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(54) **AIR CONDITIONER**

KLIMAANLAGE

APPAREIL DE CONDITIONNEMENT D'AIR

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## Description

### Technical Field

[0001] The present invention relates to an air conditioner, particularly, to an indoor unit of an air conditioner including an automatically cleanable filter, and more particularly, to a detailed structure of a cleaning unit moved along a filter to automatically clean a filter.

### Background Art

[0002] An air conditioner is an apparatus for sucking the air, heat-exchanging the sucked air through a heat exchanger, and discharging the heat-exchanged air. In the air conditioner, a blower is used to suck and discharge the air, and a filter is installed at the air suction side to filter off dust.

[0003] The filter needs to be cleaned or replaced. Actually, the user does not often clean or replace the filter. It is troublesome to clean and replace the filter.

[0004] Therefore, the mechanism for automatically cleaning the filter is necessary. However, there are many limitations in installing an automatic cleaning unit at the air conditioner. Such limitations are deformation of the external appearance of the air conditioner, damage of the automatic cleaning unit, and spatial restriction in the air conditioner.

JP 11 226331 describes an indoor unit of an air conditioner where a rotating brush is used to remove dust from a filter with a hose being used to suck the dust away from the filter.

### Disclosure of Invention

#### Technical Problem

[0005] An object of the present invention is to provide an air conditioner including an automatically cleanable filter.

[0006] Another object of the present invention is to provide an air conditioner in which major components for automatically cleaning a filter are installed

[0007] Yet another object of the present invention is to provide an air conditioner in which a cleaning unit for automatically cleaning a filter is installed.

[0008] Yet another object of the present invention is to provide a structure of a cleaning unit for automatically cleaning a filter.

[0009] Yet another object of the present invention is to provide a structure of a cleaning unit moved along a filter to automatically clean the filter.

[0010] Yet another object of the present invention is to provide a connection structure of a cleaning unit for automatically cleaning a filter and a hose for supplying a suction force to the cleaning unit.

[0011] Yet another object of the present invention is to provide a connection structure of a cleaning unit moved

along a filter to automatically clean the filter, and a hose for supplying a suction force to the cleaning unit.

### Technical Solution

[0012] An air conditioner according to the present invention is provided by claim 1.

[0013] The present invention provides an air conditioner including an automatically cleanable filter.

10 [0014] The present invention provides an air conditioner in which major components for automatically cleaning a filter are installed.

[0015] The present invention provides an air conditioner in which a cleaning unit for automatically cleaning a filter is installed.

[0016] The present invention provides a structure of a cleaning unit for automatically cleaning a filter.

[0017] The present invention provides a structure of a cleaning unit moved along a filter to automatically clean the filter.

[0018] The present invention provides a connection structure of a cleaning unit for automatically cleaning a filter and a hose for supplying a suction force to the cleaning unit.

25 [0019] The present invention provides a connection structure of a cleaning unit moved along a filter to automatically clean the filter, and a hose for supplying a suction force to the cleaning unit.

### Advantageous Effects

[0020] According to the air conditioner of the present invention, the filter of the air conditioner can be automatically cleaned.

35 [0021] According to the air conditioner of the present invention, it is possible to remove the troublesomeness of cleaning and replacement of the filter.

[0022] According to the air conditioner of the present invention, the major components for automatically cleaning the filter are installed in the air conditioner, thereby preventing deformation of the external appearance of the air conditioner and damage of the automatic cleaning unit.

[0023] According to the air conditioner of the present invention, the cleaning unit for automatically cleaning the filter is installed in the air conditioner to be protected.

[0024] According to the air conditioner of the present invention, as the cleaning unit includes a chamber, the cleaning unit can efficiently collect the dust separated from the filter.

50 [0025] According to the air conditioner of the present invention, as the cleaning unit includes a motor, the cleaning unit can be efficiently moved along the filter to collect the dust separated from the filter.

55 [0026] According to the air conditioner of the present invention, the cleaning unit moved along the filter and the hose are efficiently connected, so that the hose sufficiently transfers the suction force and the cleaning unit

collects the dust.

[0027] According to the air conditioner of the present invention, as the chamber is provided at the cleaning unit, the size of the suction force can be reduced, and diffusion of the dust to the whole cleaning unit can be prevented.

