoothly flow down along a surface of the water splash preventing sill 1833.

[0110] And, drain guide parts 1834 are projected and extended downwardly from the water splash preventing cover 1830 in the vicinity of both side end portions of the drain hole 1811 to prevent the condensed water from being spread right and left, respectively.

[0111] In particular, in order to make the condensed water converge into one position while the condensed water is moving downward, a gap between the drain

guide parts 1834 gets narrower downwardly.

[0112] In the drawings, according to one embodiment of the present invention, the outlet units 600 are provided to both of the topside and bottom side of the case 200. Alternatively, the outlet unit 600 can be provided to either the topside or the bottom side of the case 200 if necessary.

[0113] According to the above embodiment of the present invention, a pair of the front panels 400 are provided to be vertically or horizontally spaced apart from each other. Alternatively, at least three front panels 400 can be vertically or horizontally provided. And, it is apparent that the air outlet 620 can be selectively provided to the topside or the bottom side of the case 200.

[0114] In the present invention, the inlet passage 700 means a passage via which an air of an indoor space in front of the air inlet 320 is introduced into the case 200 in order for the front panel 400, which is moving forward, to introduce the air of the indoor space into the case 200 via the air inlet 320.

[0115] The inlet passage 700 is provided to a space between the front frame 300 and the front panel 400. Since the front panels 400 are plurally provided, the inlet passages 700 are plurally provided in correspondence to forward/backward movements of the front panels 400.

[0116] Specifically, according to one embodiment of the present invention, if a pair of the front panels 400 are provided to be vertically spaced from each other centering on the display unit 310 in-between, the inlet passages 700 are provided to a middle part, an upper part, and a lower part of the space between the case 200 and the front panels 400 in correspondence to the movements of the front panels 400, respectively.

[0117] In particular, the inlet passages 700 are configured in a manner of diverging from the middle part of the space between the case 200 and the front panels 400 toward the upper and lower parts of the space. So, it is able to introduce a sufficient quantity of the indoor air into a space between the front panels 400.

[0118] In more particular, the inlet passages 700 are configured to diverge upward and downward across the whole middle part (left end to right end) of the space between the case and the front panels 400 in correspondence to the movements of the front panels 400 and across the whole upper and lower parts (left end to right end) of the case 200.

[0119] In this case, both lateral sides of the space between the case 200 and the front panel 400 are preferably closed in case of a forward movement of the front panel 400.

[0120] According to another embodiment of the present invention, in case that a pair of the front panels 400 are provided to be horizontally spaced apart from each other, the inlet passage 700 can be provided to a middle part and a lateral part of the space between the case 200 and the front panel 400 in correspondence to a forward/backward movement of the front panel 400.

[0121] In the present invention, the heat exchange

passage 800 means a passage that induces heat exchange of an indoor air, which has been introduced into the case 200 via the inlet passage 700 and then passes through the heat exchanger 210 provided within the case 200.

[0122] If the front panel 400 moves forward to open the inlet passage 700, the heat exchange passage 800 is configured by the front frame 300 in rear of the air inlet 320 and the case 200.

[0123] In particular, in the heat exchange passage 800, the heat exchanger 210 is vertically installed and the middle part of the heat exchanger 210 has the prescribed shape. So, the heat-exchanged air having been introduced from the front can be more smoothly blown in upward and downward slant directions.

[0124] Meanwhile, in the present invention, the outlet passage 900 means a passage to blow the air, which has been air-conditioned via the heat exchange passage 800, into the indoor space again.

[0125] The outlet passage 900 is opened/closed by the outlet unit 600 provided to the upper and lower parts of the case 200. And, the outlet passage 900 is configured by the air outlet 620 constructed with the front frame 300 and the case 200 assembled together.

Besides, unexplained reference numbers 297, 523, 524, 1000, 1010, 1100, 1110, 1120, and 1150 in the drawings are a mounting hanger, a fixing projection, a hanging sill, an opening/closing guide, an insertion hole, a driving motor fixing part, a body, an accommodating part, and a loading leg, respectively.

[0127] As mentioned in the foregoing description, the above-configured air conditioner according to the present invention is operated in a following manner.

[0128] First of all, a plurality of the separated front panels 400 are horizontally moved back and forth by the driving unit 500. And, indoor air is introduced into the case 200 via the air inlet 320 provided to the front side of the front frame 300 in correspondence to the movements of the front panels 400.

[0129] In this case, when the front panels 400 are moved forward, a plurality of the inlet passages 700 provided to the space between the front panels 400 and the front frame 300 play a role as a passage for introducing the indoor air into the air inlet 320.

[0130] So, since a plurality of the inlet passages 700 are opened/closed by the movements of the separated front panels 400, it is able to air-condition a sufficient quantity of the indoor air. By moving a plurality of the front panels 400 back and forth selectively, it is able to efficiently control the passages in various modes including a heating mode, a cooling mode, and other modes (sleeping mode, leaving-house mode, etc.).

[0131] Specifically, since the driving unit 500 includes the pinion gear 521 and the rack rail 522 connected to the front panel 400, the front panel 40 can be stably moved back and forth without fluctuation despite the intake flowing of the air.

[0132] In case that the indoor air introduced via the

inlet passage 700 in front of the case 200 is discharged via the air outlets 620 provided to the top and bottom of the case 200, even spreading of the blown air can be induced without limitation put on the installation height of the air conditioner in case of the cooling/heating operation.

[0133] Meanwhile, if the middle part of the heat exchanger 210 provided within the case 200 configures a prescribed shape, the intake indoor air can be more smoothly blown out in upward and downward directions owing to the reduced flowing resistance within the heat exchange passage 800.

[0134] Moreover, the outlet panel 610 is rotationally moved toward a front/rear of the case 200 to open/close the outlet passage 900. So, the outlet panel 610 can remove the user's unpleasantness by indirectly blowing warm air without interrupting front air introduction in case of heating operation.

[0135] Besides, the outlet unit 600 is elastically loaded by pressurizing and fixing the blowing fan bearing part 221 via the elastic piece 670. So, the locking members for supporting the bearing part 212 are reduced to facilitate air conditioner manufacturing.

[0136] And, a plurality of the dewdrop fall preventing recesses 611 are formed by cutting the backside of the outlet panel 610 to be spaced apart from each other in a horizontal direction. So, dewdrops are received in the dewdrop fall preventing recesses 611 and then evaporate, whereby an inner space can be maintained clean.

[0137] In particular, the dewdrop fall preventing recesses 611 are configured to gradually reduce their depths downwardly by considering a considerable quantity of dewdrops on the outlet panel 610 without weakening rigidity of the outlet panel 610 considerably.

[0138] Furthermore, a plurality of the drain guide rails 1800 are provided between the heat exchanger 210 and the drain pan 1700 along the backside of the case 200. And, the water splash preventing sill 1833 is rounded and projected below the drain hole 1811. Hence, the condensed water discharged via the drain hole 1811 of the upper drain guide rail 1830 can be prevented from being spread wide.

[0139] Accordingly, the present invention provides the following effects or advantages.

[0140] First of all, a quantity of indoor air for heat exchange can be sufficiently secured. An installation height of an air conditioner is not considerably restricted. Even spreading of air blown in a cooling/heating operation can be induced. A warm air can be indirectly discharged in a heating operation without interruption of front air introduction. And, a sufficient quantity of air can be sucked in via a plurality of air inlets.

[0141] Secondly, since an outlet panel is rotationally moved in front of an air outlet to open/close an outlet passage, air is blown out toward a rear of a case along a backside of the outlet panel. So, warm air is indirectly blown out without front air introduction to eliminate user's unpleasantness.

[0142] Thirdly, a plurality of drain guide rails are arranged along a backside of a case between a heat exchanger and a drain pan. And, a water splash preventing sill is rounded and projected under a drain hole. So, a condensed water discharged from the drain hole of an upper drain guide rail is not spread wide.

[0143] Fourthly, an elastic piece provided to a bearing cover part of an outlet unit pressurizes and elastically fixes a blowing fan bearing unit thereto. So, a locking member for supporting the bearing unit is reduced to facilitate air conditioner manufacturing.

[0144] Fifthly, a plurality of dewdrop fall preventing recesses are formed by cutting a backside of an outlet panel to be spaced apart from each other in a horizontal direction. So, dewdrops are received in the dewdrop fall preventing recesses and then evaporate, whereby an inner space can be maintained clean.

