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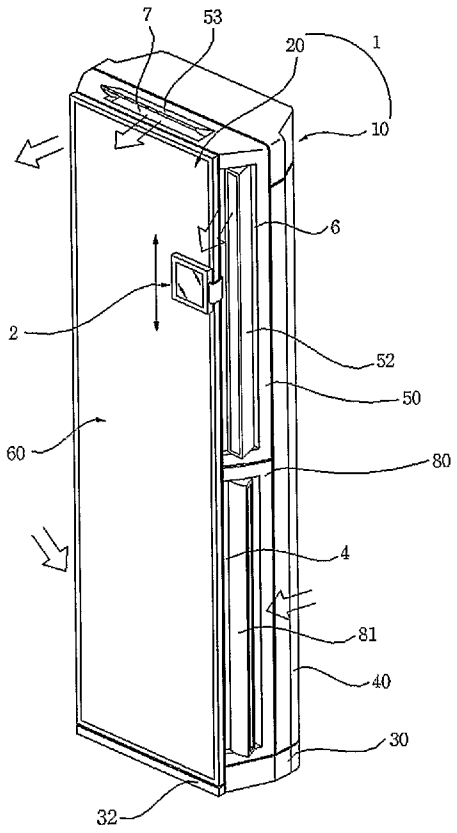
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(54) Title: AIR CONDITIONER



(57) Abstract: The present invention discloses an air conditioner which can allow the user to easily recognize and input information by moving a display for displaying the information. The air conditioner includes a main body for air-conditioning an indoor space, a display positioned toward the front of the main body, for displaying information, and a display moving mechanism connected to the display, for moving the display.

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Description

AIR CONDITIONER

Technical Field

[1] The present invention relates to an air conditioner, and more particularly, to an air conditioner which can allow the user to easily recognize and input information by moving a display for displaying the information.

[2]

Background Art

[3] In general, in order to provide a pleasant indoor environment to the user, an air conditioner cools and heats an indoor space or purifies the air by using a refrigerant freezing cycle including a compressor, a condenser, an expansion device and an evaporator. The air conditioner is roughly classified into a split type air conditioner and an integral type air conditioner.

[4] The split type air conditioner and the integral type air conditioner are identical in function. In the split type air conditioner, a cooling/heat radiating device is installed in an indoor unit, a heat radiating/cooling device and a compression device are installed in an outdoor unit, and the indoor unit and the outdoor unit are connected through a refrigerant pipe. Meanwhile, the cooling and heat radiating functions are integrated into the integral type air conditioner. The integral type air conditioner is installed through holes punched in a wall of a house, or suspended on a window of the house.

[5] Fig. 43 is a perspective view illustrating a conventional air conditioner, and Fig. 44 is a front view illustrating the conventional air conditioner.

[6] As illustrated in Figs. 43 and 44, the conventional air conditioner includes a base 601, a cabinet 602 placed at the rear upper portion of the base 601 and provided with an open front face, a front upper panel 604 placed at the front upper portion of the cabinet 602 and provided with a front air discharge hole 604a at a front upper portion thereof and left and right air discharge holes 604b and 604c at both side inclined faces thereof, a front lower panel 605 placed between the front face of the front upper panel 604 and the base 601, and left and right suction grills 606 and 607 placed between the left and right faces of the front upper panel 604 and the base 601.

[7] An up-down driving panel 610 is installed at the front upper panel 604 to be ascendable and descendable, for opening and closing the front air discharge hole 604a. A forward-backward driving panel 612 is installed at the front face of the front upper panel 604 to be advanceable and retractable, for solving a step difference between the

front upper panel 604 and the up-down driving panel 610 in the ascent of the up-down driving panel 610. Left and right vanes 614 and 616 are pivotably mounted at both side upper portions of the front upper panel 604, for opening and closing the left and right air discharge holes 604b and 604c, and controlling the directions of the air discharged through the left and right air discharge holes 604b and 604c.

[8] Meanwhile, a display 617 for displaying the operation information of the air conditioner is fixedly installed at the upper portion of the front lower panel 605 which is almost the center of the front face of the air conditioner.

[9] The display 617 includes a display panel 618 provided with a display window 618a installed at the front face of the air conditioner to be exposed to the outside, and buttons 618b for operating the air conditioner, and an LED (not shown) installed at the back of the display window 618a of the display panel 618.

[10] However, in the conventional air conditioner, the display 617 is fixedly installed almost at the center of the front face of the air conditioner, so that the user cannot easily identify the information of the display window 618a in a position lower or higher than that of the display window 618a. In addition, when identifying the information of the display window 618a, the user is influenced by peripheral illumination or lighting.

[11] As the display 617 is exposed to the outside at the front face of the air conditioner, it may break down due to an external impact. Dust or water may infiltrate through the gap 618c between the front face of the air conditioner and the display window 618a of the display 617, to thereby damage the inside of the display 617.

[12] In the meantime, Registered Patent Publication 10-0402619 discloses an indoor unit of an air conditioner wherein a control unit is integrally formed with both ends of a discharge grill, and comes in and out of the indoor unit with the discharge grill when the discharge grill ascends and descends. However, when the indoor unit of the air conditioner is not used, if the discharge grill is positioned in the indoor unit, the control unit is not exposed to the outside. It is thus difficult to control the operation or display information.

[13] Moreover, in the indoor unit of the air conditioner, the discharge grill comes in and out of the lower side through the bottom face of the indoor unit. In the case of a stand type air conditioner, it is difficult to lift and lower the discharge grill and the control unit.

[14]

Disclosure of Invention

[15] An object of the present invention is to provide an air conditioner which can allow the user to easily recognize and input information, by movably configuring a display positioned toward a front of a main body.

[16] Another object of the present invention is to provide an air conditioner which can move a display without disassembling a main body.

[17] Yet another object of the present invention is to provide an air conditioner which can move a moving panel and a display, by transferring power to the moving panel through a moving gear and a fixed gear.

[18] Yet another object of the present invention is to provide an air conditioner which can stably position-shift a display by a manual position shift using a magnetic principle.

[19] Yet another object of the present invention is to provide an air conditioner which can improve a control feeling during the movement of a display, by stably position-shifting the display by elasticity.

[20] Yet another object of the present invention is to provide an air conditioner which can increase the using convenience by preventing damage of a display and automatic ally position-shifting the display to clearly show information.

[21] Yet another object of the present invention is to provide an air conditioner which can prevent damage of a display by position-shifting the display inside a main body.

[22] Yet another object of the present invention is to provide an air conditioner which can stably position-shift a display without inclining or distorting the display.

[23]

[24] In order to achieve the above-described objects of the invention, there is provided an air conditioner, including: a main body for air-conditioning an indoor space; a display positioned toward the front of the main body, for displaying information; and a display moving mechanism connected to the display, for moving the display.

[25] Preferably, the main body includes an air conditioning unit with an air suction hole and an air discharge hole formed thereat, and a front panel pivotably connected to the air conditioning unit, the display moving mechanism being placed at the back of the front panel.

[26] Preferably, the display is positioned at the front of the front panel, and includes a connection portion for connecting the display positioned at the front of the front panel to the display moving mechanism positioned at the back of the front panel.

[27] Preferably, the connection portion surrounds a part of the edge of the front panel.

[28] Preferably, the main body includes an air conditioning unit with an air suction hole and an air discharge hole formed thereat, and a front panel pivotably connected to the air conditioning unit and provided with a transparent portion, the display and the display moving mechanism being placed at the front panel.

[29] Preferably, the front panel includes a glass constituting the transparent portion, and a glass panel coupled to the glass, the display moving mechanism being placed at the glass panel.

[30] Preferably, the display is placed between the glass and the glass panel, and the display moving mechanism is placed at the back of the glass panel.

[31] Preferably, a through hole portion through which the connection portion for connecting the display to the display moving mechanism passes is formed at the glass panel.

[32] Preferably, a display housing portion for housing the display to be position-shiftable is formed at the glass panel.

[33] Preferably, the air conditioner includes a guide provided on at least one of the main body and the display moving mechanism, for guiding the position shift of the display moving mechanism.

[34] Preferably, the display moving mechanism includes a moving panel connected to the display, a moving motor installed at the moving panel, and a power transfer mechanism cooperated with the moving motor, for position-shifting the moving panel.

[35] Preferably, the power transfer mechanism includes a fixed gear formed at the main body, and a moving gear installed at the moving motor and engaged with the fixed gear to move along the fixed gear in the driving of the moving motor.

[36] Preferably, the fixed gear is a rack formed at the main body to be long in the up-down direction, and the moving gear is a pinion installed on the rotation shaft of the moving motor.

[37] Preferably, the display moving mechanism includes a moving panel connected to the display, a magnetic substance installed at any one of the main body and the moving panel, and a magnet installed at the other of the main body and the moving panel to slide along the magnetic substance by a magnetic force with the magnetic substance.

[38] Preferably, a roller rolling along the main body is installed on at least one of the display and the moving panel.

[39] Preferably, the magnetic substance is placed at the rear face of the front panel to be long in the up-down direction, and the magnet is installed at the moving panel.

[40] Preferably, a handle placed at the outer portion of the main body is connected to the

moving panel.

[41] Preferably, the display moving mechanism includes a moving panel connected to the display, an elastic member installed at one of the main body and the moving panel, and a holder installed at the other of the main body and the moving panel, the elastic member being elastically hooked and unhooked to/from the holder.

[42] Preferably, the holder is placed at the main body to be long in the up-down direction, and the elastic member is installed at the moving panel.

[43] Preferably, the holder includes one or more hooked groove portions onto which a part of the elastic member is inserted and hooked.

[44] Preferably, the elastic member includes a hooking portion protruding to be inserted and hooked onto the hooked groove portion.

[45]

Brief Description of the Drawings

[46] The present invention will become better understood with reference to the accompanying drawings which are given only by way of illustration and thus are not limitative of the present invention, wherein:

[47] Fig. 1 is a perspective view illustrating a state where air suction holes and air d ischarge holes are open in an air conditioner in accordance with a first embodiment of the present invention;

[48] Fig. 2 is a front view illustrating the state where the air suction holes and the air discharge holes of the air conditioner of Fig. 1 are open;

[49] Fig. 3 is a vertical-sectional view illustrating the air conditioner of Fig. 1;

[50] Fig. 4 is a perspective view illustrating a state where the front face of the air conditioner is open in the forward direction to show the inside lower portion thereof, when a first example of a display moving mechanism is applied to the air conditioner of Fig. 1;

[51] Fig. 5 is a schematic exploded perspective view illustrating the air conditioner of Fig. 4;

[52] Fig. 6 is a cross-sectional view taken along line A-A of Fig. 4;

[53] Fig. 7 is an exploded perspective view illustrating a display and a display moving mechanism of Fig. 6;

[54] Fig. 8 is a perspective view illustrating the descent states of the display and the display moving mechanism of Figs. 6 and 7;

[55] Fig. 9 is a perspective view illustrating the ascent states of the display and the display moving mechanism of Figs. 6 and 7;

[56] Fig. 10 is a perspective view illustrating a state where the front face of the air conditioner is open in the forward direction to show the inside lower portion thereof, when a second example of the display moving mechanism is applied to the air conditioner of Fig. 1;

[57] Fig. 11 is a cross-sectional view taken along line A-A of Fig. 10;

[58] Fig. 12 is an exploded perspective view illustrating a display and a display moving mechanism of Fig. 10;

[59] Fig. 13 is a perspective view illustrating the descent states of the display and the display moving mechanism of Fig. 10;

[60] Fig. 14 is a perspective view illustrating the ascent states of the display and the display moving mechanism of Fig. 10;

[61] Fig. 15 is a perspective view illustrating a state where the front face of the air conditioner is open in the forward direction to show the inside lower portion thereof, when a third example of the display moving mechanism is applied to the air conditioner of Fig. 1;

[62] Fig. 16 is a cross-sectional view taken along line A-A of Fig. 15;

[63] Fig. 17 is an exploded perspective view illustrating a display and an elastic mechanism of Fig. 16;

[64] Fig. 18 is a perspective view illustrating the elastic mechanism of Fig. 17;

[65] Fig. 19 is a perspective view illustrating a descent state of a moving panel of Fig. 18;

[66] Fig. 20 is a perspective view illustrating the ascent state of the moving panel of Fig. 18;

[67] Fig. 21 is a perspective view illustrating a state where air suction holes and air discharge holes are open in an air conditioner in accordance with a second embodiment of the present invention;

[68] Fig. 22 is a front view illustrating the state where the air suction holes and the air discharge holes of the air conditioner of Fig. 21 are open;

[69] Fig. 23 is a vertical-sectional view illustrating the air conditioner of Fig. 21;

[70] Fig. 24 is a perspective view illustrating a state where the front face of the air conditioner is open in the forward direction to show the inside lower portion thereof, when a first example of a display moving mechanism is applied to the air conditioner of Fig. 21;

[71] Fig. 25 is a schematic exploded perspective view illustrating the air conditioner of Fig. 24;

[72] Fig. 26 is a cross-sectional view taken along line B-B of Fig. 24;

[73] Fig. 27 is an exploded perspective view illustrating a display and a display moving mechanism of Fig. 26;

[74] Fig. 28 is a perspective view illustrating the descent states of the display and the display moving mechanism of Figs. 26 and 27;

[75] Fig. 29 is a perspective view illustrating the ascent states of the display and the display moving mechanism of Figs. 26 and 27;

[76] Fig. 30 is a perspective view illustrating a state where the front face of the air conditioner is open in the forward direction to show the inside lower portion thereof, when a second example of the display moving mechanism is applied to the air conditioner of Fig. 21;

[77] Fig. 31 is a cross-sectional view taken along line B-B of Fig. 30;

[78] Fig. 32 is an exploded perspective view illustrating a display and a magnetic mechanism of Fig. 31;

[79] Fig. 33 is a perspective view illustrating the descent states of the display and the magnetic mechanism of Figs. 31 and 32;

[80] Fig. 34 is a perspective view illustrating the ascent states of the display and the magnetic mechanism of Figs. 31 and 32;

[81] Fig. 35 is a cross-sectional view illustrating majpr portions of another example of the display moving mechanism applied to the air conditioner of Fig. 30;

[82] Fig. 36 is a perspective view illustrating a state where the front face of the air conditioner is open in the forward direction to show the inside lower portion thereof, when a third example of the display moving mechanism is applied to the air conditioner of Fig. 21;

[83] Fig. 37 is a cross-sectional view taken along line B-B of Fig. 36;

[84] Fig. 38 is an exploded perspective view illustrating a display and an elastic mechanism of Fig. 37;

[85] Fig. 39 is a perspective view illustrating the elastic mechanism of Fig. 38;

[86] Fig. 40 is a perspective view illustrating a descent state of a moving panel of Fig. 39;

[87] Fig. 41 is a perspective view illustrating the ascent state of the moving panel of Fig. 39;

[88] Fig. 42 is a cross-sectional view illustrating majpr portions of another example of the display moving mechanism applied to the air conditioner of Fig. 36;

[89] Fig. 43 is a perspective view illustrating a conventional air conditioner; and

[90] Fig. 44 is a front view illustrating the conventional air conditioner.

[91]

Best Mode for Carrying Out the Invention

[92] An air conditioner in accordance with preferred embodiments of the present invention will now be described in detail with reference to the accompanying drawings.

[93] Fig. 1 is a perspective view illustrating a state where air suction holes and air discharge holes are open in an air conditioner in accordance with a first embodiment of the present invention, and Fig. 2 is a front view illustrating the state where the air suction holes and the air discharge holes of the air conditioner of Fig. 1 are open.

[94] In accordance with the first embodiment of the present invention, as illustrated in Figs. 1 and 2, the air conditioner includes a main body 1 for air-conditioning an indoor space, and a display 2 provided at the outer portion of the main body 1 to be position-shiftable.

[95] The main body 1 includes an air conditioning unit 10 with air suction holes 3 and 4 and air discharge holes 5, 6 and 7 formed thereat, for sucking the air from the indoor space and discharging the air to the indoor space, and a front panel 20 pivotably connected to the air conditioning unit 10, for opening and closing the partial or whole front face of the air conditioning unit 10.

[96] The air conditioning unit 10 includes a base 30, a cabinet 40, an upper panel 50 and lower panels 70 and 80. Hereinafter, a stand type air conditioner will be taken as an example.

[97] A stepped portion 32 is formed at the base 30 to protrude to the lower portion of the front panel 20, for reducing a gap between the bottom end of the front panel 20 and the floor S of the indoor space, when the front panel 20 closes the front face of the air conditioning unit 10.

[98] The left air discharge hole 5 is formed at the left portion of the upper panel 50, the right air discharge hole 6 is formed at the right portion thereof, and the upper air discharge hole 7 is formed at the upper portion thereof.

[99] In the air conditioning unit 10, the left air discharge hole 5 can be formed at the left side of the front face of the upper panel 50, the right air discharge hole 6 can be formed at the right side of the front face of the upper panel 50, and the front panel 20 can be placed to open and close the center among the left, right and center of the upper panel 50. Alternatively, the left air discharge hole 5 can be formed at the left face of the upper panel 50, the right air discharge hole 6 can be formed at the right face of the

upper panel 50, and the front panel 20 can be placed to open and close the front face of the upper panel 50. The left and right portions of the upper panel 150 can be inclined.

[100] Hereinafter, it is assumed that the left and right portions of the upper panel 50 are inclined, the left air discharge hole 5 is formed at the left inclined portion, the right air discharge hole 6 is formed at the right inclined portion, and the front panel 20 is placed to open and close the space between the left inclined portion and the right inclined portion of the upper panel 50.

[101] In addition, in the air conditioning unit 10, the upper air discharge hole 7 can be formed at the upper portion of the front face of the upper panel 50 or at the top face of the upper panel 50.

[102] Hereinafter, it is assumed that the upper air discharge hole 7 is formed at the top face of the upper panel 50.

[103] Meanwhile, a left air discharge hole vane 51 for opening and closing the left air discharge hole 5 and controlling the direction of the air discharged through the left air discharge hole 5 is pivotably placed at the upper panel 50, and a left air discharge hole vane motor for pivoting the left air discharge hole vane 51 is installed in the upper panel 50.

[104] A right air discharge hole vane 52 for opening and closing the right air discharge hole 6 and controlling the direction of the air discharged through the right air discharge hole 6 is pivotably placed at the upper panel 50, and a right air discharge hole vane motor for pivoting the right air discharge hole vane 52 is installed in the upper panel 50.

[105] An upper air discharge hole vane 53 for opening and closing the upper air discharge hole 7 and controlling the direction of the air discharged through the upper air discharge hole 7 is pivotably placed at the upper panel 50, and an upper air discharge hole vane motor for pivoting the upper air discharge hole vane 53 is installed in the upper panel 50.

[106] The lower panels 70 and 80 include a left lower panel 70 placed between the left portion of the upper panel 50 and the base 30 and provided with the left air suction hole 3, and a right lower panel 80 placed between the right portion of the upper panel 50 and the base 30 and provided with the right air suction hole 4.

[107] A left air suction hole vane 71 for opening and closing the left air suction hole 3 is pivotably placed at the left lower panel 70, a left air suction hole vane motor for pivoting the left air suction hole vane 71 is installed in the left lower panel 70, and a left filter 72 for purifying the air sucked into the left air suction hole 3 is mounted on

the left lower panel 70.

[108] A right air suction hole vane 81 for opening and closing the right air suction hole 4 is pivotably placed at the right lower panel 80, a right air suction hole vane motor for pivoting the right air suction hole vane 81 is installed in the right lower panel 80, and a right filter 82 for purifying the air sucked into the right air suction hole 4 is mounted on the right lower panel 80.

[109] In the meantime, the display 2 of Figs. 1 and 2 is placed at the front panel 20 to be position-shiftable. The display 2 can be position-shifted manually by the user or automatically by a display moving mechanism (not shown) including a motor. Hereinafter, it is assumed that the display 2 is automatically position-shifted by the display moving mechanism.

[110] The display 2 and the display moving mechanism will later be explained in detail.

[111] Fig. 3 is a vertical-sectional view illustrating the air conditioner of Fig. 1, Fig. 4 is a perspective view illustrating a state where the front face of the air conditioner is open in the forward direction to show the inside lower portion thereof, when a first example of the display moving mechanism is applied to the air conditioner of Fig. 1, and Fig. 5 is a schematic exploded perspective view illustrating the air conditioner of Fig. 4.

[112] Referring to Fig. 3, the front panel 20 includes a glass 21 placed at the front, a glass panel 22 placed at the back of the glass 21, and covers 23 for assembling the glass 21 and the glass panel 22.

[113] The covers 23 surround the edges of the glass 21 and the glass panel 22, and are fastened to the glass panel 22 by fastening means such as hooks or fastening bolts.

[114] The covers 23 include four left, right, upper and lower covers having almost (-shaped sections and covering the four left, right, upper and lower edges of the glass 21 and the glass panel 22, respectively. The four covers 23 are placed in a (-shape along the edges of the glass 21 and the glass panel 22.

[115] In the front panel 20, an opaque portion 24 with a predetermined color or pattern may be printed on the rear face of the glass 21, or an opaque sheet may be individually adhered to the rear face of the glass 21. Hereinafter, it is assumed that the opaque portion 24 is formed at the rear face of the glass 21.

[116] The upper and lower portions of the front panel 20 are hinge-connected to the front of the air conditioning unit 10 so that the front panel 20 can pivot on one of the left and right sides in the forward direction.

[117] As illustrated in Fig. 4, almost the center of one of the left and right sides of the front panel 20 is connected to the air conditioning unit 10, particularly, to the upper

panel 50 by a connection mechanism. The connection mechanism is configured to not abruptly but softly open and close the front panel 20.

[118] The connection mechanism includes a slide member 25 slidably connected to one of the front panel 20 and the upper panel 50, and hinge-connected to the other of the front panel 20 and the upper panel 50. A hinge connection portion 54 to which the slide member 25 is rotatably hinge-connected is formed at one of the front panel 20 and the upper panel 50, and a slide guide portion 26 for guiding sliding of the slide member 25 is formed at the other of the front panel 20 and the upper panel 50.

[119] When the front panel 20 pivots, the slide member 25 rotates around the hinge connection portion 54 and slides along the slide guide portion 26. When the slide member 25 slides, a frictional force operates on the front panel 20. The front panel 20 does not abruptly open and close due to the friction with the slide member 25.

[120] That is, the upper, center and lower portions of one of the left and right sides of the front panel 20 are connected to and supported by the air conditioning unit 10, respectively.

[121] Still referring to Fig. 4, a remote controller box 27 for housing a remote controller for remotely controlling the air conditioner is installed at the front panel 20.

[122] The remote controller box 27 is provided at the rear face of the front panel 20 not to be exposed to the outside of the main body 1.

[123] If the remote controller is taken in and out vertically in the up-down direction, the remote controller may contact the rear face of the front panel 20. In this case, the remote controller may be deformed and may not be easily taken in and out. If the remote controller is taken in and out inclinedly in the up-down direction, the remote controller can be easily taken in and out without damage. Therefore, the remote controller box 27 is configured so that the remote controller can be taken in and out in the inclined direction.

[124] The remote controller box 27 includes a fixed box 28 fixedly mounted on the glass panel 22 of the front panel 20 and provided with an open rear face, and a pivoting box 29 placed vertically to the rear face of the fixed box 28, for closing the rear face of the fixed box 28, and inclinedly pivoted around the lower portion of the fixed box 28 in the backward direction, for opening the rear face of the fixed box 28.

[125] The lower portion of the pivoting box 29 is hinge-connected to the lower portion of the fixed box 28.

[126] Meanwhile, as shown in Figs. 3 to 5, a lower hinge bracket 34 to which the bottom end of one of the left and right sides of the front panel 20 is pivotably connected is

installed at the base 30 by fastening members such as fastening bolts.

[127] A lower bracket cover 35 for covering a part of the lower hinge bracket 34, particularly, the portion fastened to the base 30 is installed at the base 30.

[128] A box connection/disconnection portion 36 to/from which a dust box 95 of a cleaning mechanism 90 discussed later is slidably connected and disconnected in the forward-backward direction is formed at the base 30.

[129] As depicted in Fig. 5, the cabinet 40 is placed at the rear upper portion of the base 30 to be long in the up-down direction. The front, top and bottom faces of the cabinet 40 are open, and the left and right faces 41 and 42 thereof are inclined from the rear face 43.

[130] A top panel 44 is placed at the upper portion of the cabinet 40.

[131] As shown in Fig. 3, the bottom and rear faces of the upper panel 50 are open, and as shown in Fig. 5, the left and right portions 55 and 56 thereof are inclined from the front face 57, and the top face 58 thereof is orthogonal to the front face 57.

[132] As illustrated in Figs. 3 to 5, an upper hinge bracket 59 to which the top end of one of the left and right sides of the front panel 20 is pivotably connected is installed at the upper panel 50 by fastening members such as bolts.

[133] An upper bracket cover 60 for covering a part of the upper hinge bracket 58 is provided at the upper panel 50.

[134] Filter frames 73 on which the left filter 72 and the right filter 82 are fixedly mounted are installed at the left lower panel 70 and the right lower panel 80, respectively.

[135] In the meantime, still referring to Figs. 3 to 5, the cleaning mechanism 90 for automatically cleaning the left and right filters 72 and 82 is provided in the air conditioning unit 10.

[136] As shown in Fig. 4, the cleaning mechanism 90 includes filter kits 91 movably placed at the left lower panel 70 and the right lower panel 80 to move along the left and right filters 72 and 82, respectively, for collecting dust from the left and right filters 72 and 82, a kit blower 93 connected to the filter kits 91 through dust hoses 92, for sucking filter impurities such as dust from the left and right filters 72 and 82, a cyclone 94 for separating the sucked filter impurities from the air, a dust box 95 for collecting the filter impurities separated in the cyclone 94, and a cleaning mechanism control box 96 for controlling the cleaning mechanism 90, particularly, the filter kits 91 and the kit blower 93.

[137] In addition, as depicted in Figs. 3 and 5, the air conditioning unit 10 includes a heat

exchanger 100 for heating and cooling the air by using a refrigerant, and a blower 110 for introducing the outdoor air into the air conditioning unit 10, passing the air through the heat exchanger 100, and blowing the air to the outside of the air conditioning unit 10.

[138] The heat exchanger 100 is mounted on at least one of the cabinet 40 and the blower 110 to be inclinedly positioned between the upper portion of the cabinet 40 and the upper panel 50.

[139] The blower 110 is mounted at the cabinet 40 to be positioned at the lower portion of the heat exchanger 100.

[140] The blower 110 includes a blowing motor 111 mounted at the lower portion of the cabinet 40, a blowing fan 112 connected to the blowing motor 111, a fan housing 115 mounted at the cabinet 40, and provided with an opening portion 113 at a front face thereof and a discharge portion 114 at a top face thereof, and an orifice 116 placed at the front face of the fan housing 115.

[141] A drain pan 117 for collecting condensed water dropped from the heat exchanger 100 and supporting the heat exchanger 100 is formed at the upper portion of the fan housing 115.

[142] A purification mechanism 120 for purifying the air sucked into the orifice 116 in the rotation of the blowing fan 112 is installed at the front of the blower 110.

[143] As illustrated in Figs. 3 to 5, the purification mechanism 120 includes one or more purification units 121, 122 and 123, and a purification unit holder 130 mounted at the blower 110 so that the one or more purification units 121, 122 and 123 can be connected and disconnected to/from the purification unit holder 130.

[144] The purification unit holder 130 is configured to suck the air through the front, left, right and top faces thereof and to discharge the air through the rear face thereof.

[145] If the purification units 121, 122 and 123 are taken in and out vertically in the up-down direction, the purification units 121, 122 and 123 may contact the front face of the blower 110 or the drain pan 117. In this case, the purification units 121, 122 and 123 may be easily damaged and may not be easily taken in and out. If the purification units 121, 122 and 123 are taken in and out horizontally in the forward-backward direction, the user must bend himself/herself to take in and out the purification units 121, 122 and 123. If the purification units 121, 122 and 123 are taken in and out inclinedly in the up-down direction, the purification units 121, 122 and 123 can be easily taken in and out without damage. Accordingly, the purification unit holder 130 is configured so that the purification units 121, 122 and 123 can be taken in and out in

the inclined direction.

[146] The purification unit holder 130 includes a rear purification unit holder 140 fixedly mounted at the blower 110 , and a front purification unit holder 150 rotatably connected to the rear purification unit holder 140. The front purification unit holder 150 can be open inclinedly in the forward direction.

[147] Meanwhile, in the air conditioning unit 10, an opening portion 160 open in the forward-backward direction is formed among the base 30, the upper panel 50 and the left and right lower panels 70 and 80. The purification units 121, 122 and 123 can be taken in and out through the opening portion 160 for cleaning or replacement. Moreover, various components such as the kit blower 93 and the cleaning mechanism control box 96 installed at the inside lower portion of the air conditioning unit 10 can be serviced through the opening portion 160.

[148] An inner cover 162 for blocking the opening portion 160 is provided at the air conditioning unit 10, for improving the outward appearance and the safety when the front panel 20 is open in the forward direction.

[149] Preferably, the inner cover 162 is coupled to the lower portion of the upper panel 50 by fastening means such as fastening bolts.

[150] In Figs. 4 and 5, reference numeral 170 denotes a control unit for controlling the various front mounted components of the air conditioner. The control unit 170 is connected to the cleaning mechanism control box 96, the blowing motor 111 or the display 2 through a cable such as an electric wire. Preferably, the control unit is placed in a position exposed to the outside through the opening portion 160 when the front panel 20 is open in the forward direction and the inner cover 162 is separated from the air conditioning unit 10. For example, the control unit 170 is placed at the front of the blower 110.

[151] In Figs. 4 and 5, reference numeral 300 represents a display moving mechanism 300 provided on at least one of the air conditioning unit 10 and the front panel 20, for position-shifting the display 2 of Figs. 1 and 2. The display moving mechanism 300 may be a manual moving mechanism for manually positioning the display 2 by the user, or an automatic moving mechanism for automatically positioning the display 2 by a motor or the like. Hereinafter, it is assumed that the display moving mechanism 300 is the automatic moving mechanism.

[152] Fig. 6 is a cross-sectional view taken along line A-A of Fig. 4, Fig. 7 is an exploded perspective view illustrating the display and the display moving mechanism of Fig. 6, Fig. 8 is a perspective view illustrating the descent states of the display and the display

moving mechanism of Figs. 6 and 7, and Fig. 9 is a perspective view illustrating the ascent states of the display and the display moving mechanism of Figs. 6 and 7.

[153] The display 2 includes a display cover 210, a display PCB 220 and a display rear 230.

[154] When a display window and buttons are provided at the front face of the display 2, a display component such as an LED assembly or an LCD assembly for displaying various operation information of the air conditioner through the display window, and an input component such as switches switched by the buttons can be installed in the display 2. Alternatively, when an opening portion 212 is formed at the front face of the display 2, a display PCB 220 including an LCD PCB assembly with a touch screen for inputting an operation command of the air conditioner can be installed in the display 2. Hereinafter, it is assumed that the display PCB 220 including the LCD PCB assembly with the touch screen is installed in the display 2.

[155] The display cover 210 is formed in a quadrangular box shape with an open rear face, and provided with the opening portion 212 at the front face thereof.

[156] The display PCB 220 includes a PCB 222, and a display component 224 installed on the PCB 222, for displaying information.

[157] The PCB 222 is connected to the control unit 170 of Fig. 4 through a cable 226 such as FPC.

[158] The leading ends of the display component 224 are positioned at the back or front of the opening portion 212 of the display cover 210, or surrounded by the opening portion 212 of the display cover 210.

[159] The display rear 230 is a kind of display box or display housing for defining a space for housing the display PCB 220 with the display cover 210. The display rear 230 is formed in a quadrangular box shape with an open front face.

[160] Meanwhile, a cable through hole through which the cable 226 connected to the display PCB 220 passes is formed on at least one of the display cover 210 and the display rear 230 of the display 2.

[161] In the air conditioner according to this embodiment, as illustrated in Figs. 6 to 9, the display moving mechanism 300 is positioned at the back of the glass panel 22 which is the outer portion of the front panel 20.

[162] A display connection portion 236 for connecting the display moving mechanism 300 to the display 2 is provided at the display 2 and the display moving mechanism 300.

[163] The display connection portion 236 can be integrally formed with any one of the

display 2 and the display moving mechanism 300 and coupled to the other. Alternatively, the display connection portion 236 can be individually formed from the display 2 and the display moving mechanism 300, and coupled to the display 2 and the display moving mechanism 300, respectively. Hereinafter, it is assumed that the display connection portion 236 is integrally formed with the display 2, particularly, with one of the display cover 210 and the display rear 230, and coupled to the display moving mechanism 300.

[164] Preferably, a cable reception portion for receiving and arranging the cable 226 connected to the display PCB 220 is formed at one face or the inner portion of the display connection portion 236.

[165] Here, the display connection portion 236 is formed to surround a part of the edge of the front panel 20. When the front panel 20 closes the front face of the air conditioning unit 10, the rear portion 237 is connected to the display moving mechanism 300 through the gap between the edge of the front panel 20 and the air conditioning unit 10.

[166] In the meantime, the display 2 further includes a roller 240 installed at a rear face of a display casing 110 so that the display casing 110 can easily slide along the front face of the front panel 20 in the up-down position shift control.

[167] The roller 240 includes a holder 242 placed at the rear face of the display rear 230 in the left-right direction, and a wheel 244 rotatably connected to the holder 242.

[168] A holder hole into which a part of the holder 242 is inserted is formed at the wheel 244 to be open in the left-right direction.

[169] Preferably, the roller 240 is installed at the rear face of the display rear 230 in a plural number to be spaced apart from each other in the left-right direction or the up-down direction.

[170] Meanwhile, the display moving mechanism 300 serves to support the display 2 in a specific position and shift the position of the display 2. The display moving mechanism 300 includes a moving panel 310 connected to the display 2 through the display connection portion 236, a moving motor 320 installed at the moving panel 310, and a power transfer mechanism 330 cooperated with the moving motor 320 in the driving of the moving motor 320, for position-shifting the moving panel 310.

[171] As shown in Fig. 7, a shaft through hole 311 through which the rotation shaft 311 of the moving motor 320 passes is formed at the moving panel 310.

[172] As depicted in Figs. 8 and 9, a motor coupling portion 312 to which a bracket 322 provided at the moving motor 320 is fitted and coupled in a rotary type is formed in a

plural number at the moving panel 310 around the shaft through hole 311 of Fig. 7.

[173] A protection rib 313 for surrounding a part of the circumference of the moving motor 320 is formed at the moving panel 310 to protrude in the backward direction.

[174] A panel connection portion 314 connected to the display connection portion 236 is formed at the moving panel 310.

[175] Here, the panel connection portion 314 can be integrally formed with the moving panel 310 to protrude therefrom, or can be individually formed from the moving panel 310 and coupled to the moving panel 310.

[176] The connection between the moving panel 310 and the display 2 will now be explained in detail.

[177] An insertion groove portion into which one of the display connection portion 236 and the panel connection portion 314 is inserted and coupled is formed at the other of the display connection portion 236 and the panel connection portion 314. After the insertion, fastening members 315 such as screws are fastened to the display connection portion 236 and the panel connection portion 314, for firmly assembling the display connection portion 236 and the panel connection portion 314.

[178] In the meantime, the bracket 322 is coupled to the motor coupling portions 312 so that the moving motor 320 can be positioned at the rear face of the moving panel 310. The rotation shaft 321 passes through the shaft through hole 311 of the moving panel 310 and protrudes in the forward direction of the moving panel 310.

[179] The power transfer mechanism 330 includes a moving gear 332 and a fixed gear 334.

