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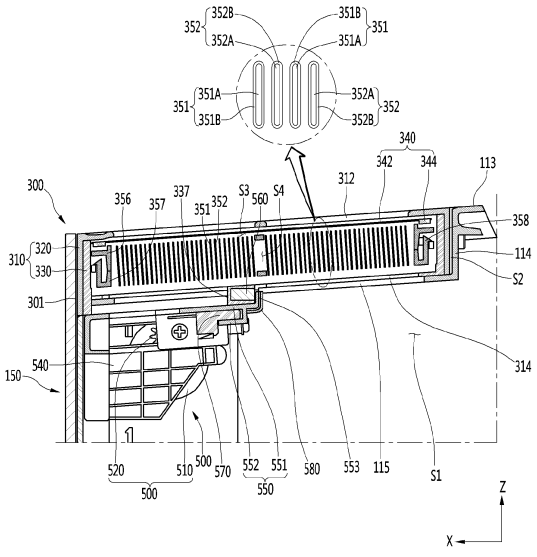
(54) AIR CONDITIONER

(57) Provide is an air conditioner. The air conditioner includes a filter assembly (300) disposed in an air suction hole (S2) that is lengthily defined in the air conditioner in a left-right direction and a pair of moving mechanisms (500) configured to allow the filter assembly (300) to move forward and backward in a direction crossing a longitudinal direction of the filter assembly (300). The pair of moving mechanisms (500) includes a motor (510) and a rack (530) configured to move forward and backward by the motor (510). The filter assembly (300) is withdrawn forward from the air conditioner when the motor (510) operates, and the filter assembly (300) is inserted into the air conditioner when the motor (510) operates reversely.

Fig.10



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Description

BACKGROUND

[0001] The present disclosure relates to an air conditioner.

[0002] Air conditioners are apparatuses that maintain air in a door space to the most proper state according to use and purpose thereof.

[0003] Such an air conditioner may be classified into an upright type, a wall-mounted type, or a ceiling type according to its installation position. The upright air conditioner may be understood as a type of air conditioner, which is installed to be erected in an indoor space, the wall-mounted type air conditioner may be understood as a type of air conditioner, which is installed to be attached to a wall surface. Also, the ceiling type air conditioner may be understood as a type of air conditioner, which is installed on a ceiling.

[0004] The air conditioner may be a cooler for cooling a predetermined space, a heater for hating a predetermined space, an air conditioner for cooling or heating a predetermined space, and a cleaner for cleaning air within a predetermined space. The function of the air conditioner may be determined according to a type of an air conditioning unit installed in the air conditioner.

[0005] The air conditioner may include a compressor, a condenser, an expansion device, and an evaporator to drive a refrigerant cycle in which compression, condensation, expansion, and evaporation processes of a refrigerant are performed, thereby cooling or heating a predetermined space.

[0006] The air conditioner may include an electric heater, and current may be applied to the electric heater to heat the predetermined space.

[0007] The air conditioner may include a cleaning unit such as a filter unit and may purify air in the predetermined space. Such a filter unit may be provided as a filter assembly including a plurality of members, and the filter assembly may include a filter and a filter case from which the filter is detached and which protects the filter.

[0008] In the air conditioner, when the filter case in which the filter is disposed moves to the outside together with the filter, the filter may be easily cleaned. Also, when the air conditioner further includes a moving part that allows the filter case to slidably move to the outside of the air conditioner, the user may hold the filter case moving to the outside of an air suction hole to withdraw the filter from the air conditioner, thereby more easily cleaning the filter.

[0009] As described above, an example of the air conditioner including the filter, the filter case, and the moving part is disclosed in Korean Patent Publication No. 10-2009-0084473 A (Published August 05, 2009).

[0010] The moving part includes a driving motor in which a pinion gear part is connected to a rotation shaft, a pair of carriers on which a rack gear part engaged with the pinion gear part is disposed and which are disposed to slidably move toward an air suction hole, and guide rails guiding the pair of carrier to be slidably movable.

[0011] The air conditioner including the moving part further includes a manipulation part such as a remote controller manipulated by a user and a controller allowing the driving motor to operate so that the filter case is withdrawn to the outside together with some of the carriers when the manipulation part is manipulated.

[Prior Art Document]

[Patent Document]

[0012] Korean Patent Publication No. 10-06609681 (Published on December 26, 2006)

SUMMARY

[0013] Embodiments provide an air conditioner that is capable of preventing a filter assembly from being incorrectly mounted.

[0014] Embodiments also provide an air conditioner in which a filter assembly reliably moves to a set position.

[0015] Embodiments also provide an air conditioner in which a user is capable of easily placing a filter assembly.

[0016] In one embodiment, an air conditioner includes: a filter assembly disposed in an air suction hole that is lengthily defined in the air conditioner in a left-right direction; and a pair of moving mechanisms configured to allow the filter assembly to move forward and backward in a direction crossing a longitudinal direction of the filter assembly.

[0017] The pair of moving mechanisms may include: a motor; and a rack configured to move forward and backward by the motor.

[0018] The filter assembly may be withdrawn forward from the air conditioner when the motor operates, and the filter assembly may be inserted into the air conditioner when the motor operates reversely.

[0019] The air conditioner may further include: a case in which the filter assembly is accommodated; a front panel disposed on the case; and a driving mechanism configured to elevate the front panel to a plurality of positions.

[0020] The pair of moving mechanisms and the driving mechanism may be interlocked with each other.

[0021] The plurality of positions may include: a first position at which the front panel covers a front surface of the filter assembly; and a second position at which the front panel exposes the front surface of the filter assembly.

[0022] The second position may be relatively lower than the first position.

[0023] The pair of moving mechanisms may allow the filter assembly to move forward and backward while the front panel is disposed at the second position.

[0024] A front discharge hole, which is opened in a front-rear direction, may be defined in a lower portion of

a front surface of the case.

[0025] Each of the first position and the second position may be a position at which the front panel covers the front discharge hole.

[0026] The plurality of positions may further include a third position at which the front panel opens the front discharge hole and covers the front surface of the filter assembly.

[0027] The air conditioner may further include an accommodation body in which the air suction hole is defined, and the filter assembly is accommodated.

[0028] Each of front and top surfaces of the accommodation body may be opened, and the filter assembly may be withdrawn forward or upward.

[0029] The air conditioner may further include a carrier on which the filter assembly is placed and to which the moving mechanism is connected.

[0030] When the carrier operates in a backward movement mode, the filter assembly may move backward so that the filter assembly is accommodated in the accommodation body, and the filter assembly may reliably move to a set position within the accommodation body.

[0031] An opening through which air passes may be defined in a lower portion of the accommodation body. The carrier may be movably disposed in the carrier. A length of the opening in a front-rear direction may be greater than a length of the carrier in the front-rear direction.

[0032] The air conditioner may further include a supply terminal disposed on the accommodation body.

[0033] The filter assembly may include an electric filter. The electric filter may include an electrode terminal that is connected to or disconnected from the supply terminal.

[0034] The moving mechanism may be connected to the carrier to allow the carrier to move backward.

[0035] When the moving mechanism moves backward, the moving mechanism may allow the carrier to move to a connection position at which the electrode terminal is connected to the supply terminal. The connection position may be the set position and also a normal mounting position or a mounting completion position at which the mounting of the filter assembly is normally completed.

[0036] The moving mechanism may further include a driving gear connected to a motor and engaged with a rack. The rack may be disposed on a gear member connected to the carrier.

[0037] In another embodiment, an air conditioner may include: a magnet disposed on a filter assembly; a magnet sensor disposed on a carrier to sense the magnet; and a controller configured to control a moving mechanism to a backward movement mode when the magnet is sensed by the magnet sensor.

[0038] When a user places the filter assembly in a direction opposite to a predetermined direction such as the placing of the filter assembly upside down in a front-rear direction or a left-right direction, in the air conditioner, the filter assembly may stand by without moving backward, incorrect mounting of the filter assembly may be prevented. Also, an operation of the air conditioner in the state in which the filter assembly is incorrectly mounted may be minimized.

[0039] The air conditioner may further include a magnetic body that is attracted to the magnet. The magnetic body may be a paramagnetic body. The carrier may be a nonmagnetic body.

[0040] The moving mechanism may further include a sliding guide that guides the carrier.

[0041] An opening may be defined between the gear member and the carrier. The opening may be opened in the forward and backward movement direction of the carrier.

[0042] The sliding guide may include a guide body through which the opening is guided, and the guide body may guide the forward and backward movement of the carrier and the driven gear.

[0043] The sliding guide may further include a guide rail spaced apart from the guide body to guide a lower end of the gear member.

[0044] The carrier may include a seating body on which the filter assembly is placed and a stopper extending from the seating body and allowing the filter assembly to be hooked in a rear direction.

[0045] When the user performs a simple operation of placing a portion of the filter assembly at a fixed position on the carrier, since the carrier allows the filter assembly to move to the set position, the user may not need to insert the whole of the filter assembly into the accommodation body, and thus, the user may more easily mount the filter assembly.

[0046] The carrier may further include a sensor accommodation body in which the magnet sensor is accommodated.

[0047] In this case, the carrier may also function to carry the filter assembly and support the magnet sensor, and the number of components of the air conditioner may be minimized.

[0048] The sensor accommodation body may be disposed below the seating body.

[0049] A size of the seating body may be greater than a size of the sensor accommodation body.

[0050] The air conditioner may further include a magnetic body disposed on a rear surface of the stopper and attracted to the magnet.

[0051] According to the embodiment, the pair of moving mechanisms may allow the filter assembly to move forward and backward, and thus, the entire filter assembly that is elongated in the left-right direction may more stably move.

[0052] Also, when the filter assembly is placed at the position at which the magnet sensor senses the magnet, the carrier may allow the filter assembly to move backward, thereby preventing the filter assembly from being incorrectly mounted. Also, the operation of the air conditioner in the state in which the filter assembly is incorrectly mounted may be minimized.

[0053] Also, in the backward movement mode of the

carrier, the carrier may allow the filter assembly to move to the set position within the accommodation body and allow the filter assembly to the set position with the higher reliability than when the user places the filter assembly at the set position.

[0054] When the user performs the simple operation of placing the portion of the filter assembly at a fixed position on the carrier, since the carrier allows the filter assembly to move to the set position, the user may not need to insert the whole of the filter assembly into the accommodation body, and thus, the user may more easily mount the filter assembly.

[0055] Also, since the carrier is movably disposed in the opening, it may be more compact when all of the carrier move upward and downward from the opening.

[0056] Also, since the carrier includes the seating body and the sensor accommodation body, the carrier may also function to carry the filter assembly and support the magnet sensor, and the number of components of the air conditioner may be minimized.

[0057] Also, the sensor accommodation body is disposed under the seating body so that the magnet sensor and the sensor accommodation body are protected by the seating body.

[0058] Also, the size of the seating body may be greater than that of the sensor accommodation body, and thus, the foreign substances such as the dust may be minimized to be accumulated on the surface of the magnet sensor or between the sensor accommodation body and the magnet sensor, and the magnet sensor may be maintained in the cleaned clean.

[0059] Also, the carrier may be made of the nonmagnetic material, and the sensing accuracy of the magnet sensor may be high.

[0060] Also, the motor may be mounted on the sliding guide that guides the carrier, and thus, the number of components may be minimized when the motor is mounted on the separate motor mounter.

[0061] Also, since the opening defined between the gear member and the carrier is guided by the guide body of the sliding guide, each of the gear member and the carrier may be guided by one guide body, and the number of components may be minimized to simply the structure when compared to the case in which the gear member and the carrier may be respectively guided to the different guide bodies.

[0062] Also, since the gear member is guided to the sliding guide and the guide rail, the gear member and the carrier may be more slidably move.

[0063] Also, the attractive force is applied between the magnet and the magnet disposed on the carrier to assist the location of the filter assembly, on which the magnet is disposed, at the fixed position on the carrier to prevent the filter assembly from being mislocated when the carrier moves.

[0064] Also, the magnetic body may be made of the paramagnetic body, and thus, the malfunction of the magnet sensor may be minimized.

[0065] Also, the stopper may determine the fixed of the filter assembly and limit the excessive insertion of the filter assembly.

[0066] Also, the magnetic body may be disposed on the rear surface of the stopper, and thus, the filter assembly on which the magnet is mounted may be induced to be hooked with the front surface of the stopper.

[0067] Also, in the backward movement mode of the moving mechanism, the moving mechanism may allow the carrier and the filter assembly to move backward to the connection position at which the electrode terminal is connected to the supply terminal, and the air conditioner may connect the electrode terminal to the supply terminal so that the air is cleaned by the electric filter.

[0068] The details of one or more embodiments are set forth in the accompanying drawings and the description below. Other features will be apparent from the description and drawings, and from the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0069]

FIG. 1 is a view illustrating a state in which an air conditioner is installed on a wall according to an embodiment.

FIG. 2 is a perspective view of the air conditioner when a case and a front panel are separated from a chassis.

FIG. 3 is an exploded perspective view of the air conditioner according to an embodiment.

FIG. 4 is a bottom view of a filter assembly according to an embodiment.

FIG. 5 is a perspective view when the front panel of FIG. 1 is disposed at a first position.

FIG. 6 is a perspective view when the front panel of FIG. 1 is disposed at a second position.

FIG. 7 is a perspective view when the front panel of FIG. 1 is disposed at a third position.

FIG. 8 is a plan view of the air conditioner according to an embodiment.

FIG. 9 is a cross-sectional view taken along line A-A' of FIG. 8.

FIG. 10 is a cross-sectional view taken along line B-B' of FIG. 8.

FIG. 11 is a bottom view illustrating the inside of a dielectric filter according to an embodiment.

FIG. 12 is a view of a filter assembly and a moving mechanism according to an embodiment.

FIG. 13 is a perspective view illustrating a carrier and a moving mechanism according to an embodiment.

FIG. 14 is a plan view when the filter assembly of FIG. 8 is withdrawn forward.

FIG. 15 is a perspective view when the filter assembly of FIG. 8 is withdrawn forward.

FIG. 16 is a perspective view of a lower case according to an embodiment.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0070] Hereinafter, detailed embodiments will be described in detail with reference to the accompanying drawings.

[0071] FIG. 1 is a view illustrating a state in which an air conditioner is installed on a wall according to an embodiment, FIG. 2 is a perspective view of the air conditioner when a case and a front panel are separated from a chassis, FIG. 3 is an exploded perspective view of the air conditioner according to an embodiment, and FIG. 4 is a bottom view of a filter assembly according to an embodiment.