[0145] While the present invention has been described and illustrated herein with reference to the preferred embodiments thereof, it will be apparent to those skilled in the art that various modifications and variations can be made therein without departing from the spirit and scope of the invention. Thus, it is intended that the present invention covers the modifications and variations of this invention that come within the scope of the appended claims and their equivalents.

Claims

1. An air conditioner comprising:

a case having a heat exchanger and a blowing fan;
at least one front panel configured in front of the case to open/close at least one air inlet;
at least one air outlet provided to a top and/or bottom of the case; and
an outlet unit opening/closing the at least one air outlet to enable an air to be discharged toward a rear of the case along a backside of an outlet panel from an inside of the case.

2. The air conditioner of claim 1, wherein the outlet panel is rotationally moved by drawing an arc.

3. The air conditioner of claim 1, wherein the outlet panel is rotationally moved in front of the at least one air outlet.

4. The air conditioner of claim 1, wherein the at least one air outlet is provided to a front portion of the top and/or bottom of the case.

5. The air conditioner of claim 1, wherein a sealing recess is formed by cutting a rear portion of the top and/or bottom of the case to enable the outlet panel to land on the sealing recess in case of closing the

- outlet panel.
6. The air conditioner of claim 1, wherein the outlet unit is provided with an outlet panel guide part cut to guide an end portion of the outlet panel. 5
 7. The air conditioner of claim 6, wherein the outlet panel shields an inner space of the outlet panel guide part in case of being closed. 10
 8. The air conditioner of claim 1, wherein the outlet unit is detachable in a direction vertical to the case. 15
 9. The air conditioner of claim 1, wherein the at least one front panel moves back and forth to open/close the at least one air inlet. 20
 10. The air conditioner of claim 1, further comprising:
 - a drain pan provided under the heat exchanger to handle a condensed water; and 25
 - at least one or more drain guide rails provided along a backside of the case to communicate with the inside of the case, the at least one or more drain guide rails vertically spaced apart from each other. 30
 11. The air conditioner of claim 10, wherein the drain guide rail provided to an upper position is configured larger than the drain guide rail provided to a lower position. 35
 12. The air conditioner of claim 10, wherein a drain hole is provided to an end portion of one side of the at least one drain guide rail to communicate with the inside of the case. 40
 13. The air conditioner of claim 10, wherein a water splash preventing cover is provided to a drain hole provided to an end portion of one side of an upper one of the at least one or more drain guide rails to communicate with the inside of the case. 45
 14. The air conditioner of claim 13, wherein the water splash preventing cover is provided with a water splash preventing sill rounded and projected forward below the drain hole. 50
 15. The air conditioner of claim 13, wherein the water splash preventing cover is provided with drain guide parts respectively projected downward from both side end portions of the drain hole. 55
 16. The air conditioner of claim 15, wherein a gap between the drain guide parts is gradually reduced downwardly.
 17. The air conditioner of claim 10, wherein the drain pan is formed in one body of the outlet unit provided to a lower part of the case.
 18. The air conditioner of claim 1, wherein the outlet unit is provided with a bearing cover part loaded by pressurizing and fixing a bearing part for the blowing fan and an outlet part opening/closing the at least one air outlet.
 19. The air conditioner of claim 18, wherein an accommodating recess is formed by cutting the bearing cover part to cover the bearing part.
 20. The air conditioner of claim 18, wherein an elastic piece is provided to the bearing cover part to be assembled to the case.
 21. The air conditioner of claim 20, wherein a locking hole is provided to a portion of the case corresponding to the elastic piece.
 22. The air conditioner of claim 21, wherein the elastic piece is provided with an insertion part inserted in the locking hole and a hanging sill part projected to land on an upper side of the locking hole.
 23. The air conditioner of claim 22, wherein the elastic piece is further provided with a grip part extending forward from the hanging sill part.
 24. The air conditioner of claim 18, wherein a hanging part for fixing a cable thereto is provided to a cover part covering a driving motor for the blowing fan.
 25. The air conditioner of claim 18, wherein the at least one front panel opens/closes the air inlet by moving back and forth.
 26. The air conditioner of claim 1, wherein the outlet unit is provided with the outlet panel to open/close the at least one air outlet, wherein a front side of the outlet panel is plain, and wherein at least one or more dewdrop fall preventing recesses are provided to a backside of the outlet panel.
 27. The air conditioner of claim 26, wherein the at least one or more dewdrop fall preventing recesses are plurally provided in a direction vertical to a course of the blown air.
 28. The air conditioner of claim 26, wherein the at least one or more dewdrop fall preventing recesses are plurally provided in a horizontal direction.
 29. The air conditioner of claim 27, wherein the at least one or more dewdrop fall preventing recesses are configured to be gradually reduced downwardly in depth.

30. The air conditioner of claim 26, wherein the at least one or more dewdrop fall preventing recesses are configured to be gradually reduced downwardly in width.
- 5
31. The air conditioner of claim 26, wherein the at least one or more dewdrop fall preventing recesses are configured to be gradually reduced downwardly in both width and depth.
- 10
32. The air conditioner of claim 26, wherein a cross-section of each of the at least one or more dewdrop fall preventing recesses has a shape of an upper-side open quadrangle.
- 15
33. The air conditioner of claim 26, wherein a cross-section of each of the at least one or more dewdrop fall preventing recesses has a shape of an upper-side open semi-circle.
- 20
34. The air conditioner of claim 26, wherein the at least one or more dewdrop fall preventing recesses are provided to the backside of the outlet panel.
- 25
35. The air conditioner of claim 26, wherein the at least one front panel opens/closes the air inlet by moving back and forth.