[180] The moving gear 332 is a gear moving along the fixed gear 334. The moving gear 332 is installed on the rotation shaft 321 of the moving motor 320, and engaged with the fixed gear 334 to move along the fixed gear 334 in the driving of the moving motor 320.

[181] The moving gear 332 is installed on the rotation shaft 321 of the moving motor 320 protruding in the forward direction of the moving panel 310, and positioned between the front face of the moving panel 310 and the rear face of the front panel 20.

[182] The moving gear 332 is a pinion installed on the rotation shaft 321 of the moving motor 320.

[183] The moving gear 332 rotates along the fixed gear 334. The fixed gear 334 is a rack formed long at the main body 1.

[184] The fixed gear 334 is provided at the glass panel 22 constituting the front panel 20, preferably, at the rear face of the glass panel 22.

[185] If the fixed gear 334 is formed long in the up-down direction, the moving gear 332 ascends and descends with the moving motor 320, the moving panel 310 and the display 2. If the fixed gear 334 is formed long in the left-right direction, the moving gear 332 moves in the left-right direction with the moving motor 320, the moving panel 310 and the display 2.

[186] In the air conditioner according to this embodiment, the display 2 can ascend and descend or move in the left-right direction. For convenience of explanation, it is assumed that the display 2 ascends and descends.

[187] That is, the fixed gear 334 is provided at the rear face of the glass panel 22 to be long in the up-down direction.

[188] The fixed gear 334 can be individually manufactured from the glass panel 22, and adhered to the glass panel 22 by an adhesion means such as an adhesive or fastened to the glass panel 22 by fastening means such as bolts or hooks. Alternatively, the fixed gear 334 can be integrally molded with the glass panel 22.

[189] Meanwhile, in the air conditioner according to this embodiment, plural sets of the moving motors 320, the moving gears 332 and the fixed gears 334 can be provided to be spaced apart from each other in the left-right direction or the up-down direction. Alternatively, when one fixed gear 334 is provided, plural sets of the moving motors 320 and the moving gears 332 can be provided to be spaced apart from each other in the up-down direction.

[190] In the case that the plurality of moving gears 332 are engaged with one fixed gear 334, the number of the fixed gears 334 can be minimized and the display 2 can be stably position-shifted. Most preferably, the one fixed gear 334 is provided at the rear face of the front panel 22 to be long in the up-down direction, and the plural sets of the moving motors 320 and the moving gears 332 are placed to be spaced apart from each other in the up-down direction.

[191] A guide means for guiding the position shift of the moving panel 310 is formed on at least one of the main body 1 and the display moving mechanism 300.

[192] The guide means includes a moving guide gear 342 placed to be rotatable around a support shaft 341 formed at the front face of the moving panel 310, and a fixed guide gear 344 provided at the front panel 20, for guiding the moving guide gear 342.

[193] The moving guide gear 342 is a pinion, and the fixed guide gear 344 is a rack provided at the rear face of the glass panel 22 to be long in the up-down direction and parallel to the fixed gear 334.

[194] The fixed guide gear 344 can be individually manufactured from the glass panel 22,

and adhered to the glass panel 22 by an adhesion means such as an adhesive or fastened to the glass panel 22 by fastening means such as bolts or hooks. Alternatively, the fixed guide gear 344 can be integrally molded with the glass panel 22.

[195] Here, the moving guide gear 342 and the fixed guide gear 344 serve to stably support the display moving mechanism 300, particularly, the moving panel 310. If the moving motor 320 is installed at the center among the left, right and center of the moving panel 310, preferably, the moving guide gears 342 are placed at the front left and right sides of the moving panel 310, and the fixed guide gears 344 are placed at the rear left and right sides of the glass panel 22. If the moving motor 320 is installed at the right side between the left and right sides of the moving panel 310, preferably, the moving guide gear 342 is placed at the left side between the front left and right sides of the moving panel 310, and the fixed guide gear 344 is placed at the left side between the rear left and right sides of the glass panel 22.

[196] In the meantime, the guide means further includes a sliding guide 352 formed at the front face of the moving panel 310 to be long in the up-down direction, and a guide rail 354 provided at the rear face of the glass panel 22 to be long in the up-down direction.

[197] The sliding guide 352 has a section protruding in a ? shape, and is provided in a plural number to be spaced apart from each other in the left-right direction.

[198] The guide rail 354 has a [-shaped section to slidably guide the sliding guide 352 in the up-down direction, and is provided in a plural number to be spaced apart from each other in the left-right direction.

[199] The operation of the present invention will now be described.

[200] When the user inputs a position shift command for the display 2 through the display 2 or the remote controller, the control unit 170 outputs an ascending or descending signal, so that the moving motor 320 is driven according to the output signal from the control unit 170.

[201] When the control unit 170 outputs the ascending signal for the display 2, the moving motor 320 rotates the moving gear 332 in the direction of lifting the display 2 and the moving panel 310, for example, in the anticlockwise direction of Figs. 8 and 9. As the fixed gear 334 is fixed to the glass panel 22, the moving gear 332 ascends along the fixed gear 334.

[202] When the moving gear 332 ascends, the moving motor 320 to which the moving gear 332 is connected and the moving panel 310 on which the moving motor 320 is mounted ascend together. The display 2 ascends with the moving panel 310 in the front position of the front panel 20.

[203] On the contrary, when the control unit 170 outputs the descending signal for the display 2, the moving motor 320 rotates the moving gear 332 in the reverse direction to the direction in the ascent of the display 2, for example, in the clockwise direction of Figs. 8 and 9. Oppositely to the ascent of the display 2, the moving gear 332 descends along the fixed gear 334.

[204] When the moving gear 332 descends, the moving motor 320 to which the moving gear 332 is connected and the moving panel 310 on which the moving motor 320 is mounted descend together. The display 2 is lowered by the moving panel 310 in the front position of the front panel 20.

[205] The user can more easily confirm the information through the lifted or lowered display 2.

[206] The present invention is not limited to the above embodiments. A special input portion with buttons for inputting the operation command of the air conditioner can be provided at the display 2. A through hole portion through which the display connection portion 236 passes can be formed at the front panel 20 so that the display connection portion 236 can pass through the front panel 20. Various changes and modifications can be made within the spirit and scope of the present invention.

[207] Fig. 10 is a perspective view illustrating a state where the front face of the air conditioner is open in the forward direction to show the inside lower portion thereof, when a second example of the display moving mechanism is applied to the air conditioner of Fig. 1.

[208] The second example of the display moving mechanism of Fig. 10 is a magnetic mechanism 300a using a magnetic force. Components of Figs. 10 to 14 are identical to the components of Figs. 1 to 9 with same reference numerals. Explanations of the same components are omitted.

[209] Fig. 11 is a cross-sectional view taken along line A-A of Fig. 10, Fig. 12 is an exploded perspective view illustrating the display and the display moving mechanism of Fig. 11, Fig. 13 is a perspective view illustrating the descent states of the display and the display moving mechanism of Fig. 11, and Fig. 14 is a perspective view illustrating the ascent states of the display and the display moving mechanism of Fig. 11.

[210] The magnetic mechanism 300a includes a moving panel 310a connected to the display 2, a magnetic substance 320a installed at any one of the main body 1 and the moving panel 310a, and a magnet 330a installed at the other of the main body 1 and the moving panel 310a to slide along the magnetic substance 320a in a contact state

with the magnetic substance 320a by a magnetic force.

[211] The magnetic mechanism 300a is a kind of holder for holding the display 2. Preferably, the magnetic mechanism 300a is positioned between the front panel 20 and the air conditioning unit 10 not to be easily seen in the close state of the front panel 20.

[212] When the user moves the display 2 or the moving panel 310a, the magnet 330a slidably moves along the magnetic substance 320a in the adhered state to the magnetic substance 320a, so that the magnetic force operates as a kind of resistance.

[213] That is, the magnetic substance 320a and the magnet 330a do not abruptly but softly move the moving panel 310a and the display 2.

[214] When an external force does not operate on the moving panel 310a, the magnet 330a is continuously fixedly adhered to the specific position of the magnetic substance 320a, for preventing arbitrary movements of the moving panel 310a and the display 2.

[215] In the magnetic mechanism 300a, the movement widths of the moving panel 310a and the display 2 are dependent upon the length of the magnetic substance 320a.

[216] In the magnetic mechanism 300a, if the magnetic substance 320a is installed at the moving panel 310a and the magnet 330a is installed at the main body 1, since the moving panel 310a is heavy due to the weight of the magnetic substance 320a, the magnet 330a must have strong magnetism and may separate from the magnetic substance 320a. On the contrary, if the magnetic substance 320a is installed at the main body 1 and the magnet 330a is installed at the moving panel 310a, the magnet 330a does not need strong magnetism and rarely separates from the magnetic substance 320a. Hereinafter, it is assumed that the magnetic substance 320a is installed at the main body 1, particularly, at the rear face of the front panel 20, and the magnet 330a is installed at the moving panel 310a, particularly, at the front face thereof.

[217] A magnet mounting portion 311a on which the magnet 330a is mounted is formed at the moving panel 310a.

[218] The magnet mounting portion 311a is provided as a groove portion at the front face of the moving panel 310a so that the magnet 330a can be inserted thereinto. The magnet mounting portion 311a is slightly larger in size than the magnet 330a.

[219] The magnet 330a can be adhered to the magnet mounting portion 311a by an adhesion means such as an adhesive, or fixedly hooked by a hook formed at the moving panel 310a.

[220] A panel connection portion 314a connected to the display connection portion 236 is formed at the moving panel 310a.

[221] Here, the panel connection portion 314a can be integrally formed with the moving

panel 310a to protrude therefrom, or individually formed from the moving panel 310a and coupled to the moving panel 310a.

[222] The connection between the moving panel 310a and the display 2 will now be explained in detail.

[223] An insertion groove portion into which one of the display connection portion 236 and the panel connection portion 314a is inserted and coupled is formed at the other of the display connection portion 236 and the panel connection portion 314a. After the insertion, fastening members 315a such as screws are fastened to the display connection portion 236 and the panel connection portion 314a, for firmly assembling the display connection portion 236 and the panel connection portion 314a.

[224] In the meantime, the magnetic substance 320a is provided at the rear face of the glass panel 22 constituting the front panel 20.

[225] If the magnetic substance 320a is placed long in the up-down direction, the magnet 330a ascends and descends with the moving panel 310a and the display 2. If the magnetic substance 320a is placed long in the left-right direction, the magnet 330a moves in the left-right direction with the moving panel 310a and the display 2.

[226] In the air conditioner according to this embodiment, the display 2 can ascend and descend or move in the left-right direction. For convenience of explanation, it is assumed that the display 2 ascends and descends.

[227] That is, the magnetic substance 320a is provided at the rear face of the glass panel 22 to be long in the up-down direction.

[228] As the magnetic substance 320a is fastened to the rear face of the glass panel 22 by fastening members 321a and 322a such as screws, fastening holes 323a and 324a through which the fastening members 321a and 322a pass are formed at the upper and lower portions of the magnetic substance 320a, and fastening portions (not shown) corresponding to the fastening holes 323a and 324a of the magnetic substance 320a are formed at the rear face of the glass panel 22.

[229] In the air conditioner according to this embodiment, plural sets of the magnetic substances 320a and the magnets 330a can be provided to be spaced apart from each other in the left-right direction. Alternatively, one set of the magnetic substance 320a and the magnet 330a can be provided.

[230] Meanwhile, a roller 342a rolling along the main body 1, particularly, along the glass panel 22 of the front panel 20 is rotatably installed at the moving panel 310a.

[231] The roller 342a is rotatably placed at an opening portion 316a formed at the moving panel 310a.

[232] A hinge shaft 343a is provided at any one of the roller 342a and the moving panel 310a to protrude in the left-right direction, and a shaft support portion 344a for rotatably supporting the hinge shaft 343a is formed at the other.

[233] Hereinafter, it is assumed that a rib 345 is formed at the front face of the moving panel 310a to be long in the up-down direction, the hinge shaft 343a protrudes from the rib 345, and the shaft support portion 344a is formed at the roller 342a in a hole shape.

[234] Preferably, the roller 342a is installed at the moving panel 310a in a plural number to be spaced apart from each other in the left-right direction or the up-down direction.

[235] A guide 22F for guiding the roller 342a is formed at the main body 1, particularly, at the front panel 20, and more particularly, at the rear face of the glass panel 22, so that the roller 342a does not slide in the left-right direction but rolls in the up-down direction.

[236] The guide 22F is provided as a vertical rib at the front panel 20 so that the roller 342a can be suspended thereon in the lateral direction.

[237] Here, the vertical rib 22F is formed at the front panel 20, particularly, at a rear face of a display housing portion 22A to protrude in the backward direction and to be long in the up-down direction.

[238] In order to stably lift and lower the moving panel 310a without being shaken in the left-right direction or distorted, if the magnet 330a is installed at the left side among the left, right and center of the moving panel 310a, the roller 342a is installed at the right side of the moving panel 310a or one or more rollers 342a are installed at the center and right side of the moving panel 310a. Alternatively, if the magnet 330a is installed at the center among the left, right and center of the moving panel 310a, one or more rollers 342a are installed at the left and right sides of the moving panel 310a, respectively.

[239] The operation of the present invention will now be described.

[240] When the user holds and lifts the display 2 or the display connection portion 236 with his/her hands, the magnet 330a ascends along the magnetic substance 320a in the adhered state to the magnetic substance 320a, so that the display 2 and the moving panel 310a ascend at the front and back of the front panel 20 with the front panel 20 therebetween.

[241] When the moving panel 310a ascends, the roller 342a installed at the moving panel 310a rolls along the rear face of the glass panel 22 by the guide of the vertical rib 22F. The moving panel 310a stably ascends with the display 2 without being distorted in the

left-right direction. Here, any one of the left and right sides of the moving panel 310a is not downwardly inclined.

[242] In a state where the magnet 330a, the moving panel 310a and the display 2 ascend, if the user does not lift but releases the display 2 or the display connection portion 236, the magnet 330a maintains the adhered state to the magnetic substance 320a due to the magnetic force, so that the moving panel 310a and the display 2 do not slide or descend downwardly. That is, the display 2 is maintained in the ascent position.

[243] The user can confirm the information through the lifted display 2.

[244] On the contrary, when the user holds and lowers the display 2 or the display connection portion 236 with his/her hands, the magnet 330a descends along the magnetic substance 320a in the adhered state to the magnetic substance 320a, so that the display 2 and the moving panel 310a descend at the front and back of the front panel 20 with the front panel 20 therebetween.

[245] When the moving panel 310a descends, the roller 342a rolls along the glass panel 22, particularly, along the rear face of the display housing portion 22A by the guide of the vertical rib 22F in the opposite direction to the direction in the ascent of the moving panel 310a. The moving panel 310a stably descends with the display 2.

[246] In a state where the magnet 330a, the moving panel 310a and the display 2 descend, if the user does not lower but releases the display 2 or the display connection portion 236, the magnet 330a maintains the adhered state to the magnetic substance 320a due to the magnetic force, so that the moving panel 310a and the display 2 do not slide or descend downwardly. That is, the display 2 is maintained in the descent position. The user can confirm the information through the lowered display 2.

[247] Fig. 15 is a perspective view illustrating a state where the front face of the air conditioner is open in the forward direction to show the inside lower portion thereof, when a third example of the display moving mechanism is applied to the air conditioner of Fig. 1.

[248] The third example of the display moving mechanism of Fig. 15 is an elastic mechanism 300b using elasticity. Components of Figs. 16 to 20 are identical to the components of Figs. 1 to 9 with same reference numerals. Explanations of the same components are omitted.

[249] Fig. 16 is a cross-sectional view taken along line A-A of Fig. 15, Fig. 17 is an exploded perspective view illustrating the display and the elastic mechanism of Fig. 15, Fig. 18 is a perspective view illustrating the elastic mechanism of Fig. 17, Fig. 19 is a perspective view illustrating a descent state of a moving panel of Fig. 18, and Fig.

20 is a perspective view illustrating the ascent state of the moving panel of Fig. 18.

[250] The elastic mechanism 300b includes a moving panel 310b connected to the display 2, an elastic member 320b installed at one of the main body 1 and the moving panel 310b, and a holder 330b installed at the other of the main body 1 and the moving panel 310b, the elastic member 320b being elastically hooked and unhooked to/from the holder 330b.

[251] That is, in the elastic mechanism 300b, the moving panel 310b can be connected and disconnected to/from the holder 330b by the elastic member 320b. In addition, the elastic member 320b can move along the holder 330b and can be position-fixed to one side of the holder 330b, for controlling the position of the moving panel 310b. The position control of the moving panel 310b will now be explained in detail.

[252] Here, the moving panel 310b is a kind of carrier for transferring the display 2. The moving panel 310b can be individually formed from the display 2 and coupled to the display 2, or integrally formed with the display 2 to constitute a part of the display 2.

[253] When the moving panel 310b is integrally formed with the display 2, any one of the elastic member 320b and the holder 330b is installed at the display 2, and the other is installed at the main body 1.

[254] Hereinafter, it is assumed that the moving panel 310b is individually formed from the display 2 and connected to the display 2.

[255] Preferably, the moving panel 310b is positioned between the front panel 20 and the air conditioning unit 10 not to be easily seen in the close state of the front panel 20. Therefore, the moving panel 310b is positioned at the rear face of the front panel 20.

[256] In the elastic mechanism 300b, the movement widths of the moving panel 310b and the display 2 are determined in proportion to the length of the holder 330b. If the holder 330b is installed at the moving panel 310b and the elastic member 320b is installed at the main body 1, particularly, at the front panel 20, since the moving panel 310b is heavy due to the weight of the holder 330b, the moving panel 310b may separate from the holder 330b. On the contrary, if the holder 330b is installed at the main body 1, particularly, at the front panel 20 and the elastic member 320b is installed at the moving panel 310b, the moving panel 310b is relatively light, and thus rarely separates from the holder 330b. Hereinafter, it is assumed that the holder 330b is installed at the main body 1, particularly, at the rear face of the front panel 20, and the elastic member 320b is installed at the moving panel 310b.

[257] An elastic member mounting portion 311b on which the elastic member 320b is mounted is formed at the moving panel 310b.

[258] Preferably, the elastic member mounting portion 311b is placed at the front face of the moving panel 310b to protrude in the forward direction, and moves along the holder 330b.

[259] The elastic member mounting portion 311b includes a space portion 311b-1 into which the elastic member 320b is inserted and housed, and also includes a pass-through portion 312b for passing through the gap between a left holder 334b and a right holder 335b of the holder 330b explained below.

[260] A through hole 313b through which a hooking portion 321b of the elastic member 320b explained later passes is formed at the pass-through portion 312b.

[261] Left and right hooked jaws 314b and 315b hooked on the holder 330b, particularly, on the left holder 334b and the right holder 335b in the backward direction are formed at the elastic member mounting portion 311b to protrude in the left-right direction.

[262] A panel connection portion 316b connected to the display connection portion 236 is formed at the moving panel 310b.

[263] Here, the panel connection portion 316b can be integrally formed with the moving panel 310b to protrude therefrom, or individually formed from the moving panel 310b and coupled to the moving panel 310b.

[264] The connection between the moving panel 310b and the display 2 will now be explained in detail.

[265] An insertion groove portion into which one of the display connection portion 236 and the panel connection portion 316b is inserted and coupled is formed at the other of the display connection portion 236 and the panel connection portion 316b. After the insertion, fastening members 317 such as screws are fastened to the display connection portion 236 and the panel connection portion 316b, for firmly assembling the display connection portion 236 and the panel connection portion 316b.

[266] In the meantime, the elastic member 320b and the holder 330b are fixing means for fixing the moving panel 310b and the display 2 to the main body 1, particularly, to a specific position of the front panel 20 to be position-shiftable. When the user moves the moving panel 310b, the elastic member 320b moves along the holder 330b in contact with the holder 330b, so that the moving panel 310b and the display 2 do not abruptly move due to a contact resistance.

[267] That is, the elastic member 320b and the holder 330b do not abruptly but softly move the moving panel 310b.

[268] If an external force does not operate on the moving panel 310b, the elastic member 320b is continuously fixedly hooked in the specific position of the holder 330b, for

preventing an arbitrary movement of the moving panel 310b.

[269] Preferably, the elastic member 320b and the holder 330b are positioned between the front panel 20 and the air conditioning unit 10 not to be easily seen in the close state of the front panel 20.

[270] Here, the elastic member 320b can be a detent including a coil spring installed at the elastic member mounting portion 311b, and a ball elastically supported by the coil spring and hooked on the holder 330b, or a plate spring mounted at the elastic member mounting portion 311b, and provided with the protruding hooking portion 321b hooked on the holder 330b. Hereinafter, it is assumed that the elastic member 320b is the plate spring.

[271] The hooking portion 321b formed almost at the center of the elastic member 320b is curved to protrude in one of the left and right directions.

[272] The elastic member 320b is inserted into the space portion 311b-1 of the elastic member mounting portion 311b. The hooking portion 321b is placed to protrude through the pass-through portion 312b of the elastic member mounting portion 311b.

[273] Preferably, the holder 330b is provided at the rear face of the glass panel 22 constituting the front panel 20.

[274] In the air conditioner according to this embodiment, if the holder 330b is placed long in the up-down direction, the elastic member 320b ascends and descends with the moving panel 310b and the display 2. If the holder 330b is placed long in the left-right direction, the elastic member 320b moves in the left-right direction with the moving panel 310b and the display 2. For convenience of explanation, it is assumed that the display 2 ascends and descends.

[275] That is, the holder 330b is provided at the rear face of the front panel 20 to be long in the up-down direction.

[276] As the holder 330b is fastened to the rear face of the glass panel 22 by fastening members 331b such as screws, fastening holes 333b through which the fastening members 331b pass are formed at the holder 330b, and fastening portions 22D corresponding to the fastening holes 333b of the holder 330b are formed at the rear face of the glass panel 22 so that the fastening members 331b can be fastened thereto.

[277] The holder 330b includes the left holder 334b and the right holder 335b spaced apart from each other in the left-right direction.

[278] Here, the left holder 334b and the right holder 335b include fastening portions 334b-1 and 335b-1 provided with the fastening holes 333b and fastened to the glass panel 22, and rail portions 334b-2 and 335b-2 curved from the fastening portions

334b-1 and 335b-1 to have '¬' shaped sections.

[279] The left holder 334b and the right holder 335b of the holder 330b are spaced apart from each other at an interval larger than the left-right width of the pass-through portion 312b of the elastic member mounting portion 311b.

[280] The holder 330b includes a lower holder 336b for connecting the lower portions of the left holder 334b and the right holder 335b. The pass-through portion 312b of the elastic member mounting portion 311b is suspended on the lower holder 336b in the downward direction.

[281] Meanwhile, a plurality of hooked groove portions 337b, 338b and 339b onto which the hooking portion 321b of the elastic member 320b is inserted and hooked are formed at the holder 330b.

[282] As the plurality of hooked groove portions 337b, 338b and 339b are formed at the holder 330b to be spaced apart in the longitudinal direction of the holder 330b, each of the hooked groove portions 337b, 338b and 339b is indented into one of the left holder 334b and the right holder 335b in the lateral direction.

[283] If the holder 330b has many hooked groove portions 337b, 338b and 339b, it can variously control the position of the display 2. Accordingly, at least two hooked groove portions are formed.

[284] Here, the holder 330b is not limited by the number of the hooked groove portions 337b, 338b and 339b. For convenience of explanation, it is assumed that the upper hooked groove portion 337b, the center hooked groove portion 338b and the lower hooked groove portion 339b are formed at the holder 330b.

[285] The elastic mechanism 300b can include one set of the elastic member 320b and the holder 330b, or plural sets of the elastic members 320b and the holders 330b spaced apart from each other in the left-right direction.

[286] In addition, in the elastic mechanism 300b, if the plurality of elastic members 320b are hooked and unhooked to/from one holder 330b, the number of the holders 330b can be minimized and the display 2 can be stably position-shifted. Most preferably, the plurality of elastic member mounting portions 311b and the plurality of elastic members 320b are provided at the moving panel 310b to be spaced apart from each other in the up-down direction.

[287] The operation of the present invention will now be described.

[288] When the user holds and lowers the display 2 or the display connection portion 236 of Figs. 16 and 18 with his/her hands, the moving panel 310b descends with the display 2, and the elastic member 320b is elastically deformed by the lower portion of

the center hooked groove portion 338b of the holder 330b, so that the hooking portion 321b unhooks from the center hooked groove portion 338b.

[289] The elastic member 320b unhooks from the center hooked groove portion 338b of the holder 330b. The hooking portion 321b descends in contact with the lower portion of the center hooked groove portion 338b of the holder 330b. The elastic member 320b does not abruptly but stably descends with the moving panel 310b and the display 2 due to a contact resistance.

[290] In this descending process, when the hooking portion 321b of the elastic member 320b is positioned next to the lower hooked groove portion 339b of the holder 330b, the elastic member 320b is elastically deformed, so that the hooking portion 321b is protruded toward the lower hooked groove portion 339b of the holder 330b, inserted into the lower hooked groove portion 339b, and hooked thereon in the up-down direction. As shown in Fig. 19, the moving panel 310b is fixed in the low position by the restriction of the elastic member 320b.

[291] Here, the display 2 is lowered with the moving panel 310b. The user can confirm the information through the lowered display 2.

[292] On the contrary, when the user holds and lifts the display 2 or the display connection portion 236 of Figs. 16 and 18 with his/her hands, the moving panel 310b ascends with the display 2, and the elastic member 320b is elastically deformed by the upper portion of the center hooked groove portion 338b of the holder 330b, so that the hooking portion 321b unhooks from the center hooked groove portion 338b.

[293] The elastic member 320b unhooks from the center hooked groove portion 338b of the holder 330b. The hooking portion 321b ascends in contact with the upper portion of the center hooked groove portion 338b of the holder 330b. The elastic member 320b does not abruptly but stably ascends with the moving panel 310b and the display 2 due to a contact resistance.

[294] In this ascending process, when the hooking portion 321b of the elastic member 320b is positioned next to the upper hooked groove portion 337b of the holder 330b, the elastic member 320b is elastically deformed, so that the hooking portion 321b is protruded toward the upper hooked groove portion 337b of the holder 330b, inserted into the upper hooked groove portion 337b, and hooked thereon in the up-down direction. As shown in Fig. 20, the moving panel 310b is fixed in the high position by the restriction of the elastic member 320b.

[295] Here, the display 2 is lifted with the moving panel 310b. The user can confirm the information through the lifted display 2.

[296] Fig. 21 is a perspective view illustrating a state where air suction holes and air discharge holes are open in an air conditioner in accordance with a second embodiment of the present invention, and Fig. 22 is a front view illustrating the state where the air suction holes and the air discharge holes of the air conditioner of Fig. 21 are open.

[297] In accordance with the second embodiment of the present invention, as illustrated in Figs. 21 and 22, the air conditioner includes a main body 1' for air-conditioning an indoor space, and a display 2' provided in the main body 1' to be position-shiftable.

[298] The main body 1' includes an air conditioning unit 10' with air suction holes 3' and 4' and air discharge holes 5', 6' and 7' formed thereat, for sucking the air from the indoor space and discharging the air to the indoor space, and a front panel 20' pivotably connected to the air conditioning unit 10' for opening and closing the partial or whole front face of the air conditioning unit 10'.

[299] The air conditioning unit 10' includes a base 30', a cabinet 40', an upper panel 50' and lower panels 70' and 80'. Hereinafter, a stand type air conditioner will be taken as an example.

[300] A stepped portion 32' is formed at the base 30' to protrude to the lower portion of the front panel 20', for reducing a gap between the bottom end of the front panel 20' and the floor S' of the indoor space, when the front panel 20' closes the front face of the air conditioning unit 10'.

[301] The left air discharge hole 5' is formed at the left portion of the upper panel 50' the right air discharge hole 6' is formed at the right portion thereof, and the upper air discharge hole 7' is formed at the upper portion thereof.

[302] In the air conditioning unit 10', the left air discharge hole 5' can be formed at the left side of the front face of the upper panel 50', the right air discharge hole 6' can be formed at the right side of the front face of the upper panel 50' and the front panel 20' can be placed to open and close the center among the left, right and center of the upper panel 50'. Alternatively, the left air discharge hole 5' can be formed at the left face of the upper panel 50', the right air discharge hole 6' can be formed at the right face of the upper panel 50', and the front panel 20' can be placed to open and close the front face of the upper panel 50'. The left and right portions of the upper panel 50' can be inclined.

[303] Hereinafter, it is assumed that the left and right portions of the upper panel 50' are inclined, the left air discharge hole 5' is formed at the left inclined portion, the right air discharge hole 6' is formed at the right inclined portion, and the front panel 20' is

placed to open and close the space between the left inclined portion and the right inclined portion of the upper panel 50'.

[304] In addition, in the air conditioning unit 10', the upper air discharge hole 7' can be formed at the upper portion of the front face of the upper panel 50' or at the top face of the upper panel 50'.

[305] Hereinafter, it is assumed that the upper air discharge hole 7' is formed at the top face of the upper panel 50'.

[306] Meanwhile, a left air discharge hole vane 51' for opening and closing the left air discharge hole 5' and controlling the direction of the air discharged through the left air discharge hole 5' is pivotably placed at the upper panel 50', and a left air discharge hole vane motor for pivoting the left air discharge hole vane 51' is installed in the upper panel 50'.

[307] A right air discharge hole vane 52' for opening and closing the right air discharge hole 6' and controlling the direction of the air discharged through the right air discharg e hole 6' is pivotably placed at the upper panel 50', and a right air discharge hole vane motor for pivoting the right air discharge hole vane 52' is installed in the upper panel 50'.

[308] An upper air discharge hole vane 53' for opening and closing the upper air discharge hole 7' and controlling the direction of the air discharged through the upper air discharge hole 7' is pivotably placed at the upper panel 50', and an upper air discharge hole vane motor for pivoting the upper air discharge hole vane 53' is installed in the upper panel 50'.

[309] The lower panels 70' and 80' include a left lower panel 70' placed between the left portion of the upper panel 50' and the base 30' and provided with the left air suction hole 3', and a right lower panel 80' placed between the right portion of the upper panel 50' and the base 30' and provided with the right air suction hole 4'.

[310] A left air suction hole vane 71' for opening and closing the left air suction hole 3' is pivotably placed at the left lower panel 70', a left air suction hole vane motor for pivoting the left air suction hole vane 71' is installed in the left lower panel 70', and a left filter 72' for purifying the air sucked into the left air suction hole 3' is mounted on the left lower panel 70'.

[311] A right air suction hole vane 81' for opening and closing the right air suction hole 4' is pivotably placed at the right lower panel 80', a right air suction hole vane motor for pivoting the right air suction hole vane 81' is installed in the right lower panel 80', and a right filter 82' for purifying the air sucked into the right air suction hole 4' is mounted

on the right lower panel 80'.

[312] In the meantime, the display 2 of Figs. 21 and 22 is placed at the front panel 20' to be position-shiftable. The display 2' can be position-shifted manually by the user or automatically by a display moving mechanism (not shown) including a motor. Hereinafter, it is assumed that the display 2' is automatically position-shifted by the display moving mechanism.

[313] The display 2' and the display moving mechanism will later be explained in detail.

[314] Fig. 23 is a vertical-sectional view illustrating the air conditioner of Fig. 21, Fig. 24 is a perspective view illustrating a state where the front face of the air conditioner is open in the forward direction to show the inside lower portion thereof, when a first example of the display moving mechanism is applied to the air conditioner of Fig. 21, and Fig. 25 is a schematic exploded perspective view illustrating the air conditioner of Fig. 24.

[315] The front panel 20' is a kind of door for opening and closing the partial or whole front face of the air conditioning unit 10'. The front panel 20' is sufficiently high to open and close the space between the front upper portion of the base 30' and the top end of the front face of the upper panel 50'. Referring to Fig. 23, the front panel 20' includes a glass 21' placed at the front, a glass panel 22' placed at the back of the glass 21' and covers 23'for assembling the glass 21' and the glass panel 22'.

[316] The covers 23' surround the edges of the glass 21' and the glass panel 22' and are fastened to the glass panel 22' by fastening means such as hooks or fastening bolts.

[317] The covers 23' include four left, right, upper and lower covers having almost '(' shaped sections and covering the four left, right, upper and lower edges of the glass 21' and the glass panel 22', respectively. The four covers 23' are placed in a '(' shape along the edges of the glass 21' and the glass panel 22'.

[318] In the front panel 20' an opaque portion 24' with a predetermined color or pattern may be printed on the rear face of the glass 21' or an opaque sheet may be individually adhered to the rear face of the glass 21'. Hereinafter, it is assumed that the opaque portion 24' is formed at the rear face of the glass 21'.

[319] The upper and lower portions of the front panel 20' are hinge-connected to the front of the air conditioning unit 10' so that the front panel 20' can pivot on one of the left and right sides in the forward direction.

[320] As illustrated in Fig. 24, almost the center of one of the left and right sides of the front panel 20' is connected to the air conditioning unit 10', particularly, to the upper panel 50' by a connection mechanism. The connection mechanism is configured to not

abruptly but softly open and close the front panel 20'.

[321] The connection mechanism includes a slide member 25' slidably connected to one of the front panel 20' and the upper panel 50' and hinge-connected to the other of the front panel 20' and the upper panel 50'. A hinge connection portion 54' to which the slide member 25' is rotatably hinge-connected is formed at one of the front panel 20' and the upper panel 50' and a slide guide portion 26' for guiding sliding of the slide member 25' is formed at the other of the front panel 20 and the upper panel 50'.

[322] When the front panel 20' pivots, the slide member 25' rotates around the hinge connection portion 54' and slides along the slide guide portion 26'. When the slide member 25' slides, a frictional force operates on the front panel 20'. The front panel 20' does not abruptly open and close due to the friction with the slide member 25'.

[323] That is, the upper, center and lower portions of one of the left and right sides of the front panel 20' are connected to and supported by the air conditioning unit 10', respectively.

[324] Still referring to Fig. 24, a remote controller box 27' for housing a remote controller for remotely controlling the air conditioner is installed at the front panel 20'.

[325] The remote controller box 27' is provided at the rear face of the front panel 20' not to be exposed to the outside of the main body 1'.

[326] If the remote controller is taken in and out vertically in the up-down direction, the remote controller may contact the rear face of the front panel 20'. In this case, the remote controller may be deformed and may not be easily taken in and out. If the remote controller is taken in and out inclinedly in the up-down direction, the remote controller can be easily taken in and out without damage. Therefore, the remote controller box 27' is configured so that the remote controller can be taken in and out in the inclined direction.

[327] The remote controller box 27' includes a fixed box 28' fixedly mounted on the glass panel 22' of the front panel 20' and provided with an open rear face, and a pivoting box 29' placed vertically to the rear face of the fixed box 28' for closing the rear face of the fixed box 28' and inclinedly pivoted around the lower portion of the fixed box 28' in the backward direction, for opening the rear face of the fixed box 28'.

[328] The lower portion of the pivoting box 29' is hinge-connected to the lower portion of the fixed box 28'.

[329] Meanwhile, as shown in Figs. 23 to 25, a lower hinge bracket 34' to which the bottom end of one of the left and right sides of the front panel 20' is pivotably connected is installed at the base 30' by fastening members such as fastening bolts.

[330] A lower bracket cover 35' for covering a part of the lower hinge bracket 34', particularly, the portion fastened to the base 30' is installed at the base 30'.

[331] A box connection/disconnection portion 36' to/from which a dust box 95' of a cleaning mechanism 90' discussed later is slidably connected and disconnected in the forward-backward direction is formed at the base 30'.

[332] As depicted in Fig. 25, the cabinet 40' is placed at the rear upper portion of the base 30' to be long in the up-down direction. The front, top and bottom faces of the cabinet 40' are open, and the left and right faces 41' and 42' thereof are inclined from the rear face 43'.