[0072] An air conditioner 10 of this embodiment may be installed on a wall W.

[0073] The air conditioner 10 may include a chassis 30 and a case 100.

[0074] The air conditioner 10 may be installed on the wall W by an installation plate 20. The installation plate 20 may be a component for fixing the air conditioner 10 to the wall W.

[0075] installation plate 20 may be coupled to wall W, and the chassis 30 may be mounted on the installation plate 20. The installation plate 20 may have a thin plate shape.

[0076] The installation plate 20 may include a central portion coupled to a rear surface of the chassis 30 and both side portions extending downward from both sides of the central portion to support a lower portion of the chassis 30.

[0077] The case 100 may be coupled to the front of the chassis 30. Also, the blower fan 40 may be accommodated between the chassis 30 and the case 100. An inner space S1 may be defined between the chassis 30 and the case 100, and the blower fan 40 may be rotatably accommodated in the inner space S1.

[0078] The chassis 30 may include a plate coupling part 31 coupled to the installation plate 20 and a rear guide 33 extending downward to be rounded from the plate coupling part 31 so as to surround a portion of an outer circumferential surface of the blower fan 40.

[0079] The plate coupling part 31 may have a thin plate shape.

[0080] The rear guide 33 may function as a flow guide for guiding a flow of air discharged from the blower fan 40 toward the discharge hole.

[0081] The blower fan 40 may include a tangential fan. The tangential fan may suction air suctioned from an upper portion of the air conditioner 10 in a circumferential direction to discharge the air in the circumferential direction. An axial direction of the blower fan 40 may be a horizontal direction of the air conditioner 10.

[0082] The blower fan 40 may be rotatably supported at both sides of the chassis 30.

[0083] The chassis 30 may further include two fan support parts 35 supporting both ends of the blower fan 40. The two fan support parts 35 may protrude forward from both sides of the rear guide 33.

[0084] A fan motor 45 driving the blower fan 40 may be installed outside one of the two fan support parts 35. A shaft of the fan motor 45 may be coupled to the blower fan 40 by passing through the fan support parts 35.

[0085] A motor cover 47 may be coupled to fan motor 45. The fan motor 45 may be accommodated in an inner space defined by fan support part 35 and the motor cover 47.

[0086] The chassis 30 may be provided with a controller 50 controlling the air conditioner 10. The controller 50 may be disposed at a side of the fan motor 45 and supported by the case 100. The controller 50 may include a control box 52 defining an outer appearance and a control component disposed in the control box 53 to allow the air conditioner to operate.

[0087] The air conditioner 10 may further include a lower plate 55 defining a lower outer appearance of the air conditioner 10. The lower plate 55 may be disposed below the chassis 30.

[0088] The conditioner may further include an air conditioning unit accommodated in inner space S1. One example of the air conditioning unit may be a heat exchanger 60 through which a refrigerant passes. Another example of the conditioning unit may be a thermoelectric element. Another example of the conditioning unit may be an electric heater.

[0089] Hereinafter, the air conditioner will be described as an example in which the heat exchanger 60 is accommodated in inner space S1. However, the present disclosure is not limited to the heat exchanger 60 accommodated in the inner space S1, and thus, it may be possible that various air conditioning units, such as thermoelectric elements, electric heaters, humidifiers, and purification units, are selectively accommodated in the inner space S1, and the various air conditioning units may be accommodated together with the heat exchanger 60.

[0090] The heat exchanger 60 may be accommodated in the inner space S1 defined by chassis 30 and case 100. The exchanger 60 may be supported by at least one of the chassis 30 or a discharge grill assembly 80 based on the flow of air.

[0091] The heat exchanger 60 may have a bent shape. The heat exchanger 60 includes a first heat exchange part 61 extending vertically in a direction corresponding to the front surface of the air conditioner 10, a second heat exchange part 63 extending to be inclined upward from the first heat exchange part 61, and a third heat exchange part 65 extending to be inclined downward from the second heat exchange part 63.

[0092] The first to third heat exchange parts 61, 63, and 65 may be disposed outside the blower fan 40 and be understood as being disposed at a suction region of air suctioned into the blower fan 40.

[0093] A heat exchanger holder 67 is coupled to the heat exchanger 60. The heat exchanger holder 67 may be coupled to a side of the heat exchanger 60 and may be supported on an inner surface of the case 100.

[0094] A refrigerant tube 70 is coupled to the heater

exchanger 60. The refrigerant tube 70 may introduce a refrigerant into the heat exchanger 60 or guide a flow of the refrigerant discharged from the heat exchanger 60. The refrigerant tube 70 may be coupled to the side of the heat exchanger 60 so that a tube cover 75 surrounds the outside of the refrigerant tube 70.

[0095] The case 100 is provided at the front of the chassis 30. The assembly of the chassis 30 and the case 100 may constitute a main body of the air conditioner 10. The air conditioner 10 may have a substantially hexahedral shape.

[0096] An air passage is provided in the case 100.

[0097] The air conditioner may include a pair of side parts 111 and 112 defining an outer appearance of the side surface thereof. Also, the air conditioner may further include a top surface part 113 defining an outer appearance of the top surface of the air conditioner. The air conditioner may further include an accommodation body 114 in which the filter assembly 300 is inserted and accommodated.

[0098] The pair of side parts 111 and 112 and the top surface part 113 may be provided by at least one of the chassis 30 or the case 100.

[0099] The accommodation body 114 may have a shape recessed from the top surface part 113. The accommodation body 114 may be a filter assembly cover that covers at least one surface of the filter assembly 300. An air suction hole may be defined in the accommodation body 114.

[0100] The filter assembly 300 may include a filter case 310 defining an outer appearance thereof, and the accommodation body 114 may be a filter case cover covering at least one surface of the filter case 310.

[0101] When the filter assembly 300 is inserted into the accommodation body 114, the filter assembly 300 may define an outer appearance of the top surface of the air conditioner 10. When the filter assembly 300 is inserted into the accommodation body 114, the filter assembly 300 may be disposed on an upper portion of at least one of the chassis 30 or the case 100, and the air outside the air conditioner may be introduced into the inner space S1 between the chassis 30 and the case 100 after being purified while passing through the filter assembly 300.

[0102] The filter assembly 300 may be disposed in the case 100.

[0103] When the filter assembly 300 is inserted into the accommodation body 114, the top surface of the filter assembly 300 may be exposed to the outside, and the top surface of the filter assembly 300 may define the outer appearance of the top surface of the air conditioner together with the top surface of the case 100. The filter assembly 300 may be withdrawn out of the air conditioner 10 in the state of being accommodated in the accommodation body 114 and may be withdrawn forward from the air conditioner 10.

[0104] A discharge hole is provided in a lower portion of the case 100. The discharge hole may include a lower discharge hole 126. The lower discharge hole 126 may be defined in a lower portion of the case 100. The lower discharge hole 126 may be configured to discharge the air in a downward direction.

[0105] The case 100 may be provided as one member or an assembly of a plurality of members 110 and 120. When the case 100 is provided as the assembly of the plurality of members, the case 100 may include a case body 110 coupled to the chassis 30 and a grill frame 120 disposed in front of the case body 110.

[0106] The air conditioner 10 may further include a discharge grill assembly 80.

[0107] The discharge grill assembly 80 may be disposed in a lower portion of the case 100. The discharge grill assembly 80 may include a discharge grill body 81 spaced apart from the chassis 30. The discharge grill assembly 80 may include a horizontal vane 82 controlling a direction of the discharge air flow. The horizontal vane 82 may rotate in a left-right direction based on a vertical line to control the discharge air flow in the left-right direction. The horizontal vane 83 may be provided in plurality and connected to one link bar. The plurality of horizontal vanes 83 may rotate together as a link moves. The discharge grill assembly 80 may include a horizontal vane motor 86 that allows the horizontal vane 82 to rotate. The horizontal vane motor 86 may be installed in the discharge grill body 81.

[0108] A vertical vane 88 controlling the discharge air flow in the vertical direction is provided in a lower portion of the case 100. The link 89 may be connected to a side of the vertical vane 88, and a vertical vane motor 90 for driving the vertical vane 88 may be connected to the link 89. The vertical vane motor 90 may be installed on at least one of the chassis 30, the lower plate 55, or the discharge grill body 81.

[0109] A front panel 150 may be disposed on the case 100. The front panel 150 may be disposed in front of the case 100 to define an outer appearance of the front surface of the air conditioner 10.

[0110] The front panel 150 may be provided with a display unit 152 that is capable of confirming operation information of the air conditioner 10. The front panel 150 may have a display hole 154 in which the display unit 152 is disposed.

[0111] The air conditioner 10 may further include a driving mechanism 170 (see FIG. 3) connected to the front panel 150 to allow the front panel 150 to operate to a plurality of positions. The driving mechanism 170 may be installed in the case 100 or the chassis 30. The driving mechanism 170 may be connected to the front panel 150 and a power transmission member such as a gear.

[0112] For example, the front panel 150 may be provided with a long rack in the vertical direction. In addition, the driving mechanism 170 may include a motor 172 and may further include a pinion 174 rotating by the motor 172 and engaged with the rack.

[0113] The air conditioner 10 may further include a high voltage power supply 180 (see FIG. 2) applying a high voltage to filter assembly 300.

[0114] The high voltage power supply 180 may apply the high voltage to the filter assembly 300 and a charging module 360 (see FIG. 9) to be described later.

[0115] The charging module 360 may ionize foreign substances in the air, and the foreign substances ionized by the charging module 360 may be collected inside the filter assembly 300.

[0116] In the filter assembly 300, a filter may be disposed in a filter case 310. The filter assembly 300 may include the filter case 310 and at least one filter accommodated in the filter case 310. The filter accommodated in the filter case 310 may be provided in plurality in the filter case, and the filter assembly 300 may include a plurality of filters. Each of the plurality of filters may include an electric filter 350 (see FIG. 4). Each of the plurality of filters may further include a prefilter 340 (see FIG. 3).

[0117] The prefilter 340 may be disposed in the front of the air conditioning unit in an air flow direction. The prefilter 340 may be disposed above the electric filter 350.

[0118] The electric filter 350 may be disposed inside the filter case 310. The electric filter 350 may be electrically connected to the high voltage power supply 180 through a wire and a terminal. The electric filter 350 may be an electrostatic dust filter in which dust is collected.

[0119] The air conditioner may further include a brush unit 380 (see FIG. 4) separating foreign substances (hereinafter, referred to as 'dust') such as dust attached to the filter (for example, the prefilter 340) from the filter. Also, the air conditioner may further include a dust container 390 (see FIG. 4) in which dust separated from filter is contained.

[0120] The brush unit 380 may be disposed at a position at which the prefilter 340 contacts the brush unit 380. The dust attached to the prefilter 340 may be separated from the prefilter 340 by the brush unit 380, and the dust separated from the prefilter 340 may be introduced into the dust container 390 and then stored in the dust container 390.

[0121] The dust container 390 may be disposed to be withdrawn out of the air conditioner, and the dust stored therein may be discarded by the user.

[0122] The air conditioner may further include a filter cleaning device 400 (see FIG. 2) separating the dust accumulated in the filter assembly 300.

[0123] The filter cleaning device 400 may communicate with the dust container 390 when the dust container 390 is mounted in the air conditioner 10. The filter cleaning device 400 may be a suction unit connected to the dust container 390 to suction air from the dust container 390. The filter cleaning device 400 may include a fan motor unit that suctions and blows air from the dust container 390.

[0124] The filter cleaning device 400 may be accommodated between the case 100 and the chassis 30. The filter cleaning device 400 may be disposed inside the case 100. The filter cleaning device 400 may be disposed to be positioned above the controller 50.

[0125] When the filter cleaning device 400 is driven, suction force of the filter cleaning device 400 may be applied to the filter (particularly, the prefilter 340) through the dust container 390 and the brush unit 380, and the dust attached to the filter of the filter assembly 300 may be introduced into the dust container 390 and be temporarily stored in the dust container 390.

[0126] As illustrated in FIG. 4, the brush unit 380 and the dust container 390 may be disposed in the filter case 310 so as to be withdrawn out of the air conditioner together with the filter case 310.

[0127] In this case, the brush unit 380 and the dust container 390 may constitute a portion of the filter assembly 300, and the dust container 390 may be connected to or separated from the filter cleaning device 400 to be described later.

[0128] On the other hand, the brush unit 380 and the dust container 390 may be disposed in the chassis 30 or the case 100, but not disposed in filter case 310. In this case, the brush unit 380 and the dust container 390 may be maintained in the state of being connected to the filter cleaning device 400. When the filter assembly 300 is mounted, the brush unit 380 and the dust container 390 may be connected to the filter assembly 300.

[0129] The brush unit 380 and the dust container 390 need to be cleaned by the user or a service provider and be preferably disposed to be easily withdrawn or mounted.

[0130] When the brush unit 380 and the dust container 390 are disposed in the filter case 310 together with the prefilter 340 and the electric filter 350, a user or an operator may simply withdraw the filter assembly 300 to the outside to withdraw the prefilter 340, the electric filter 350, the brush unit 380, and the dust container 390 together. Thereafter, the user may clean the prefilter 340, the electric filter 350, and the brush unit 380, and may empty the dust container 390.

[0131] FIG. 5 is a perspective view when the front panel of FIG. 1 is disposed at a first position, FIG. 6 is a perspective view when the front panel of FIG. 1 is disposed at a second position, and FIG. 7 is a perspective view when the front panel of FIG. 1 is disposed at a third position.

[0132] The driving mechanism 170 (see FIG. 2) may allow the front panel 150 to ascend or descend as illustrated in FIGS. 5 to 7. The driving mechanism 170 may be a front panel elevation mechanism that elevates the front panel 150.

[0133] As illustrated in FIG. 7, the discharge hole provided in the case 100 may further include a front discharge hole 129. The front discharge hole 129 may be provided by opening a portion of a front lower portion of the case 100 in the front-rear direction.

[0134] The driving mechanism 170 may allow the front panel 150 to move to a plurality of positions.

[0135] The plurality of positions may include a first position P1 and a second position P2.

[0136] The first position P1 may be a position at which

the front panel 150 covers the front surface 301 of the filter assembly 300.

[0137] The second position P2 may be a position relatively lower than the first position P1. The second position P1 may be a position at which the front panel 150 exposes the front surface 301 of the filter assembly 300. The first position P1 and the second position P2 may be positions at which front panel 150 covers front discharge hole 129.