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FIG. 1

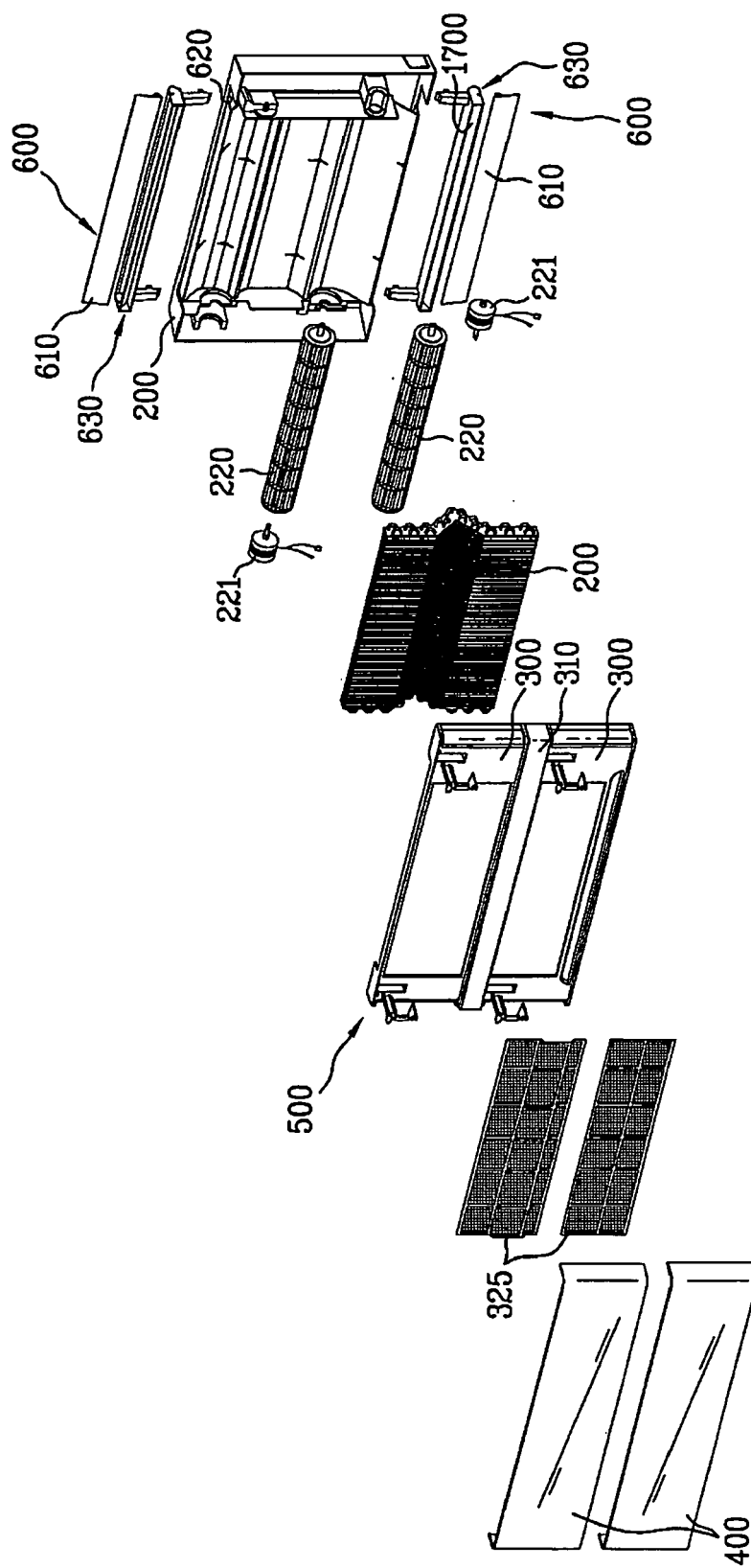


FIG. 2

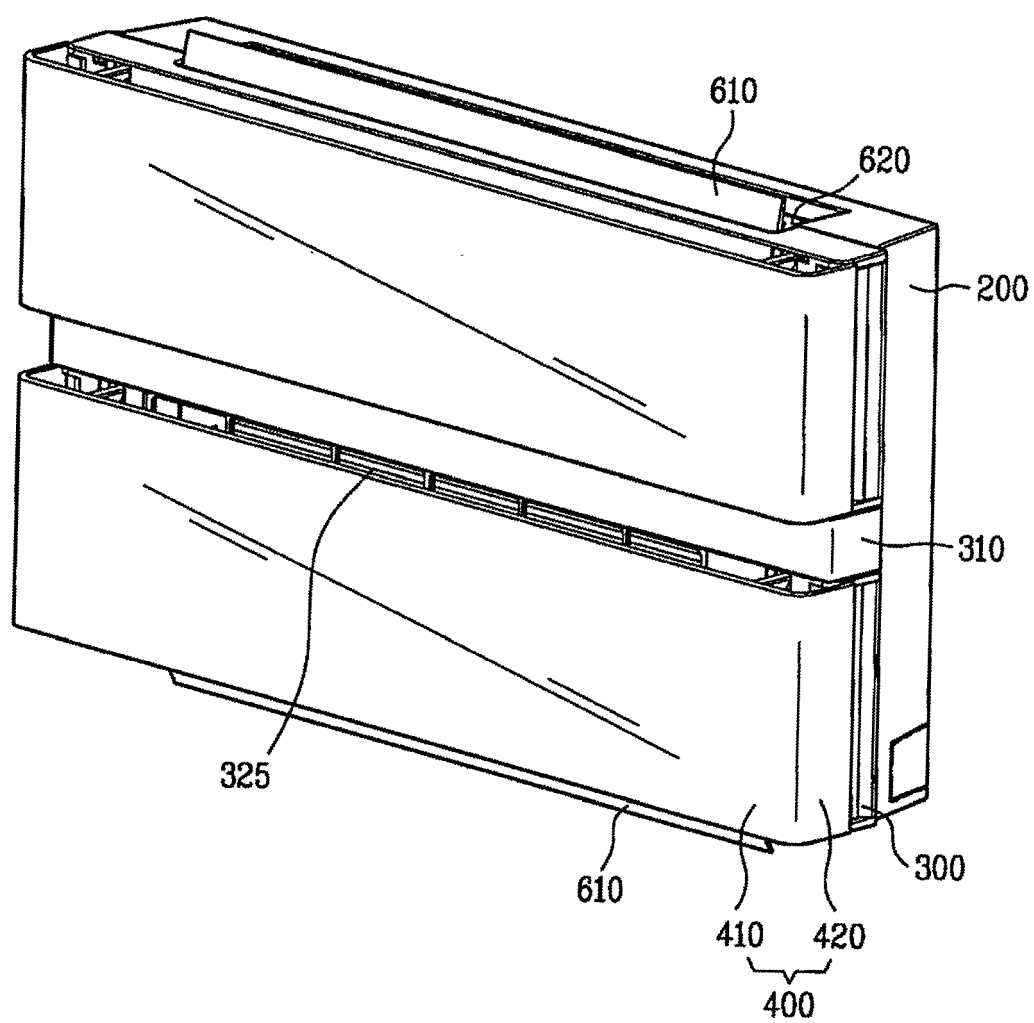