[333] A top panel 44' is placed at the upper portion of the cabinet 40'.

[334] As shown in Fig. 23, the bottom and rear faces of the upper panel 50' are open, and as shown in Fig. 25, the left and right portions 55' and 56' thereof are inclined from the front face 57' and the top face 58' thereof is orthogonal to the front face 57'.

[335] As illustrated in Figs. 23 to 25, an upper hinge bracket 59' to which the top end of one of the left and right sides of the front panel 20' is pivotably connected is installed at the upper panel 50' by fastening members such as bolts.

[336] An upper bracket cover 60' for covering a part of the upper hinge bracket 58' is provided at the upper panel 50'.

[337] Filter frames 73' on which the left filter 72' and the right filter 82' are fixedly mounted are installed at the left lower panel 70' and the right lower panel 80',respectively.

[338] In the meantime, still referring to Figs. 23 to 25, the cleaning mechanism 90' for automatically cleaning the left and right filters 72' and 82' is provided in the air conditioning unit 10'.

[339] As shown in Fig. 24, the cleaning mechanism 90' includes filter kits 91' movably placed at the left lower panel 70' and the right lower panel 80' to move along the left and right filters 72' and 82', respectively, for collecting dust from the left and right filters 72' and 82', a kit blower 93' connected to the filter kits 91' through dust hoses 92', for sucking filter impurities such as dust from the left and right filters 72' and 82', a cyclone 94' for separating the sucked filter impurities from the air, a dust box 95' for collecting the filter impurities separated in the cyclone 94', and a cleaning mechanism control box 96' for controlling the cleaning mechanism 90', particularly, the filter kits 91' and the kit blower 93'.

[340] In addition, as depicted in Figs. 23 and 25, the air conditioning unit 10' includes a heat exchanger 100' for heating and cooling the air by using a refrigerant, and a blower

110' for introducing the outdoor air into the air conditioning unit 10', passing the air through the heat exchanger 100' and blowing the air to the outside of the air conditioning unit 10'.

[341] The heat exchanger 100' is mounted on at least one of the cabinet 40' and the blower 110' to be inclinedly positioned between the upper portion of the cabinet 40' and the upper panel 50 .'.

[342] The blower 110' is mounted at the cabinet 40' to be positioned at the lower portion of the heat exchanger 100'.

[343] The blower 110' includes a blowing motor 111' mounted at the lower portion of the cabinet 40', a blowing fan 112' connected to the blowing motor 111', a fan housing 115' mounted at the cabinet 40', and provided with an opening portion 113' at a front face thereof and a discharge portion 114' at a top face thereof, and an orifice 116' placed at the front face of the fan housing 115'.

[344] A drain pan 117' for collecting condensed water dropped from the heat exchanger 100' and supporting the heat exchanger 100' is formed at the upper portion of the fan housing 115'.

[345] A purification mechanism 120' for purifying the air sucked into the orifice 116' in the rotation of the blowing fan 112' is installed at the front of the blower 110'.

[346] As illustrated in Figs. 23 to 25, the purification mechanism 120' includes one or more purification units 121', 122 and 123', and a purification unit holder 130' mounted at the blower 110' so that the one or more purification units 121', 122' and 123' can be connected and disconnected to/from the purification unit holder 130'.

[347] The purification unit holder 130' is configured to suck the air through the front, left, right and top faces thereof and to discharge the air through the rear face thereof.

[348] If the purification units 121', 122' and 123' are taken in and out vertically in the up-down direction, the purification units 121', 122, and 123, may contact the front face of the blower 110, or the drain pan 117'. In this case, the purification units 121', 122' and 123' may be easily damaged and may not be easily taken in and out. If the purification units 121', 122' and 123' are taken in and out horizontally in the forward-backward direction, the user must bend himself/herself to take in and out the purification units 121', 122' and 123'. If the purification units 121', 122' and 123' are taken in and out inclinedly in the up-down direction, the purification units 121', 122' and 123' can be easily taken in and out without damage. Accordingly, the purification unit holder 130' is configured so that the purification units 121', 122' and 123' can be taken in and out in the inclined direction.

[349] The purification unit holder 130' includes a rear purification unit holder 140' fixedly mounted at the blower 110', and a front purification unit holder 150' rotatably connected to the rear purification unit holder 140'. The front purification unit holder 150' can be open inclinedly in the forward direction.

[350] Meanwhile, in the air conditioning unit 10', an opening portion 160' open in the forward-backward direction is formed among the base 30', the upper panel 50' and the left and right lower panels 70' and 80'. The purification units 121', 122' and 123' can be taken in and out through the opening portion 160' for cleaning or replacement. Moreover, various components such as the kit blower 93' and the cleaning mechanism control box 96' installed at the inside lower portion of the air conditioning unit 10' can be serviced through the opening portion 160'.

[351] An inner cover 162' for blocking the opening portion 160' is provided at the air conditioning unit 10', for improving the outward appearance and the safety when the front panel 20' is open in the forward direction.

[352] Preferably, the inner cover 162' is coupled to the lower portion of the upper panel 50' by fastening means such as fastening bolts.

[353] In Figs. 24 and 25, reference numeral 170' denotes a control unit for controlling the various front mounted components of the air conditioner. The control unit 170' is connected to the cleaning mechanism control box 96', the blowing motor 111' or the display 2' through a cable such as an electric wire. Preferably, the control unit 170' is placed in a position exposed to the outside through the opening portion 160' when the front panel 20' is open in the forward direction and the inner cover 162 'is separated from the air conditioning unit 10'. For example, the control unit 170' is placed at the front of the blower 110'.

[354] In Figs. 24 and 25, reference numeral 300' represents a display moving mechanism 300' provided on at least one of the air conditioning unit 10' and the front panel 20' for position-shifting the display 2' of Figs. 21 and 22. The display moving mechanism 300' may be a manual moving mechanism for manually positioning the display 2' by the user, or an automatic moving mechanism for automatically positioning the display 2' by a motor or the like. Hereinafter, it is assumed that the display moving mechanism 300' is the automatic moving mechanism.

[355] Fig. 26 is a cross-sectional view taken along line B-B of Fig. 24, Fig. 27 is an exploded perspective view illustrating the display and the display moving mechanism of Fig. 26, Fig. 28 is a perspective view illustrating the descent states of the display and the display moving mechanism of Figs. 26 and 27, and Fig. 29 is a perspective

view illustrating the ascent states of the display and the display moving mechanism of Figs. 26 and 27.

[356] As illustrated in Fig. 26, the front panel 20 defines the outward appearance of the front face of the main body 1'. The whole front panel 20' can be transparent to show the information of the display 2'. Alternatively, a part of the front panel 20' can be transparent and the other part thereof can be opaque. Hereinafter, it is assumed that the part of the front panel 20' corresponding to the front of the movement path of the display 2' is transparent and the other part of the front panel 20' is opaque.

[357] That is, in the front panel 20' as shown in Fig. 26, the opaque portion 24 is formed except the front of the movement path of the display 2' and the part of the glass 21' which is not provided with the opaque portion 24' on the rear face thereof becomes the transparent portion 26'.

[358] In the meantime, the display 2' includes a display cover 210', a display PCB 220' and a display rear 230'.

[359] The display cover 210' is formed in a quadrangular box shape with an open rear face, and provided with an opening portion 212' at the front face thereof.

[360] A cover connection portion 214' to which the display moving mechanism 300' is connected is provided at one of the left and right sides of the display cover 210'.

[361] The display PCB 220' includes a PCB 222', and a display component 224' installed on the PCB 222' for displaying the information.

[362] The PCB 222' is connected to the control unit 170' of Fig. 24 through a cable 226'.

[363] The display component 224' is a general display such as an LCD or an LED. Hereinafter, it is assumed that the display component 224'is the LCD.

[364] The leading ends of the display component 224' are positioned at the back of the opening portion 212' of the display cover 210', or surrounded by the opening portion 212'of the display cover 210'.

[365] The display rear 230' is a kind of display box or display housing for defining a space for housing the display PCB 220' with the display cover 210'. The display rear 230' is formed in a quadrangular box shape with an open front face.

[366] The display rear 230' includes a rear connection portion 236' connected to the display moving mechanism 300' with the cover connection portion 214' of the display cover 210'.

[367] Meanwhile, as depicted in Fig. 25, a cable through hole 215' through which the cable 226' connected to the display PCB 220' passes is formed on at least one of the display cover 210' and the display rear 230' of the display 2'.

[368] In the air conditioner according to this embodiment, as illustrated in Figs. 25 to 29, the display moving mechanism 300' is positioned at the back of the glass panel 22' namely, at the outer portion of the front panel 20', and the display 2' is positioned between the glass 21' and the glass panel 22', namely, at the inner portion of the front panel 20'.

[369] Parts 214' and 216' of any one 2' of the display 2' and the display moving mechanism 300' can pass through the glass panel 22' and connect to the other 300'. Alternatively, a special connection member connected respectively to the display 2' and the display moving mechanism 300' can pass through the glass panel 22'.

[370] Hereinafter, it is assumed that the parts 214' and 216' of any one 2 of the display 2' and the display moving mechanism 300' pass through the glass panel 22'.

[371] A display housing portion 22A' for housing the display 2' to be position-shiftable is formed at the front panel 20', particularly, at the glass panel 22'.

[372] The display housing portion 22A' is a quadrangular box portion indented into the glass panel 22' in the backward direction. When the glass panel 22' is placed, the display housing portion 22A' is not close to the rear face of the glass 21' and the other portion is close to the rear face of the glass 21'.

[373] The left-right width of the display housing portion 22A' is larger than that of the display 2' and the height of the display housing portion 22A'is larger than the length of the movement path of the display 2'.

[374] That is, the display 2' is position-shifted between the glass 21', particularly, the rear face of the transparent portion 26' and the display housing portion 22A'.

[375] A through hole portion 22B' through which the parts 214' and 216' of at least one of the display 2' and the display moving mechanism 300' pass is formed at the glass panel 22'.

[376] Here, the through hole portion 22B' is open in at least one direction of the left-right direction and the forward-backward direction to pass through the inside of the display housing portion 22A' and the back of the rear face of the glass panel 22'.

[377] In the glass panel 22', the height of the through hole portion 22B' is similar or equal to the movement distance of the display 2'. Therefore, in a state where the parts 214' and 216' of at least one of the display 2' and the display moving mechanism 300' pass through the through hole portion 22B', the display 2' can be position-shifted along the through hole portion 22B'.

[378] Hereinafter, it is assumed that the cover connection portion 214' of the display cover 210' and the rear connection portion 236' of the display rear 230' protrude in the

backward direction, pass through the through hole portion 22B' of the glass panel 22' and connect to the display moving mechanism 300'.

[379] A service portion 22C' is formed at the glass panel 22' so that the display 2' can move inside the display housing portion 22A' in the backward direction of the glass panel 22' in the assembly state of the glass 21' and the glass panel 22'.

[380] The service portion 22C' is a kind of avoidance groove portion. When the display 2' passes through the part of the through hole portion 22B' in the left-right direction, the service portion 22C' prevents the display 2' from interfering with the glass panel 22'. The service portion 22C' is larger in size than the display 2' and is open in the left-direction direction at one of the upper and lower sides of the through hole portion 22B' to have a larger width than the left-right width of the display 2'.

[381] Meanwhile, the display moving mechanism 300' includes a moving panel 310 connected to the display 2', a moving motor 320' installed at the moving panel 310', and a power transfer mechanism 330' cooperated with the moving motor 320' in the driving of the moving motor 320', for position-shifting the moving panel 310'.

[382] As shown in Fig. 27, a shaft through hole 311' through which the rotation shaft 311' of the moving motor 320' passes is formed at the moving panel 310'.

[383] As depicted in Figs. 28 and 29, a motor coupling portion 312' to which a bracket 322' provided at the moving motor 320' is fitted and coupled in a rotary type is formed at the moving panel 310' in a plural number around the shaft through hole 311' of Fig. 27.

[384] A protection rib 313' for surrounding the part of the circumference of the moving motor 320' is formed at the moving panel 310' to protrude in the backward direction.

[385] A panel connection portion 314' connected to the display 2' is formed at the moving panel 310'. Here, the panel connection portion 314' can be integrally formed with the moving panel 310' to protrude therefrom, or can be individually formed from the moving panel 310' and coupled to the moving panel 310'.

[386] The connection between the moving panel 310' and the display 2' will now be explained in detail.

[387] When the display cover 210' and the display rear 230' of the display 2' are coupled, the cover connection portion 214' of the display cover 210' and the rear connection portion 236' of the display rear 230' can be provided with an insertion hole portion, and the panel connection portion 314' of the moving panel 310' can be inserted into the insertion hole portion. Alternatively, the panel connection portion 314' of the moving panel 310' can be provided with an insertion hole portion, and the cover connection

portion 214' of the display cover 210' and the rear connection portion 236' of the display rear 230' can be inserted into the insertion hole portion.

[388] After the insertion, fastening members such as fastening bolts can be passed through the panel connection portion 314' of the moving panel 310' and fastened to one of the cover connection portion 214' of the display cover 210' and the rear connection portion 236' of the display rear 230' to thereby firmly assemble the display 2' and the moving panel 310'.

[389] The bracket 322' is coupled to the motor coupling portions 312' so that the moving motor 320' can be positioned at the rear face of the moving panel 310'. The rotation shaft 321 passes through the shaft through hole 311' of the moving panel 310' and protrudes in the forward direction of the moving panel 310'.

[390] The power transfer mechanism 330' includes a moving gear 332' and a fixed gear 334'.

[391] The moving gear 332' is a gear moving along the fixed gear 334'. The moving gear 332' is installed on the rotation shaft 321' of the moving motor 320', and engaged with the fixed gear 334' to move along the fixed gear 334' in the driving of the moving motor 320'.

[392] The moving gear 332' is installed on the rotation shaft 321' of the moving motor 320' protruding in the forward direction of the moving panel 310', and positioned between the front face of the moving panel 310' and the rear face of the display housing portion 22A'.

[393] The moving gear 332' is a pinion installed on the rotation shaft 321' of the moving motor 320'.

[394] The moving gear 332' rotates along the fixed gear 334'. The fixed gear 334'is a rack formed long inside the main body 1'.

[395] The fixed gear 334' is provided at the glass panel 22' constituting the front panel 20', preferably, at the rear face of the display housing portion 22A'.

[396] If the fixed gear 334' is formed long in the up-down direction, the moving gear 332' ascends and descends with the moving motor 320', the moving panel 310 and the display 2'. If the fixed gear 334' is formed long in the left-right direction, the moving gear 332 moves in the left-right direction with the moving motor 320', the moving panel 310' and the display 2'.

[397] In the air conditioner according to this embodiment, the display 2' can ascend and descend or move in the left-right direction. For convenience of explanation, it is assumed that the display 2'ascends and descends.

[398] That is, the fixed gear 334' is provided at the rear face of the display housing portion 22A' to be long in the up-down direction.

[399] The fixed gear 334' can be individually manufactured from the glass panel 22', and adhered to the glass panel 22' by an adhesion means such as an adhesive or fastened to the glass panel 22' by fastening means such as bolts or hooks. Alternatively, the fixed gear 334' can be integrally molded with the glass panel 22'.

[400] Meanwhile, in the air conditioner according to this embodiment, plural sets of the moving motors 320', the moving gears 332' and the fixed gears 334' can be provided to be spaced apart from each other in the left-right direction or the up-down direction. Alternatively, when one fixed gear 334' is provided, plural sets of the moving motors 320' and the moving gears 332' can be provided to be spaced apart from each other in the up-down direction.

[401] In the case that the plurality of moving gears 332' are engaged with one fixed gear 334', the number of the fixed gears 334' can be minimized and the display 2' can be stably position-shifted. Most preferably, the one fixed gear 334' is provided at the rear face of the display housing portion 22A' to be long in the up-down direction, and the plural sets of the moving motors 320' and the moving gears 332' are placed to be spaced apart from each other in the up-down direction.

[402] A guide means for guiding the position shift of the moving panel 310' is formed on at least one of the main body 1' and the display moving mechanism 300'.

[403] The guide means includes a moving guide gear 342' placed to be rotatable around a support shaft 341' formed at the front face of the moving panel 310', and a fixed guide gear 344' provided at the front panel 20' for guiding the moving guide gear 342'.

[404] The moving guide gear 342' is a pinion, and the fixed guide gear 344' is a rack provided at the rear face of the display housing portion 22A' to be long in the up-down direction and parallel to the fixed gear 334'.

[405] The fixed guide gear 344' can be individually manufactured from the glass panel 22', and adhered to the glass panel 22' by an adhesion means such as an adhesive or fastened to the glass panel 22' by fastening means such as bolts or hooks. Alternatively, the fixed guide gear 334' can be integrally molded with the glass panel 22'.

[406] Here, the moving guide gear 342' and the fixed guide gear 344' serve to stably support the display moving mechanism 300', particularly, the moving panel 310'. If the moving motor 320' is installed at the center among the left, right and center of the moving panel 310', preferably, the moving guide gears 342' are placed at the front left and right sides of the moving panel 310' and the fixed guide gears 344' are placed at

the rear left and right sides of the display housing portion 22A'. If the moving motor 320' is installed at the right side between the left and right sides of the moving panel 310', preferably, the moving guide gear 342' is placed at the left side between the front left and right sides of the moving panel 310' and the fixed guide gear 344' is placed at the left side between the rear left and right sides of the display housing portion 22A'.

[407] In the meantime, the guide means further includes a sliding guide 352' formed at the front face of the moving panel 310' to be long in the up-down direction, and a guide rail 354' provided at the rear face of the display housing portion 22A' to be long in the up-down direction.

[408] The sliding guide 352 has a section protruding in a '

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' shape, and is provided in a plural number to be spaced apart from each other in the left-right direction.

[409] The guide rail 354 has a '(' shaped section to slidably guide the sliding guide 352' in the up-down direction, and is provided in a plural number to be spaced apart from each other in the left-right direction.

[410] In the air conditioner according to this embodiment, an operation unit 360' for operating the display 2'is connected to the main body 1'.

[411] The operation unit 360' is connected to one of the display 2' and the display moving mechanism 300' to be position-shifted with the display 2' in the position shift of the display 2'.

[412] That is, when the position of the display 2' is lifted, the position of the operation unit 360' is also lifted, and when the position of the display 2' is lowered, the position of the operation unit 360' is also lowered.

[413] Meanwhile, the operation unit 360' can be connected to be positioned between the front panel 20' and the air conditioning unit 10' in the main body 1', or connected to be positioned outside the main body 1'. Preferably, the operation unit 360' is connected to be positioned outside the main body 1' so that it can be controlled in the close state of the front panel 20'.

[414] Preferably, the operation unit 360' is connected to be positioned almost next to the front panel 20'. As the display 2' is positioned inside the front panel 20' and the display moving mechanism 300' is positioned at the back of the front panel 20', the operation unit 360' is preferably connected not to the display 2' but to the display moving mechanism 300'. Hereinafter, it is assumed that the operation unit 360' is connected to the moving panel 310'.

[415] The operation unit 360' is connected to the moving panel 310' to protrude from the side thereof. An insertion portion 362' is formed at one of the operation unit 360', and the moving panel 310', and an insertion groove portion 316' into which the insertion portion 362' is inserted is formed at the other. Hereinafter, it is assumed that the insertion portion 362' protrudes from the operation unit 360' to be long in the left-right direction, and the insertion groove portion 316' with an open side face is formed at the moving panel 310'.

[416] After the insertion portion 362' is inserted into the insertion groove portion 316', fastening members 317' such as fastening bolts can be fastened to the insertion portion 362' and the insertion groove portion 316', for firmly assembling the operation unit 360'and the moving panel 310'.

[417] In the meantime, the operation unit 360' includes a connection panel 364' with the insertion portion 362' protruding therefrom, and a control panel 366' coupled next to the connection panel 364'.

[418] A board 370' provided with switches 368' is placed between the connection panel 364' and the control panel 366' of the operation unit 360'.

[419] The board 370' is connected to the control unit 170' of Fig. 24 through a cable 372' such as an electric wire.

[420] A through hole 374' through which the cable 372' passes is formed at the connection panel 364'.

[421] Buttons 376' for switching the switches 368' are provided at the control panel 366' in a click type.

[422] In Fig. 27, reference numeral 318' denotes a cable guide formed at the moving panel 310', for arranging and guiding the cable 372' of the operation unit 360'.

[423] In Figs. 27 to 29, reference numeral 22D' denotes a cable guide portion indented into the rear face of the glass panel 22' in the forward direction, for arranging and guiding the cable 226' of the display 2' and the cable 372' of the operation unit 360', and 22E denotes a cable cover mounted on the glass panel 22' for covering the cable guide portion 22D'.

[424] The operation of the present invention will now be described.

[425] When the user inputs a position shift command for the display 2' through the operation unit 360' or the remote controller, the control unit 170' outputs an ascending or descending signal, so that the moving motor 320' is driven according to the output signal from the control unit 170'.

[426] When the control unit 170' outputs the ascending signal for the display 2', the

moving motor 320' rotates the moving gear 332' in the direction of lifting the display 2' and the moving panel 310', for example, in the anticlockwise direction of Figs. 28 and 29. As the fixed gear 334' is fixed to the glass panel 22', the moving gear 332' ascends along the fixed gear 334'.

[427] When the moving gear 332' ascends, the moving motor 320' to which the moving gear 332' is connected and the moving panel 310' on which the moving motor 320' is mounted ascend together. The display 2' is lifted by the moving panel 310' in the rear position of the transparent portion 26' of the front panel 20'.

[428] On the contrary, when the control unit 170' outputs the descending signal for the display 2', the moving motor 320' rotates the moving gear 332' in the reverse direction to the direction in the ascent of the display 2', for example, in the clockwise direction of Figs. 28 and 29. Oppositely to the ascent of the display 2', the moving gear 332' descends along the fixed gear 334'.

[429] When the moving gear 332' descends, the moving motor 320' to which the moving gear 332' is connected and the moving panel 310' on which the moving motor 320' is mounted descend together. The display 2' is lowered by the moving panel 310' in the rear position of the transparent portion 26' of the front panel 20'.

[430] On the other hand, the user can check the ascent or descent of the display 2' through the transparent portion 26' and easily confirm the information displayed on the display 2' through the transparent portion 26' afterwards.

[431] Fig. 30 is a perspective view illustrating a state where the front face of the air conditioner is open in the forward direction to show the inside lower portion thereof, when a second example of the display moving mechanism is applied to the air conditioner of Fig. 21.

[432] In Fig. 30, the display 2' can be positioned at the front of the main body 1' and position-shifted by a magnetic mechanism 300a' at the front of the main body 1'. Alternatively, the display 2' can be positioned inside the main body 1' and position-shifted by the magnetic mechanism 300a' inside the main body 1'. Hereinafter, it is assumed that the display 2' is positioned inside the main body 1' and position-shifted by the magnetic mechanism 300a'. Components of Figs. 30 to 35 are identical to the components of Figs. 20 to 29 with same reference numerals. Explanations of the same components are omitted.

[433] Fig. 31 is a cross-sectional view taken along line B-B of Fig. 30, Fig. 32 is an exploded perspective view illustrating the display and the magnetic mechanism of Fig. 31, Fig. 33 is a perspective view illustrating the descent states of the display and the

magnetic mechanism of Figs. 31 and 32, and Fig. 34 is a perspective view illustrating the ascent states of the display and the magnetic mechanism of Figs. 31 and 32.

[434] The magnetic mechanism 300a' includes a moving panel 310a' connected to the display 2', a magnetic substance 320a' installed at any one of the main body 1' and the moving panel 310a', and a magnet 330a' installed at the other of the main body 1' and the moving panel 310a' to slide along the magnetic substance 320a' in a contact state with the magnetic substance 320a' by a magnetic force.

[435] Here, the moving panel 310a' is a kind of carrier for transferring the display 2'. Preferably, the moving panel 310a' is positioned between the front panel 20' and the air conditioning unit 10' not to be easily seen in the close state of the front panel 20'.

[436] The magnetic substance 320a' and the magnet 330a' are holders for holding the moving panel 310a' and the display 2' at the main body 1', particularly, at the front panel 20'. When the user moves the moving panel 310a', the magnet 330a' slidably moves along the magnetic substance 320a'in the adhered state to the magnetic substance 320a' so that the magnetic force operates as a kind of resistance.

[437] That is, the magnetic substance 320a' and the magnet 330a' do not abruptly but softly move the moving panel 310a'.

[438] When an external force does not operate on the moving panel 310a', the magnet 330a' is continuously fixedly adhered to the specific position of the magnetic substance 320a', for preventing an arbitrary movement of the moving panel 310a'.

[439] Preferably, the magnetic substance 320a' and the magnet 330a' are positioned between the front panel 20' and the air conditioning unit 10' not to be easily seen in the close state of the front panel 20'.

[440] Meanwhile, in the magnetic mechanism 300a', the movement widths of the moving panel 310a' and the display 2' are dependent upon the length of the magnetic substance 320a'.

[441] In the magnetic mechanism 300a', if the magnetic substance 320a' is installed at the moving panel 310a' and the magnet 330a' is installed at the main body 1', since the moving panel 310a' is heavy due to the weight of the magnetic substance 320a', the magnet 330a' must have strong magnetism and may separate from the magnetic substance 320a'. On the contrary, if the magnetic substance 320a' is installed at the main body 1' and the magnet 330a' is installed at the moving panel 310a', the magnet 330a' does not need strong magnetism and rarely separates from the magnetic substance 320a'. Hereinafter, it is assumed that the magnetic substance 320a' is installed at the main body 1', particularly, at the rear face of the front panel 20', and the

magnet 330a' is installed at the moving panel 310a', particularly, at the front face thereof.

[442] A magnet mounting portion 311a' on which the magnet 330a' is mounted is formed at the moving panel 310a'.

[443] The magnet mounting portion 311a' is provided as a groove portion at the front face of the moving panel 310a' so that the magnet 330a' can be inserted thereinto. The magnet mounting portion 311a' is slightly larger in size than the magnet 330a'.

[444] The magnet 330a' can be adhered to the magnet mounting portion 311a' by an adhesion means such as an adhesive, or fixedly hooked by a hook formed at the moving panel 310a'.

[445] A panel connection portion 314a' connected to the display 2' is formed at the moving panel 310a'. Here, the panel connection portion 314a' can be integrally formed with the moving panel 310a' to protrude therefrom, or individually formed from the moving panel 310a' and coupled to the moving panel 310a'. For convenience of explanation, it is assumed that the panel connection portion 314a' is integrally formed with the moving panel 310a' to protrude therefrom.

[446] The connection between the moving panel 310a' and the display 2' will now be explained in detail.

[447] When the display cover 210' and the display rear 230' of the display 2' are coupled, the cover connection portion 214' of the display cover 210' and the rear connection portion 236' of the display rear 230' can be provided with an insertion hole portion, and the panel connection portion 314a' of the moving panel 310a' can be inserted into the insertion hole portion. Alternatively, the panel connection portion 314a' of the moving panel 310a' can be provided with an insertion hole portion, and the cover connection portion 214' of the display cover 210' and the rear connection portion 236' of the display rear 230 can be inserted into the insertion hole portion.

[448] After the insertion, fastening members such as fastening bolts can be passed through the panel connection portion 314a' of the moving panel 310a' and fastened to one of the cover connection portion 214' of the display cover 210' and the rear connection portion 236' of the display rear 230' to thereby firmly assemble the display 2' and the moving panel 310a'.

[449] The magnetic substance 320a' is provided at the rear face of the glass panel 22' constituting the front panel 20'.

[450] If the magnetic substance 320a' is placed long in the up-down direction, the magnet 330a' ascends and descends with the moving panel 310a' and the display 2'. If the

magnetic substance 320a' is placed long in the left-right direction, the magnet 330a' moves in the left-right direction with the moving panel 310a' and the display 2'.

[451] In the air conditioner according to this embodiment, the display 2' can ascend and descend or move in the left-right direction. For convenience of explanation, it is assumed that the display 2' ascends and descends.

[452] That is, the magnetic substance 320a' is provided at the rear face of the glass panel 22' to be long in the up-down direction.

[453] As the magnetic substance 320a' is fastened to the rear face of the glass panel 22' by fastening members 321a' and 322a' such as screws, fastening holes 323a' and 324a' through which the fastening members 321a' and 322a' pass are formed at the upper and lower portions of the magnetic substance 320a', and fastening portions (not shown) corresponding to the fastening holes 323a' and 324a' of the magnetic substance 320a' are formed at the rear face of the glass panel 22'.

[454] In the air conditioner according to this embodiment, plural sets of the magnetic substances 320a' and the magnets 330a' can be provided to be spaced apart from each other in the left-right direction. Alternatively, one set of the magnetic substance 320a' and the magnet 330a' can be provided.

[455] Meanwhile, a roller 342a' rolling along the main body 1', particularly, along the glass panel 22' of the front panel 20' is installed on at least one of the display 2' and the moving panel 310a'.

[456] The roller 342a' can be rotatably installed at the rear face of the display 2' to roll along the front face of the display housing portion 22A' or rotatably installed at the moving panel 310a' to roll along the rear face of the display housing portion 22A'. Hereinafter, it is assumed that the roller 342a' is rotatably installed at the moving panel 310a'.

[457] The roller 342a' is rotatably placed at an opening portion 316a' formed at the moving panel 310a'.

[458] A hinge shaft 343a' is provided at any one of the roller 342a' and the moving panel 310a' to protrude in the left-right direction, and a shaft support portion 344a' for rotatably supporting the hinge shaft 343a' is formed at the other.

[459] Hereinafter, it is assumed that a rib 345a' is formed at the front face of the moving panel 310a' to be long in the up-down direction, the hinge shaft 343a' protrudes from the rib 345a', and the shaft support unit 344a' is formed at the roller 342a' in a hole shape.

[460] Preferably, the roller 342a' is installed at the moving panel 310a' in a plural number

to be spaced apart from each other in the left-right direction or the up-down direction.

[461] A guide 22F' for guiding the roller 342a' is formed at the main body 1', particularly, at the front panel 20', so that the roller 342a' does not slide in the left-right direction but rolls in the up-down direction.

[462] The guide 22F' is provided as a vertical rib at the front panel 20' so that the roller 342a' can be suspended thereon in the lateral direction.

[463] Here, the vertical rib 22F' is formed at the front panel 20', particularly, at the rear face of the display housing portion 22A' of the glass panel 22' to protrude in the backward direction and to be long in the up-down direction.

[464] In order to stably lift and lower the moving panel 310a' and the display 2' without being shaken in the left-right direction or distorted, if the magnet 330a' is installed at the left side among the left, right and center of the moving panel 310a', the roller 342a' is installed at the right side of the moving panel 310a' or one or more rollers 342a' are installed at the center and right side of the moving panel 310a'. Alternatively, if the magnet 330a' is installed at the center among the left, right and center of the moving panel 310a', one or more rollers 342a' are installed at the left and right sides of the moving panel 310a', respectively.

[465] In the air conditioner according to this embodiment, an operation unit 360a' for operating the display 2' is connected to the main body 1'.

[466] The operation unit 360a' is connected to one of the display 2' and the magnetic mechanism 300a' to be position-shifted with the display 2' in the position shift of the display 2'.

[467] That is, when the position of the display 2' is lifted, the position of the operation unit 360a' is also lifted, and when the position of the display 2' is lowered, the position of the operation unit 360a' is also lowered.

[468] Meanwhile, the operation unit 360a' can be connected to be positioned between the front panel 20' and the air conditioning unit 10' in the main body 1' or connected to be positioned outside the main body 1'. Preferably, the operation unit 360a' is connected to be positioned outside the main body 1' so that it can be controlled in the close state of the front panel 20' and function as a handle.

[469] Preferably, the operation unit 360a' is connected to be positioned almost next to the front panel 20'. As the display 2' is positioned inside the front panel 20' and the magnetic mechanism 300a' is positioned at the back of the front panel 20', the operation unit 360a' is preferably connected not to the display 2' but to the magnetic mechanism 300a'. Hereinafter, it is assumed that the operation unit 360a' is connected

to the moving panel 310a'.

[470] The operation unit 360a' is connected to the moving panel 310a' to protrude from the side thereof. An insertion portion 362a' is formed at one of the operation unit 360a' and the moving panel 310a', and an insertion groove portion 316a' into which the insertion portion 362a' is inserted is formed at the other. Hereinafter, it is assumed that the insertion portion 362a' protrudes from the operation unit 360a' to be long in the left-right direction, and the insertion groove portion 316a' with an open side face is formed at the moving panel 310a'.

[471] After the insertion portion 362a' is inserted into the insertion groove portion 316a' fastening members such as fastening bolts can be fastened to the insertion portion 362a' and the insertion groove portion 316a', for firmly assembling the operation unit 360a' and the moving panel 310a'.

[472] In the meantime, the operation unit 360a' includes a connection panel 364a' with the insertion portion 362a' protruding therefrom, and a control panel 366a' coupled next to the connection panel 364a'.

[473] A board 370a' provided with switches 368a' is placed between the connection panel 364a' and the control panel 366a' of the operation unit 360a'.

[474] The board 370a' is connected to the control unit 170' of Fig. 30 through a cable 372a' such as an electric wire.

[475] A through hole 374a' through which the cable 372a' passes is formed at the connection panel 364a'.

[476] Buttons 376a' for switching the switches 368a' are provided at the control panel 366a' in a click type.

[477] In Fig. 32, reference numeral 318a' denotes a cable guide formed at the moving panel 310a', for arranging and guiding the cable 372a' of the operation unit 360a'.

[478] In Figs. 32 to 34, reference numeral 22D' denotes a cable guide portion indented into the rear face of the glass panel 22' in the forward direction, for arranging and guiding the cable 226a' of the display 2' and the cable 372a' of the operation unit 360a', and 22E' denotes a cable cover mounted on the glass panel 22' for covering the cable guide portion 22D'.

[479] In Figs. 33 and 34, reference numeral 22G' denotes a top end stopper protruding from the front panel 20', particularly, from the rear face of the glass panel 22' in the backward direction to stop the top end of the moving panel 310a' in the upward direction, and 22H' denotes a bottom end stopper protruding from the front panel 20', particularly, from the rear face of the glass panel 22' in the backward direction to stop

the bottom end of the moving panel 310a' in the downward direction.

[480] The operation of the present invention will now be described.

[481] When the user holds and lifts the operation unit 360a' with his/her hands, the magnet 330a' ascends along the magnetic substance 320a' in the adhered state to the magnetic substance 320a' so that the display 2' and the moving panel 310a' ascend together.

[482] When the moving panel 310a' ascends, the roller 342a' rolls along the glass panel 22', particularly, along the rear face of the display housing portion 22A' by the guide of the vertical rib 22F' The moving panel 310a' stably ascends with the display 2' without being distorted in the left-right direction. Here, any one of the left and right sides of the moving panel 310a' is not downwardly inclined.

[483] In a state where the magnet 330a', the moving panel 310a' and the display 2' ascend, if the user does not lift but releases the operation unit 360a', the magnet 330a maintains the adhered state to the magnetic substance 320a' due to the magnetic force, so that the moving panel 310a' and the display 2' do not slide or descend downwardly. That is, the display 2' is maintained in the ascent position.

[484] On the contrary, when the user holds and lowers the operation unit 360a' with his/her hands, the magnet 330a' descends along the magnetic substance 320a' in the adhered state to the magnetic substance 320a' so that the display 2' and the moving panel 310a' descend together.

[485] When the moving panel 310a' descends, the roller 342a' rolls along the glass panel 22', particularly, along the rear face of the display housing portion 22A' by the guide of the vertical rib 22F' in the opposite direction to the direction in the ascent of the moving panel 310a'. The moving panel 310a stably descends with the display 2'.