[0138] When the front panel 150 is disposed at the first position P1, as illustrated in FIG. 5, the front panel 150 may cover the front surface 301 and the front discharge hole 129 of the filter assembly 300.

[0139] When the front panel 150 is disposed at the second position, as illustrated in FIG. 6, the front panel 150 may expose the front surface 301 of the filter assembly 300 but cover the front discharge hole 129. When the front panel 150 is disposed at the second position P2, an upper end of the front panel 150 may be disposed below the front of the filter assembly 300, and the filter assembly 300 may be movable forward over the upper end of the front panel 150.

[0140] The filter assembly 300 may move forward when the front panel 150 is disposed at the second position P2, and the air conditioner or the user may easily withdraw the filter assembly 300 forward without separating the front panel 150 or the case 100.

[0141] The user may withdraw the filter assembly 300 withdrawn in front of the accommodation body 114 from the accommodation body 114, and then, all of the filter assembly 300 or a portion of the filter assembly 300 with a cleaning solution such as water may be easily cleaned.

[0142] After the user cleans the filter assembly 300, the user may insert the filter assembly 300 into the accommodation body 114 while the filter assembly 300 is placed on the accommodation body 114, and the filter assembly 300 may be inserted into and accommodated in the accommodation body 114.

[0143] The plurality of positions may further include a third position P3. The third position P3 may be a position relatively higher than the first position P1. As shown in FIG. 7, the third position P3 may be a position at which the front panel 150 opens the front discharge hole 129 and may be a position at which the front panel 150 covers the front surface 301 of the filter assembly 300. When the front panel 150 is disposed at the third position, air flowing toward the filter assembly 300 may be guided to the rear surface of the front panel 150 and then suctioned into the filter assembly 300.

[0144] The air conditioner 10 may selectively perform a downward airflow mode in which the air-conditioned air is discharged to a lower side of the case 100 through the lower discharge hole 126 (see FIG. 1) and a upward airflow mode in which the air-conditioned air is discharged to a front side of the case 100 through the front discharge hole 129 (see FIG. 6).

[0145] When front panel 150 is disposed at the first position P1 or the second position P2, the air conditioner 10 may discharge the air-conditioned air through the lower discharge hole 126.

[0146] When the front panel 150 is disposed at the third position P3, the air conditioner 10 may discharge the air-conditioned air through the front discharge hole 129 and the lower discharge hole 126.

[0147] FIG. 8 is a plan view of the air conditioner according to an embodiment, FIG. 9 is a cross-sectional view taken along line A-A' of FIG. 8, FIG. 10 is a cross-sectional view taken along line B-B' of FIG. 8, FIG. 11 is a bottom view illustrating the inside of the electric filter according to an embodiment, and FIG. 12 is a view of the filter assembly and the moving mechanism according to an embodiment.

[0148] The air conditioner may further include a charging module 360 (or an ionization module, see FIGS. 8 and 9).

[0149] The charging module 360 may be an ionization module or ionizing module that ionizes foreign substances in the air. The charging module 360 may be installed so that the foreign substances in the air are ionized before introducing the electric filter 350.

[0150] The charging module 360 may ionize the foreign substances in the air flowing toward the electric filter 350 and may include a discharge electrode 361 (see FIG. 9) that ionizes the foreign substances in the air when a high voltage is applied.

[0151] The discharge electrode 361 may include a carbon fiber or a fiber bundle of carbon fibers. The discharge electrode 361 may be electrically connected to the high voltage power supply 180 shown in FIG. 2.

[0152] The discharge electrode 361 may be disposed to be disposed outside the filter assembly 300, and even though the filter assembly 300 is withdrawn to clean the filter assembly 300, the discharge electrode 361 may not be withdrawn together with the filter assembly 300.

[0153] The discharge electrode 361 may be disposed in the chassis 30 or the case 100, for example, may be disposed to face the outside of the air conditioner. In this case, the discharge electrode 361 may ionize the foreign substances of the air outside the air conditioner 10, particularly outside the filter assembly 300.

[0154] The foreign substances in the air outside the air conditioner may be ionized outside the filter assembly 300. The foreign substances ionized by the discharge electrode 361 may be suctioned into the filter assembly 300 and then collected into the electric filter 350 while passing through the filter assembly 300.

[0155] The discharge electrode 361 may ionize the foreign substances in the air around the filter assembly 300. For this, the discharge electrode 361 may be disposed close to the accommodation body 114, for example, disposed to face an upper side of the accommodation body 114.

[0156] When the blower fan 40 is driven, external air of the air conditioner may flow to upper sides of the accommodation body 114 and the filter assembly 300 and then be suctioned into the filter assembly 300. Here, the

foreign substances of the air flowing to the upper sides of the accommodation body 114 and the filter assembly 300 may be ionized by the discharge electrode 361.

[0157] The discharge electrode 361 facing the upper side of the accommodation body 114 may minimize a power loss for ionizing the foreign substances in the air.

[0158] The charging module 360 may further include a module mounter 364 disposed on an upper portion of at least one of the chassis 30 and the case 100.

[0159] A space S5 in which the discharge electrode 361 is accommodated may be defined in the module mounter 364. The space S5 may be larger than the discharge electrode 361.

[0160] A wire through-hole 365 through which a wire 362 connected to the discharge electrode 361 may pass may be defined in the module mounter 364. The wire 362 may be fitted into the wire through-hole 365 so as to be fixed, and the wire 362 connected to the discharge electrode 361 may extend into the high voltage power supply 180 illustrated in FIG. 2.

[0161] The charging module 360 may be provided in a pair within air conditioner. The pair of charging modules 360A and 360B may be spaced apart in a longitudinal direction Y of the filter assembly 300. The pair of charging modules 360A and 360B may be symmetrically disposed with the filter assembly 300 therebetween.

[0162] The pair of charging modules 360A and 360B may include a left charging module 360A installed at a left side of the filter assembly 300 and a right charging module 360B installed at a right side of the filter assembly 300.

[0163] When the blower fan 40 rotates, the foreign substances in the air flowing upward of the filter assembly 300 may be ionized while passing around the discharge electrode 361. The foreign substances passing through the prefilter 340 among the foreign substances ionized by the discharge electrode 361 may be adsorbed and collected onto the electric filter 350.

[0164] Hereinafter, the filter assembly 300 will be described in detail.

[0165] A space S3 in which at least one filter is accommodated may be defined in the filter case 310.

[0166] The filter case 310 may be configured to allow air to pass therethrough. An outer inlet 312 through which external air is suctioned into the filter case 310 may be provided in the filter case 310. An inner outlet 314 through which the air passing through the space S3 of the filter case 310 pass to flow into the inner space S1 may be provided in the filter case 310.

[0167] The outer inlet 312 may face an upper side when the filter assembly 300 is inserted into the accommodation body 114, and the outer inlet 312 may be exposed to the outside of the air conditioner.

[0168] The inner outlet 314 may face a lower side when the filter assembly 300 is inserted into the accommodation body 114, and the inner outlet 314 may face the inside of the air conditioner.

[0169] The filter case 310 may be provided as an assembly of a plurality of members.

[0170] The filter case 310 includes an upper cover 320 having the outer inlet 312 through which external air is suctioned and a lower case having the inner outlet 314 through which the air passing through the filter flows to the opening 115.

[0171] The upper cover 320 may be separably coupled to the lower case 330 by a hook part such as a hook or a coupling member such as a screw, and when the upper cover 320 is separated from the lower case 330, the inside of the filter case 310 may be opened.

[0172] As illustrated in FIG. 10, the prefilter 340 may include a filter net 342 having a through-hole through which air passes. The prefilter 340 may include a filter body 344 that supports the filter net 342.

[0173] The prefilter 340 may be accommodated between the electric filter 350 and the upper cover 320.

[0174] The electric filter 350 may be a collection module or an electrostatic dust filter in which the foreign substances ionized by the charging module 360 are collected.

[0175] As illustrated in FIG. 10, the electric filter 350 may include a first filter body 351 surrounding a first electrode 351A by a first dielectric 351B and a second filter body 352 surrounding a second electrode 352A by a second dielectric 352B. In this case, the electric filter 350 may be a dielectric filter.

[0176] The first dielectric 351B and the second dielectric 351B may be coating members which are made of a dielectric material and prevent the foreign substances from being exposed to the first electrode 351A and the second electrode 352A and may be an adsorption body that is adsorbed by electric fields generated between the second electrode 352A and the second electrode 352A.

[0177] As illustrated in FIGS. 10 and 11, the first filter body 351 and the second filter body 352 may be spaced apart from each other in a direction X that is perpendicular to an air suction direction Z. The first filter body 351 and the second filter body 352 may be alternately disposed in a direction X that is perpendicular to the air suction direction Z.

[0178] An electrode terminal may be disposed on the electric filter 350. The electrode terminal may be connected to or separated from the supply terminal. A pair of electrode terminals may be provided to the electric filter 350, and the pair of electrode terminals may include a positive electrode terminal 353 and a ground terminal 354, as illustrated in FIG. 11.

[0179] The positive electrode terminal 353 and the ground terminal 354 may be spaced apart in the longitudinal direction Y of the electric filter 350.

[0180] The positive electrode terminal 353 may be electrically connected to the first electrode 351A and may be spaced apart from the second filter body 352.

[0181] A portion of the first electrode 351A may be connected to the positive electrode terminal 353 of the first filter body 351.

[0182] The ground terminal 354 may be electrically

connected to the second electrode 352A and may be spaced apart from the first filter body 351.

[0183] A portion of the second electrode 352A may be connected to the ground terminal 354 of the second filter body 352.

[0184] Each of the positive electrode terminal 353 and the ground terminal 354 may be disposed to pass through the filter frame of the electric filter 350, and a part of each of the positive electrode terminal 353 and the ground terminal 354 may be disposed outside the filter frame of the electric filter 350.

[0185] Hereinafter, a common configuration of the positive electrode terminal 353 and the ground terminal 354 will be described as the electrode terminals 353 and 354, and when it is necessary to distinguish the positive electrode terminal 353 from the ground terminal 354, the positive electrode terminal 353 and the ground terminal 354 will be described be distinguished from each other.

[0186] The electric filter 350 may include a filter frame having a space S4 therein. The filter frame may be provided as an assembly of a plurality of members 356 and 357. The assembly 356 and 367 may include an upper frame 356 and a lower frame 357, and the upper frame 356 and the lower frame 357 may be separably coupled to each other by a hook part 358 such as the hook.

[0187] The air conditioner 10 may further include a moving mechanism 500 allowing a position of the filter assembly 300 to move. The moving mechanism 500 may be a filter assembly backward movement mechanism that allows the filter assembly 300 to move backward.

[0188] The filter assembly 300 may allow the filter assembly 300 to move forward and backward in a direction crossing the longitudinal direction of the filter assembly 300. The filter assembly 300 may be lengthily disposed in the left-right direction, and the longitudinal direction of the filter assembly 300 may be the left-right direction. The moving mechanism 500 may allow the filter assembly 300 to move forward and backward. The forward and backward movement of the filter assembly 300 by the moving mechanism 500 may include forward and backward movement of the filter assembly 300 to be inclined at a predetermined angle.

[0189] The air conditioner may include a pair of moving mechanisms 500, and the pair of moving mechanisms 500 may be spaced apart from the air conditioner in the left-right direction. One of the pair of moving mechanisms 500 may be disposed below a left side of the air suction hole, and the other of the pair of moving mechanisms 500 may be disposed below a right side of the air suction hole.

[0190] The pair of moving mechanisms 500 may be interlocked with a driving mechanism 170. The pair of moving mechanisms 500 and the driving mechanism 170 operate in conjuction. After the driving mechanism 170 locates the front panel 150 at the second position P2, the pair of moving mechanisms 500 may operate. The pair of moving mechanisms 500 may allow the filter assembly 300 to move forward and backward while the front panel 150 is disposed at the second position P2.

[0191] The second position P2 may be a position relatively lower than the first position P1. The second position P1 may be a position at which the front panel 150 exposes the front surface 301 of the filter assembly 300. The first position P1 and the second position P2 may be positions at which front panel 150 covers front discharge hole 129.

[0192] The moving mechanism 500 may include a driving source such as a motor and at least one power transmission member connected to the driving source. One example of the moving mechanism 500 may include a motor 510, a driving gear 520 rotating by the motor 512, and a driven gear 530 engaged with the driving gear 520.

[0193] The filter assembly 300 may be withdrawn in front of the air conditioner when the motor 510 operates. The filter assembly 300 may be inserted into the air conditioner when operating in an opposite direction of the motor 510.

[0194] The air conditioner 10 may further include a sliding guide 540 disposed in the case 100.

[0195] The air conditioner 10 may further include a carrier 550 on which the filter assembly 300 is placed.

[0196] The moving mechanism 500 may be connected to the carrier 550 to allow the carrier 550 to move forward and backward. The moving mechanism 500 may allow the filter assembly 300 mounted on the carrier 550 to move forward and backward by the forward and backward movement of the carrier 550 and thus may be a carrier forward/backward movement mechanism.

[0197] The motor 510 may be installed to be fixed in the air conditioner 10, in particular, the case 100.

[0198] The motor 510 may be mounted on the sliding guide 540 by a coupling member such as a screw. The sliding guide 540 may guide the carrier 550, and the motor 510 may be installed on the sliding guide 540. In this case, the air conditioner may have a simpler structure to simplify the assembly process when compared to a case in which the carrier guide for sliding the carrier 550 and the motor mounter for mounting the motor 510 are separately provided.

[0199] The driving gear 520 may be directly connected to a rotation shaft of the motor 510 or may be connected to the rotation shaft of the motor 510 through a separate intermediate gear. One example of the drive gear 520 may be a pinion rotating by the motor 510.

[0200] The driven gear 530 may be disposed on a separate gear member 532. The driven gear 530 may be a rack disposed on the gear member 532, and the rack may linearly move while being engaged with the pinion which is the driving gear 520. The rack may move forward and backward by the motor when the motor is driven. The gear member 532 may be connected to the carrier 550 to allow the carrier 550 to move forward and backward when the motor 510 is driven. The gear member 532 may be coupled to the carrier 550 by a coupling member such as a screw, and the gear member 532 may move forward and backward together with the carrier

550.

[0201] An opening 534 may be defined between the gear member 532 and the carrier 550 in the forward movement direction of the carrier 505.

[0202] The sliding guide 540 may include a coupling body 541 coupled to the case 100. The coupling body 541 may be coupled to the case 100 by the coupling member such as the screw. The coupling body 541 may be coupled to an inner wall of the case 100 to be disposed below the accommodation body 114.