FIG. 3

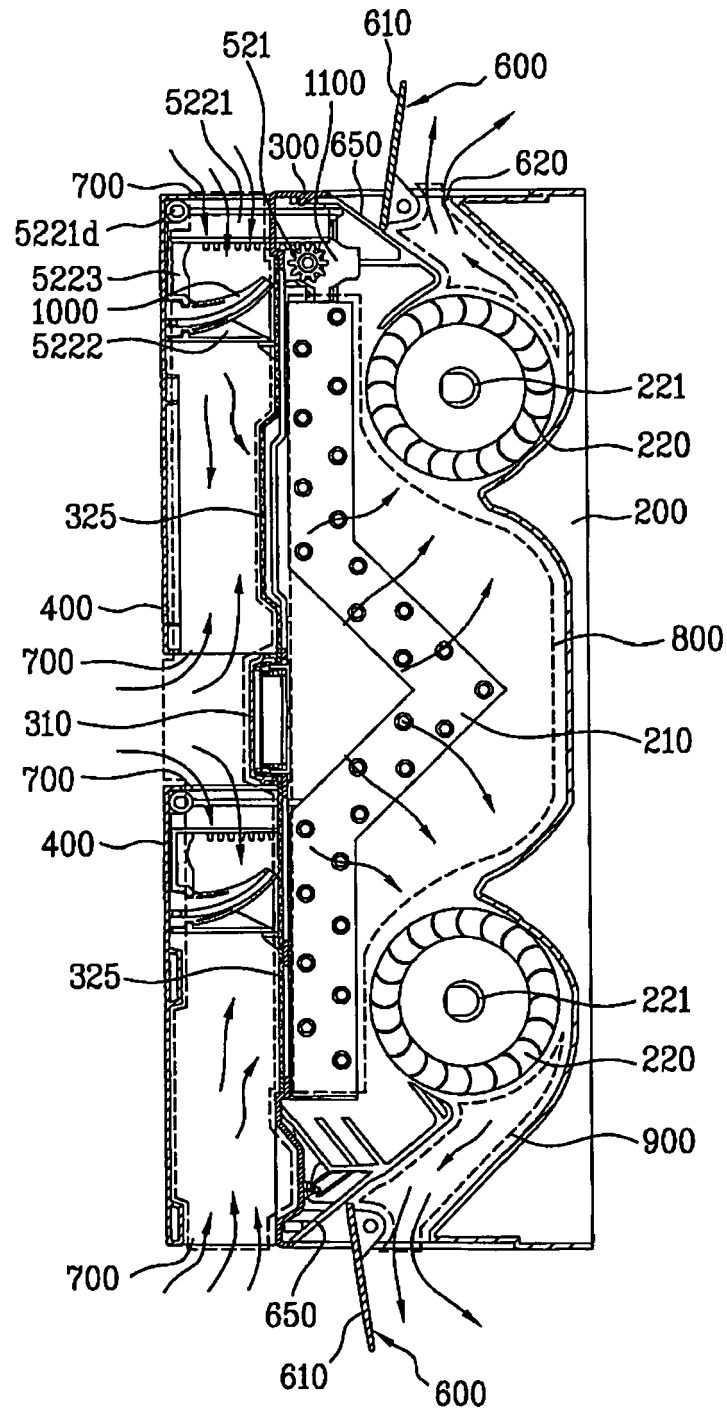


FIG. 4

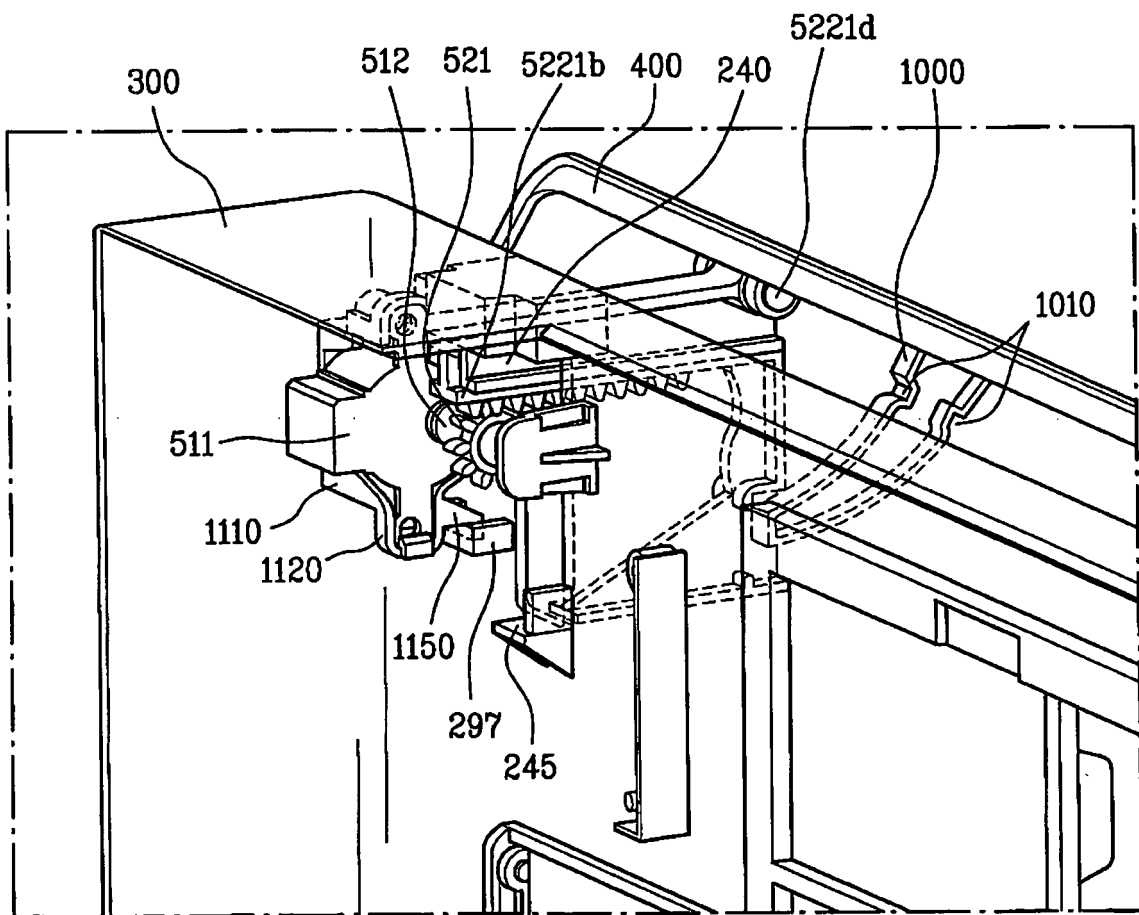


FIG. 5

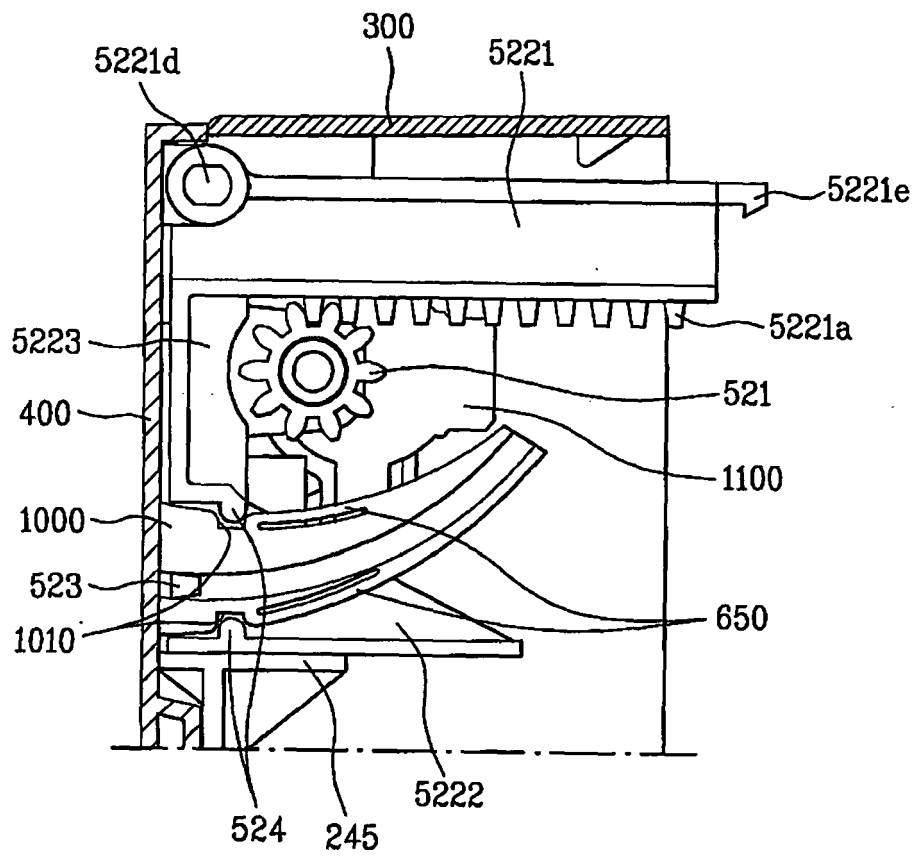