[486] In a state where the magnet 330a', the moving panel 310a' and the display 2' descend, if the user does not lower but releases the operation unit 360a', the magnet 330a' maintains the adhered state to the magnetic substance 320a' due to the magnetic force, so that the moving panel 310a' and the display 2' do not slide or descend downwardly. That is, the display 2' is maintained in the descent position.

[487] On the other hand, the user can check the ascent or descent of the display 2' through the transparent portion 26', and easily confirm the information displayed on the display 2' through the transparent portion 26'.

[488] Fig. 35 is a cross-sectional view illustrating major portions of another example of the display moving mechanism applied to the air conditioner of Fig. 30.

[489] In the air conditioner according to this embodiment, as shown in Fig. 35, a handle

380a' is provided at the moving panel 310a' instead of the operation unit 360a'.

[490] The handle 380a' is connected to the moving panel 310a' to protrude from the side thereof. An insertion portion 382a' is formed at one of the handle 380a' and the moving panel 310a', and an insertion groove portion 316a' into which the insertion portion 382a' is inserted is formed at the other. Hereinafter, it is assumed that the insertion portion 382a' protrudes from the handle 380a' to be long in the left-right direction, and the insertion groove portion 316a' with an open side face is formed at the moving panel 310a'.

[491] After the insertion portion 382a' of the handle 380a' is inserted into the insertion groove portion 316a', fastening members such as fastening bolts can be fastened to the insertion portion 382a' and the insertion groove portion 316a', for firmly assembling the handle 380a' and the moving panel 310a'.

[492] A forward protruding portion 384a' and a backward protruding portion 386a' are formed at the handle 380a' so that the user can easily hold the handle 380a' with his/her hands.

[493] Fig. 36 is a perspective view illustrating a state where the front face of the air conditioner is open in the forward direction to show the inside lower portion thereof, when a third example of the display moving mechanism is applied to the air conditioner of Fig. 21.

[494] In Fig. 36, the display 2' can be positioned at the front of the main body 1' and position-shifted by an elastic mechanism 300b' at the front of the main body 1'. Alternatively, the display 2' can be positioned inside the main body 1' and position-shifted by the elastic mechanism 300b' inside the main body 1'. Hereinafter, it is assumed that the display 2' is positioned inside the main body 1' and position-shifted by the elastic mechanism 300b'. Components of Figs. 36 to 42 are identical to the components of Figs. 20 to 29 with same reference numerals. Explanations of the same components are omitted.

[495] Fig. 37 is a cross-sectional view taken along line B-B of Fig. 36, Fig. 38 is an exploded perspective view illustrating the display and the elastic mechanism of Fig. 37, Fig. 39 is a perspective view illustrating the elastic mechanism of Fig. 38, Fig. 40 is a perspective view illustrating a descent state of a moving panel of Fig. 39, and Fig. 41 is a perspective view illustrating the ascent state of the moving panel of Fig. 39.

[496] The elastic mechanism 300b' includes a moving panel 310b' connected to the display 2', an elastic member 320b' installed at one of the main body 1' and the moving panel 310b', and a holder 330b' installed at the other of the main body 1' and the

moving panel 310b', the elastic member 320b' being elastically hooked and unhooked to/from the holder 330b'.

[497] That is, in the elastic mechanism 300b', the moving panel 310b' can be connected and disconnected to/from the holder 330b' by the elastic member 320b'. In addition, the elastic member 320b' can move along the holder 330b' and can be position-fixed to one side of the holder 330b' for controlling the position of the moving panel 310b'. The position control of the moving panel 310b' will now be explained in detail.

[498] Here, the moving panel 310b' is a kind of carrier for transferring the display 2'. The moving panel 310b' can be individually formed from the display 2' and coupled to the display 2', or integrally formed with the display 2' to constitute a part of the display 2'.

[499] When the moving panel 310b' is integrally formed with the display 2', any one of the elastic member 320b' and the holder 330b' is installed at the display 2', and the other is installed at the main body 1'.

[500] Hereinafter, it is assumed that the moving panel 310b' is individually formed from the display 2' and connected to the display 2'.

[501] Preferably, the moving panel 310b' is positioned between the front panel 20' and the air conditioning unit 10' not to be easily seen in the close state of the front panel 20'. Therefore, the moving panel 310b is positioned at the rear face of the front panel 20'.

[502] In the elastic mechanism 300b', the movement widths of the moving panel 310b' and the display 2' are determined in proportion to the length of the holder 330b'. If the holder 330b' is installed at the moving panel 310b' and the elastic member 320b' is installed at the main body 1', particularly, at the front panel 20' since the moving panel 310b' is heavy due to the weight of the holder 330b', the moving panel 310b' may separate from the holder 330b'. On the contrary, if the holder 330b' is installed at the main body 1', particularly, at the front panel 20' and the elastic member 320b' is installed at the moving panel 310b', the moving panel 310b' is relatively light, and thus rarely separates from the holder 330b'. Hereinafter, it is assumed that the holder 330b' is installed at the main body 1', particularly, at the rear face of the front panel 20' and the elastic member 320b'is installed at the moving panel 310b'.

[503] An elastic member mounting portion 311b' on which the elastic member 320b' is mounted is formed at the moving panel 310b'.

[504] Preferably, the elastic member mounting portion 311b' is placed at the front face of the moving panel 310b' to protrude in the forward direction, and moves along the holder 330b'.

[505] The elastic member mounting portion 311b' includes a space portion 311b-1' into

which the elastic member 320b' is inserted and housed, and also includes a pass-through portion 312b' for passing through the gap between a left holder 334b' and a right holder 335b of the holder 330b' explained below.

[506] A through hole 313b' through which a hooking portion 321b' of the elastic member 320b' explained later passes is formed at the pass-through portion 312b'.

[507] Left and right hooked jaws 314b' and 315b' hooked on the holder 330b', particularly, on the left holder 334b' and the right holder 335b' in the backward direction are formed at the elastic member mounting portion 311b' to protrude in the left-right direction.

[508] A panel connection portion 316b' connected to the display 2' is formed at the moving panel 310b'. Here, the panel connection portion 316b' can be integrally formed with the moving panel 310b' to protrude therefrom, or individually formed from the moving panel 310b' and coupled to the moving panel 310b'.

[509] The connection between the moving panel 310b' and the display 2' will now be explained in detail.

[510] When the display cover 210' and the display rear 230' of the display 2' are coupled, the cover connection portion 214' of the display cover 210' and the rear connection portion 236' of the display rear 230' can be provided with an insertion hole portion, and the panel connection portion 316b' of the moving panel 310b' can be inserted into the insertion hole portion. Alternatively, the panel connection portion 316b' of the moving panel 310b' can be provided with an insertion hole portion, and the cover connection portion 214' of the display cover 210' and the rear connection portion 236' of the display rear 230' can be inserted into the insertion hole portion.

[511] After the insertion, fastening members such as fastening bolts can be passed through the panel connection portion 316b' of the moving panel 310b' and fastened to one of the cover connection portion 214' of the display cover 210' and the rear connection portion 236 'of the display rear 230' to thereby firmly assemble the display 2'and the moving panel 310b'.

[512] In the meantime, the elastic member 320b' and the holder 330b' are fixing means for fixing the moving panel 310b' and the display 2' to the main body 1', particularly, to a specific position of the front panel 20' to be position-shiftable. When the user moves the moving panel 310b', the elastic member 320b moves along the holder 330b' in contact with the holder 330b' so that the moving panel 310b' and the display 2' do not abruptly move due to a contact resistance.

[513] That is, the elastic member 320b' and the holder 330b' do not abruptly but softly

move the moving panel 310b'.

[514] If an external force does not operate on the moving panel 310b', the elastic member 320b' is continuously fixedly hooked in the specific position of the holder 330b' for preventing an arbitrary movement of the moving panel 310b'.

[515] Preferably, the elastic member 320b' and the holder 330b' are positioned between the front panel 20' and the air conditioning unit 10' not to be easily seen in the close state of the front panel 20'.

[516] Here, the elastic member 320b' can be a detent including a coil spring installed at the elastic member mounting portion 311b' and a ball elastically supported by the coil spring and hooked on the holder 330b', or a plate spring mounted at the elastic member mounting portion 311b', and provided with the protruding hooking portion 321b' hooked on the holder 330b'. Hereinafter, it is assumed that the elastic member 320b'is the plate spring.

[517] The hooking portion 321b' formed almost at the center of the elastic member 320b' is curved to protrude in one of the left and right directions.

[518] The elastic member 320b' is inserted into the space portion 311b-1' of the elastic member mounting portion 311b'. The hooking portion 321b' is placed to protrude through the pass-through portion 312b' of the elastic member mounting portion 311b'.

[519] The holder 330b' is provided at the rear face of the glass panel 22' constituting the front panel 20'. Preferably, the holder 330b' is provided at the rear face of the display housing portion 22A'.

[520] In the air conditioner according to this embodiment, if the holder 330b' is placed long in the up-down direction, the elastic member 320b' ascends and descends with the moving panel 310b' and the display 2'. If the holder 330b' is placed long in the left-right direction, the elastic member 320b' moves in the left-right direction with the moving panel 310b' and the display 2'. For convenience of explanation, it is assumed that the display 2' ascends and descends.

[521] That is, the holder 330b is provided at the rear face of the display housing portion 22A which is the rear face of the front panel 20 to be long in the up-down direction.

[522] As the holder 330b' is fastened to the rear face of the glass panel 22' by fastening members 331b' such as screws, fastening holes 333b' through which the fastening members 331b' pass are formed at the holder 330b', and fastening portions 22D' corresponding to the fastening holes 333b' of the holder 330b' are formed at the rear face of the glass panel 22' so that the fastening members 331b' can be fastened thereto.

[523] The holder 330b' includes the left holder 334b' and the right holder 335b' spaced

apart from each other in the left-right direction.

[524] Here, the left holder 334b' and the right holder 335b' include fastening portions 334b-1' and 335b-1' provided with the fastening holes 333b' and fastened to the glass panel 22', and rail portions 334b-2 'and 335b-2' curved from the fastening portions 334b-1' and 335b-1' to have '(' shaped sections.

[525] The left holder 334b' and the right holder 335b' of the holder 330b' are spaced apart from each other at an interval larger than the left-right width of the pass-through portion 312b' of the elastic member mounting portion 311b'.

[526] The holder 330b' includes a lower holder 336b' for connecting the lower portions of the left holder 334b' and the right holder 335b'. The pass-through portion 312b' of the elastic member mounting portion 311b' is suspended on the lower holder 336b' in the downward direction.

[527] Meanwhile, a plurality of hooked groove portions 337b', 338b' and 339b' onto which the hooking portion 321b' of the elastic member 320b' is inserted and hooked are formed at the holder 330b'.

[528] As the plurality of hooked groove portions 337b', 338b', and 339b' are formed at the holder 330b' to be spaced apart in the longitudinal direction of the holder 330b', each of the hooked groove portions 337b', 338b', and 339b' is indented into one of the left holder 334b' and the right holder 335b' in the lateral direction.

[529] If the holder 330b' has many hooked groove portions 337b', 338b', and 339b', it can variously control the position of the display 2'. Accordingly, at least two hooked groove portions are formed.

[530] Here, the holder 330b' is not limited by the number of the hooked groove portions 337b', 338b' and 339b'. For convenience of explanation, it is assumed that the upper hooked groove portion 337b', the center hooked groove portion 338b' and the lower hooked groove portion 339b' are formed at the holder 330b'.

[531] The elastic mechanism 300b' can include one set of the elastic member 320b' and the holder 330b', or plural sets of the elastic members 320b' and the holders 330b' spaced apart from each other in the left-right direction.

[532] In addition, in the elastic mechanism 300b', if the plurality of elastic members 320b' are hooked and unhooked to/from one holder 330b', the number of the holders 330b' can be minimized and the display 2' can be stably position-shifted. Most preferably, the plurality of elastic member mounting portions 311b' and the plurality of elastic members 320b' are provided at the moving panel 310b' to be spaced apart from each other in the up-down direction.

[533] In the air conditioner according to this embodiment, an operation unit 360b' for operating the display 2' is connected to the main body 1'.

[534] The operation unit 360b' is connected to one of the display 2' and the elastic mechanism 300b' to be position-shifted with the display 2' in the position shift of the display 2'.

[535] That is, when the position of the display 2' is lifted, the position of the operation unit 360b' is also lifted, and when the position of the display 2' is lowered, the position of the operation unit 360b' is also lowered.

[536] Meanwhile, the operation unit 360b' can be connected to be positioned between the front panel 20' and the air conditioning unit 10' in the main body 1', or connected to be positioned outside the main body 1'. Preferably, the operation unit 360b' is connected to be positioned outside the main body 1' so that it can be controlled in the close state of the front panel 20' and function as a handle.

[537] In the air conditioner according to this embodiment, as the display 2' is positioned inside the front panel 20', and the elastic mechanism 300b' is positioned at the back of the front panel 20', the operation unit 360b' is preferably connected not to the display 2' but to the elastic mechanism 300b'. Hereinafter, it is assumed that the operation unit 360b' is connected to the moving panel 310b' to be positioned almost next to the front panel 20'.

[538] That is, the operation unit 360b' is connected to the moving panel 310b' to protrude from the side thereof. An insertion portion 362b' is formed at one of the operation unit 360b' and the moving panel 310b', and an insertion groove portion 316b' into which the insertion portion 362b' is inserted is formed at the other. Hereinafter, it is assumed that the insertion portion 362b' protrudes from the operation unit 360b' to be long in the left-right direction, and the insertion groove portion 316b' with an open side face is formed at the moving panel 310b'.

[539] After the insertion portion 362b' is inserted into the insertion groove portion 316b', fastening members 361b' such as fastening bolts can be fastened to the insertion portion 362b', and the insertion groove portion 316b' for firmly assembling the operation unit 360b' and the moving panel 310b'.

[540] In the meantime, the operation unit 360b' includes a connection panel 364b' with the insertion portion 362b' protruding therefrom, and a control panel 366b' coupled next to the connection panel 364b'.

[541] A board 370b' provided with switches 368b' is placed between the connection panel 364b' and the control panel 366b' of the operation unit 360b'.

[542] The board 370b' is connected to the control unit 170' of Fig. 36 through a cable 372b' such as an electric wire.

[543] A through hole 374b' through which the cable 372b' passes is formed at the connection panel 364b'.

[544] Buttons 376b' for switching the switches 368b' are provided at the control panel 366b' in a click type.

[545] In Figs. 38 to 41, reference numeral 22E' denotes a cable guide portion indented into the rear face of the glass panel 22' in the forward direction, for arranging and guiding the cable 226' of the display 2' and the cable 372b' of the operation unit 360b', and 22F' denotes a cable cover mounted on the glass panel 22' for covering the cable guide portion 22E'.

[546] The operation of the present invention will now be described.

[547] When the user holds and lowers the operation unit 360b' of Figs. 37 and 39 with his/her hands, the moving panel 310b' descends with the display 2' and the elastic member 320b' is elastically deformed by the lower portion of the center hooked groove portion 338b' of the holder 330b' so that the hooking portion 321b'unhooks from the center hooked groove portion 338b'.

[548] The elastic member 320b' unhooks from the center hooked groove portion 338b' of the holder 330b'. The hooking portion 321b' descends in contact with the lower portion of the center hooked groove portion 338b' of the holder 330b'. The elastic member 320b' does not abruptly but stably descends with the moving panel 310b' and the display 2' due to a contact resistance.

[549] In this descending process, when the hooking portion 321b' of the elastic member 320b' is positioned next to the lower hooked groove portion 339b' of the holder 330b', the elastic member 320b' is elastically deformed, so that the hooking portion 321b' is protruded toward the lower hooked groove portion 339b 'of the holder 330b' inserted into the lower hooked groove portion 339b', and hooked thereon in the up-down direction. As shown in Fig. 40, the moving panel 310b' is fixed in the low position by the restriction of the elastic member 320b'.

[550] Here, the display 2' is lowered with the moving panel 310b'. The user can check the descent of the display 2' through almost the lower portion of the transparent portion 26' and confirm the information displayed on the display 2' through the transparent portion 26'.

[551] On the contrary, when the user holds and lifts the operation unit 360b' of Figs. 37 and 39 with his/her hands, the moving panel 310b' ascends with the display 2', and the

elastic member 320b 'is elastically deformed by the upper portion of the center hooked groove portion 338b' of the holder 330b' so that the hooking portion 321b' unhooks from the center hooked groove portion 338b'.

[552] The elastic member 320b' unhooks from the center hooked groove portion 338b' of the holder 330b'. The hooking portion 321b' ascends in contact with the upper portion of the center hooked groove portion 338b' of the holder 330b'. The elastic member 320b' does not abruptly but stably ascends with the moving panel 310b' and the display 2' due to a contact resistance.

[553] In this ascending process, when the hooking portion 321b' of the elastic member 320b' is positioned next to the upper hooked groove portion 337b' of the holder 330b', the elastic member 320b' is elastically deformed, so that the hooking portion 321b' is protruded toward the upper hooked groove portion 337b' of the holder 330b' inserted into the upper hooked groove portion 337b', and hooked thereon in the up-down direction. As shown in Fig. 41, the moving panel 310b' is fixed in the high position by the restriction of the elastic member 320b'.

[554] Here, the display 2' is lifted with the moving panel 310b'. The user can check the ascent of the display 2' through almost the upper portion of the transparent portion 26' and confirm the information displayed on the display 2'through the transparent portion 26'.

[555] Fig. 42 is a cross-sectional view illustrating majpr portions of another example of the display moving mechanism applied to the air conditioner of Fig. 36.

[556] In the air conditioner according to this embodiment, as shown in Fig. 42, a handle 380b' is provided at the moving panel 310b' instead of the operation unit 360b'. The configuration and operation of this embodiment are similar or identical to those of the above-described embodiment except the handle 380b'. Therefore, same reference numerals are used, and detailed explanations thereof are omitted.

[557] The handle 380b' is connected to the moving panel 310b' to protrude from the side thereof. An insertion portion 382b' is formed at one of the handle 380b' and the moving panel 310b', and an insertion groove portion 316b' into which the insertion portion 382b' is inserted is formed at the other. Hereinafter, it is assumed that the insertion portion 382b' protrudes from the handle 380b' to be long in the left-right direction, and the insertion groove portion 316b' with an open side face is formed at the moving panel 310b'.

[558] After the insertion portion 382b' of the handle 380b' is inserted into the insertion groove portion 316b', fastening members such as fastening bolts can be fastened to the

insertion portion 382b' and the insertion groove portion 316b', for firmly assembling the handle 380b' and the moving panel 310b'.

[559] A forward protruding portion 384b' and a backward protruding portion 386b' are formed at the handle 380b' so that the user can easily hold the handle 380b'with his/her hands.

[560] Although the preferred embodiments of the present invention have been described, it is understood that the present invention should not be limited to these preferred embodiments but various changes and modifications can be made by one skilled in the art within the spirit and scope of the present invention as hereinafter claimed.

[561]

Industrial Applicability

[562] In accordance with the present invention, the display can be position-shifted regardless of the ascent and descent of the discharge hole portion or the discharge of the conditioned air. Moreover, the display can be automatically position-shifted to the position in which the user can clearly see the information thereof.

[563] In accordance with the present invention, the display is positioned at the front of the front panel, so that the display can be serviced without disassembling the main body. In addition, the display moving mechanism is positioned at the back of the front panel, so that the display moving mechanism can be serviced not by disassembling the air conditioning unit but by opening the front panel.

[564] In accordance with the present invention, the moving motor not only moves the moving panel connected to the display but also moves with the moving panel. As compared with a case in which the moving motor is fixedly installed in a specific position, this configuration maximizes the movement distance of the display.

[565] In accordance with the present invention, the driving force of the moving motor is transferred to the moving panel by the moving gear such as the pinion installed at the moving motor and the fixed gear such as the rack engaged with the moving gear and formed at the main body to be long in the up-down direction, for moving the moving panel and the display. That is, the display can be lifted and lowered by the simple structure.

[566] In accordance with the present invention, a front mounted mechanism such as a motor is not required to position-shift the display, which simplifies the structure. The magnetic force operates in the movement of the display, to thereby prevent the abrupt movement of the display and manually stably position-shift the display.

[567] In accordance with the present invention, the plurality of hooked groove portions

onto which the part of the elastic member is inserted and hooked are formed at the holder, for controlling the position of the display by multi-steps. When the part of the elastic member is inserted and hooked onto the hooking groove portion, the user can feel the operation feeling and fix the display in the accurate position in which the elastic member is hooked on the holder.

[568] In accordance with the present invention, the display or the display moving mechanism can be serviced not by disassembling the main body but by opening the front panel.

[569] In accordance with the present invention, the display is placed between the glass and the glass panel of the front panel, and the display moving mechanism is placed at the back of the glass panel. Accordingly, the display moving mechanism can be easily serviced without disassembling the front panel.

[570] In accordance with the present invention, the through hole portion through which the connection portion for connecting the display to the display moving mechanism passes is formed at the glass panel, so that the connection portion can be hidden by the front panel in the close state of the front panel. As the connection portion is not exposed to the outside, it can be protected from damage or separation.

[571] In accordance with the present invention, the transparent portion is provided at the front of the main body, and the display is position-shifted at the back of the transparent portion, so that the display can be protected from damage.

[572] In accordance with the present invention, the moving panel is connected to the display, for easily moving the display, and the guide for guiding the position shift of the moving panel is formed on at least one of the main body and the moving panel, for stably moving the moving panel. As a result, the display can stably move without shake.

[573]

Claims

[1] An air conditioner, comprising:
a main body for air-conditioning an indoor space;
a display positioned toward the front of the main body, for displaying information; and
a display moving mechanism connected to the display, for moving the display.

[2] The air conditioner of claim 1, wherein the main body comprises an air conditioning unit with an air suction hole and an air discharge hole formed thereat, and a front panel pivotably connected to the air conditioning unit, the display moving mechanism being placed at the back of the front panel.

[3] The air conditioner of claim 2, wherein the display is positioned at the front of the front panel, and comprises a connection portion for connecting the display positioned at the front of the front panel to the display moving mechanism positioned at the back of the front panel.

[4] The air conditioner of claim 3, wherein the connection portion surrounds a part of the edge of the front panel.

[5] The air conditioner of claim 1, wherein the main body comprises an air conditioning unit with an air suction hole and an air discharge hole formed thereat, and a front panel pivotably connected to the air conditioning unit and provided with a transparent portion, the display and the display moving mechanism being placed at the front panel.

[6] The air conditioner of claim 5, wherein the front panel comprises a glass constituting the transparent portion, and a glass panel coupled to the glass, the display moving mechanism being placed at the glass panel.

[7] The air conditioner of claim 6, wherein the display is placed between the glass and the glass panel, and the display moving mechanism is placed at the back of the glass panel.

[8] The air conditioner of claim 7, wherein a through hole portion through which the connection portion for connecting the display to the display moving mechanism passes is formed at the glass panel.

[9] The air conditioner of claim 6, wherein a display housing portion for housing the display to be position-shiftable is formed at the glass panel.

[10] The air conditioner of claim 1, comprising a guide provided on at least one of the main body and the display moving mechanism, for guiding the position shift of

the display moving mechanism.

[11] The air conditioner of any one of claims 1 to 10, wherein the display moving mechanism comprises a moving panel connected to the display, a moving motor installed at the moving panel, and a power transfer mechanism cooperated with the moving motor, for position-shifting the moving panel.

[12] The air conditioner of claim 11, wherein the power transfer mechanism comprises a fixed gear formed at the main body, and a moving gear installed at the moving motor and engaged with the fixed gear to move along the fixed gear in the driving of the moving motor.

[13] The air conditioner of claim 12, wherein the fixed gear is a rack formed at the main body to be long in the up-down direction, and the moving gear is a pinion installed on the rotation shaft of the moving motor.

[14] The air conditioner of any one of claims 1 to 10, wherein the display moving mechanism comprises a moving panel connected to the display, a magnetic substance installed at any one of the main body and the moving panel, and a magnet installed at the other of the main body and the moving panel to slide along the magnetic substance by a magnetic force with the magnetic substance.

[15] The air conditioner of claim 14, wherein a roller rolling along the main body is installed on at least one of the display and the moving panel.

[16] The air conditioner of claim 14, wherein the magnetic substance is placed at the rear face of the front panel to be long in the up-down direction, and the magnet is installed at the moving panel.

[17] The air conditioner of claim 14, wherein a handle placed at the outer portion of the main body is connected to the moving panel.

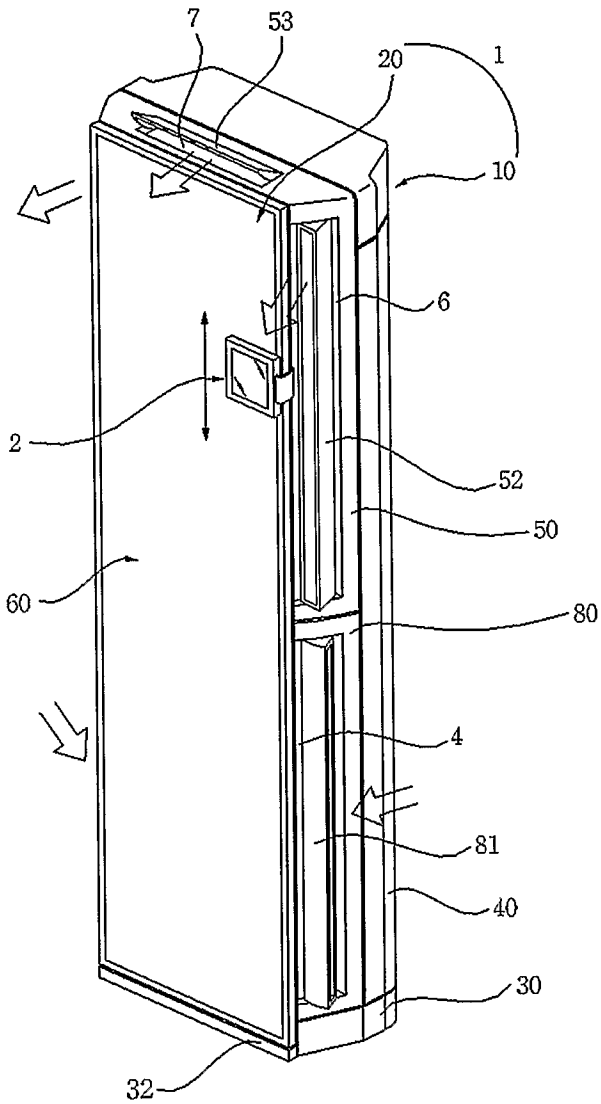
[18] The air conditioner of any one of claims 1 to 10, wherein the display moving mechanism comprises a moving panel connected to the display, an elastic member installed at one of the main body and the moving panel, and a holder installed at the other of the main body and the moving panel, the elastic member being elastically hooked and unhooked to/from the holder.

[19] The air conditioner of claim 18, wherein the holder is placed at the main body to be long in the up-down direction, and the elastic member is installed at the moving panel.

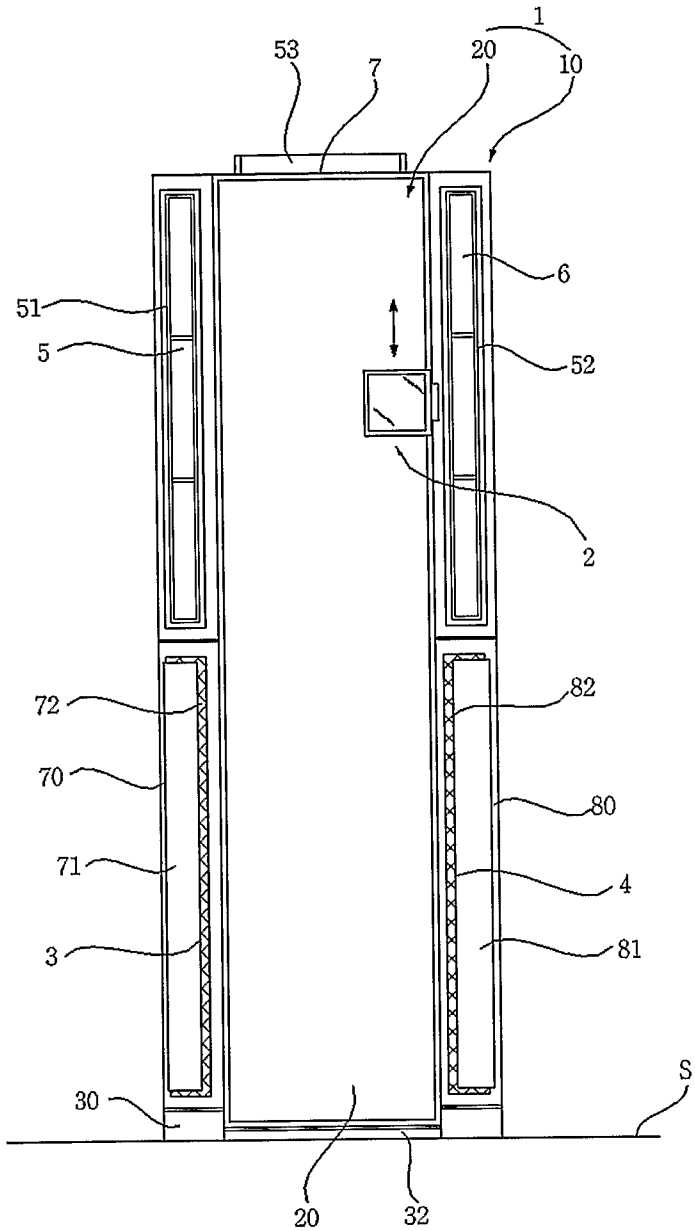
[20] The air conditioner of claim 18, wherein the holder comprises one or more hooked groove portions onto which a part of the elastic member is inserted and hooked.

[21] The air conditioner of claim 20, wherein the elastic member comprises a hooking portion protruding to be inserted and hooked onto the hooked groove portion.

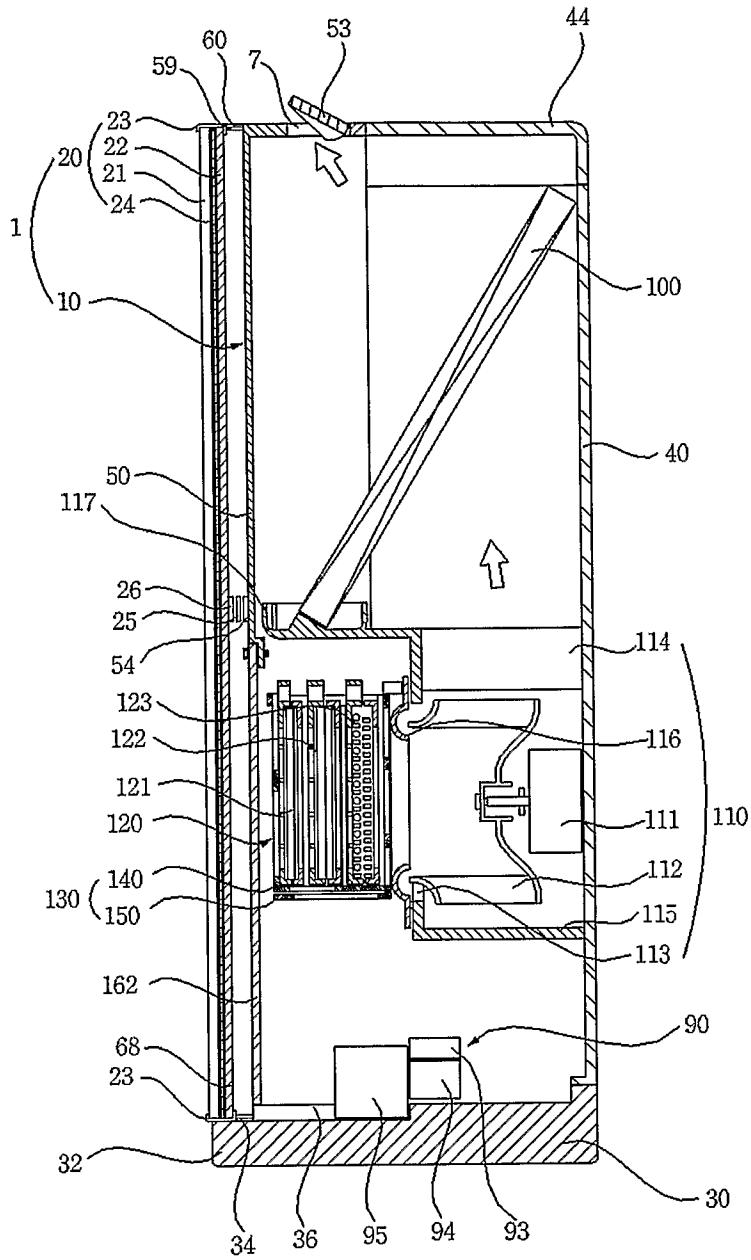
[Fig. 1]



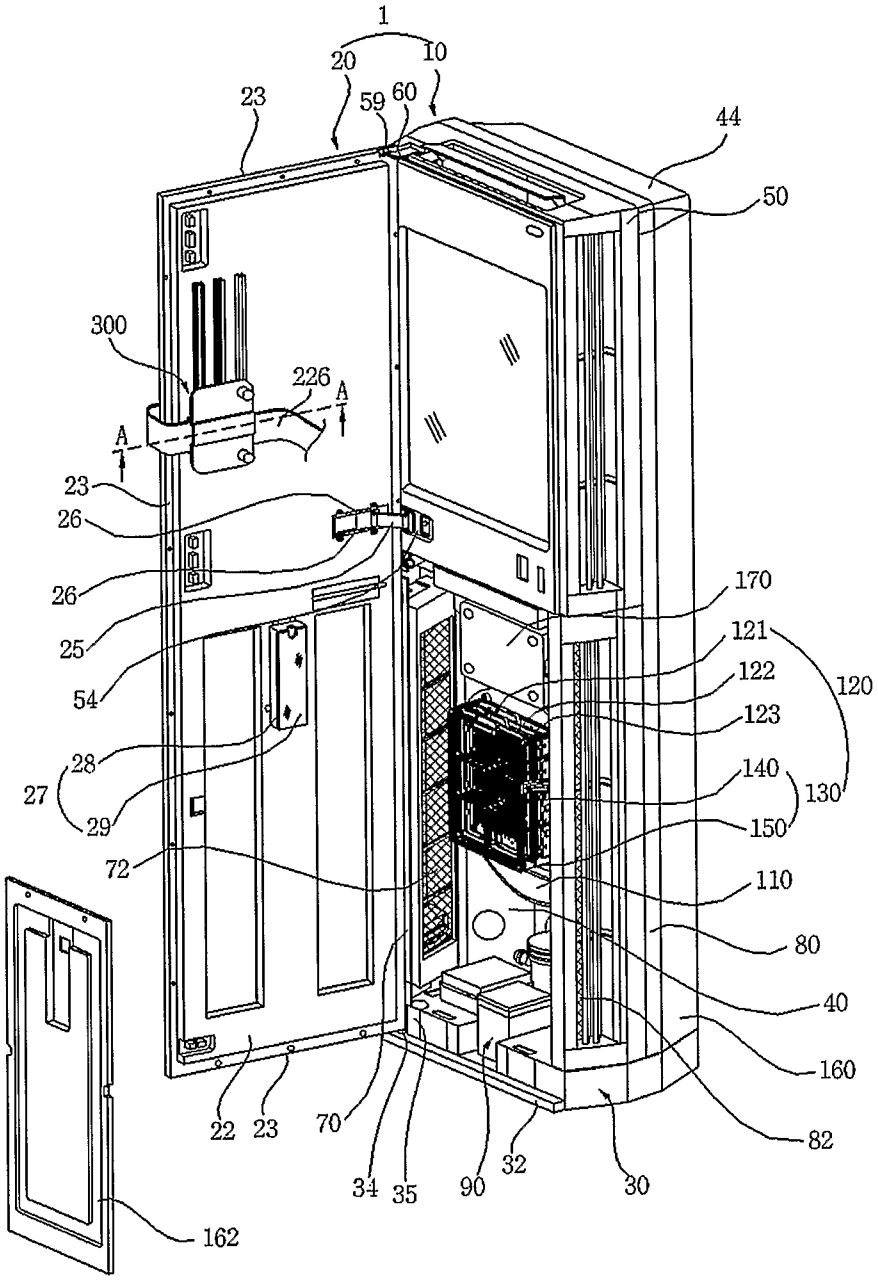
[Fig. 2]