[0203] The sliding unit 540 may include a guide body 542. The guide body 542 may guide an opening 534 and guide the forward and backward movement of the carrier 550 and the driven gear 530.

[0204] Each of the opening 534 and the guide body 542 may have a polygonal shape, and the opening 534 may not rotate about the guide body 542, but be guided in a longitudinal direction of the guide body 542 along an outer surface of the guide body 542.

[0205] The sliding guide 540 may include a guide rail 544 guiding a lower end 535 of the gear member 532. The guide rail 544 may be spaced apart from the guide body 542. The guide rail 544 may be disposed to be spaced apart from the guide body 542 in the vertical direction under the guide body 542.

[0206] A portion of the gear member 532 may be disposed between the guide body 542 and the guide rail 544, and the gear member 532 may move forward and backward together with the carrier 550 while being guided by each of the guide body 542 and the guide rail 544.

[0207] The carrier 550 may include a seating body 551 on which the filter assembly 300 is placed. The carrier 550 may further include a sensor accommodation body 552 in which the magnet sensor 570 is accommodated. The carrier 550 may further include a stopper 553 which extends from the seating body 551 and with which the filter assembly 300 is hooked in the rear direction.

[0208] A size of the seating body 551 may be greater than that of the sensor accommodation body 552.

[0209] The sensor accommodation body 552 may be disposed below the seating body 551. The sensor accommodation body 552 may be protected by the seating body 551 disposed thereabove.

[0210] The magnet sensor 570 and the sensor accommodation body 552 may be disposed at a rear side of the seating body 551 in the air flow direction, and the magnet sensor 570 may be protected by the seating body 551.

[0211] The stopper 553 may be configured to substantially determine a fixed position (normal seating position) of the filter assembly 300. When the filter assembly 300 contacts and is hooked with the stopper 553, the filter assembly 300 may be defined as being disposed at the fixed position.

[0212] The stopper 553 may extend upward from the seating body 551, and the filter case 310 mounted on the top surface of the seating body 551 may contact the front surface of the stopper 553 and thus be hooked with the stopper 553.

[0213] The carrier 550 may be made of a material in which the magnet sensor 570 is capable of sensing the proximity of the magnet 560 with high reliability, and the carrier 550 may be made of a nonmagnetic material. The carrier 550 may be made of a synthetic material.

[0214] The air conditioner 10 may further include a magnetic body 580 that is attracted to the magnet 560. The magnetic body 580 may be disposed in the carrier 550 and may apply force to the magnet 560 so that the filter assembly 300 is disposed at a fixed position. The magnetic body 580 may be made of a material that is capable of minimizing malfunction of the magnet sensor 570. The magnetic body 580 may be made of a paramagnetic material instead of a ferromagnetic material. For example, the magnetic material 580 may be made of aluminum.

[0215] The carrier 550 may be made of a nonmagnetic material such as a synthetic resin, and the magnetic material 580 may be made of a paramagnetic material such as aluminum. The magnetic material 580 may pull the magnet 560 so that the filter assembly 300 is disposed at a fixed position, and the magnetic sensor 570 may sense the magnet 560 when the filter assembly 300 is disposed at a fixed position.

[0216] Such a magnetic body 580 may be disposed on a rear surface of the stopper 553 and apply attraction force to the magnet 560 such that the magnet 560 moves in the direction toward the stopper 553, and the filter case 310 may be reliably restricted on the front surface of the stopper 553 by the magnet 560.

[0217] The attraction force between the magnetic body 580 and the magnet 560 may maintain the state in which the filter case 310 contacts the stopper 553, and the filter case 310 may move forward and backward while minimizing shaking or random mislocation when moving forward and backward.

[0218] The moving mechanism 500 may be controlled by the controller 50. When the controller 50 controls the motor 510 in the forward movement mode, the motor 510 may allow the rotating shaft to rotate in one of a clockwise direction and a counterclockwise direction so that the gear member 532 and the carrier 550, on which the driven gear 530 is disposed, move forward and backward, and the filter assembly 300 may move forward and backward together with the carrier 550 while being placed on the carrier 550.

[0219] The controller 50 may transmit a signal of the forward movement mode to the motor 510 when the user inputs a command for withdrawing the filter assembly 300 through an input unit of a remote controller or the like, or when the air conditioner is under a filter assembly withdrawal condition.

[0220] The user may input a withdrawal command (or a filter cleaning command) of the filter assembly 300 through a remote controller or the like while the filter assembly 300 is inserted into the accommodation body 114, and in this case, the controller 50 may transmit a signal of the forward movement mode to the motor 510.

[0221] When the controller 50 controls the motor 510 in the backward movement mode, the motor 510 may allow the rotation shaft to move in a direction opposite to the forward movement mode, and the gear member 532 and the carrier, on which the driven gear 530 are formed, may move backward, and the filter assembly 300 may be deeply inserted into the accommodation body 114 while being placed on the carrier 550.

[0222] The air conditioner may include a sensing unit capable of sensing a position of the filter assembly 300. The sensing unit may be installed to sense a correct position (i.e., a normal seating position) of the filter assembly 300. The sensing unit may sense whether the filter assembly 300 is normally placed on the carrier 550. The sensing unit may include a magnet 560 and a magnet sensor 570.

[0223] The magnet 560 may be disposed in the filter case 310. The magnet 560 may be withdrawn together with the filter assembly 300 when the filter assembly 300 is withdrawn out of the case 100.

[0224] The magnet sensor 570 may be disposed on the carrier 550 to sense the magnet 560. The magnet sensor 570 may move forward and backward together with the carrier 550 when the carrier 550 moves.

[0225] A magnet mounting part 337 on which the magnet 560 is seated and accommodated may be provided on the filter case 310, in particular, in the lower case 330, and the magnet 560 may be mounted on the magnet mounting part 337 to move forward and backward together with the filter assembly 300.

[0226] The magnet sensor 570 may be accommodated in the sensor accommodation body 552 provided in the carrier 520.

[0227] The magnet sensor 570 may sense the magnet 560 when the filter assembly 300 is placed on the carrier 550 at a fixed position, and the controller 50 may be controlled in the backward movement mode when the magnet 560 is sensed by the magnet sensor 570.

[0228] The controller 50 may stand by until the filter assembly 300 is placed at a fixed position, and when the filter assembly 300 is placed at the fixed position, the controller 50 may allow the filter assembly 300 to move backward by allowing the carrier 550 to move backward.

[0229] The controller 50 may control the moving mechanism 500 in the backward movement mode when the magnet 560 is sensed by the magnet sensor 570, and in the backward movement mode, the moving mechanism 500 may allow the electrode terminals 353 and 354 to move backward to the connection position at which the electrode terminals 353 and 354 are connected to the supply terminals 121 and 122.

[0230] The connection position of the filter assembly 300 may be a position at which the electrode terminals 353 and 354 of the filter assembly 300 contact and are connected to the supply terminals 121 and 122.

[0231] In this case, the air conditioner may allow high voltage to be applied to the electric filter 350 with high reliability.

[0232] FIG. 14 is a plan view when the filter assembly of FIG. 8 is withdrawn forward, FIG. 15 is a perspective view when the filter assembly of FIG. 8 is withdrawn forward, and FIG. 16 is a perspective view of the lower case according to an embodiment.

[0233] The accommodation body 114 may be configured to accommodate the filter assembly 300 to be inserted. The top surface of the accommodation body 114 and the front surface of the accommodation body 114 may be opened.

[0234] The accommodation body 114 may have a three-dimensional shape, and an upper space S2 in which the filter assembly 300 is accommodated may be defined inside the accommodation body 114. The upper space S2 may be an air suction hole lengthily defined in the air conditioner in the left-right direction. The filter assembly 300 may be disposed at the air suction hole or be withdrawn to the outside.

[0235] The filter assembly 300 may be withdrawn in front of the accommodation body 114 or above the accommodation body 114 in the state disposed in the accommodation body 114.

[0236] An opening 115 through which air passes may be defined in a lower portion of the accommodation body 114.

[0237] The opening 115 may be defined so that the upper space S2 communicates with the inner space S1. The carrier 550 may be movably disposed in the opening 115, and the carrier 550 may move within the opening 115 in the front-rear direction.

[0238] The opening 115 may have a length in the front-rear direction X, which is longer than a length of the carrier in the front-rear direction X in consideration of the movement of the carrier 550.

[0239] The accommodation body 114 may include a pair of side bodies 116 and 117 and a rear body 118.

[0240] The pair of side bodies 116 and 117 may be spaced apart from each other in the left-right direction, and when the filter assembly 300 is inserted into the accommodation body 114, the side surfaces 302 and 303 of the filter case 310 may face the side surfaces 302 and 303 of the filter case 310.

[0241] The rear body 118 may connect a pair of side bodies 116 and 117 to each other and may be disposed to face the rear surface 304 of the filter case 310.

[0242] Each of the pair of side bodies 116 and 117 and the rear body 118 may have a predetermined length in the vertical direction Z, and the length of each of the pair of side bodies 116 and 117 and the rear body 118 may be greater than or equal to a thickness of the filter assembly 300 (i.e., the vertical length of the filter assembly 300).

[0243] The accommodation body 114 may further include a lower body 119 disposed below the pair of side bodies 116 and 117 and on which a portion of the filter assembly 300 is seated.

[0244] The lower body 119 may have a stepped portion with respect to an upper end of each of the pair of side

bodies 116 and 117 and the rear body 118.

[0245] The opening 115 may be defined in the lower body 119 so as to be opened in the vertical direction.

[0246] The pair of side bodies 116 and 117 and the lower body 119 may have a width in the front-rear direction X, and the width may be greater than or equal to a width of the front-rear directions X of the filter assembly 300.

[0247] When the filter assembly 300 is accommodated in the accommodation body 114, the top surface 305 of the filter assembly 300 may match the top surface part 113 of the air conditioner, and the front surface 301 of the filter assembly may match the front surface of the case 100.

[0248] The supply terminals 121 and 122 contacting the electrode terminals 353 and 354 may be disposed in accommodation body 114.

[0249] The supply terminals 121 and 122 may be fixed terminals that are fixed to the chassis 30 or the case 100. The supply terminals 121 and 122 may one-to-one correspond to the electrode terminals 353 and 354. The supply terminals 121 and 122 may include a positive electrode fixed terminal 121 with/from the positive electrode terminal 353 is in contact or separated and a ground fixed terminal 122 with/from the ground terminal 354 is in contact or separated.

[0250] The supply terminals 121 and 122 may be disposed in the accommodation body 114.

[0251] The positive electrode fixed terminal 121 and the ground fixed terminal 122 may be spaced apart from each other in the longitudinal direction Y of the filter assembly 300. Hereinafter, a common configuration will be described as the supply terminals 121 and 122. When it is necessary to distinguish the positive electrode fixed terminal 121 and the ground fixed terminal 122, the positive electrode fixed terminal 121 and the ground fixed terminal 122 will be described to be distinguished from each other.

[0252] The positive electrode fixed terminal 121 may be connected to the high voltage power supply 180 illustrated in FIG. 2, and a wire or a bus bar connected to the positive electrode fixed terminal 121 may extend to the high voltage power supply 180.

[0253] The ground stationary terminal 122 may be connected to the high voltage power supply 180 illustrated in FIG. 2, like the positive electrode fixed terminal 121, and a wire or a bus bar connected to the ground stationary terminal 122 may extend to the high voltage power supply 180.

[0254] A terminal hole 338 through which at least one of the electrode terminals 353 and 354 and the supply terminals 121 and 122 passes may be defined in the filter case 310. For example, the terminal hole 338 may be defined in the lower case 330.

[0255] The air conditioner 10 may include a roller 370 rotatably disposed in the filter case 310. The roller 370 may be accommodated in the filter case 310. The roller 370 may include a pair of pinions 372 and 374 and a rotation shaft 376 connecting the pair of pinions 372 and 374 to each other.

[0256] The prefilter 340 may be provided with a pair of racks engaged with the pair of pinions 372 and 374.

[0257] The brush unit 380 may be disposed in the filter case 310 so as to be disposed next to the roller 370.

[0258] A brush unit insertion part 349 into which the brush unit 380 is inserted may be provided in the filter case 310, in particular, the lower case 330.

[0259] The brush unit 380 may contact the bent portion of the prefilter 340 along the roller 370. The brush unit 380 may include a brush body inserted and disposed in the brush unit insertion unit 349 and having a through-hole through which air and dust pass and a brush hair disposed on a surface of the brush body, which faces the roller 370, to contact the brush filter 340.

[0260] The dust container 390 may be disposed next to the brush unit accommodation part 349 and be connected to the brush unit 380.

[0261] A roller rotation mechanism that allows the roller 370 to rotate may be disposed in the chassis 30 or the case 100.

[0262] The roller rotation mechanism includes a connector 377 that is separably connected to any one of the pair of pinions 372 and 374 and a roller rotation motor 378 that allows the connector 377 to rotate. The roller rotation motor 378 may include a rotation shaft connected to the connector 377.

[0263] The above-disclosed subject matter is to be considered illustrative, and not restrictive, and the appended claims are intended to cover all such modifications, enhancements, and other embodiments, which fall within the scope of the present disclosure.

[0264] Thus, the embodiment of the present disclosure is to be considered illustrative, and not restrictive, and the scope of the present disclosure is not limited to the foregoing embodiment.

[0265] Therefore, the scope of the present disclosure is defined not by the detailed description of the invention but by the appended claims, and all differences within the scope will be construed as being included in the present disclosure.

[0266] The present invention is also defined by the following items.

1. An air conditioner (10) comprising:

   a filter assembly (300) disposed in an air suction hole (S2) that is lengthily defined in the air conditioner in a left-right direction; and
   a pair of moving mechanisms (500) configured to allow the filter assembly (300) to move forward and backward in a direction crossing a longitudinal direction of the filter assembly (300),
   wherein the pair of moving mechanisms (500) comprises:

      a motor (510); and

a rack (530) configured to move forward and backward by the motor (510);

wherein the filter assembly (300) is adapted to be withdrawn forward from the air conditioner when the motor (510) operates, and
the filter assembly (300) is adapted to be inserted into the air conditioner when the motor (510) operates reversely.

2. The air conditioner (10) according to item 1, further comprising:

a case (100) in which the filter assembly (300) is accommodated;
a front panel (150) disposed on the case (100); and
a driving mechanism (170) configured to elevate the front panel (150) to a plurality of positions,
wherein the pair of moving mechanisms (500) and the driving mechanism (170) are interlocked with each other.