FIG. 6

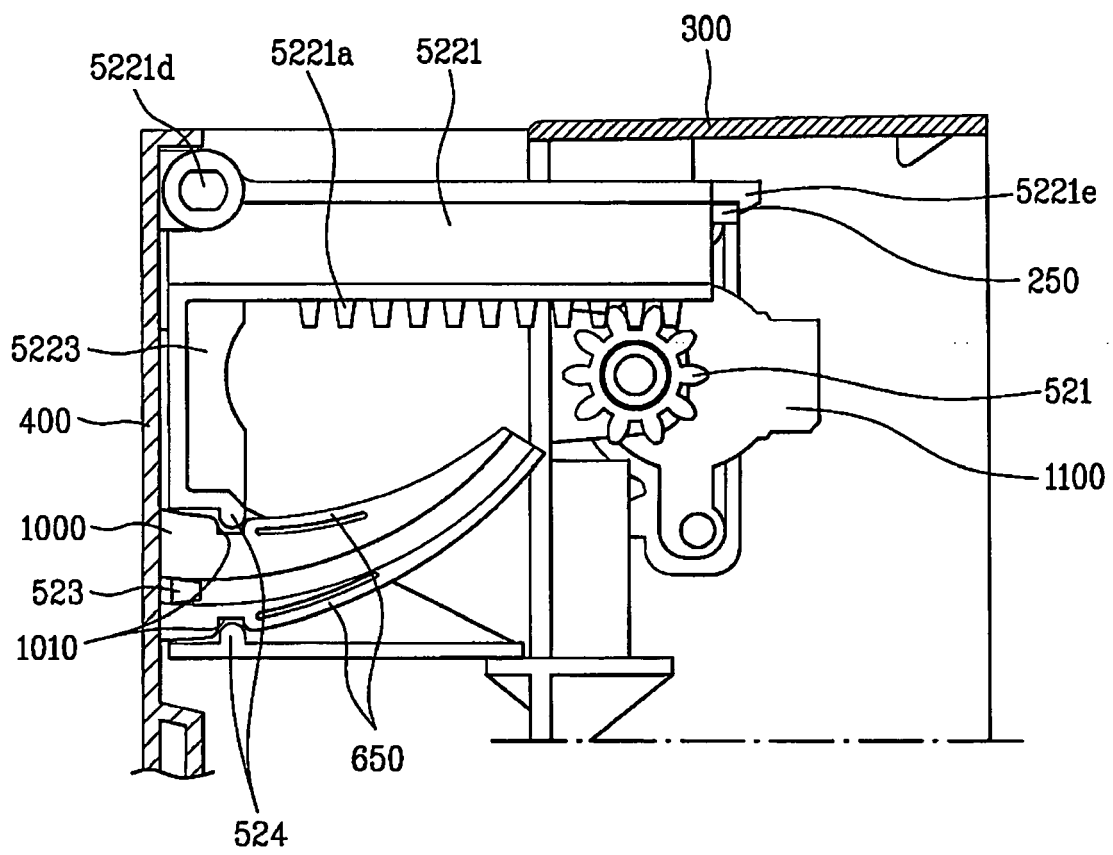


FIG. 7

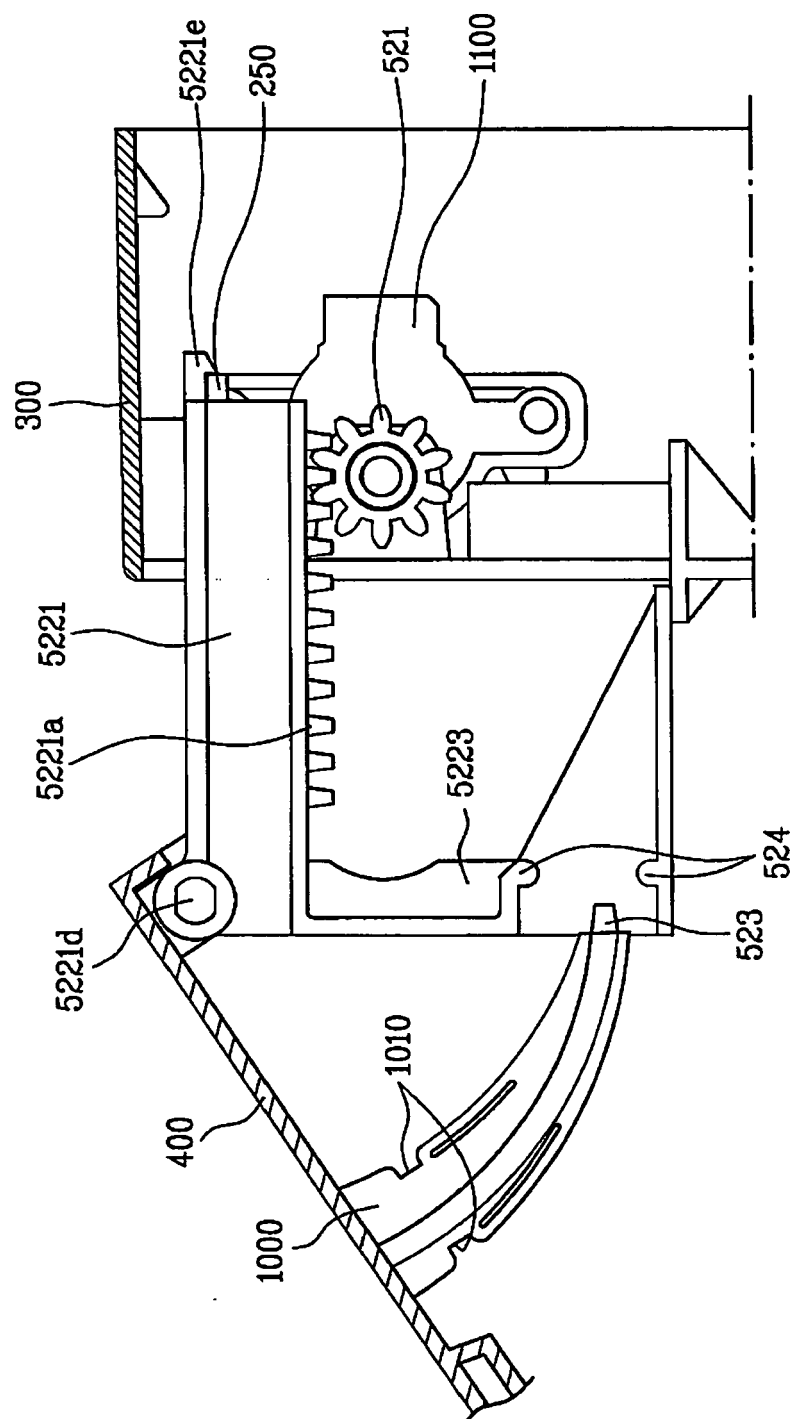
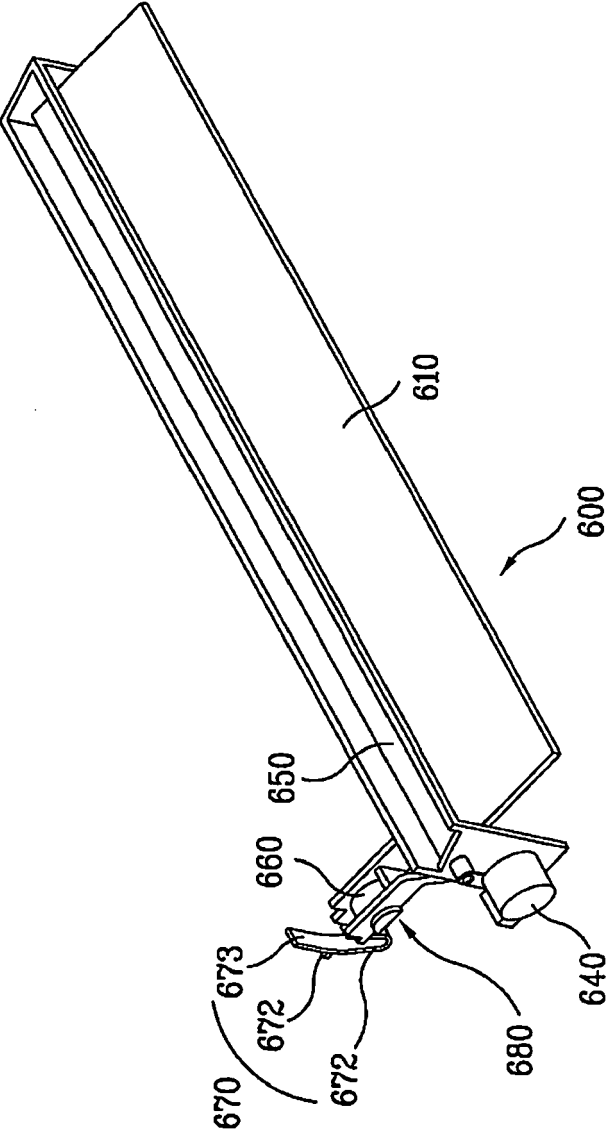