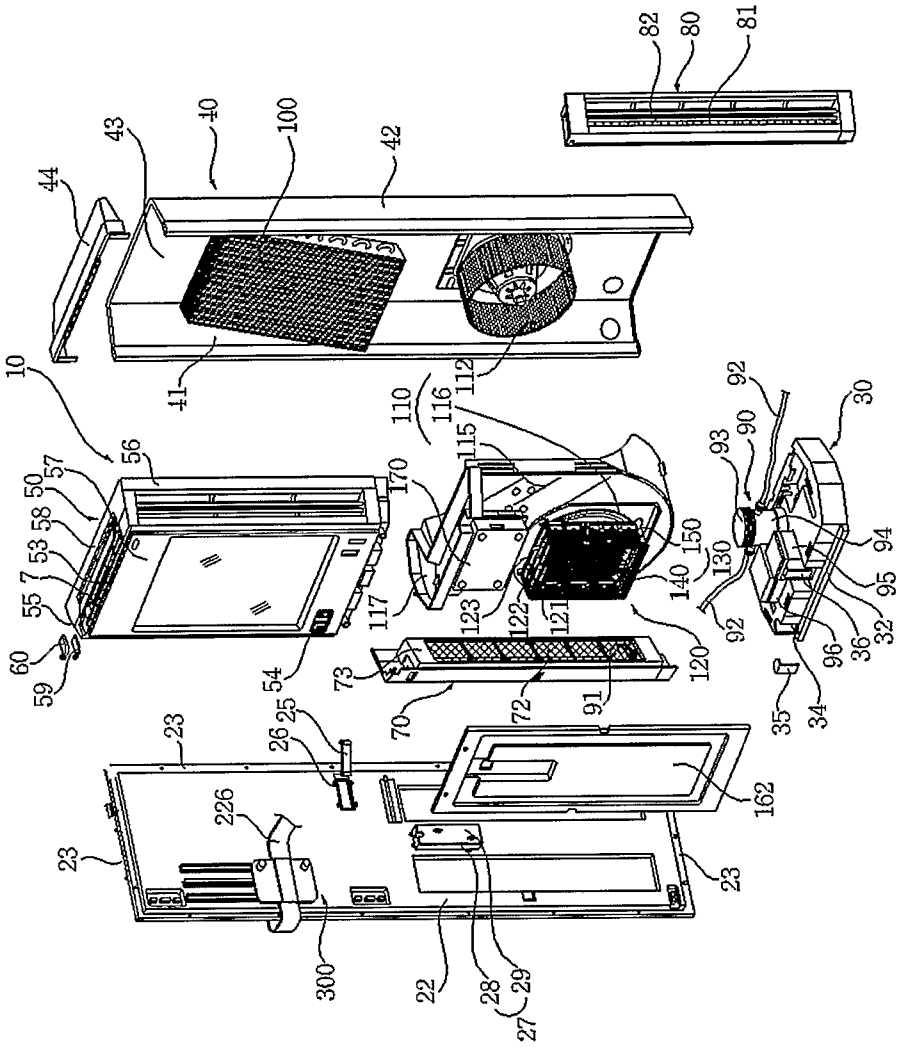
[Fig. 3]


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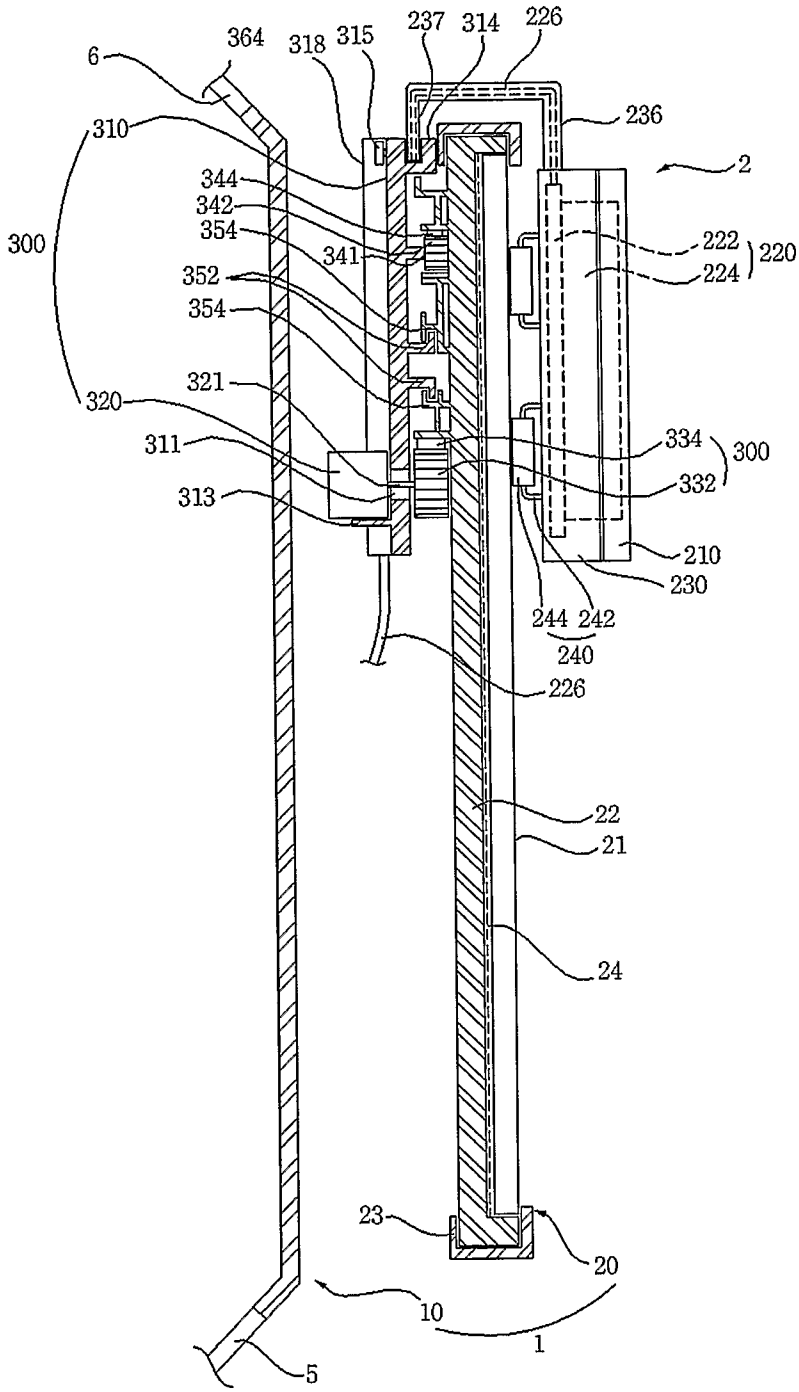
[Fig. 4]


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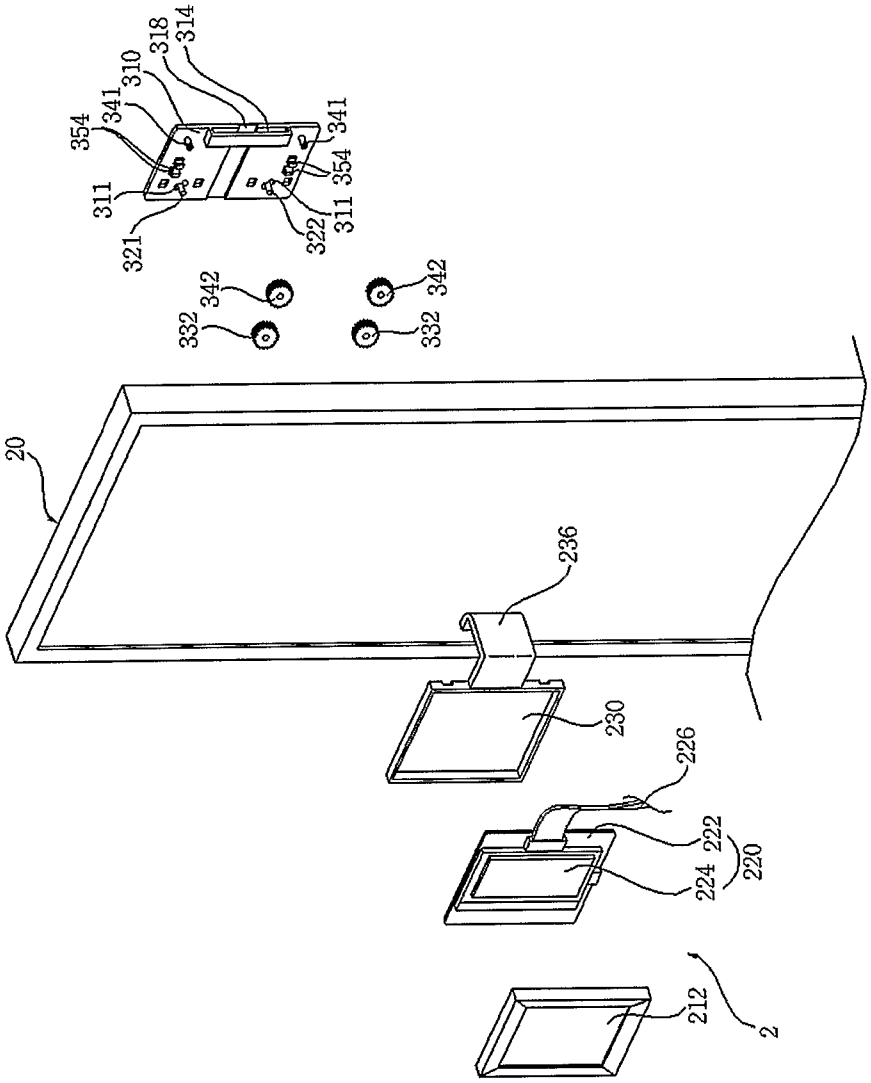
[Fig. 5]


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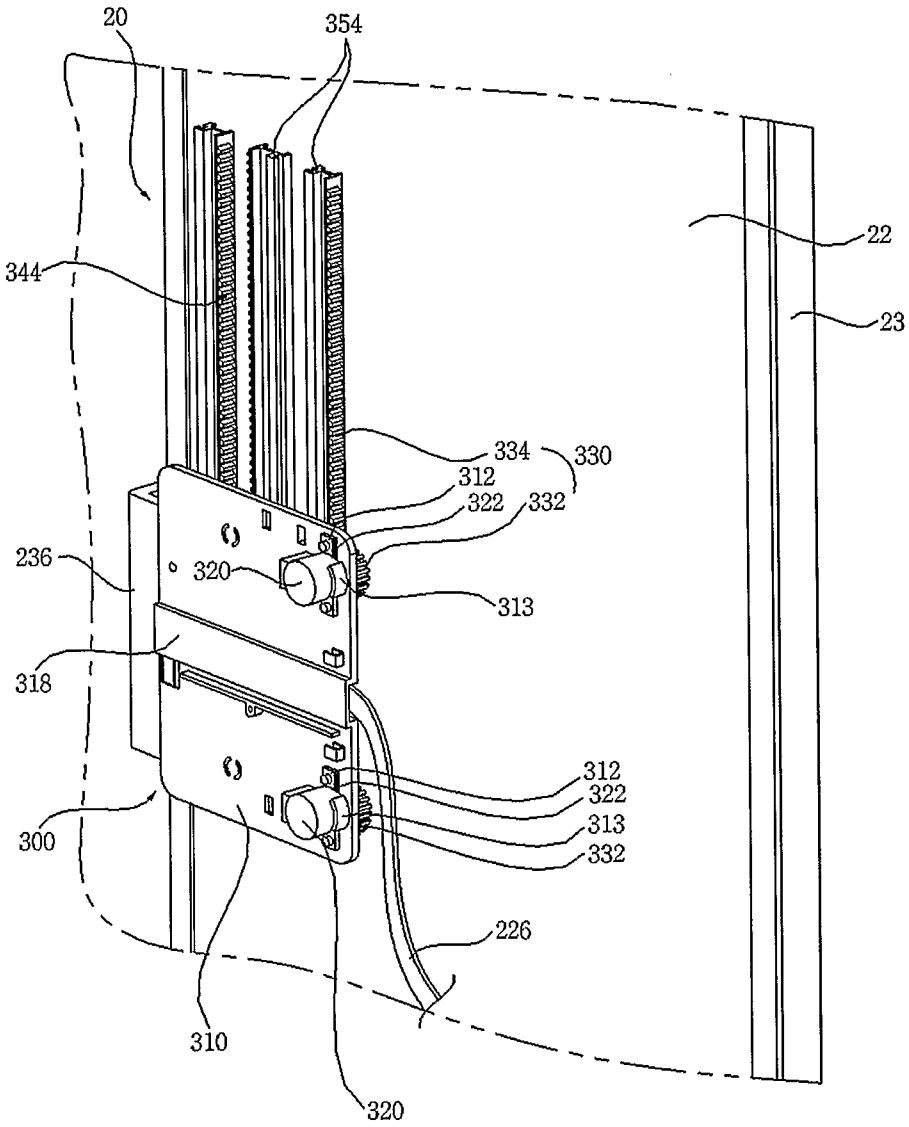
[Fig. 6]


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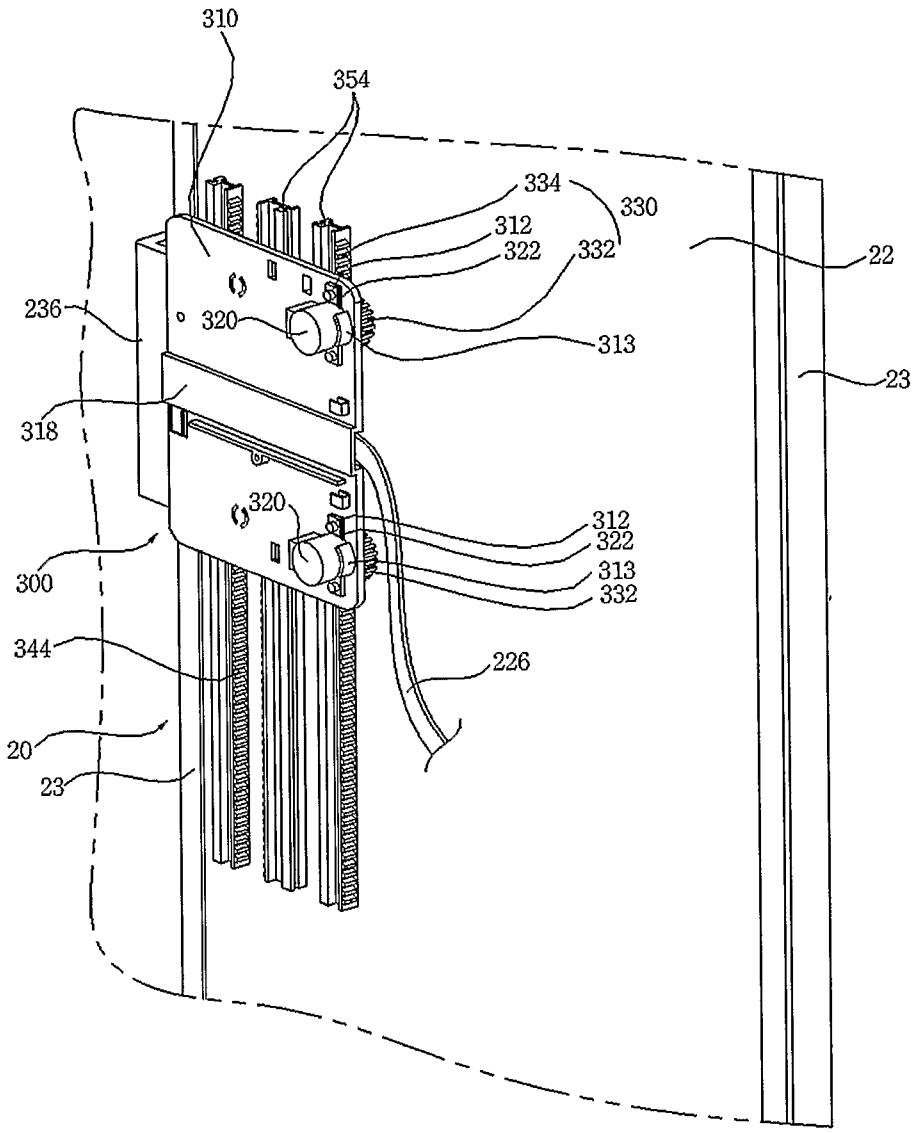
[Fig. 7]


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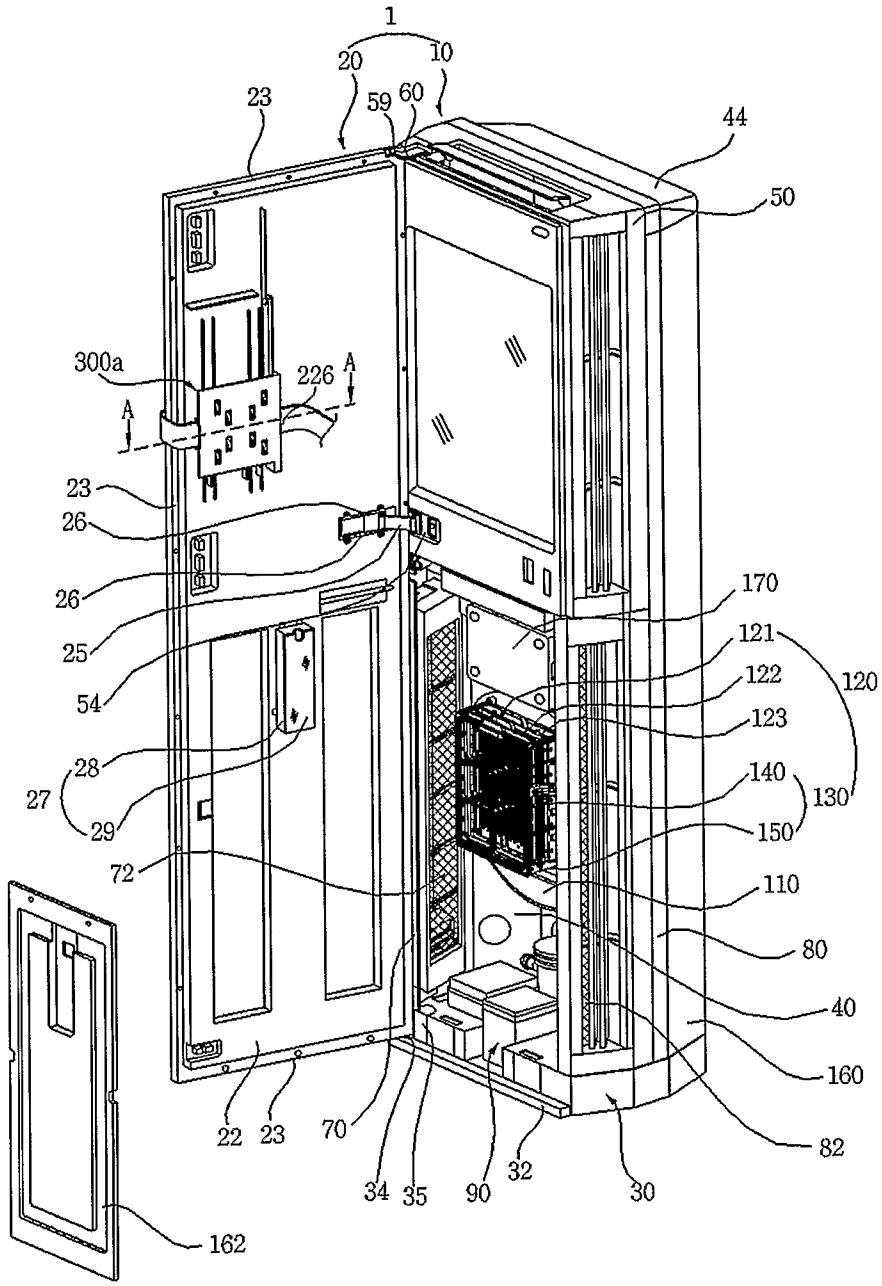
[Fig. 8]


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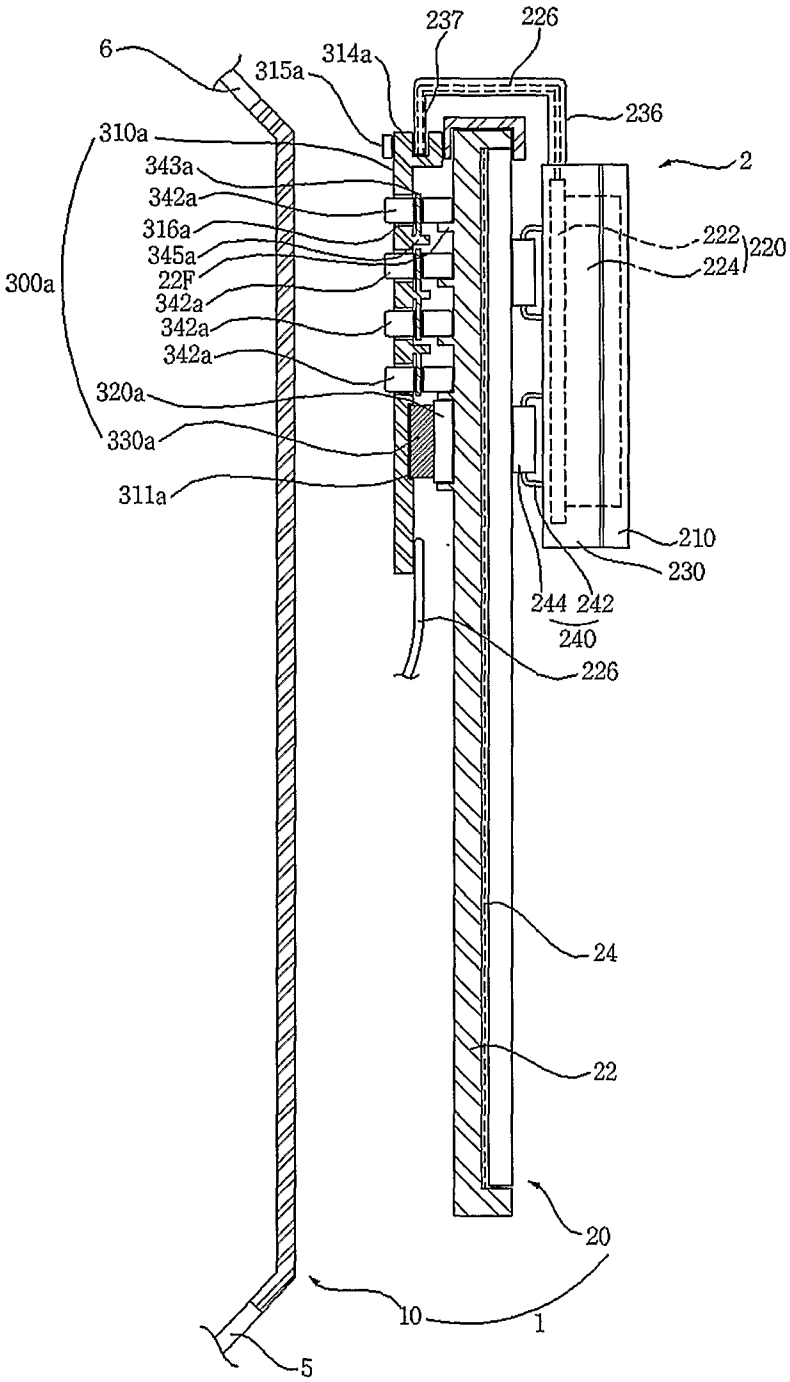
[Fig. 9]


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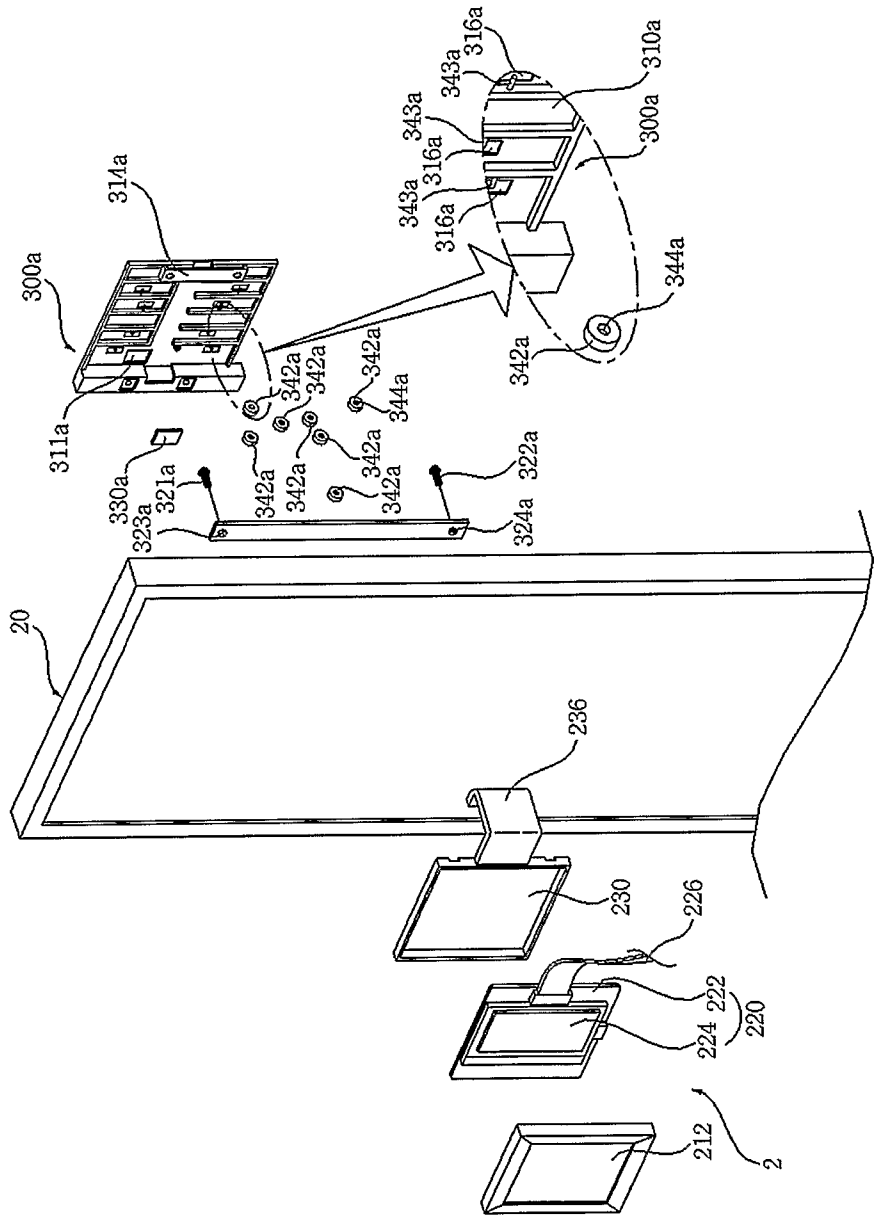
[Fig. 10]


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54
28
27
29
72
170
121
122
123
120
140
130
150
110
80
40
160
82
22
23
70
34
35
90
32
30
162

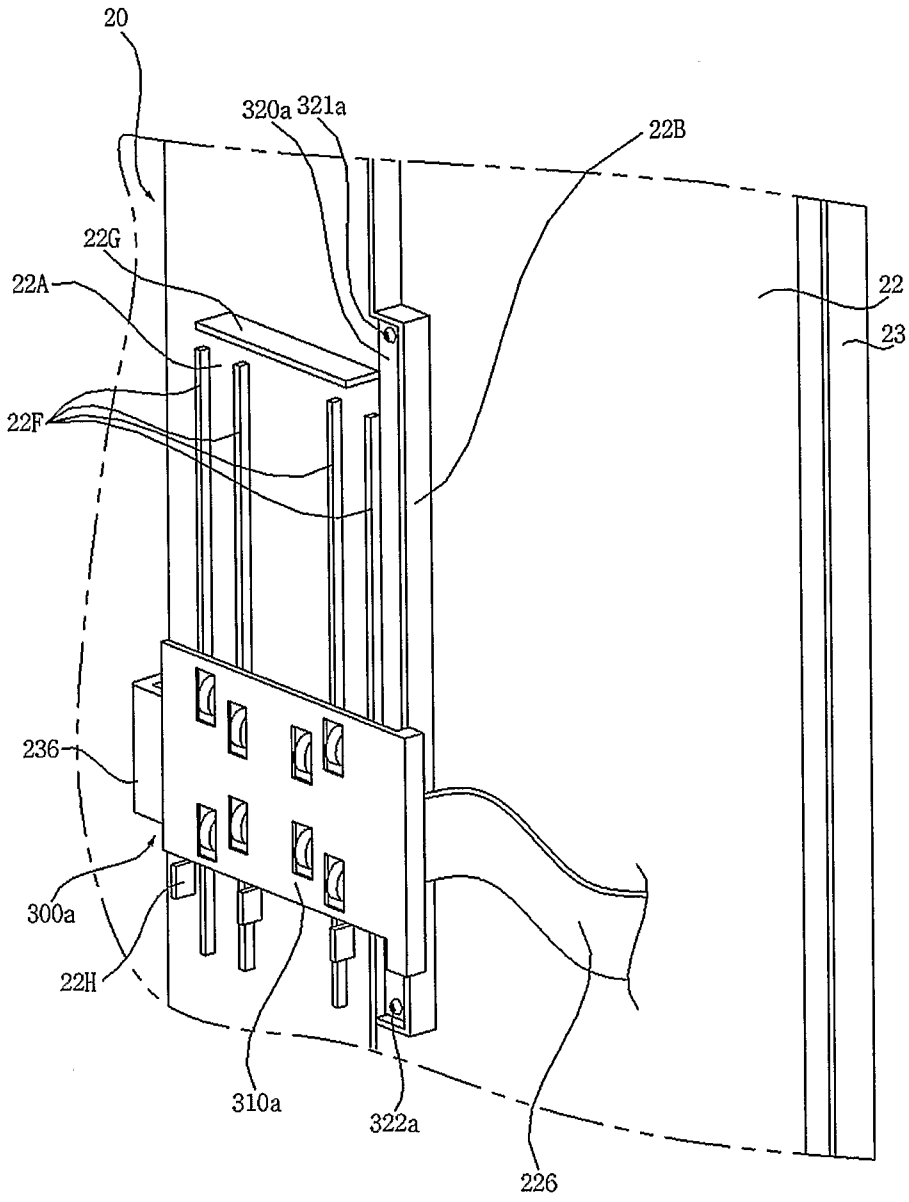
[Fig. 11]


237
226
6
314a
315a
236
310a
2
343a
342a
316a
222
220
345a
224
22F
300a
342a
342a
342a
320a
330a
311a
210
230
244 242
240
226
24
22
20
10
1
5

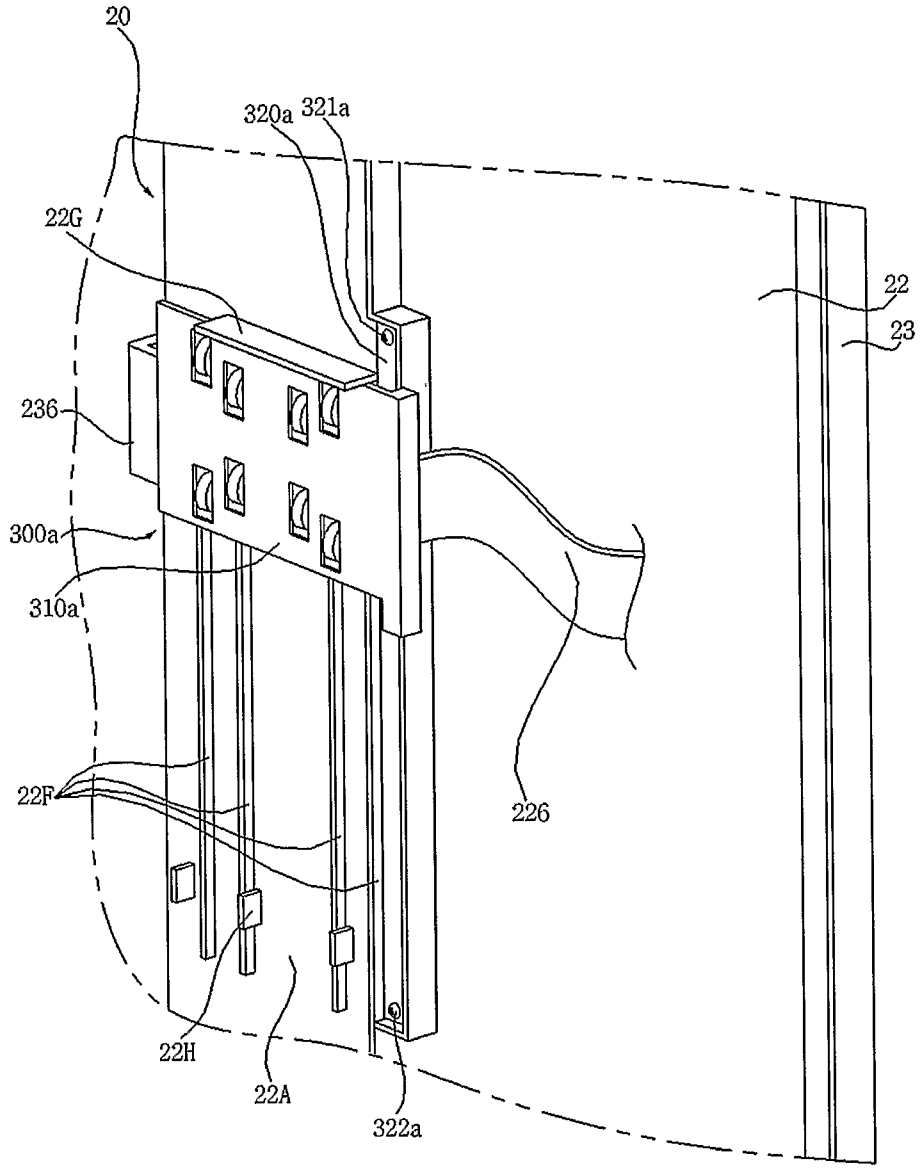
[Fig. 12]


316a
343a
310a
343a
316a
300a
343a
316a
344a
314a
300a
342a
342a
342a
344a
311a
342a
342a
342a
342a
330a
321a
322a
323a
324a
20
236
230
226
222
220
224
212
2