3. The air conditioner (10) according to item 2, wherein the plurality of positions comprise:

a first position (P1) at which the front panel (150) is configured to cover a front surface (301) of the filter assembly (300); and
a second position (P2) at which the front panel (150) is configured to expose the front surface (301) of the filter assembly (300),
wherein the second position (P2) is relatively lower than the first position (P1).

4. The air conditioner (10) according to item 3, wherein the pair of moving mechanisms (500) is configured to allow the filter assembly (300) to move forward and backward while the front panel (150) is disposed at the second position (P2).

5. The air conditioner (10) according to item 3 or 4, wherein a front discharge hole (129), which is opened in a front-rear direction, is defined in a lower portion of a front surface of the case (100), and
each of the first position (P1) and the second position (P2) is a position at which the front panel (150) covers the front discharge hole (129).

6. The air conditioner (10) according to item 5, wherein the plurality of positions further comprise a third position (P3) at which the front panel (150) opens the front discharge hole (129) and covers the front surface (301) of the filter assembly (300) .

7. The air conditioner (10) according to any one of items 1 to 6, further comprising an accommodation body (114) in which the air suction hole (S2) is defined, and the filter assembly (300) is accommodated,
each of front and top surfaces of the accommodation body (114) is opened, and
the filter assembly (300) is adapted to be withdrawn forward or upward.

8. The air conditioner (10) according to item 7, further comprising a carrier (550) on which the filter assembly (300) is placed and to which the moving mechanism (500) is connected,
wherein an opening (115) through which air passes is defined in a lower portion of the accommodation body (114), and
a length of the opening (115) in a front-rear direction is greater than a length of the carrier (550) in the front-rear direction.

9. The air conditioner (10) according to item 8, further comprising a supply terminal disposed on the accommodation body (114),
wherein the filter assembly (300) comprises an electric filter (350),
the electric filter (350) comprises an electrode terminal that is connected to or disconnected from the supply terminal, and
when the moving mechanism (500) moves backward, the moving mechanism (500) is configured to allow the carrier (550) to move backward to a connection position at which the electrode terminal is connected to the supply terminal.

10. The air conditioner (10) according to any one of items 1 to 7, further comprising a carrier (550) on which the filter assembly (300) is placed,
wherein the moving mechanism (500) is connected to the carrier (550) to allow the carrier (550) to move forward and backward.

11. The air conditioner (10) according to any one of items 1 to 10, wherein the moving mechanism (500) further comprises a driving gear (520) connected to the motor (510) and engaged with the rack (530), and the rack (530) is disposed on a gear member (532) connected to the carrier (550).

12. The air conditioner (10) according to any one of items 8 to 11, further comprising:

a magnet (560) disposed on the filter assembly (300);
a magnet sensor (570) disposed on the carrier (550) configured to sense the magnet (560); and
a controller (50) configured to control the moving mechanism (500) when the magnet (560) is sensed by the magnet sensor (570).

13. The air conditioner (10) according to item 12,

further comprising a magnetic body (580) disposed on the carrier (500) and attracted to the magnet (560),
wherein the carrier (500) is a nonmagnetic body.

14. The air conditioner (10) according to any one of items 8 to 13, wherein the moving mechanism (500) further comprises a sliding guide (540) configured to guide the carrier (550).

15. The air conditioner according to any one of items 8 to 13, wherein the carrier (550) comprises:

a seating body (551) on which the filter assembly (300) is placed; and
a stopper (553) which extends from the seating body (551) and with which the filter assembly (300) is hooked in a rear direction.

Claims

1. An air conditioner (10) comprising:

a filter assembly (300) disposed in an air suction hole (S2) that is lengthily defined in the air conditioner in a left-right direction; and
a pair of moving mechanisms (500) configured to allow the filter assembly (300) to move forward and backward in a direction crossing a longitudinal direction of the filter assembly (300),
wherein the pair of moving mechanisms (500) comprises:

a motor (510); and
a rack (530) configured to move forward and backward by the motor (510);

wherein the filter assembly (300) is adapted to be withdrawn forward from the air conditioner when the motor (510) operates, and
the filter assembly (300) is adapted to be inserted into the air conditioner when the motor (510) operates reversely,
wherein the air conditioner further comprises a carrier (550) on which the filter assembly (300) is placed,
wherein the moving mechanism (500) is connected to the carrier (550) to allow the carrier (550) to move forward and backward.

2. The air conditioner (10) according to claim 1, further comprising:

a case (100) in which the filter assembly (300) is accommodated;
a front panel (150) disposed on the case (100); and
a driving mechanism (170) configured to elevate the front panel (150) to a plurality of positions.

3. The air conditioner (10) according to claim 2, wherein the plurality of positions comprise:

a first position (P1) at which the front panel (150) is configured to cover a front surface (301) of the filter assembly (300); and
a second position (P2) at which the front panel (150) is configured to expose the front surface (301) of the filter assembly (300),
wherein the second position (P2) is relatively lower than the first position (P1).

4. The air conditioner (10) according to claim 3, wherein the pair of moving mechanisms (500) is configured to allow the filter assembly (300) to move forward and backward while the front panel (150) is disposed at the second position (P2).

5. The air conditioner (10) according to claim 3 or 4, wherein a front discharge hole (129), which is opened in a front-rear direction, is defined in a lower portion of a front surface of the case (100), and
each of the first position (P1) and the second position (P2) is a position at which the front panel (150) covers the front discharge hole (129).

6. The air conditioner (10) according to claim 5, wherein the plurality of positions further comprise a third position (P3) at which the front panel (150) opens the front discharge hole (129) and covers the front surface (301) of the filter assembly (300).

7. The air conditioner (10) according to any one of claims 1 to 6, further comprising an accommodation body (114) in which the air suction hole (S2) is defined, and the filter assembly (300) is accommodated,
each of front and top surfaces of the accommodation body (114) is opened, and
the filter assembly (300) is adapted to be withdrawn forward or upward.

8. The air conditioner (10) according to claim 7, wherein an opening (115) through which air passes is defined in a lower portion of the accommodation body (114), and
a length of the opening (115) in a front-rear direction is greater than a length of the carrier (550) in the front-rear direction.

9. The air conditioner (10) according to claim 8, further comprising a supply terminal disposed on the accommodation body (114),
wherein the filter assembly (300) comprises an electric filter (350),

the electric filter (350) comprises an electrode terminal that is connected to or disconnected from the supply terminal, and
when the moving mechanism (500) moves backward, the moving mechanism (500) is configured to allow the carrier (550) to move backward to a connection position at which the electrode terminal is connected to the supply terminal.

10. The air conditioner (10) according to any one of claims 1 to 9, wherein the moving mechanism (500) further comprises a driving gear (520) connected to the motor (510) and engaged with the rack (530), and the rack (530) is disposed on a gear member (532) connected to the carrier (550).

11. The air conditioner (10) according to any one of claims 1 to 10, further comprising:

a magnet (560) disposed on the filter assembly (300);
a magnet sensor (570) disposed on the carrier (550) configured to sense the magnet (560); and
a controller (50) configured to control the moving mechanism (500) when the magnet (560) is sensed by the magnet sensor (570).

12. The air conditioner (10) according to claim 11, further comprising a magnetic body (580) disposed on the carrier (500) and attracted to the magnet (560), wherein the carrier (500) is a nonmagnetic body.

13. The air conditioner (10) according to any one of claims 1 to 12, wherein the moving mechanism (500) further comprises a sliding guide (540) configured to guide the carrier (550).

14. The air conditioner according to any one of claims 1 to 13, wherein the carrier (550) comprises:

a seating body (551) on which the filter assembly (300) is placed; and
a stopper (553) which extends from the seating body (551) and with which the filter assembly (300) is hooked in a rear direction.

15. The air conditioner according to claim 14, wherein a magnet (560) is disposed on the filter assembly (300),
wherein a magnetic body (580) is disposed on a rear surface of the stopper (553) and is configured to apply attraction force to the magnet (560) such that the magnet (560) moves in a direction toward the stopper (553).

Fig.1

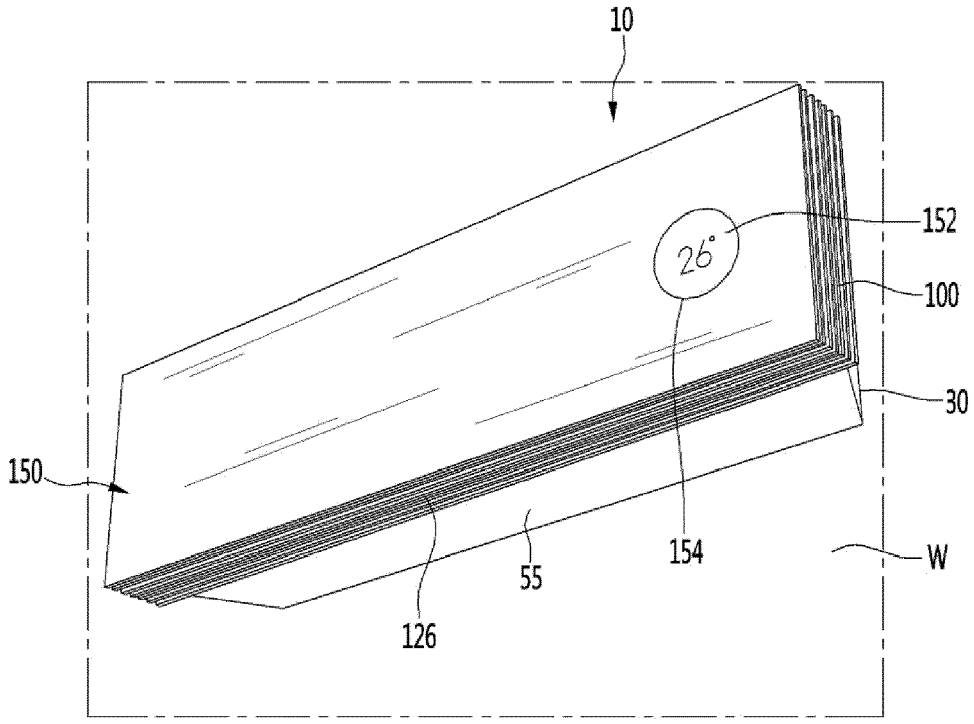

Fig.2

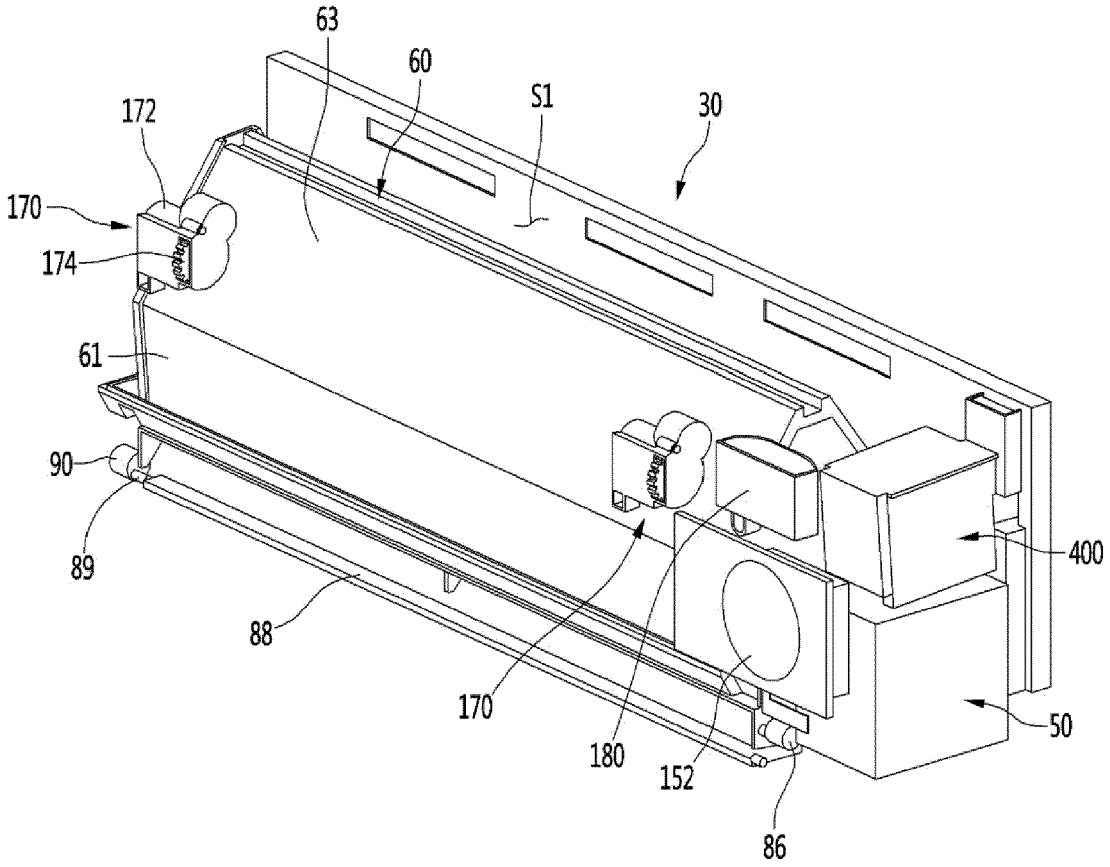

Fig.3

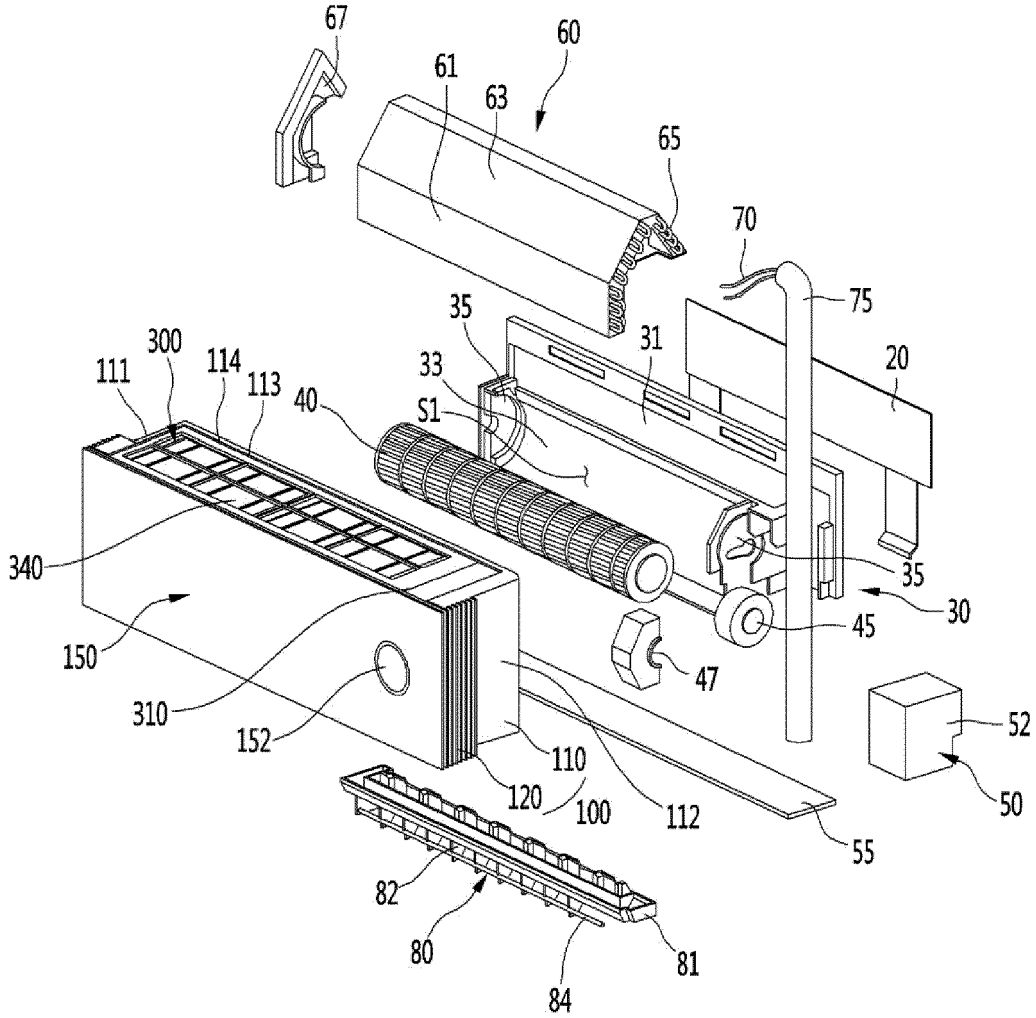
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Fig.4