FIG. 8



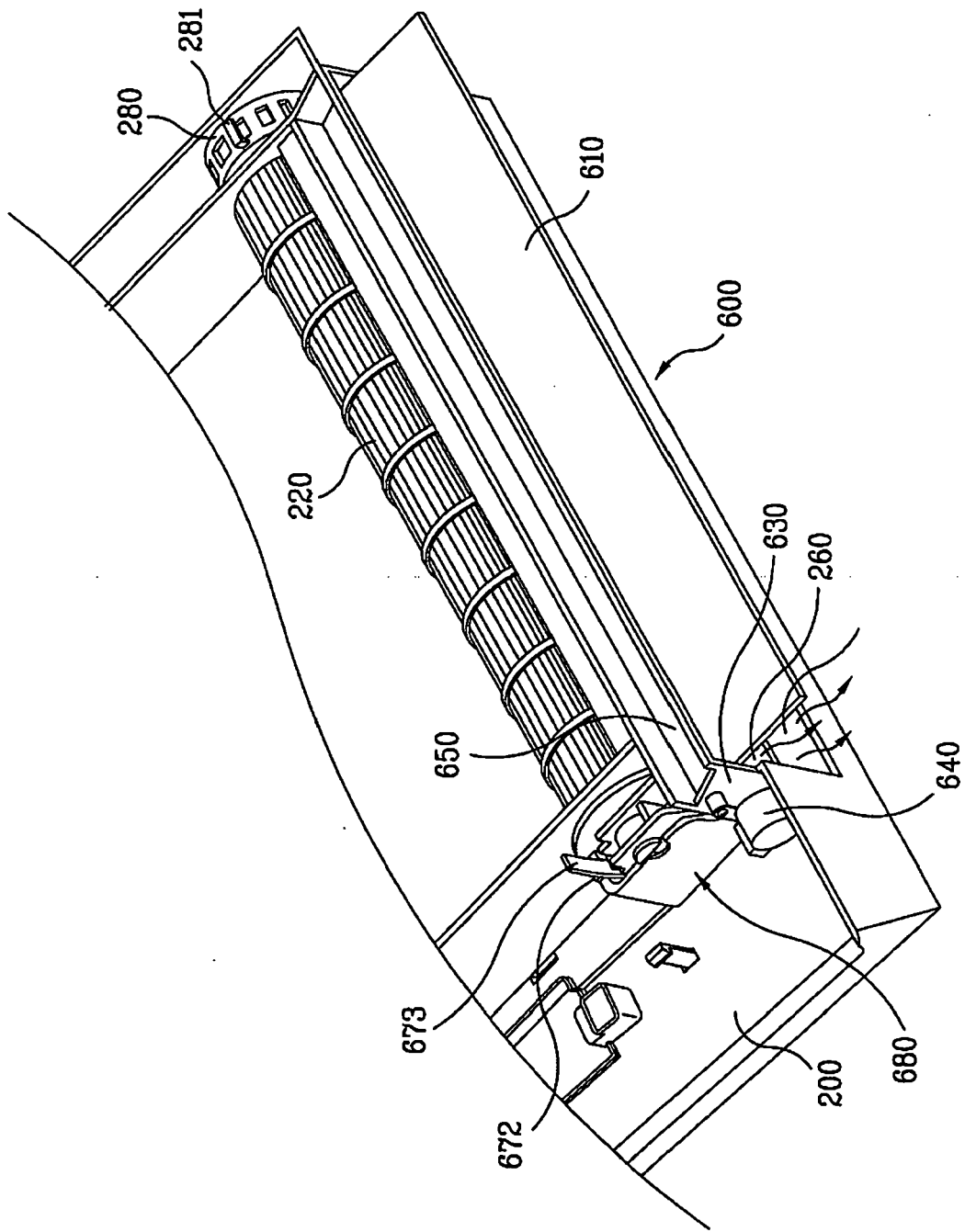


FIG. 9

FIG. 10

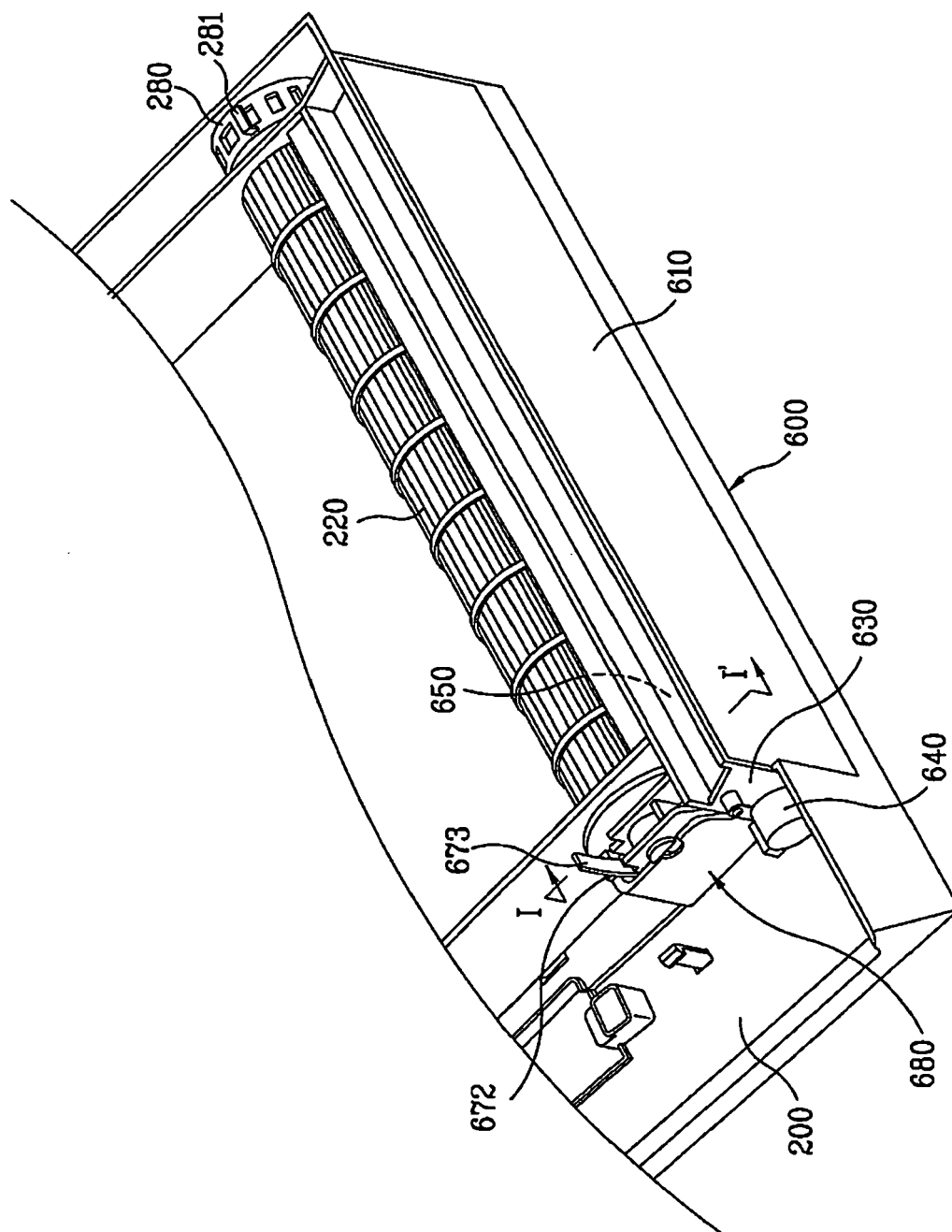
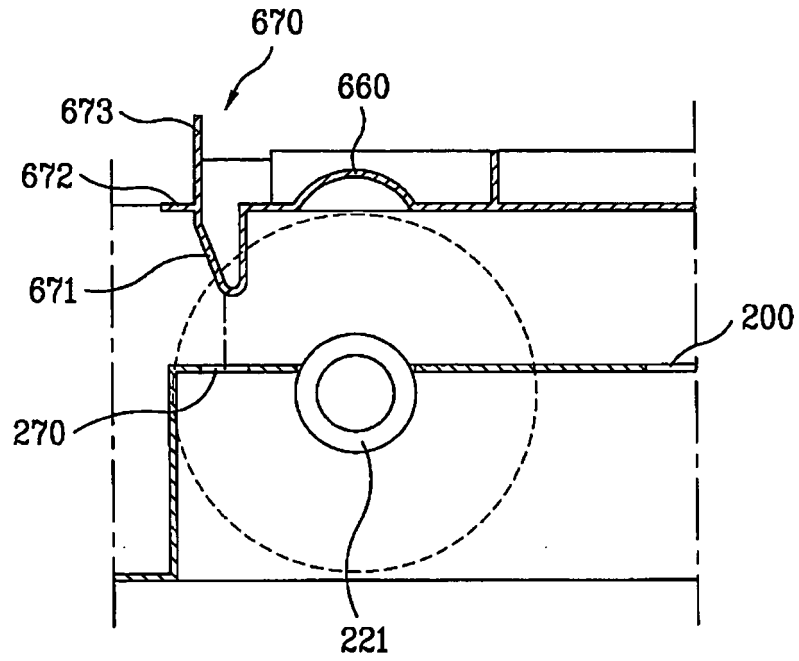


FIG. 11

(a)



(b)