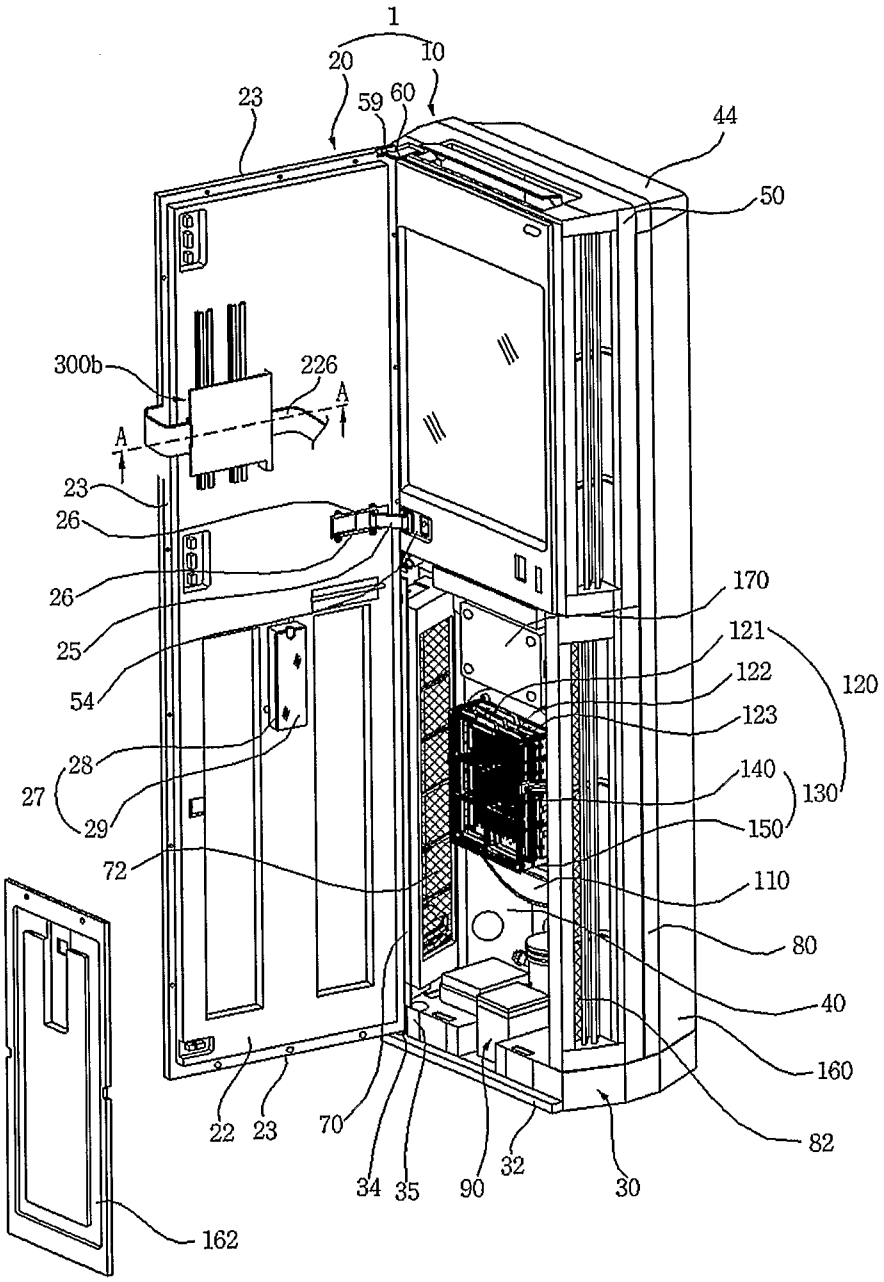
[Fig. 13]



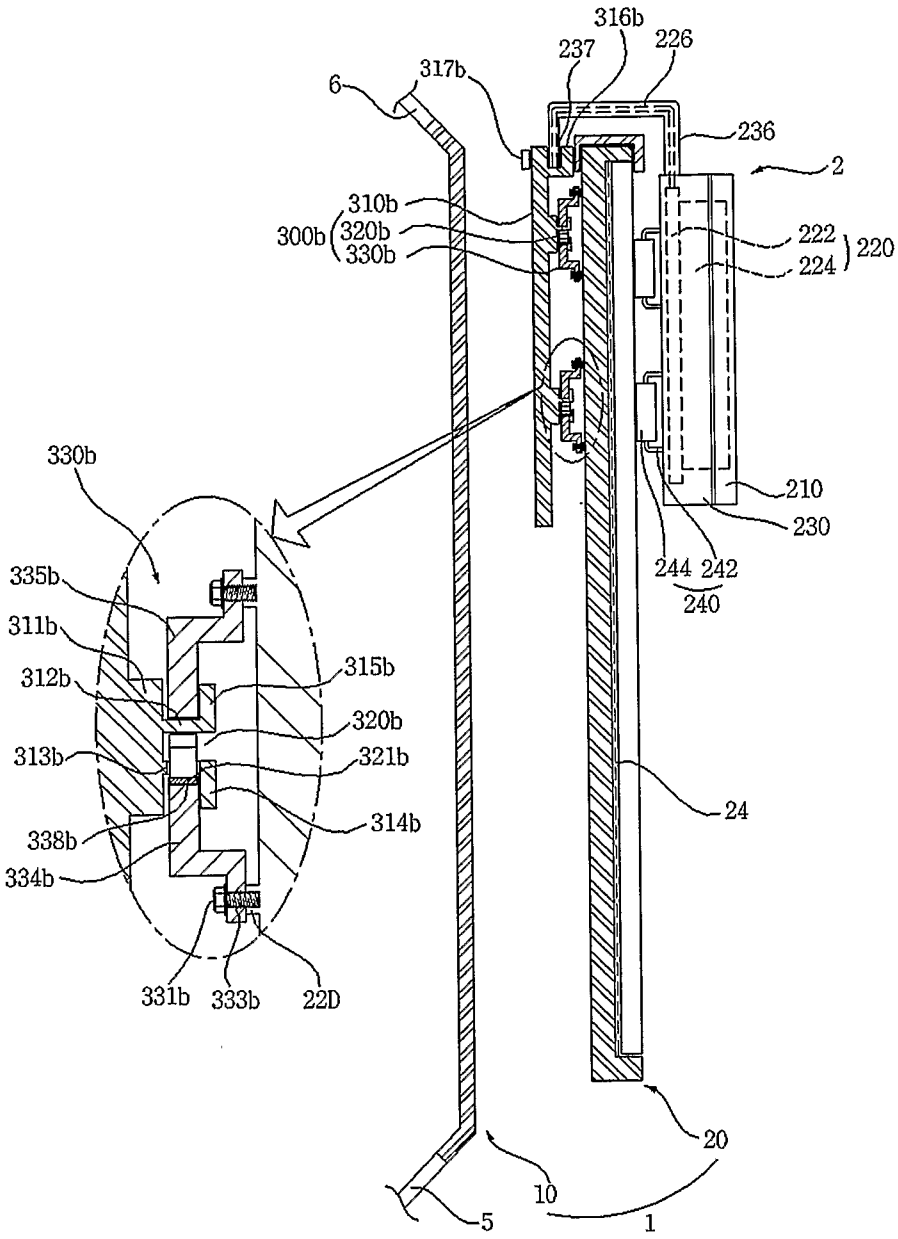
[Fig. 14]



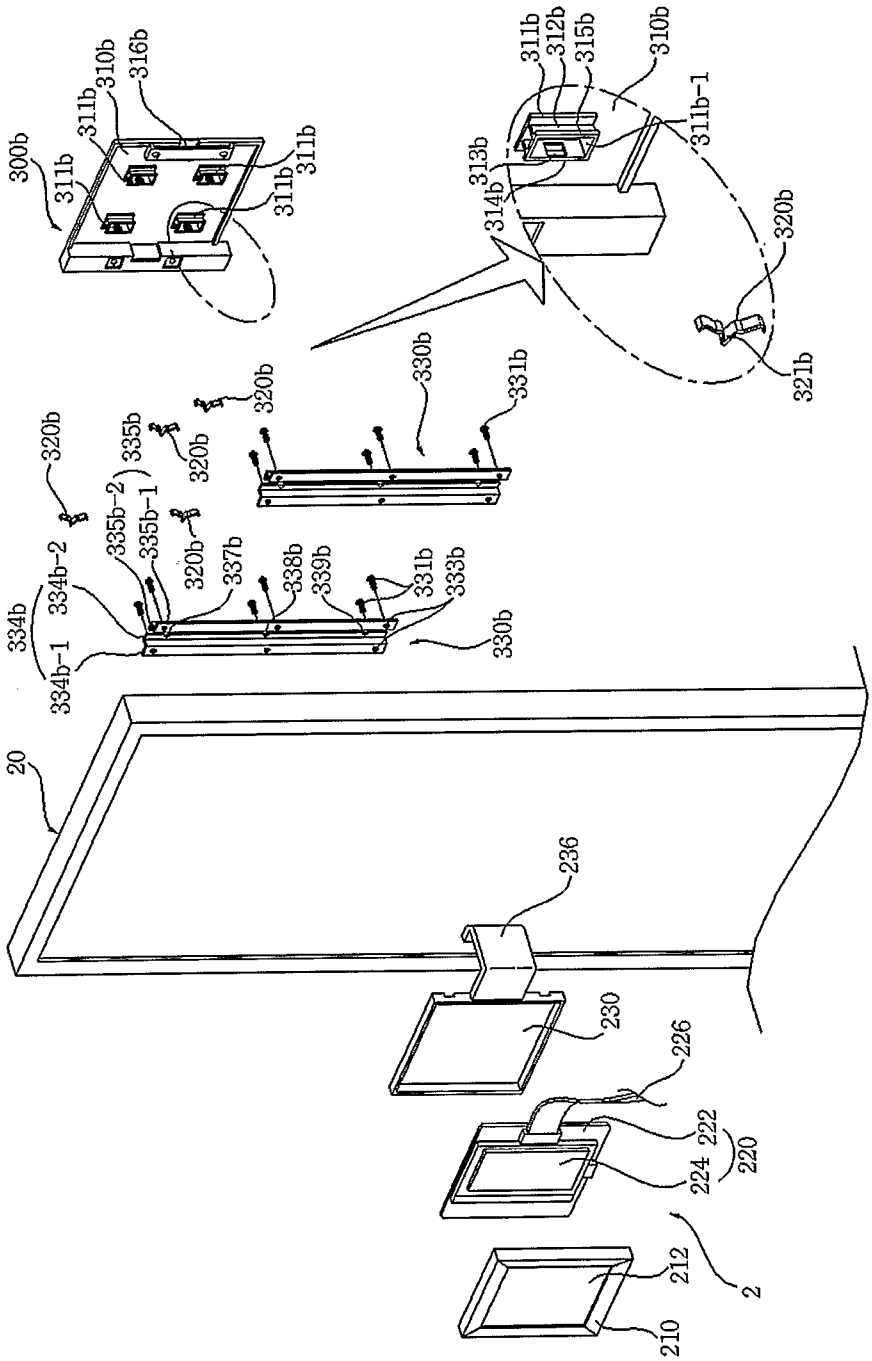
[Fig. 15]


1
20
10
23
59
60
44
50
300b
226
A
A
23
26
26
25
54
28
27
29
72
170
121
122
123
120
140
130
150
110
80
40
160
82
22
23
70
34
35
90
32
30
162

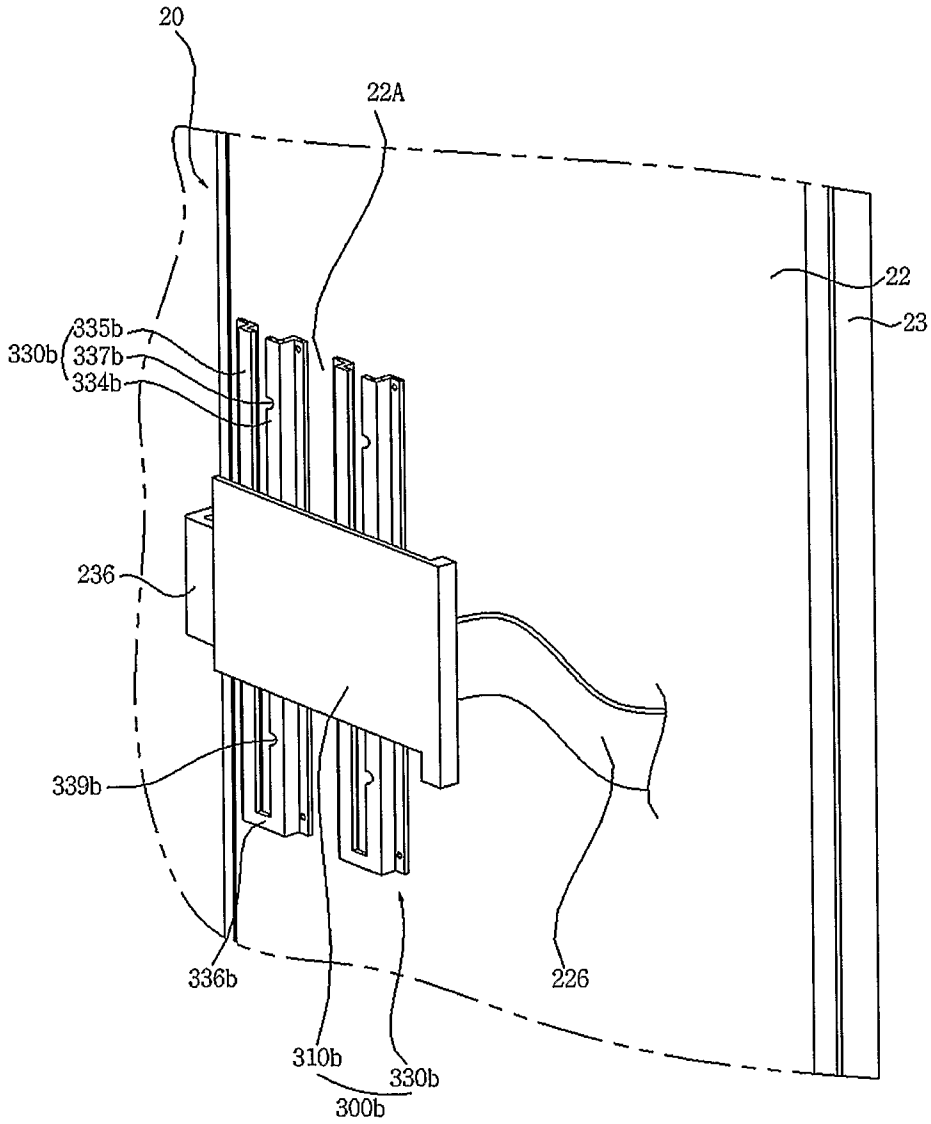
[Fig. 16]


316b
237
226
317b
6
236
2
310b
300b
320b
330b
222
220
224
330b
210
230
244 242
240
335b
311b
315b
312b
320b
313b
321b
24
314b
338b
334b
331b
333b
22D
20
10
5
1

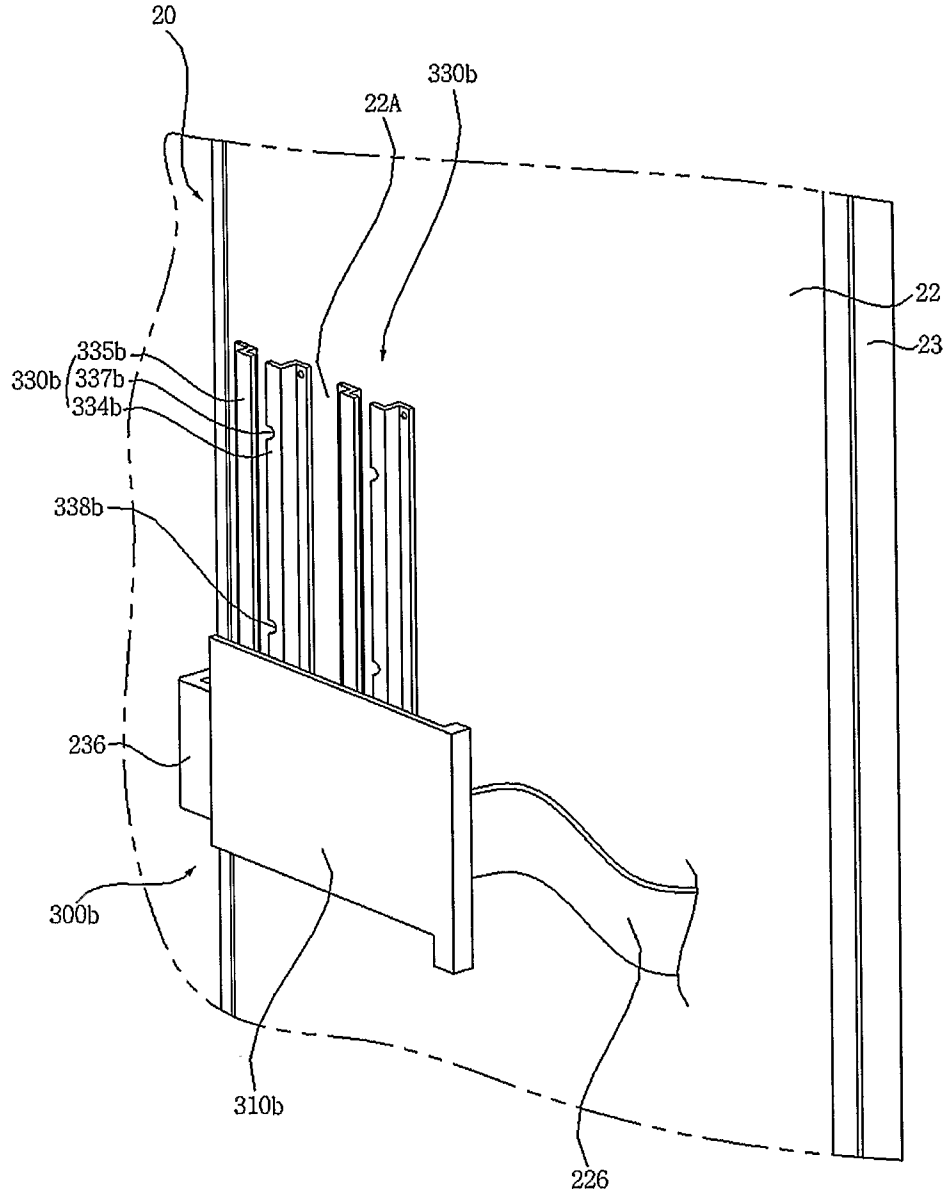
[Fig. 17]


300b
311b
310b
316b
311b
311b
311b
311b
312b
315b
310b
311b-1
313b
314b
320b
321b
320b
330b
331b
320b
335b
320b
335b-2
335b-1
320b
337b
338b
339b
331b
333b
330b
334b-2
334b
334b-1
20
236
230
226
222
220
224
212
2
210

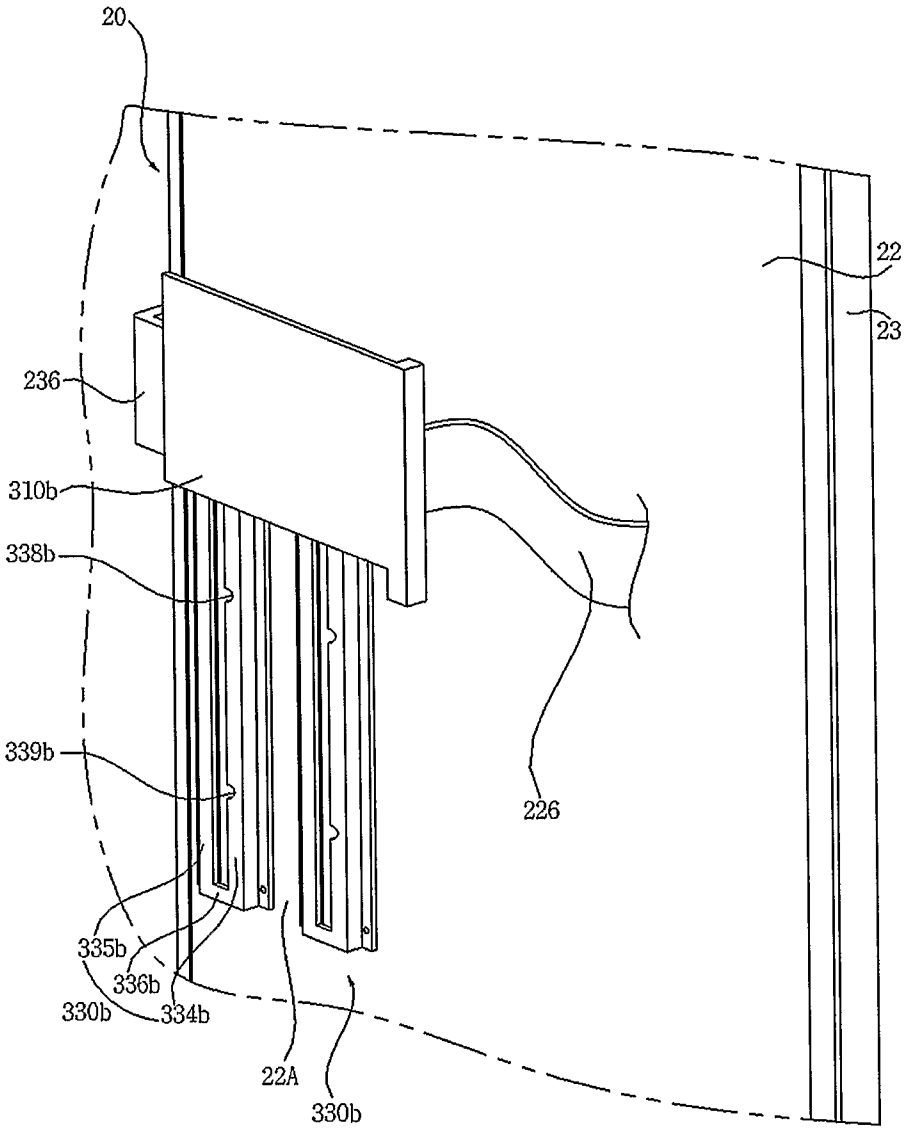
[Fig. 18]


20
22A
22
23
335b
330b
337b
334b
236
339b
336b
226
310b
330b
300b

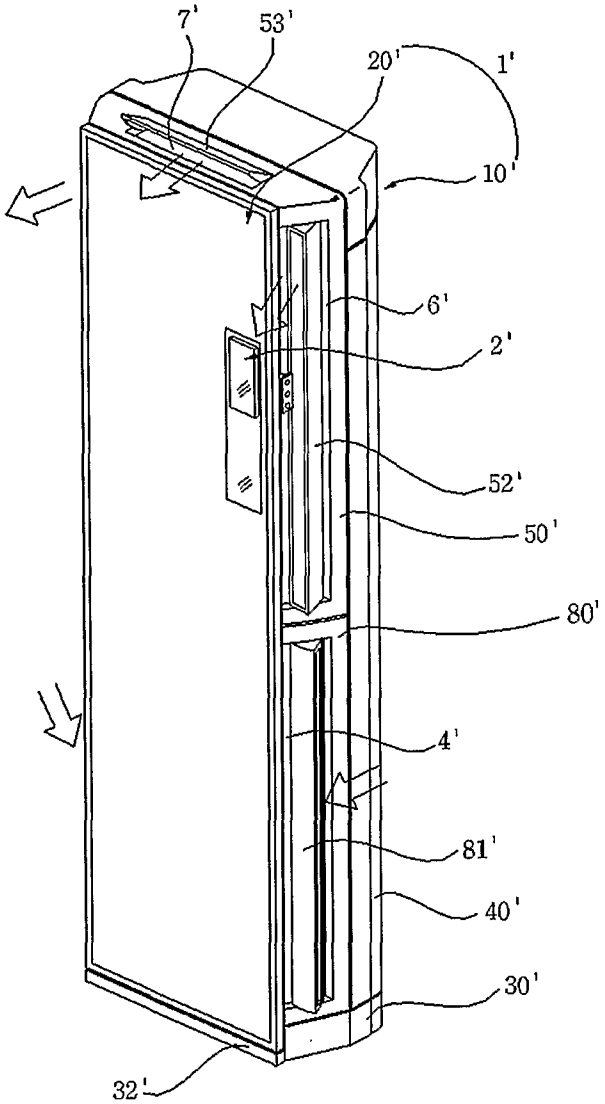
[Fig. 19]



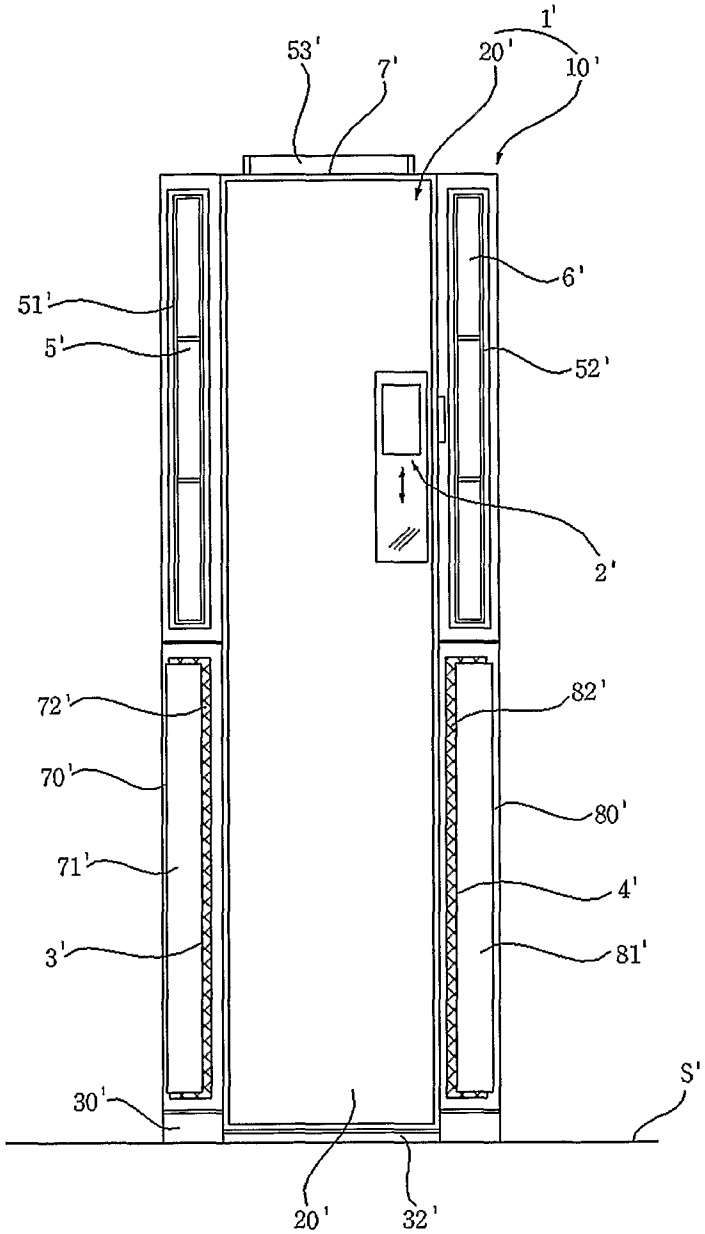
[Fig. 20]



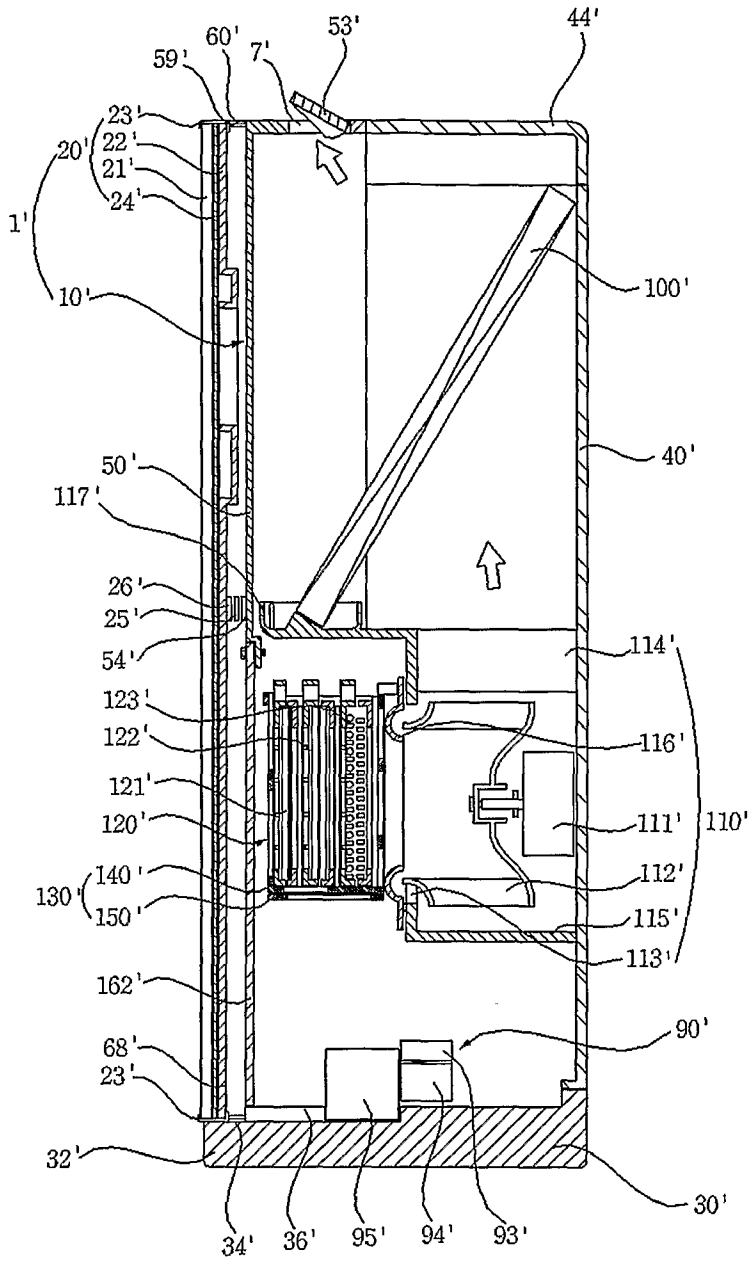
[Fig. 21]



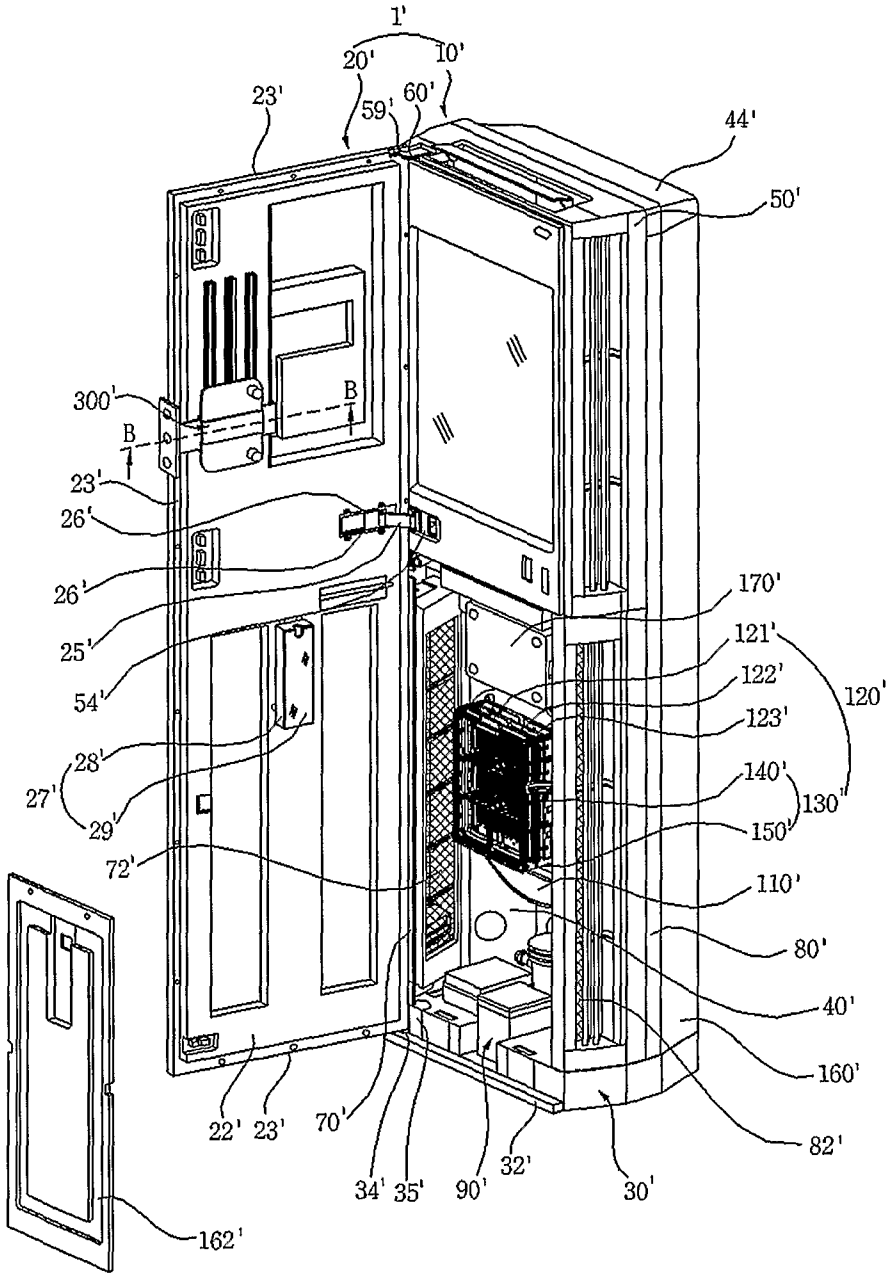
[Fig. 22]



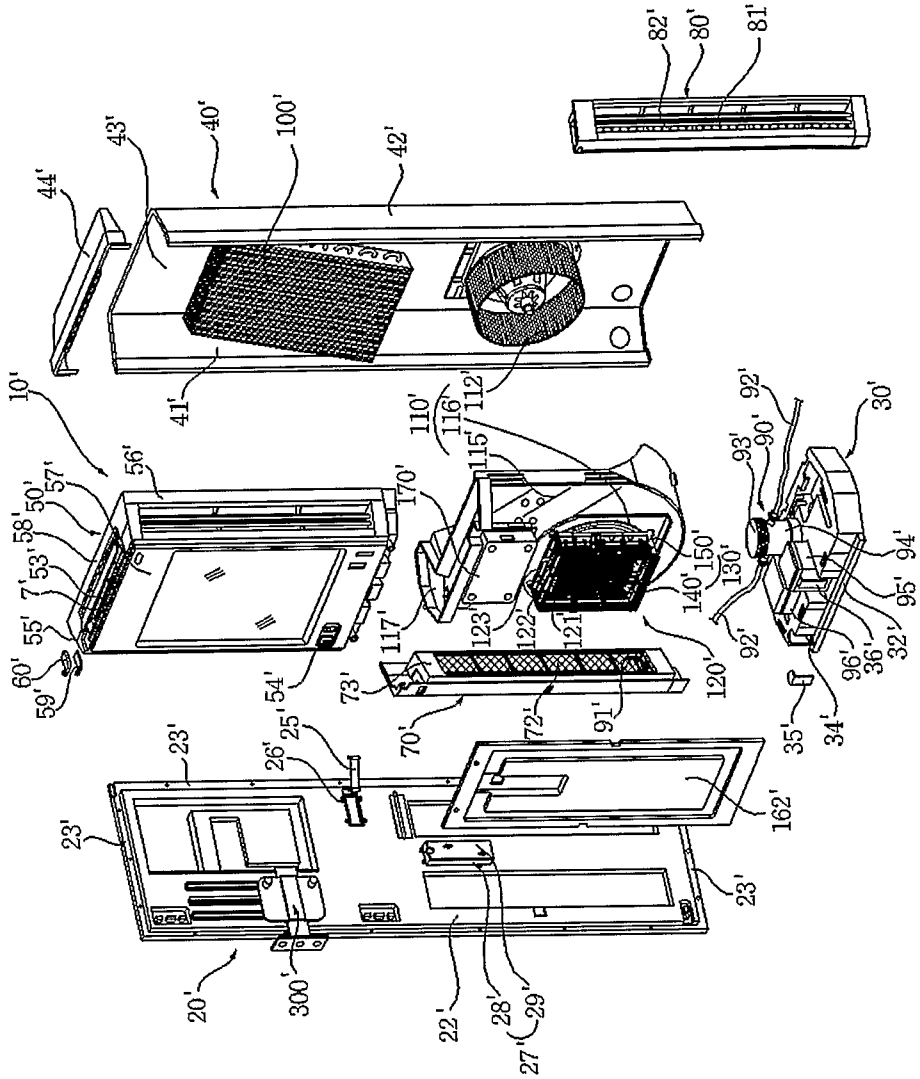
[Fig. 23]