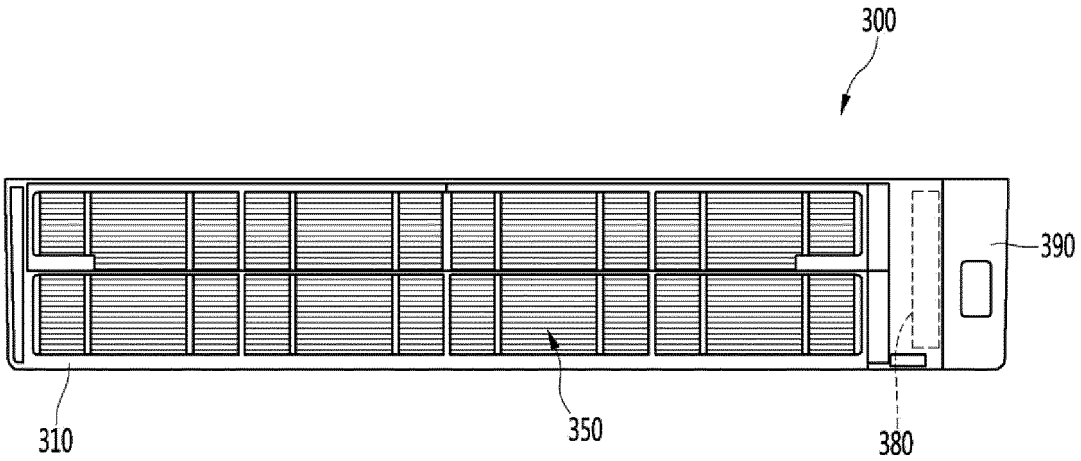

Fig.5

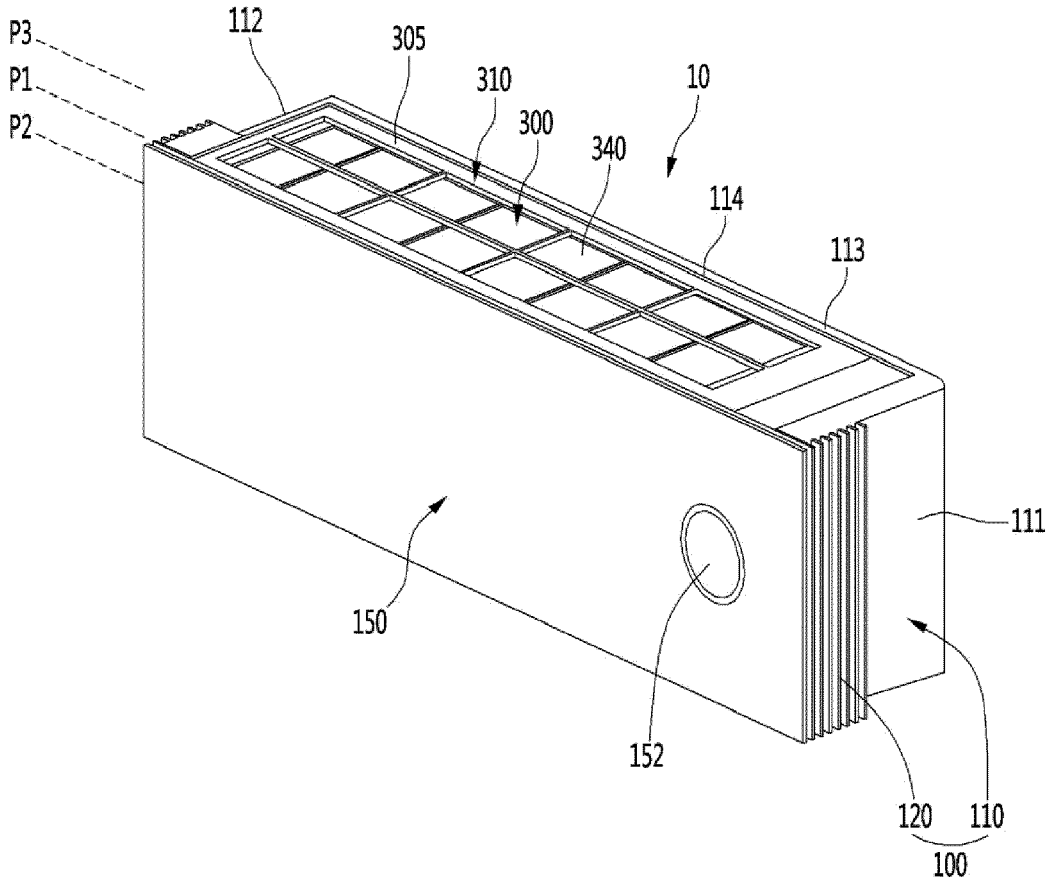

Fig.6

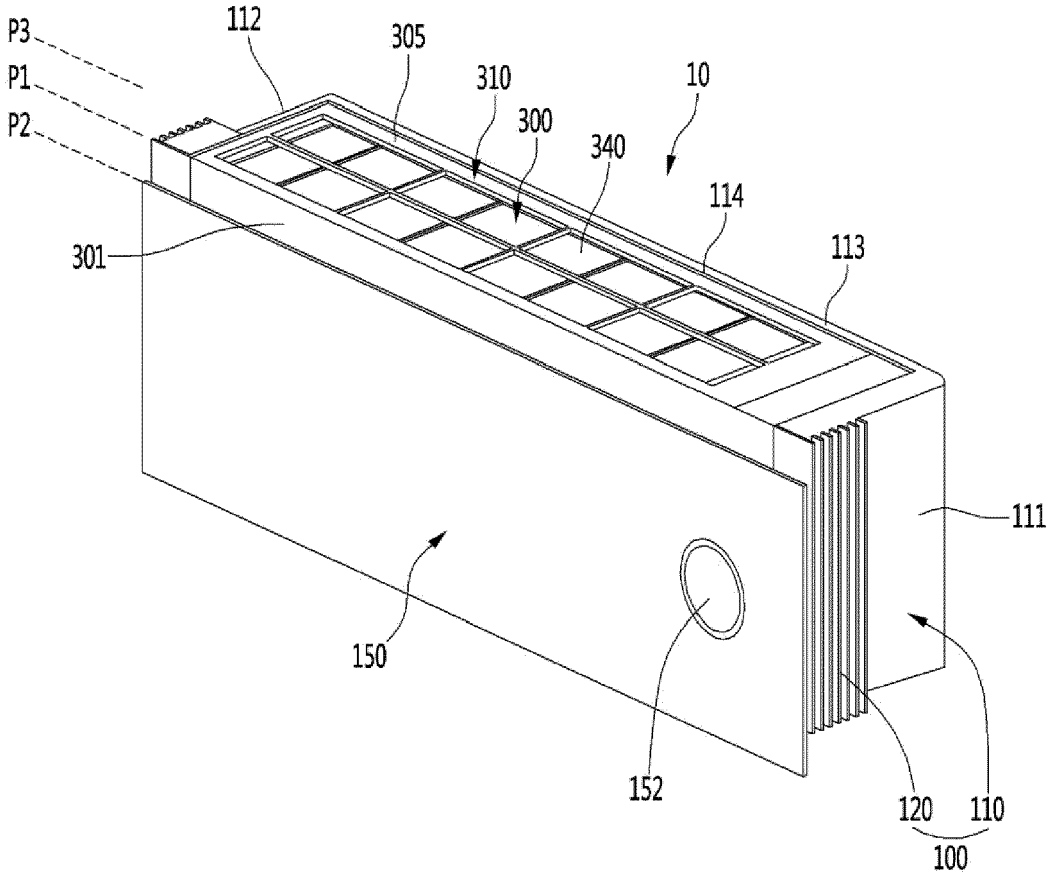
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Fig.7

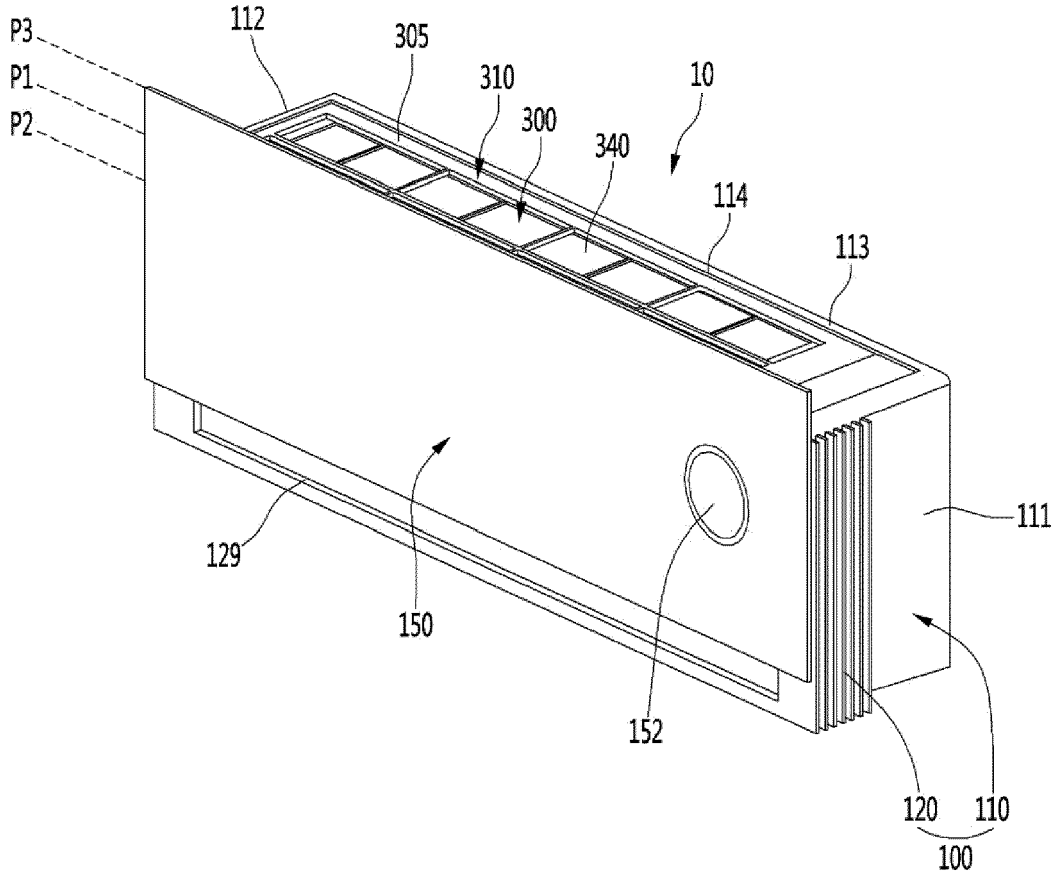
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Fig.8