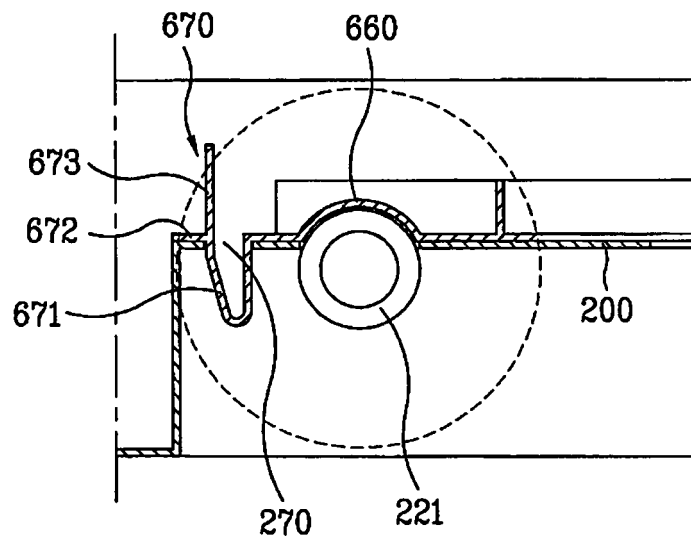


FIG. 12

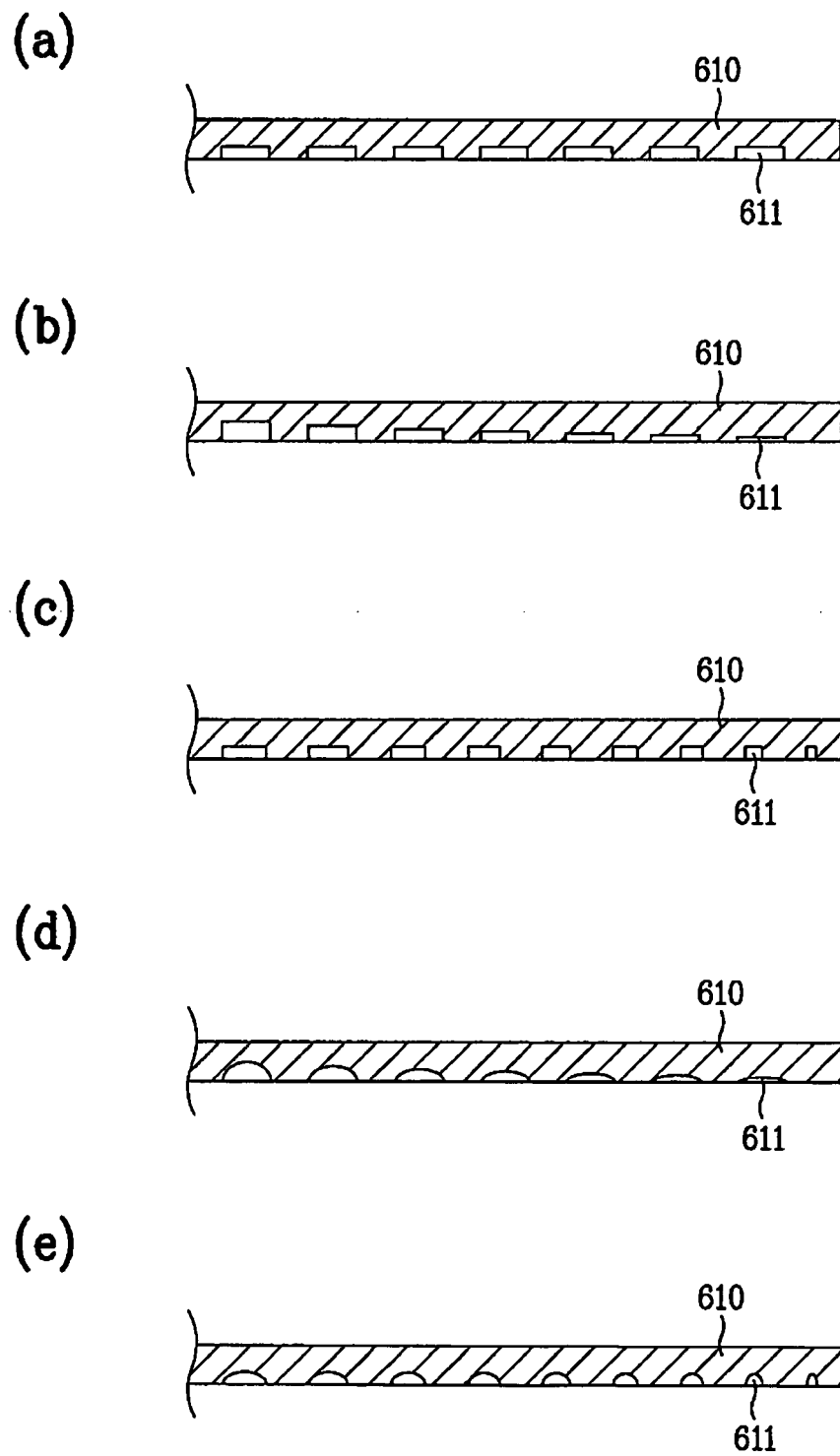


FIG. 13

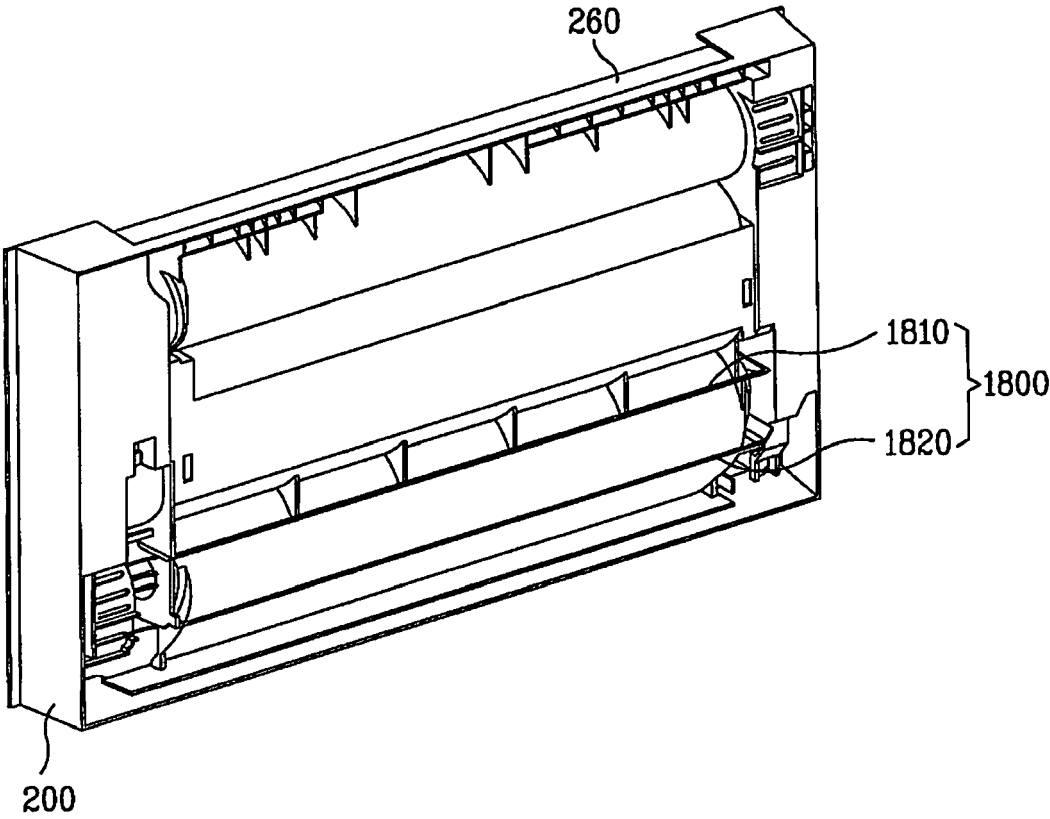


FIG. 14

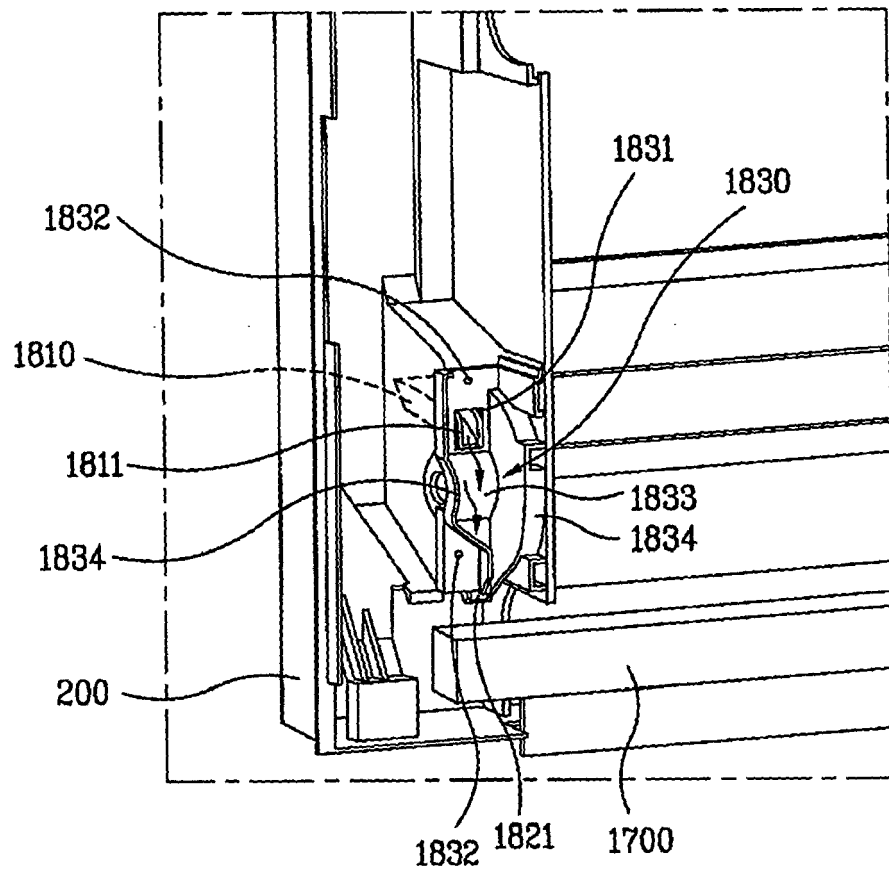


FIG. 15

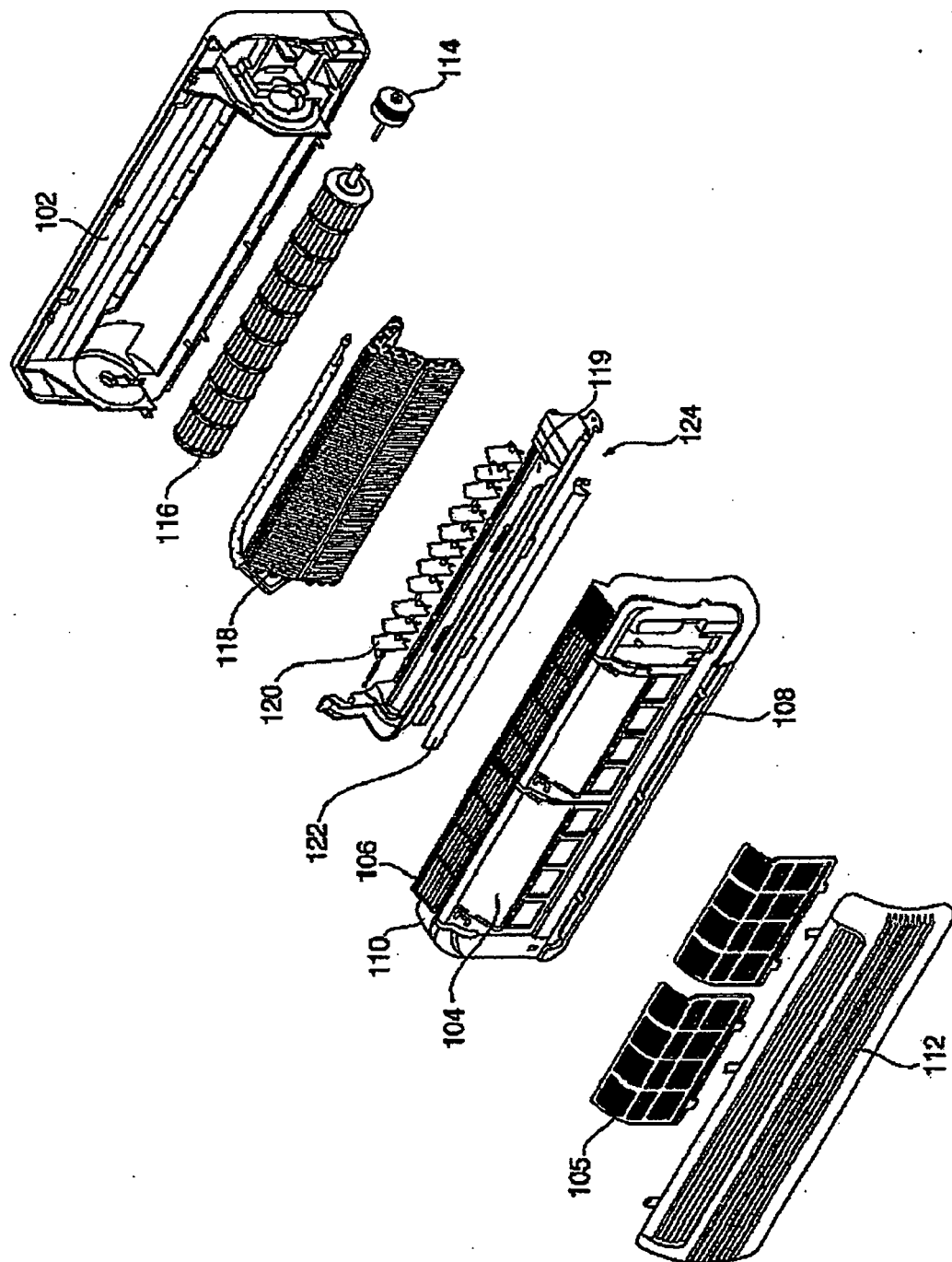
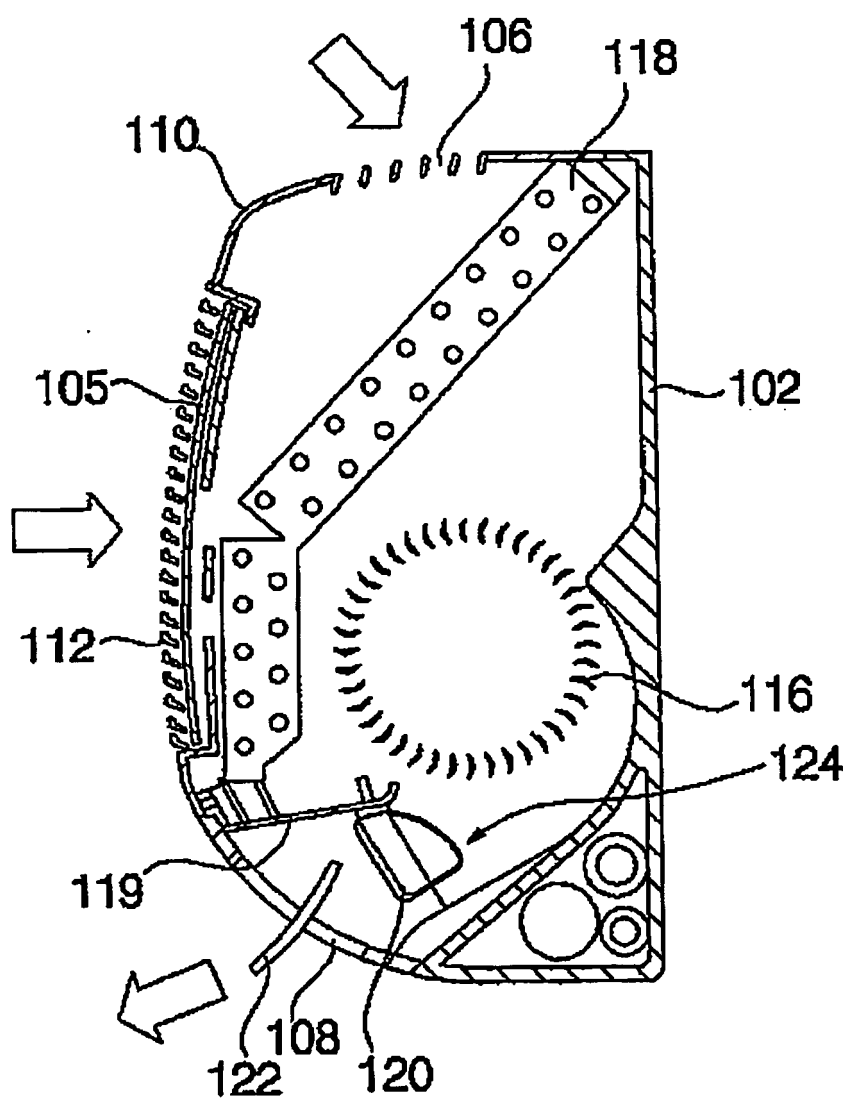


FIG. 16





European Patent
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EUROPEAN SEARCH REPORT

Application Number
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Place of search Munich		Date of completion of the search 22 February 2008	Examiner Decking, Oliver
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22-02-2008

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