44'
53'
60'
59'
7'
23'
22'
21'
24'
20'
1'
10'
100'
40'
50'
117'
26'
25'
54'
114'
123'
122'
116'
121'
120'
111'
110'
140'
130'
150'
112'
115'
113'
162'
90'
68'
23'
32'
30'
34'
36'
95'
94'
93'

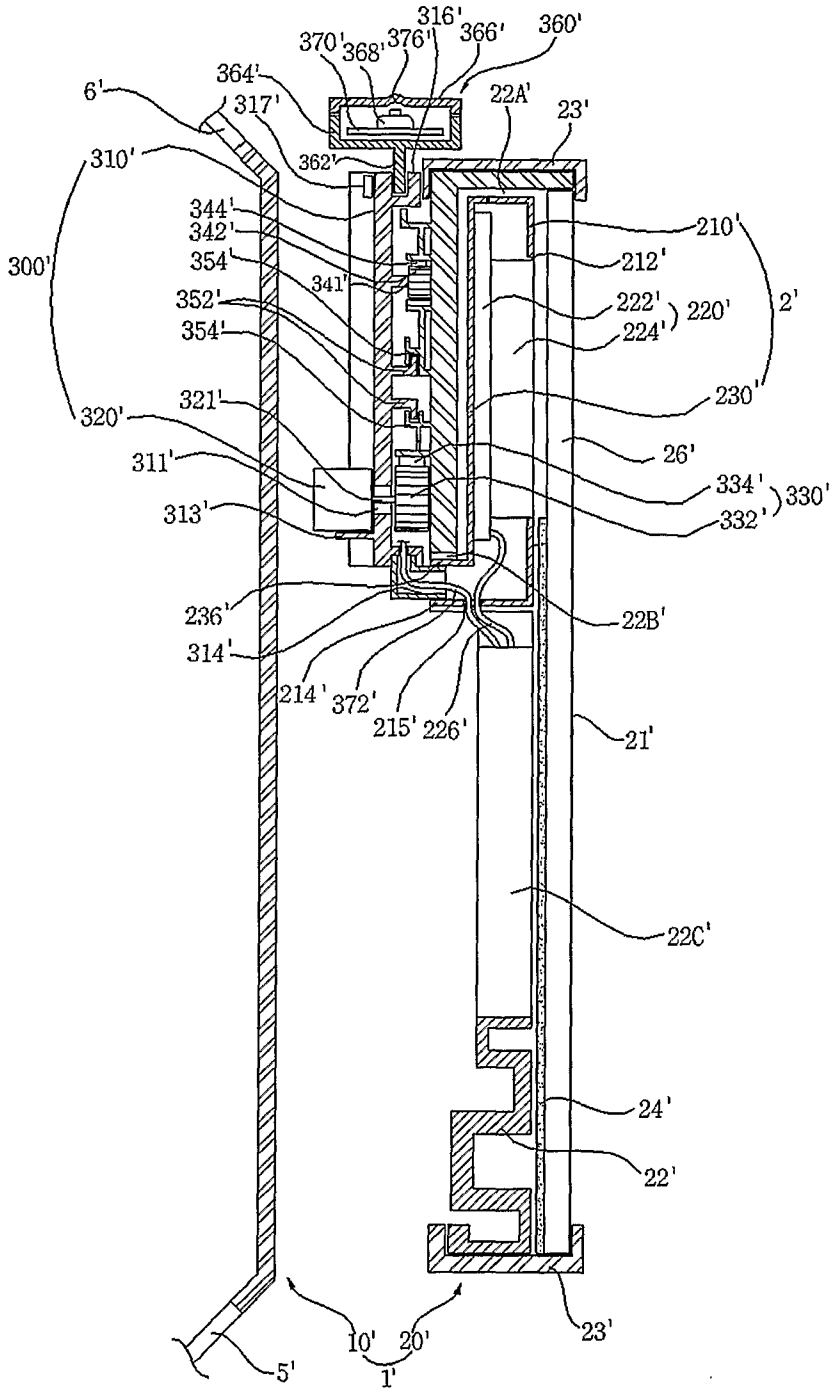
[Fig. 24]


1'
20'
10'
23'
59'
60'
44'
50'
300'
B
B
23'
26'
26'
25'
54'
28'
27'
29'
72'
170'
121'
122'
123'
120'
140'
130'
150'
110'
80'
40'
160'
82'
22'
23'
70'
34'
35'
90'
32'
30'
162'

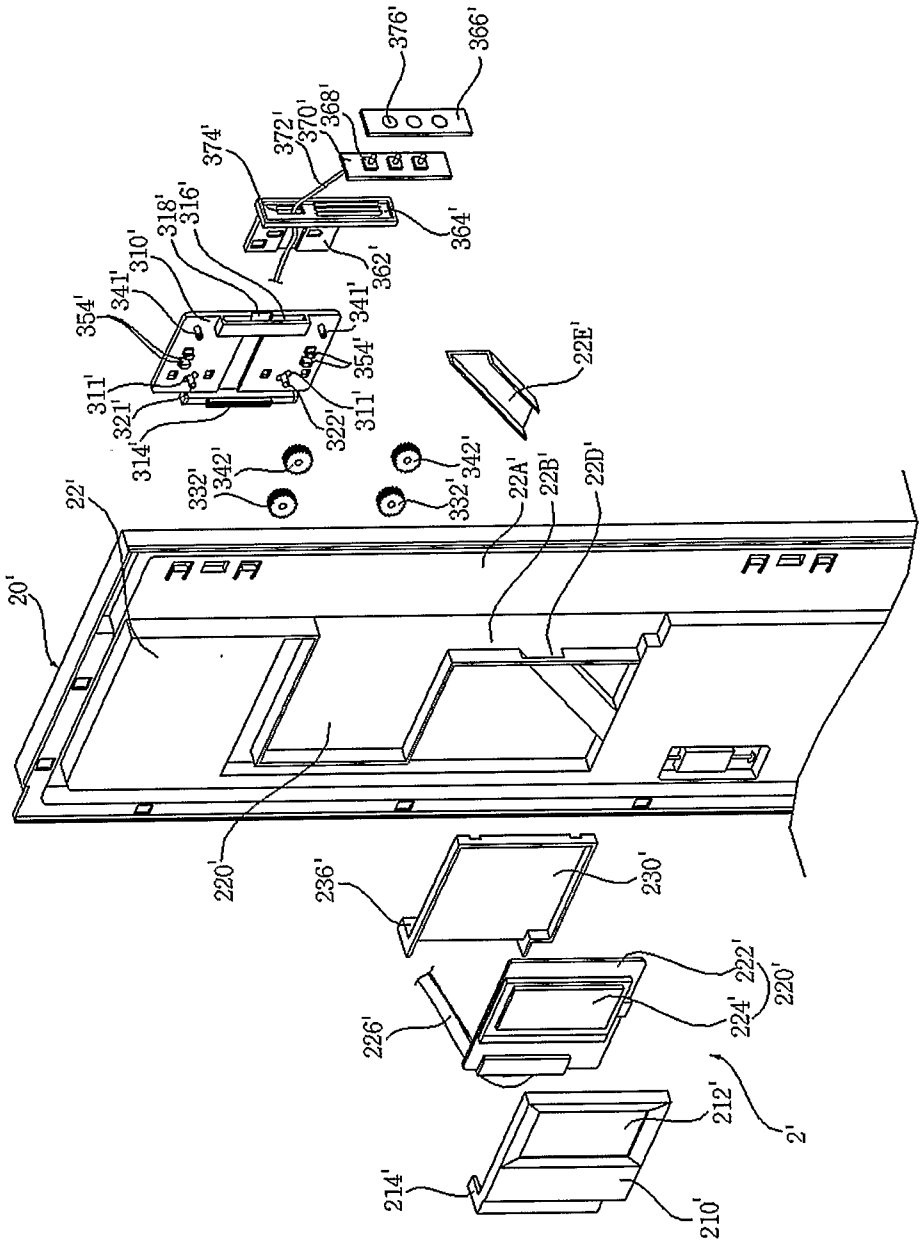
[Fig. 25]


82'
80'
81'
43'
40'
100'
42'
44'
41'
10'
110'
116'
112'
115'
92'
30'
93'
90'
56'
57'
50'
58'
53'
7'
55'
60'
59'
54'
170'
150'
130'
140'
94'
95'
32'
36'
96'
92'
120'
117'
123'
122'
121'
73'
70'
72'
91'
35'
34'
23'
26'
25'
162'
23'
20'
300'
22'
28'
29'
27'

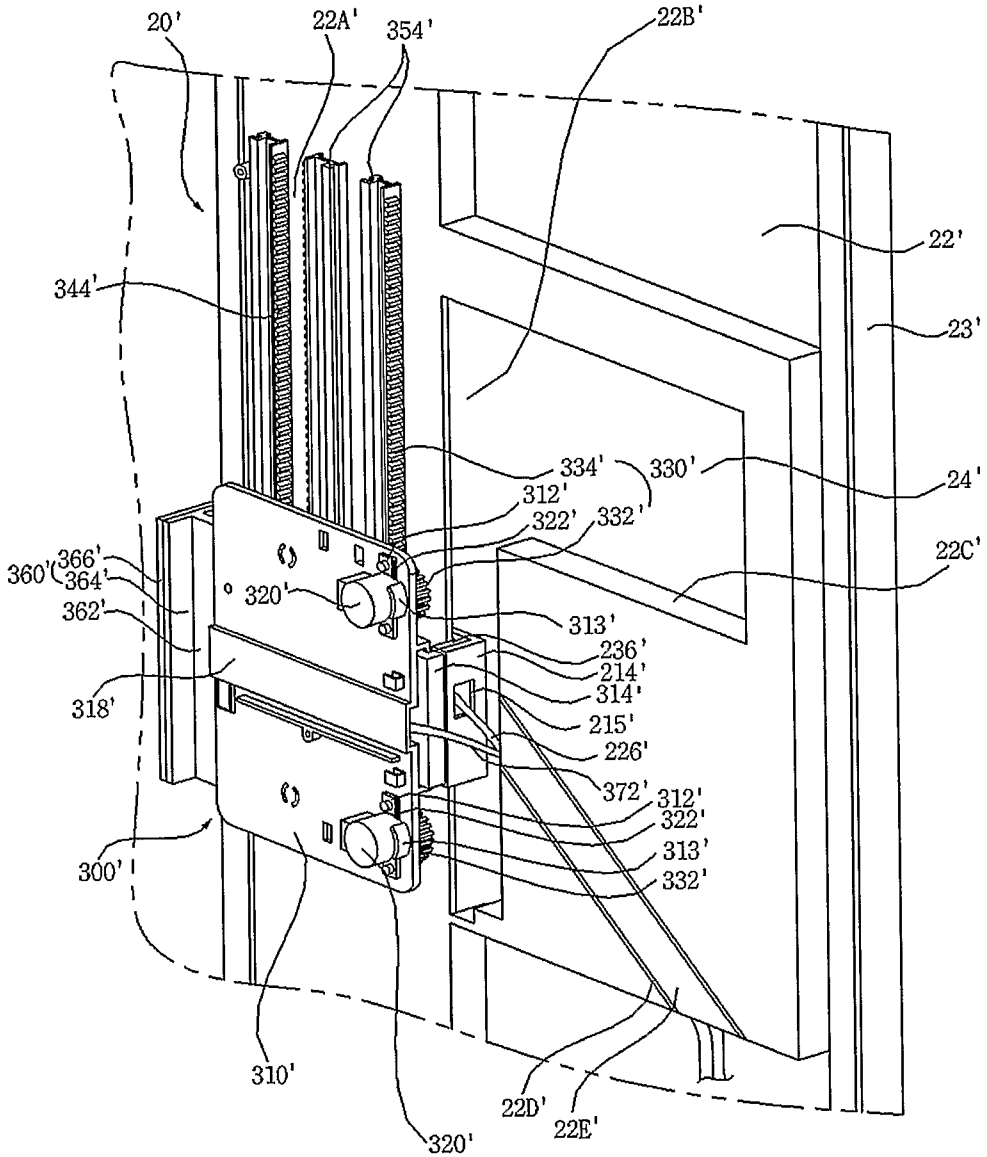
[Fig. 26]


316'
370'
368'
376'
366'
360'
364'
6'
317'
22A'
23'
362'
310'
344'
342'
354'
341'
210'
212'
222'
220'
224'
2'
300'
352'
354'
230'
321'
320'
26'
311'
334'
330'
313'
332'
236'
22B'
314'
214'
372'
215'
226'
21'
22C'
24'
22'
10'
20'
23'
5'
1'

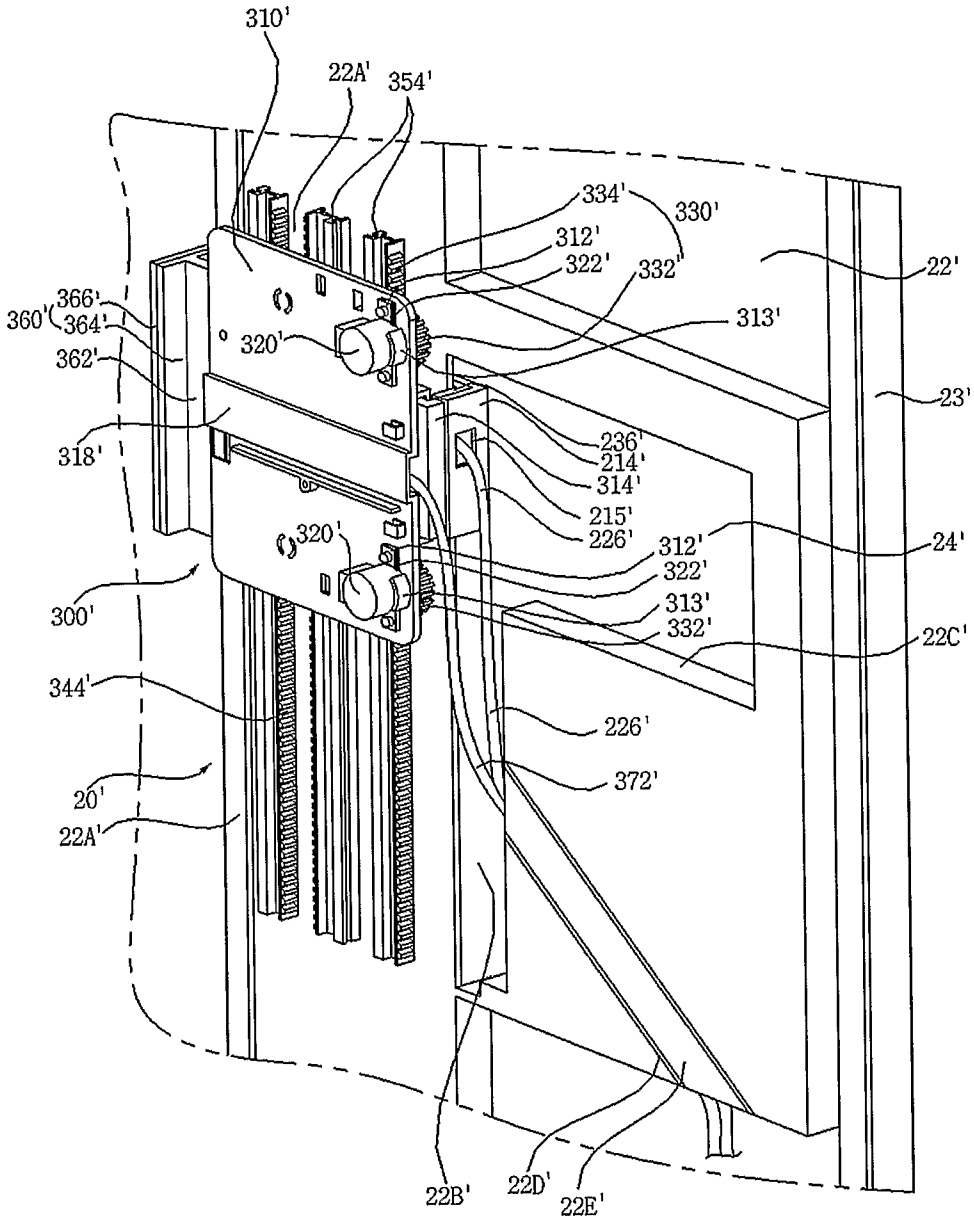
[Fig. 27]


376'
366'
372'
370'
368'
374'
364'
318'
316'
310'
362'
341'
354'
341'
354'
311'
321'
311'
322'
314'
22E'
332'
342'
332'
342'
22'
22A'
22B'
22D'
20'
220'
236'
230'
222'
220'
224'
226'
212'
2'
214'
210'

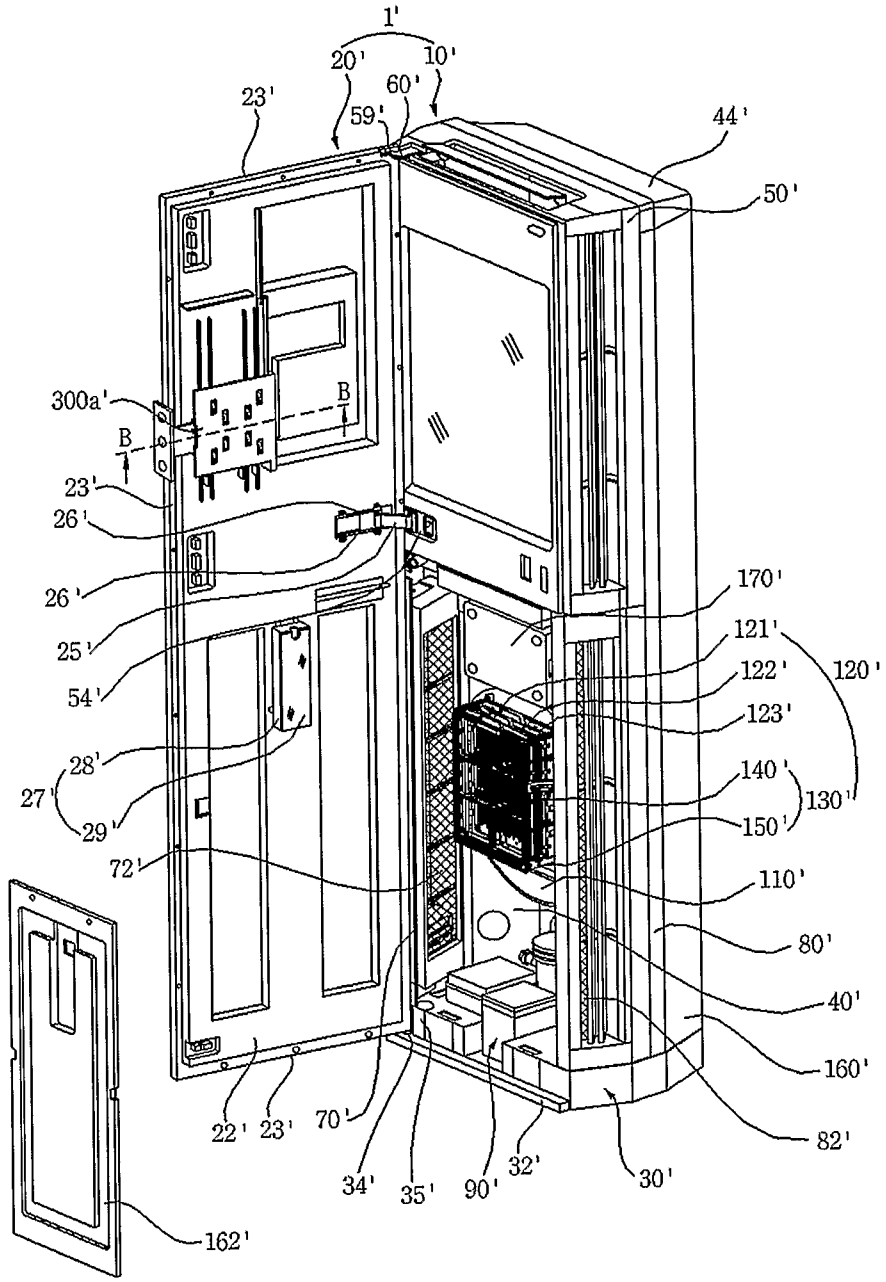
[Fig. 28]


20'
22A'
354'
22B'
22'
344'
23'
334'
330'
24'
312'
322'
332'
22C'
360'
366'
364'
320'
362'
313'
236'
214'
318'
314'
215'
226'
372'
312'
322'
300'
313'
332'
310'
22D'
22E'
320'

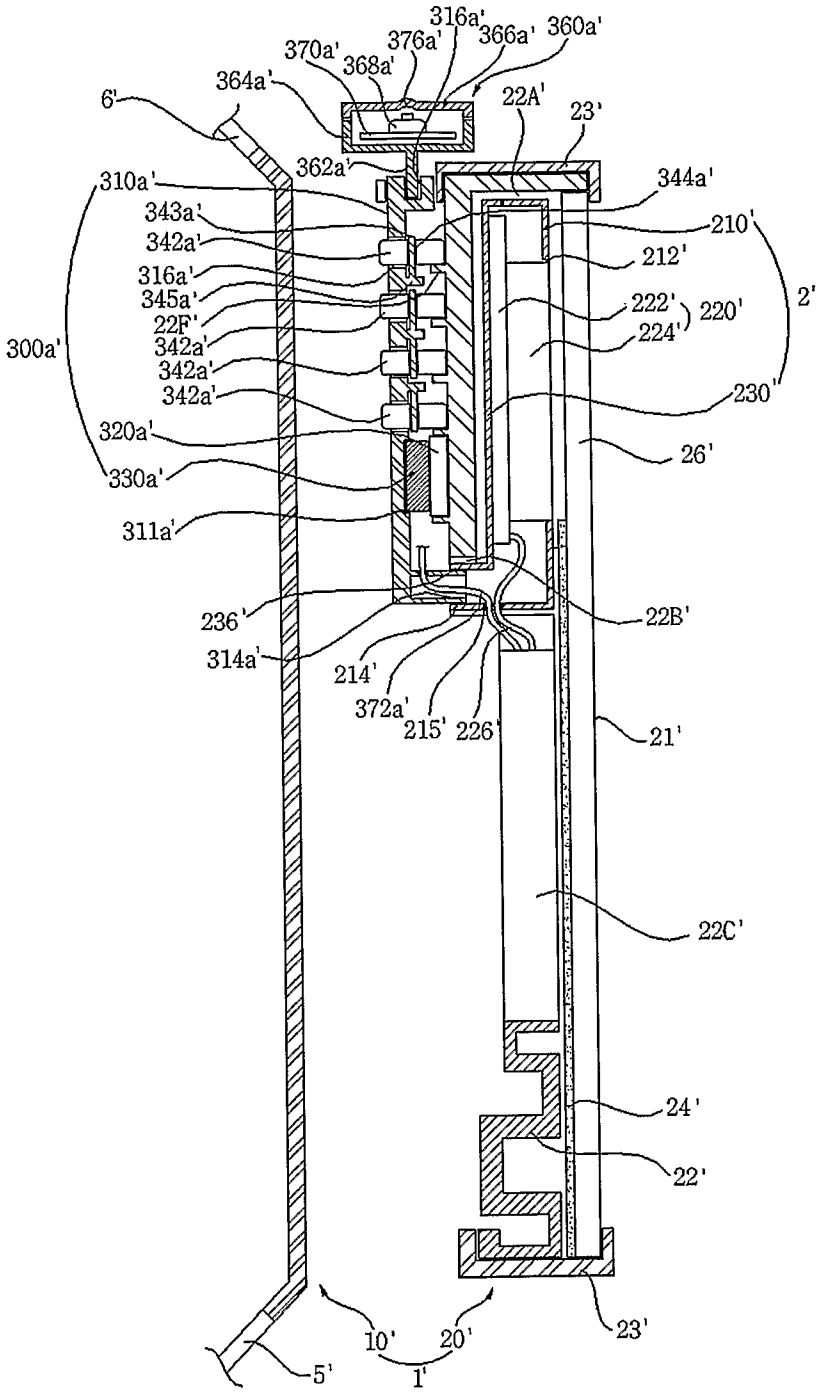
[Fig. 29]


310'
22A'
354'
334'
330'
312'
322'
332'
22'
366'
360'
364'
362'
320'
313'
23'
318'
236'
214'
314'
215'
226'
320'
312'
24'
322'
313'
332'
300'
22C'
344'
226'
372'
20'
22A'
22B'
22D'
22E'

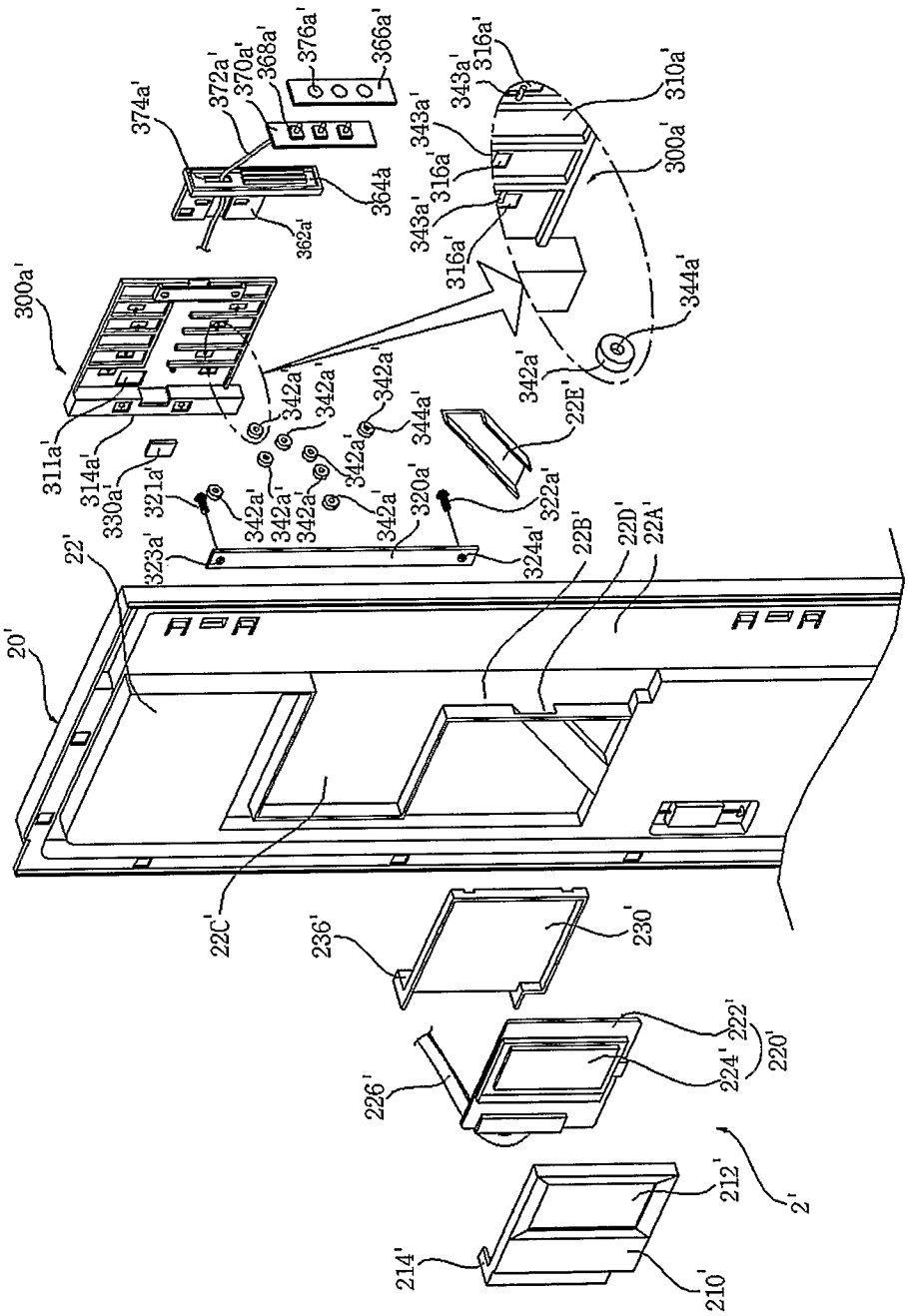
[Fig. 30]


1'
20'
10'
60'
23'
59'
44'
50'
300a'
B
B
23'
26'
26'
25'
54'
28'
27'
29'
72'
170'
121'
122'
123'
120'
140'
130'
150'
110'
80'
40'
160'
82'
22'
23'
70'
34'
35'
90'
32'
30'
162'

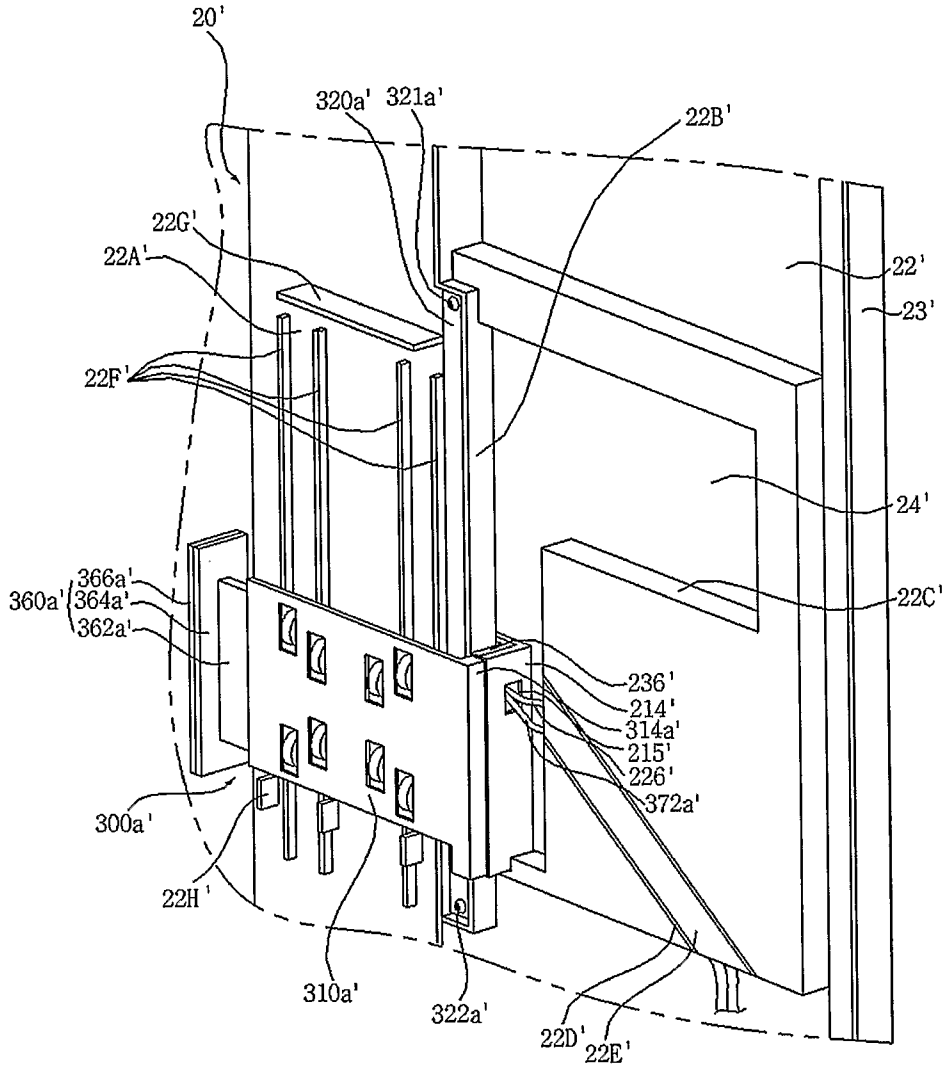
[Fig. 31]


316a'
370a'
376a'
366a'
360a'
368a'
364a'
6'
22A'
23'
362a'
344a'
310a'
343a'
210'
342a'
212'
316a'
345a'
222'
220'
2'
22F'
224'
300a'
342a'
342a'
230'
342a'
320a'
26'
330a'
311a'
236'
22B'
314a'
214'
372a'
215'
226'
21'
22C'
24'
22'
23'
10'
20'
5'
1'

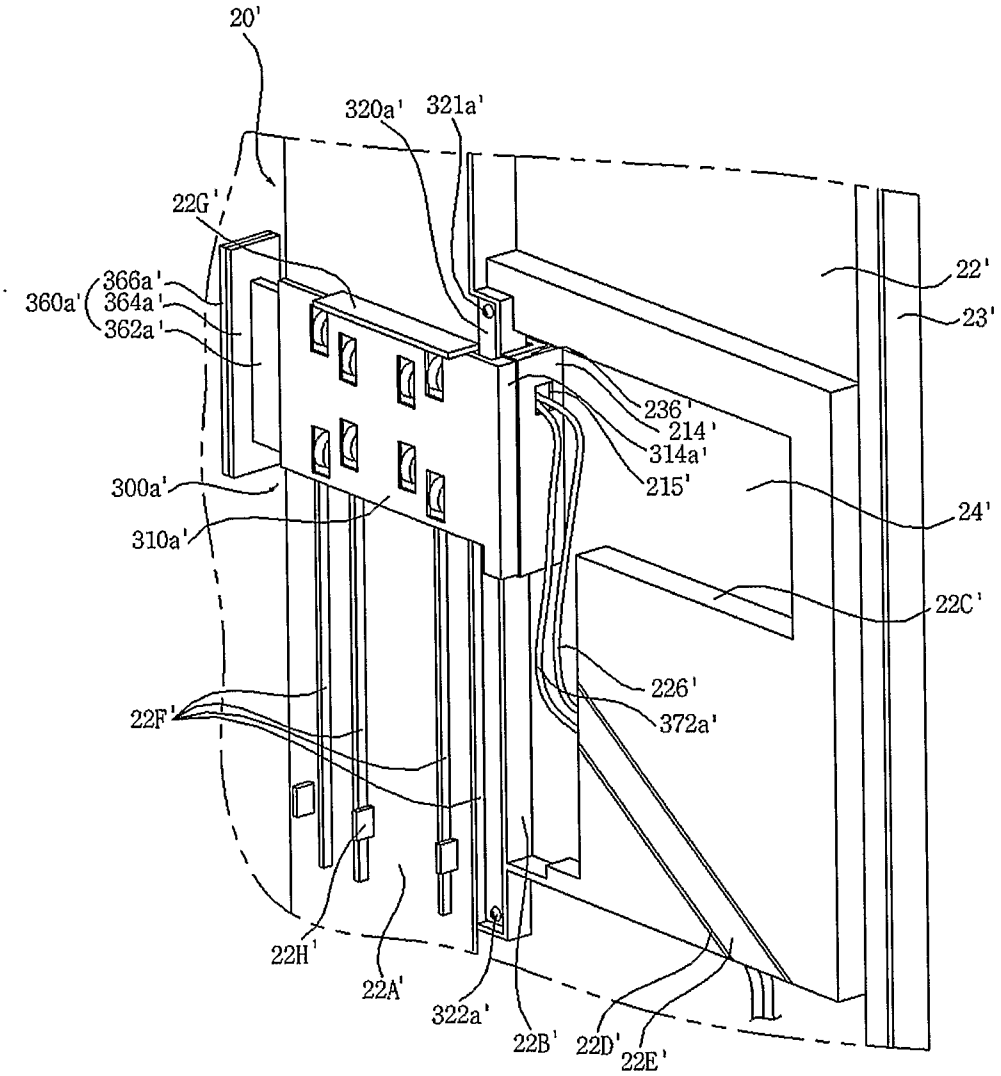
[Fig. 32]