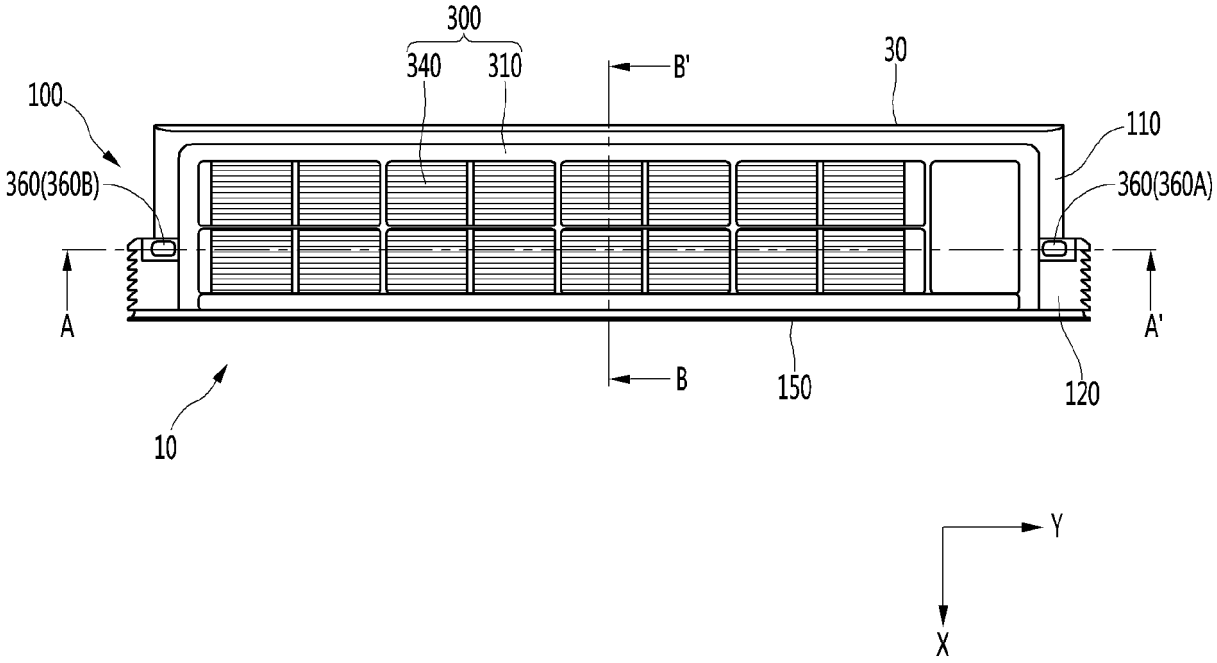

Fig.9

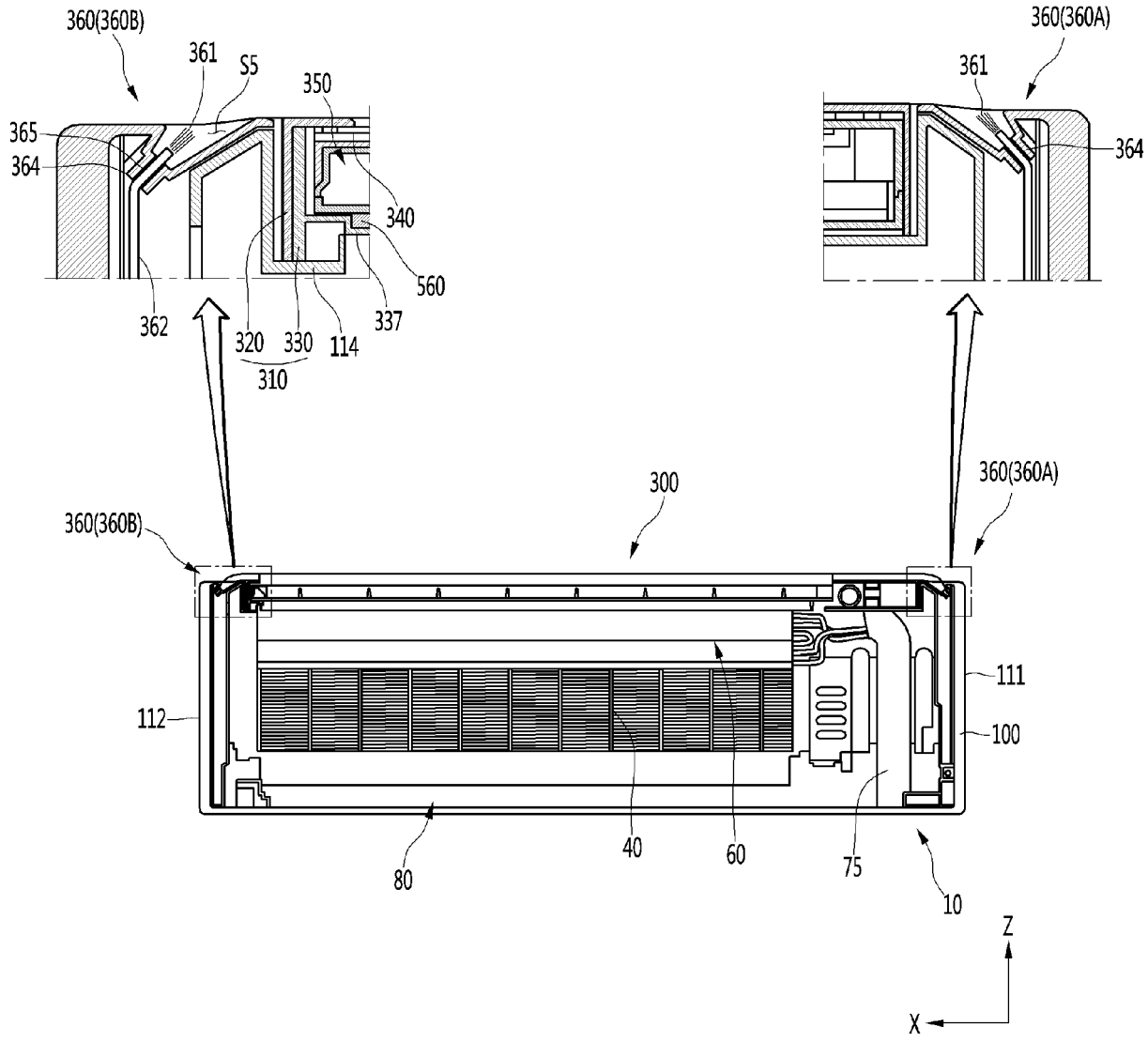
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Fig.10

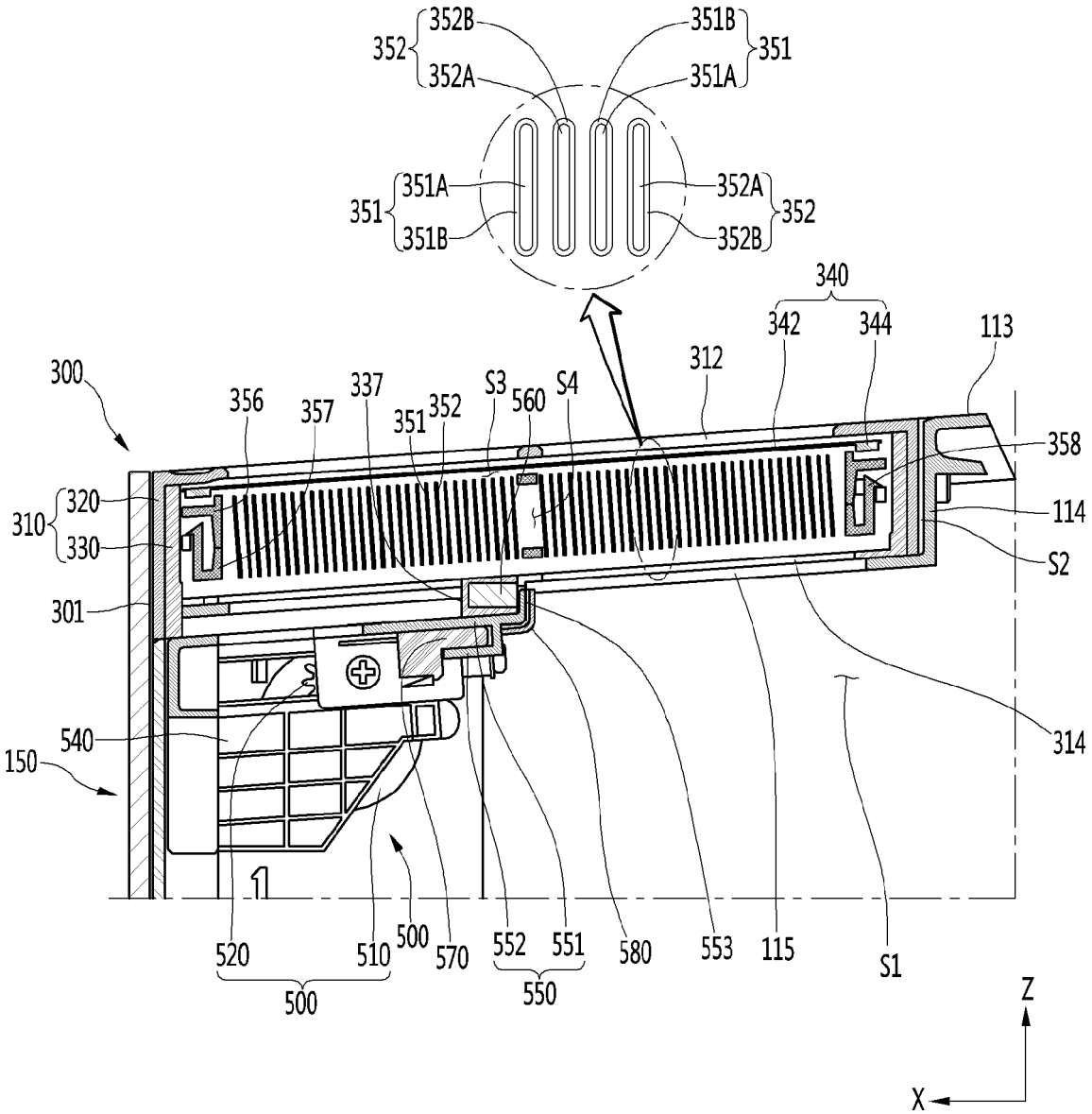
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Fig.11

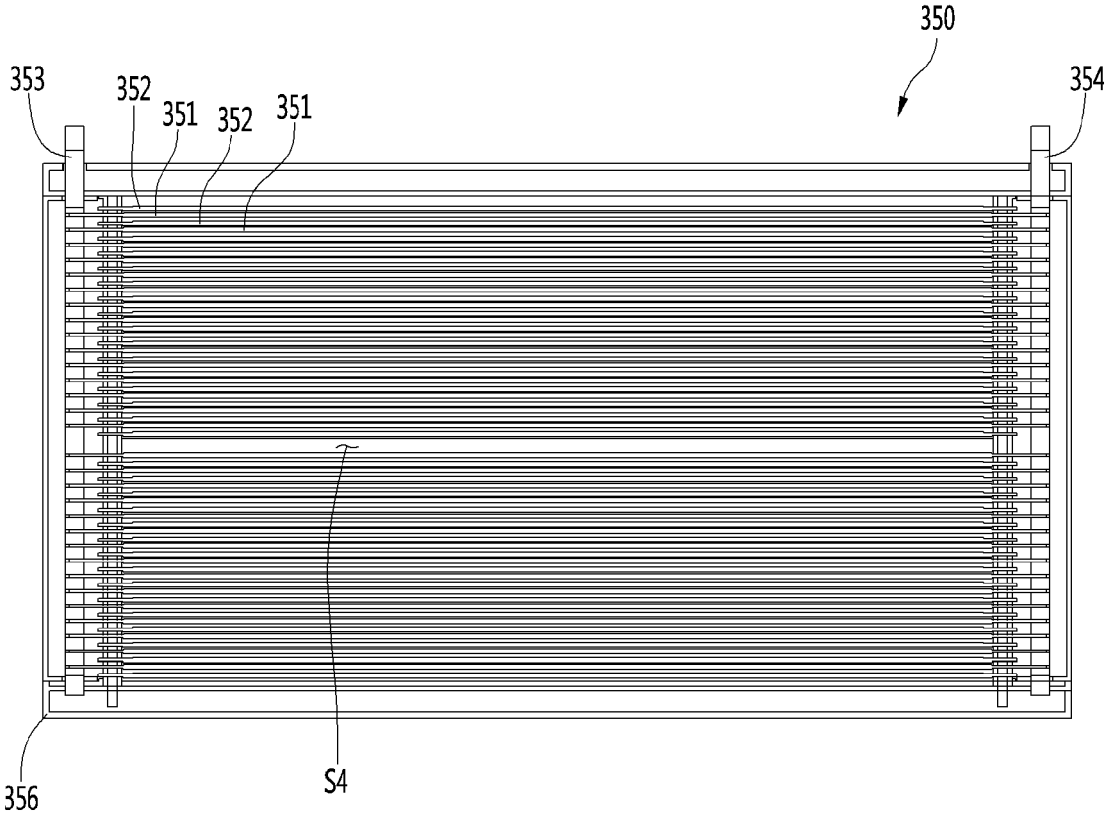

Fig.12

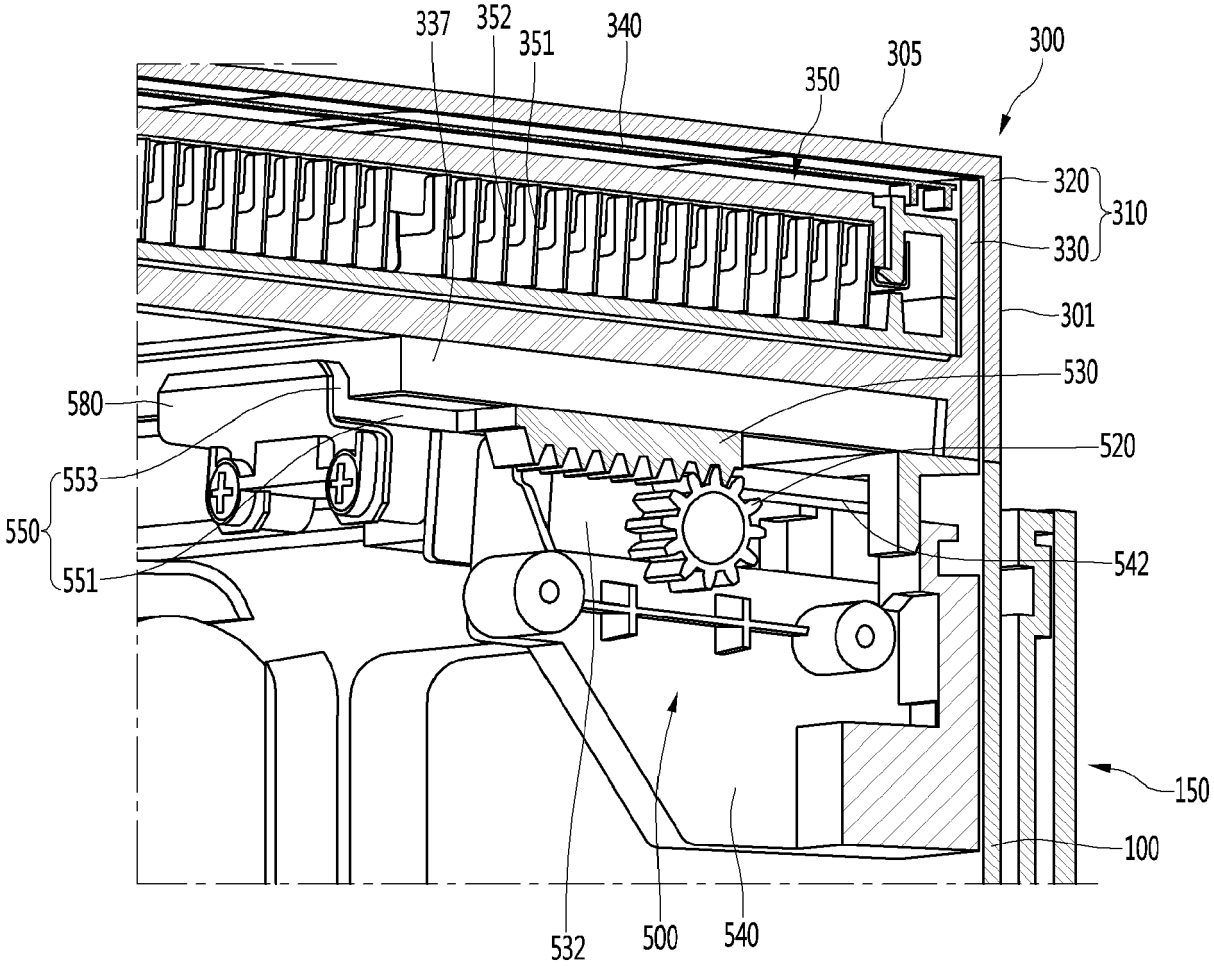
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Fig.13

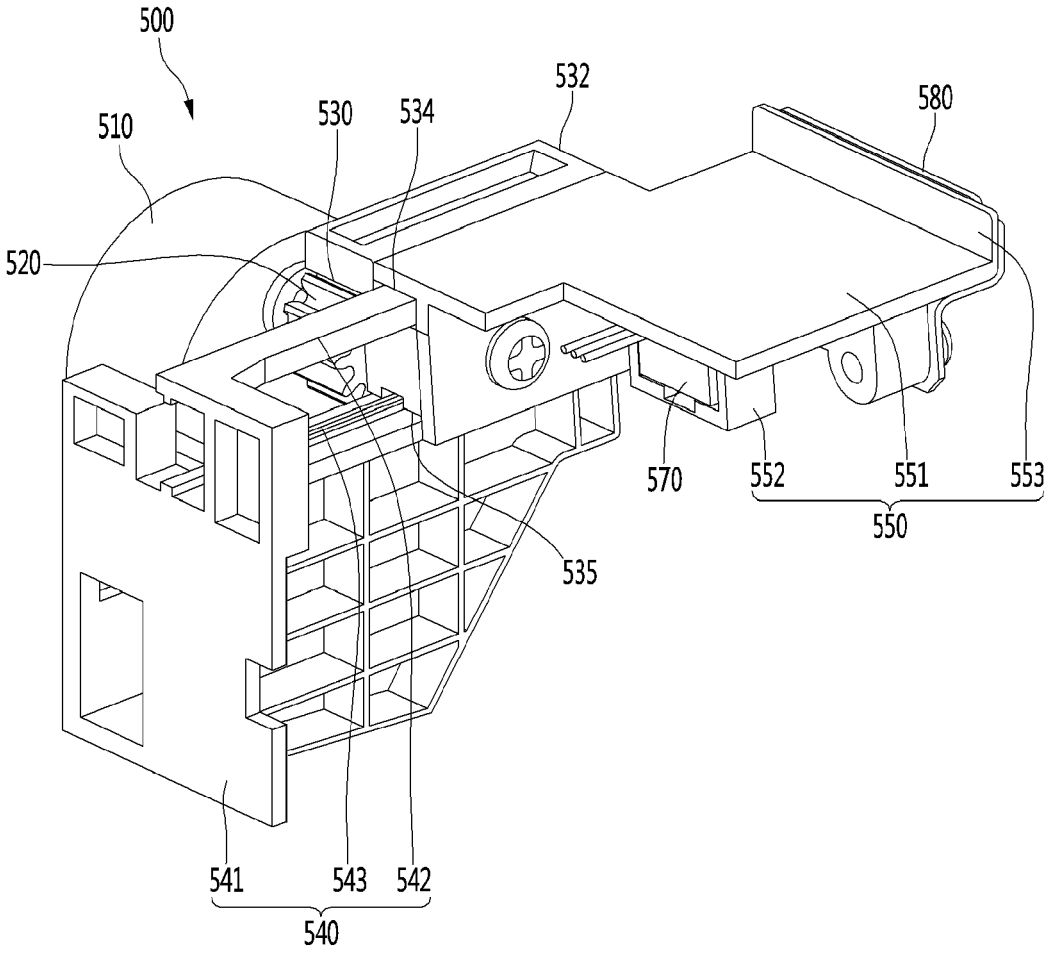
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Fig.14

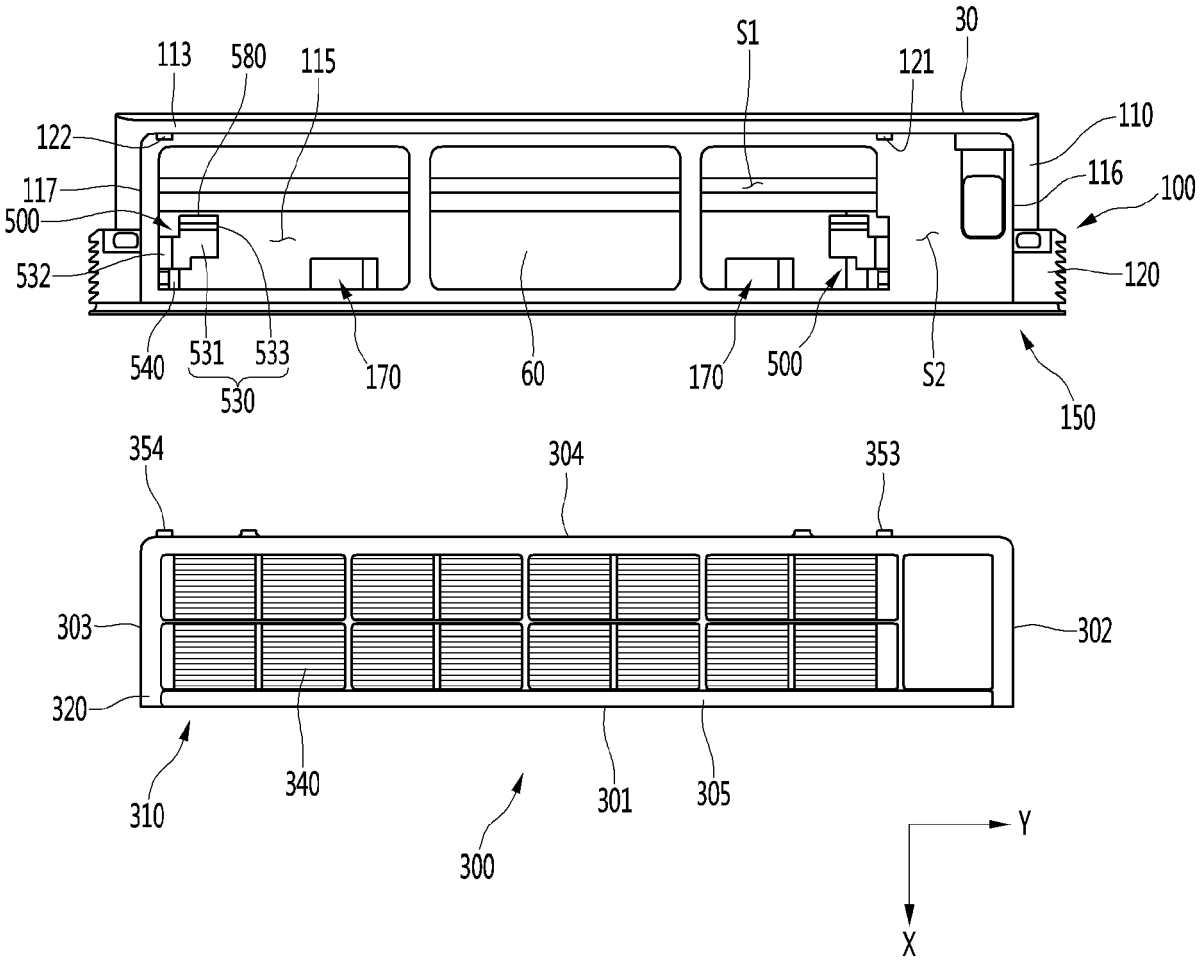
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Fig.15

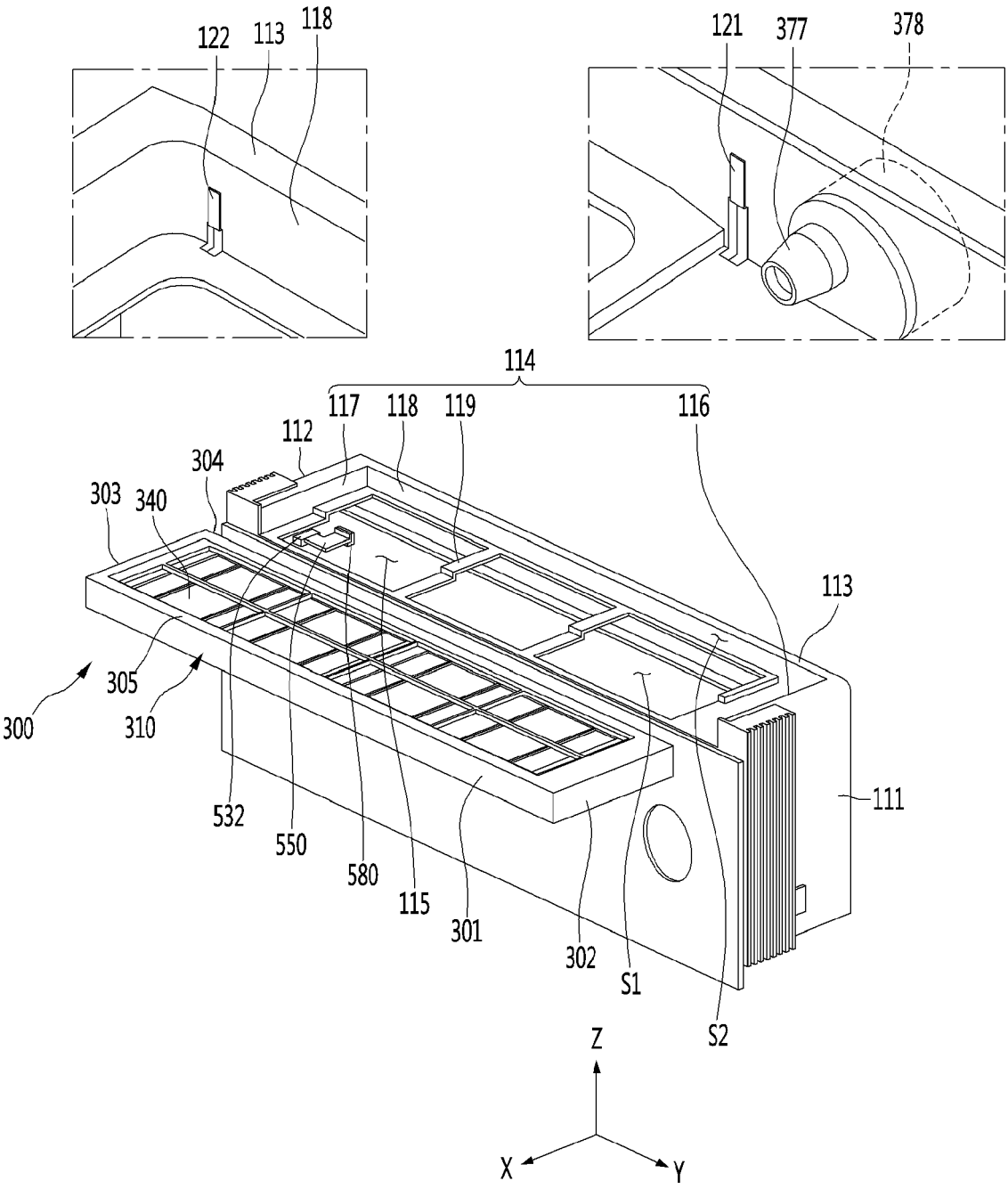
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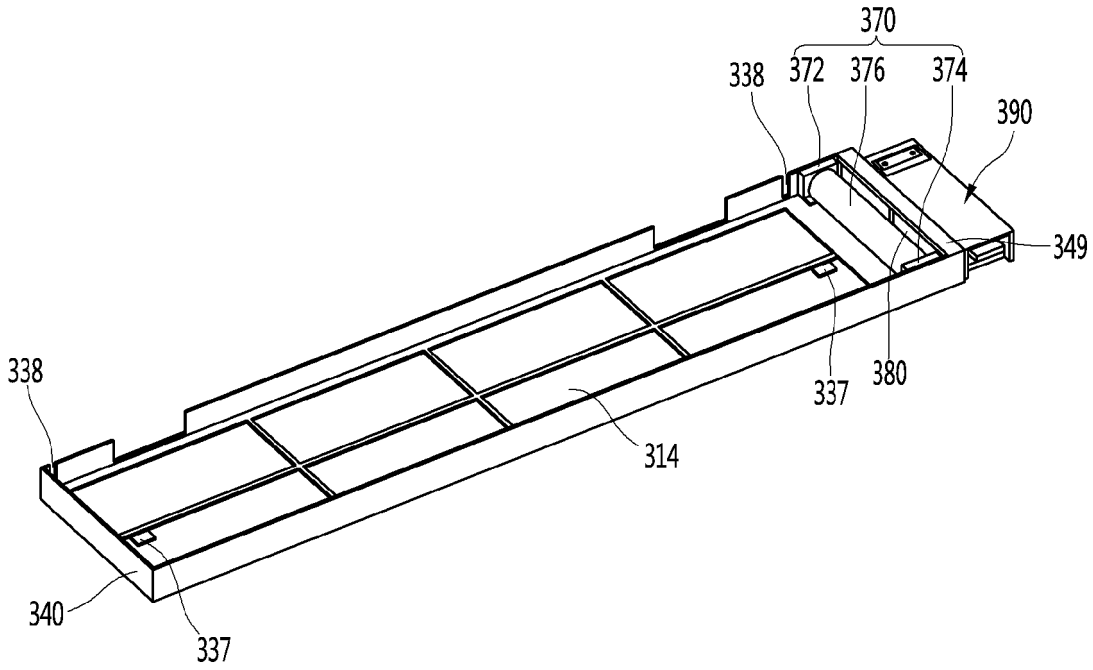
Fig.16



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Application Number
EP 21 15 0232

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Y	EP 1 640 671 A2 (FUJITSU GENERAL LTD [JP]) 29 March 2006 (2006-03-29) * paragraph [0040] * * figures 1-2 *	1-15	
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A	JP 2009 216277 A (MITSUBISHI HEAVY IND LTD) 24 September 2009 (2009-09-24) * the whole document *	1	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	3 May 2021	Mattias Grenbäck

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