376a'
366a'
372a'
370a'
368a'
374a'
364a'
362a'
343a'
316a'
310a'
300a'
344a'
342a'
22E'
311a'
314a'
330a'
321a'
323a'
320a'
322a'
324a'
22'
22B'
22D'
22A'
20'
22C'
236'
230'
222'
220'
224'
226'
212'
2'
214'
210'

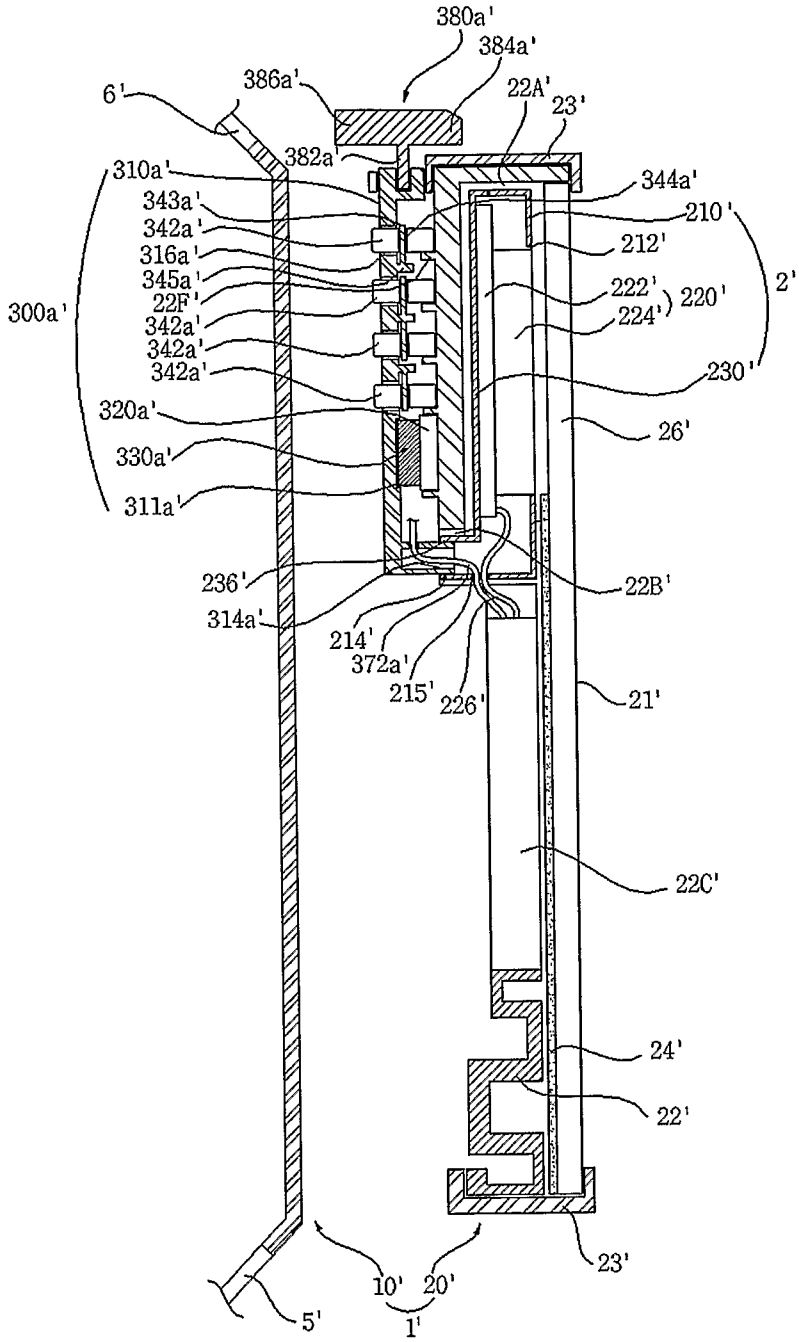
[Fig. 33]


20'
320a' 321a'
22B'
22G'
22A'
22'
23'
22F'
24'
22C'
366a'
360a'
364a'
362a'
236'
214'
314a'
215'
226'
372a'
300a'
22H'
310a'
322a'
22D'
22E'

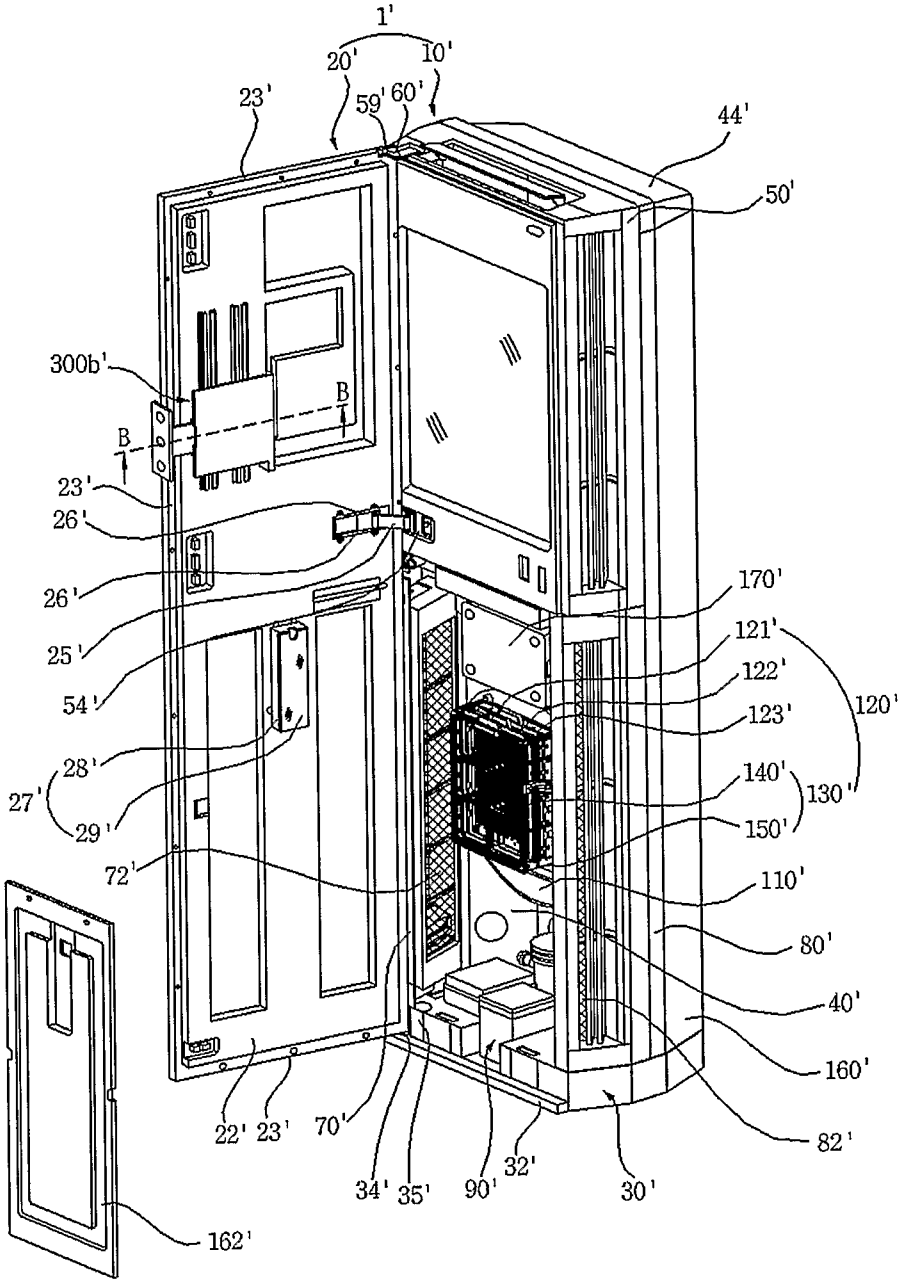
[Fig. 34]


20'
320a'
321a'
22G'
360a'
366a'
364a'
362a'
300a'
310a'
22F'
22H'
22A'
322a'
22B'
22D'
22E'
22'
23'
236'
214'
314a'
215'
24'
22C'
226'
372a'

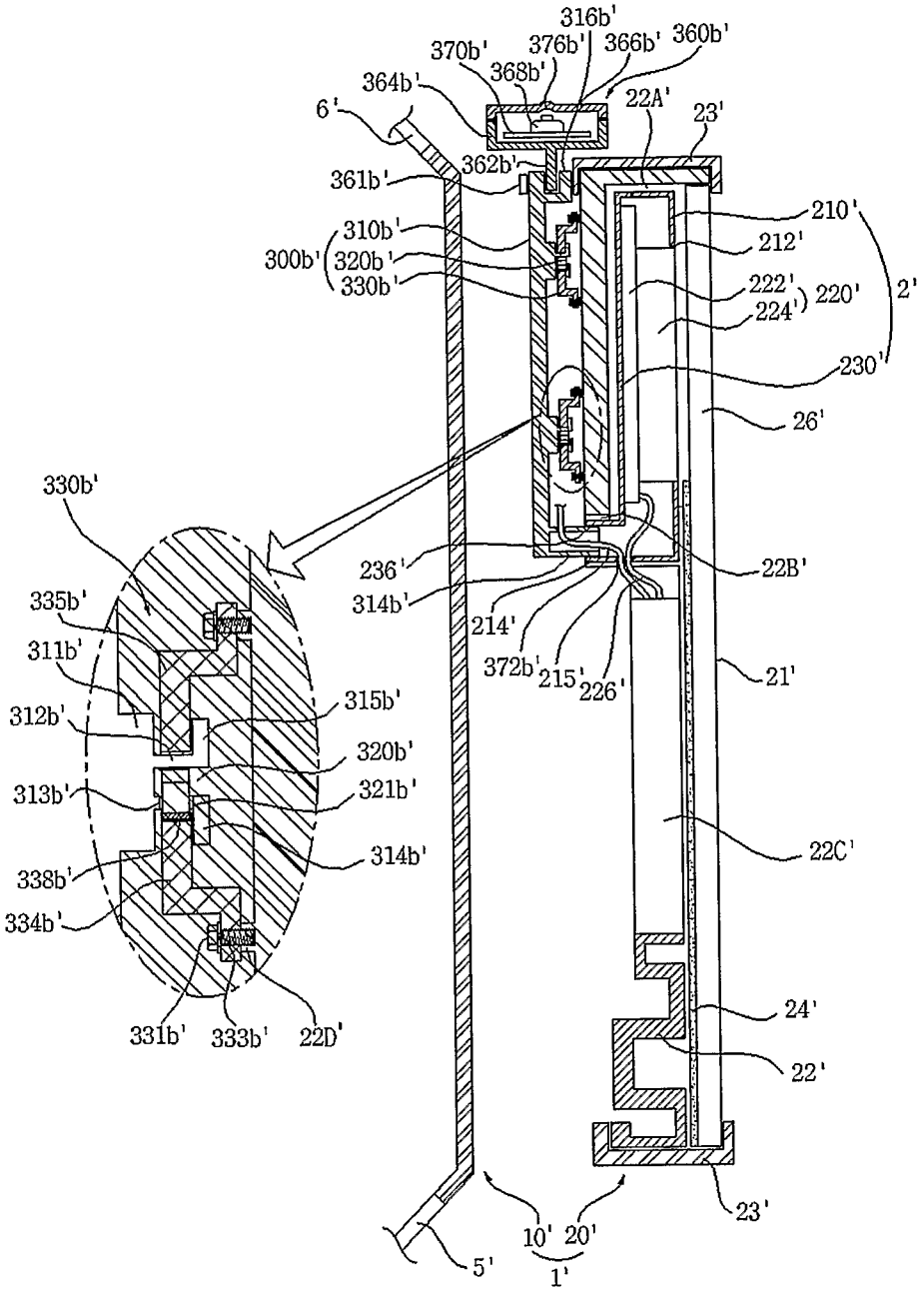
[Fig. 35]


380a'
384a'
386a'
22A'
23'
6'
382a'
310a'
344a'
343a'
210'
342a'
212'
316a'
345a'
222'
220'
2'
22F'
224'
300a'
342a'
342a'
230'
342a'
320a'
26'
330a'
311a'
236'
22B'
314a'
214'
372a'
215'
226'
21'
22C'
24'
22'
23'
10'
20'
5'
1'

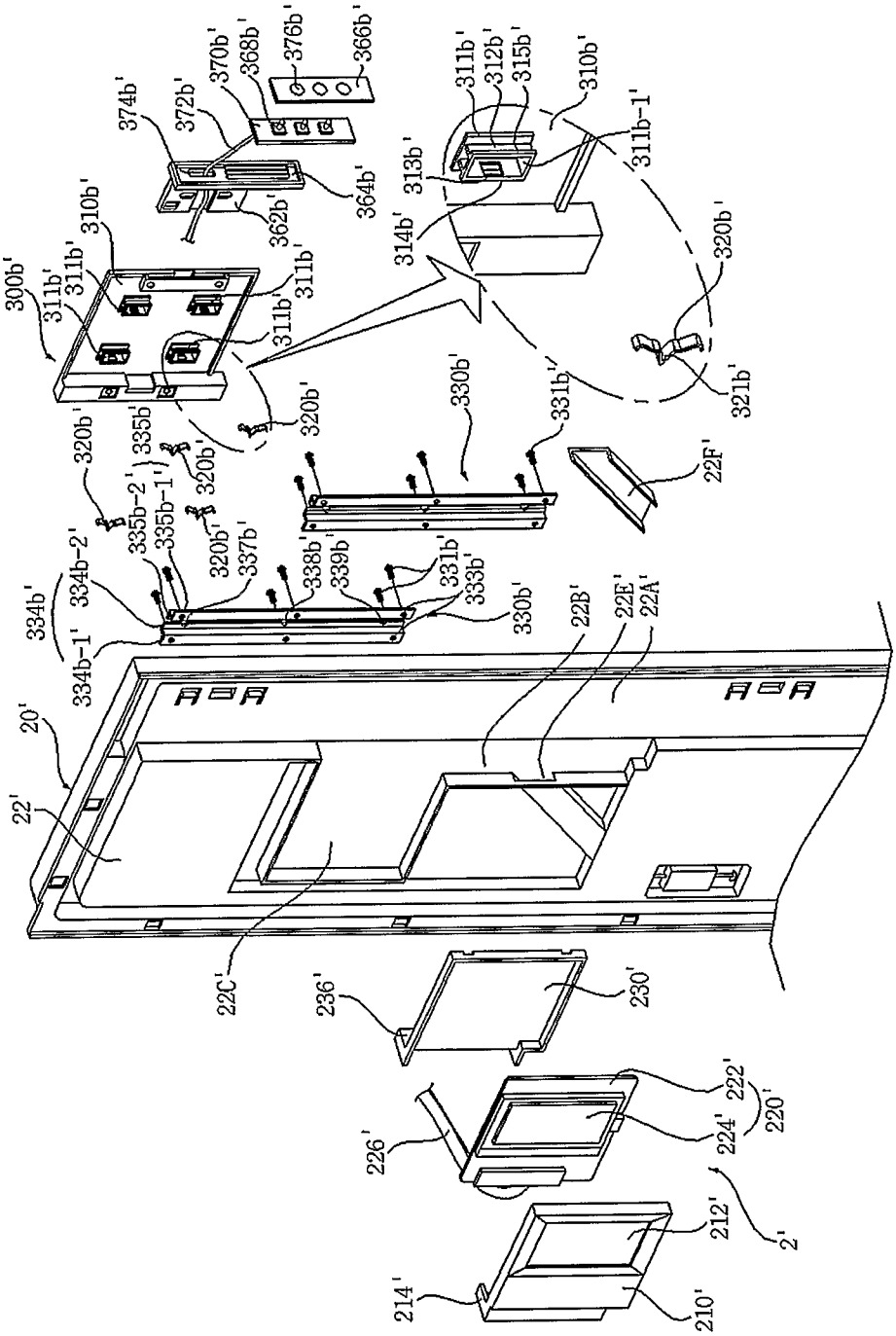
[Fig. 36]


1'
20'
10'
23'
59'
60'
44'
50'
300b'
B
B
23'
26'
26'
25'
54'
28'
27'
29'
72'
170'
121'
122'
123'
120'
140'
130'
150'
110'
80'
40'
160'
82'
22'
23'
70'
34'
35'
90'
32'
30'
162'

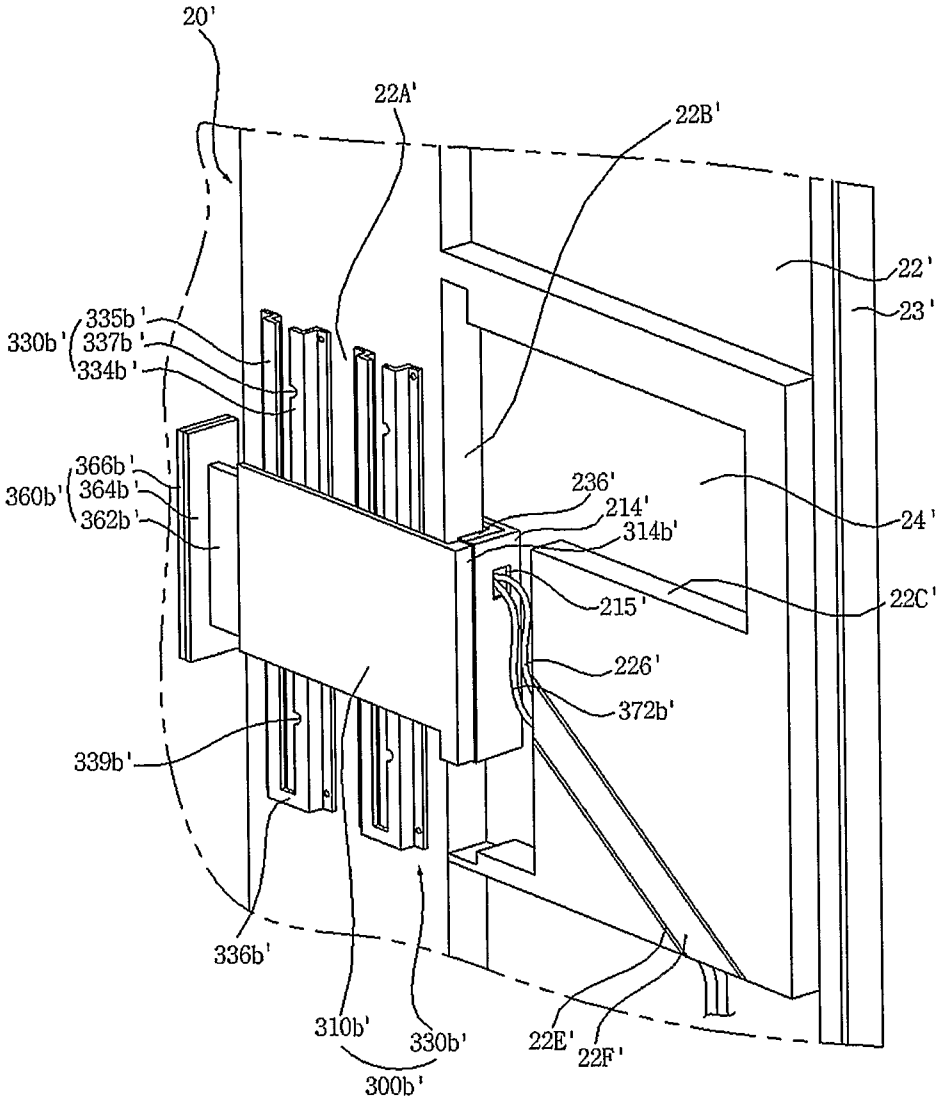
[Fig. 37]


316b'
370b'
376b'
366b'
360b'
364b'
368b'
22A'
23'
6'
362b'
361b'
210'
310b'
212'
300b'
320b'
330b'
222'
220'
224'
2'
230'
26'
330b'
236'
22B'
335b'
314b'
214'
311b'
372b'
215'
226'
21'
312b'
315b'
320b'
313b'
321b'
22C'
314b'
338b'
24'
334b'
22'
331b'
333b'
22D'
23'
10'
20'
5'
1'

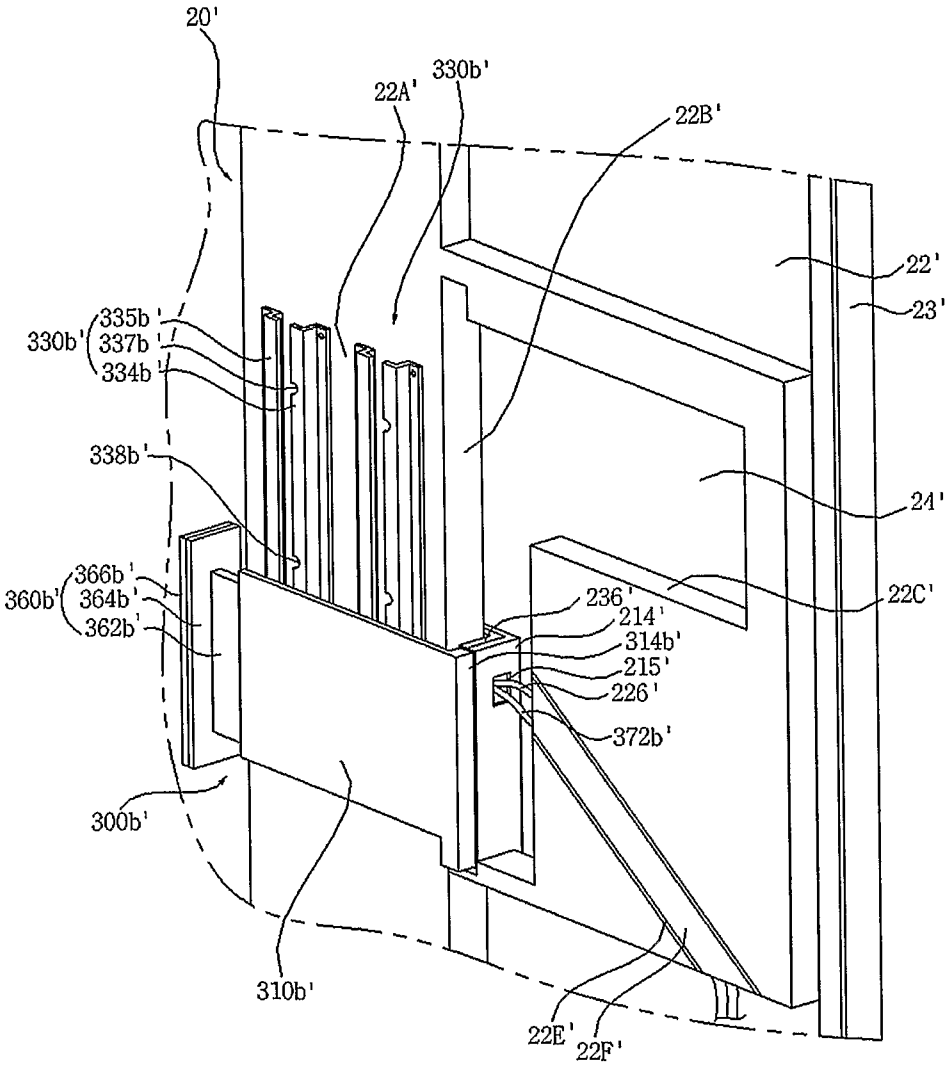
[Fig. 38]


300b'
310b'
311b'
312b'
313b'
314b'
315b'
320b'
321b'
330b'
331b'
334b'
334b-1'
334b-2'
335b'
335b-1'
335b-2'
337b'
338b'
339b'
333b'
22F'
22B'
22E'
22A'
22'
20'
22C'
236'
230'
222'
220'
224'
226'
212'
2'
214'
210'
362b'
364b'
366b'
368b'
370b'
372b'
374b'
376b'

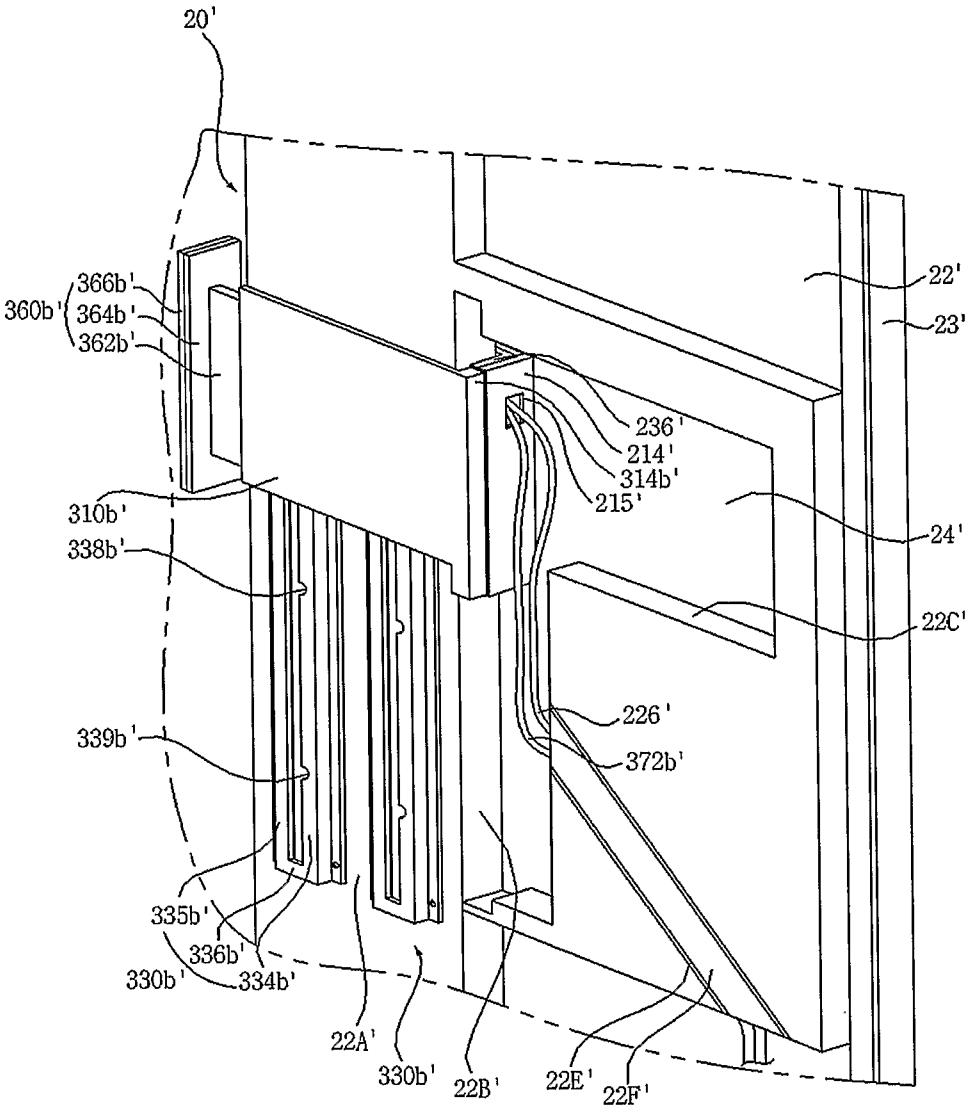
[Fig. 39]


20'
22A'
22B'
22'
23'
330b'
335b'
337b'
334b'
360b'
366b'
364b'
362b'
236'
214'
314b'
24'
215'
22C'
226'
372b'
339b'
336b'
310b'
330b'
300b'
22E'
22F'

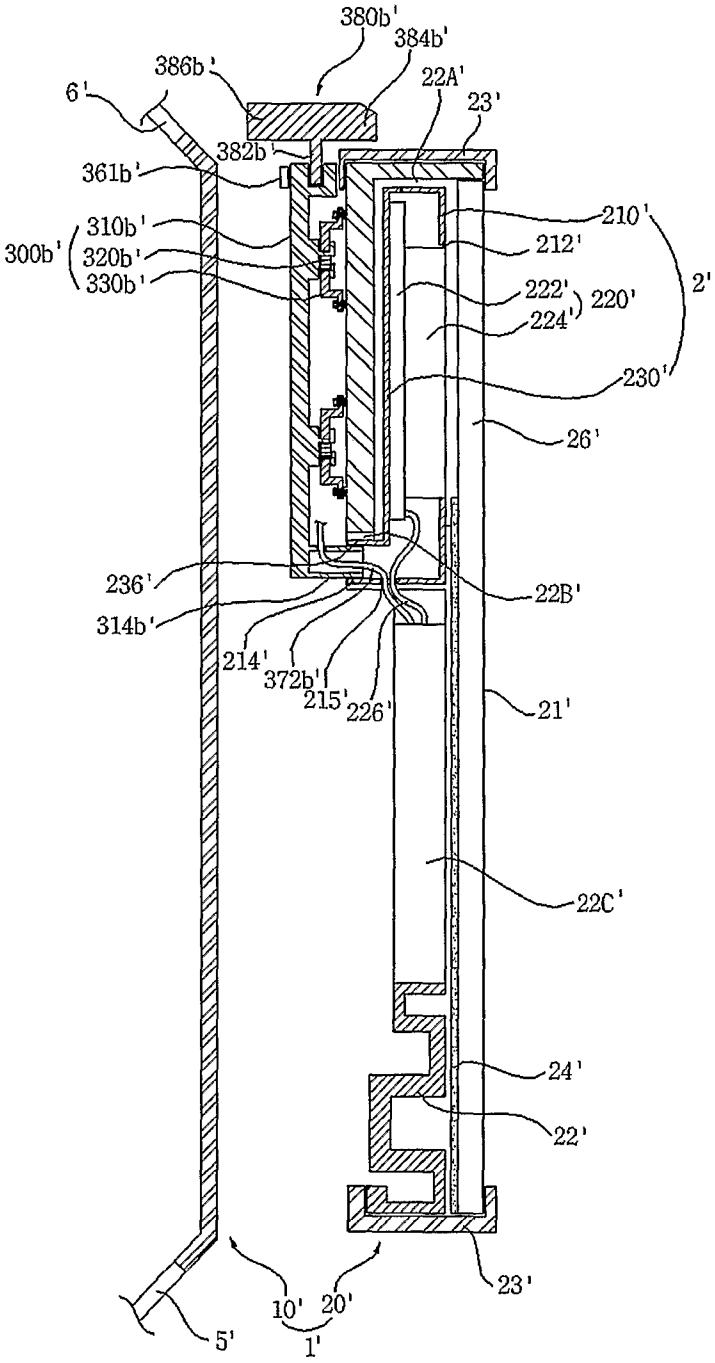
[Fig. 40]


20'
22A'
330b'
22B'
22'
23'
330b'
335b'
337b'
334b'
338b'
24'
360b'
366b'
364b'
362b'
236'
214'
314b'
215'
226'
22C'
372b'
300b'
310b'
22E'
22F'

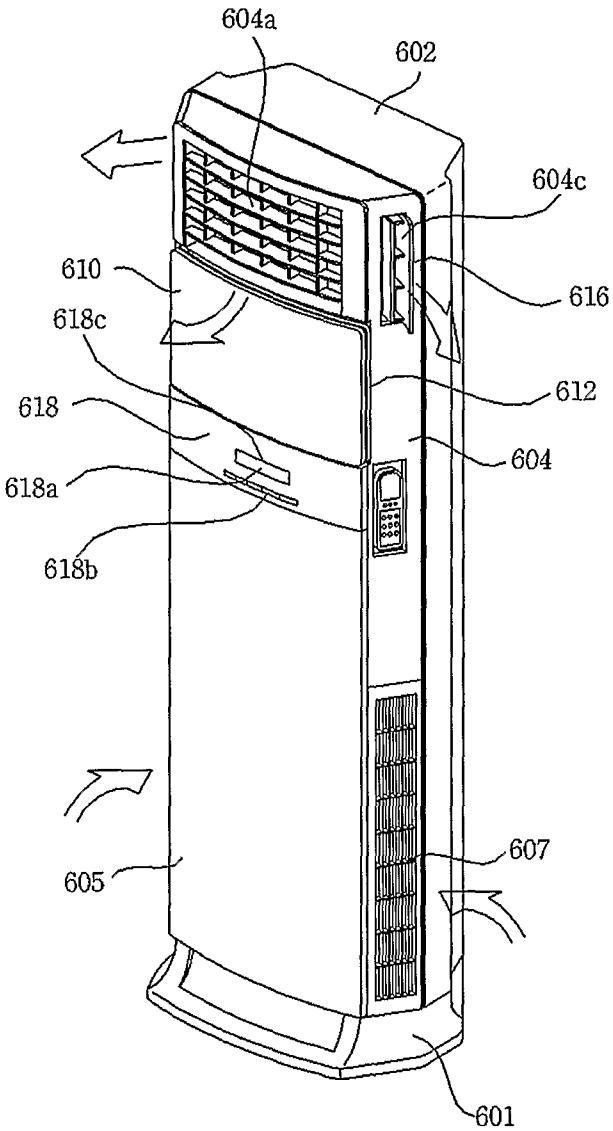
[Fig. 41]


20'
366b'
360b'
364b'
362b'
22'
23'
236'
214'
314b'
215'
310b'
24'
338b'
22C'
226'
339b'
372b'
335b'
336b'
330b'
334b'
22A'
330b'
22B'
22E'
22F'

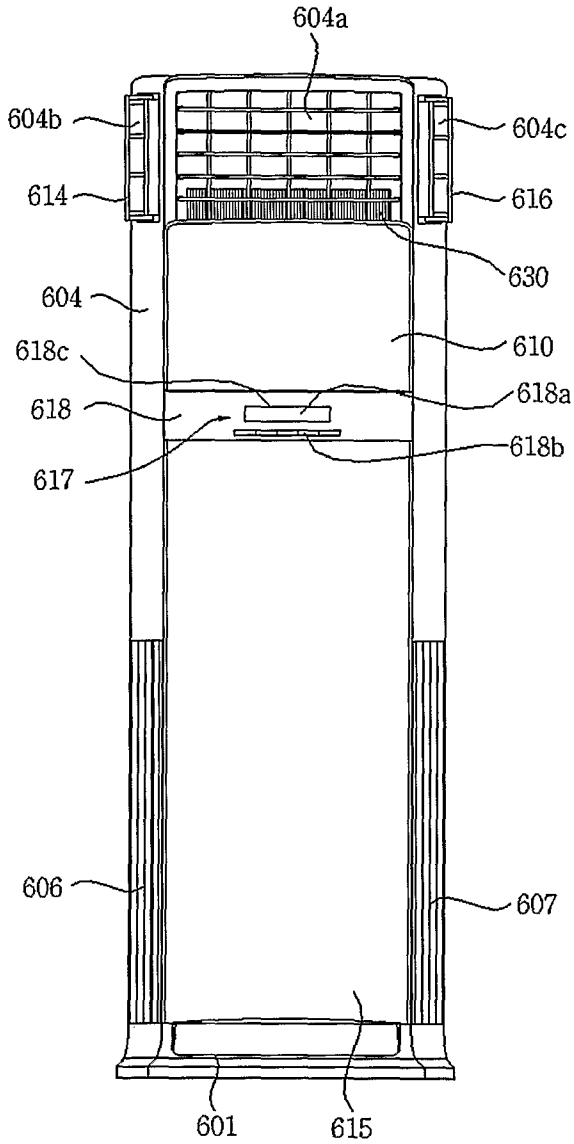
[Fig. 42]


380b'
384b'
386b'
22A'
23'
6'
382b'
361b'
210'
310b'
300b'
320b'
330b'
212'
222'
220'
224'
2'
230'
26'
236'
22B'
314b'
214'
372b'
215'
226'
21'
22C'
24'
22'
23'
10'
20'
5'
1'

[Fig. 43]



[Fig. 44]


604a
604b
604c
614
616
630
604
610
618c
618a
618
618b
617
606
607
601
615