### Brief Description of the Drawings

[0028] Fig. 1 is a perspective view illustrating a state where an air suction hole and an air discharge hole are opened in one example of an indoor unit of an air conditioner in accordance with the present invention;

[0029] Fig. 2 is a front view illustrating the state where the air suction hole and the air discharge hole are opened in one example of the indoor unit of the air conditioner in accordance with the present invention;

[0030] Fig. 3 is a perspective view illustrating a state where a front panel is opened in the forward direction in one example of the indoor unit of the air conditioner in accordance with the present invention;

[0031] Fig. 4 is a schematic exploded perspective view illustrating one example of the indoor unit of the air conditioner in accordance with the present invention;

[0032] Fig. 5 is a vertical-sectional view illustrating one example of the indoor unit of the air conditioner in accordance with the present invention;

[0033] Fig. 6 is a detailed perspective view illustrating part A of Fig. 4;

[0034] Fig. 7 is an exploded perspective view illustrating part of Fig. 6;

[0035] Fig. 8 is an enlarged perspective view illustrating part B of Fig. 4;

[0036] Fig. 9 is an exploded perspective view illustrating part of Fig. 8;

[0037] Fig. 10 is a perspective view illustrating a state where a filter panel is separated from an upper portion of a suction grill in the air conditioner in accordance with the present invention;

[0038] Fig. 11 is a perspective view illustrating a state where the suction grill is separated from the upper portion of the filter panel in the air conditioner in accordance with the present invention;

[0039] Fig. 12 is a cross-sectional view taken along line A-A of Fig. 8;

[0040] Fig. 13 is a cross-sectional view taken along line B-B of Fig. 8;

[0041] Fig. 14 is a cross-sectional view taken along line C-C of Fig. 8;

[0042] Fig. 15 is a cross-sectional view taken along line D-D of Fig. 8;

[0043] Fig. 16 is a front exploded perspective view illustrating a filter cleaner kit of the air conditioner in accordance with the present invention;

[0044] Fig. 17 is a rear exploded perspective view illustrating the filter cleaner kit of the air conditioner in accordance with the present invention;

[0045] Fig. 18 is a spread view illustrating an outer cover of the air conditioner in accordance with the present

invention;

[0046] Fig. 19 is a cross-sectional view taken along line A-A of Fig. 6;

[0047] Fig. 20 is an exploded view illustrating part of Fig. 19;

[0048] Fig. 21 is a cross-sectional view taken along line B-B of Fig. 6; and

[0049] Fig. 22 is an exemplary view illustrating another example of the outer cover.

### Mode for the Invention

[0050] An air conditioner in accordance with preferred embodiments of the present invention will now be described in detail with reference to the accompanying drawings.

[0051] For reference, for the convenience of explanation, the up-down direction, the left-right direction and the forward-backward direction are defined around an indoor unit of an air conditioner of Fig. 1. Arrow Z indicates the up-down direction, Y indicates the left-right direction, and X indicates the forward-backward direction.

[0052] Fig. 1 is a perspective view illustrating a state where an air suction hole and an air discharge hole are opened in one example of the indoor unit of the air conditioner in accordance with the present invention, Fig. 2 is a front view illustrating the state where the air suction hole and the air discharge hole are opened in one example of the indoor unit of the air conditioner in accordance with the present invention, Fig. 3 is a perspective view illustrating a state where a front panel is opened in the forward direction in one example of the indoor unit of the air conditioner in accordance with the present invention, Fig. 4 is a schematic exploded perspective view illustrating one example of the indoor unit of the air conditioner in accordance with the present invention, and Fig. 5 is a vertical-sectional view illustrating one example of the indoor unit of the air conditioner in accordance with the present invention.

[0053] In this embodiment, as illustrated in Figs. 1 to 5, the indoor unit of the air conditioner includes a main body 2 provided with an air conditioning unit for sucking and conditioning the indoor air, and a front panel 500 connected to the main body 2 to be rotatable in the forward direction.

[0054] The main body 2 includes a base 10, a cabinet 50, an upper panel 100, a lower panel 150, and suction panels 200 and 300.

[0055] The top, bottom and front surfaces of the cabinet 50 are opened, the rear surface 51 thereof is placed on the base 10 in the up-down direction, and the left and right sides 52 and 53 thereof are inclined from the rear surface 51. A top panel 54 is installed at the upper portion of the cabinet 50.

[0056] The main body 2 further includes a heat exchanger 60 for heating/cooling the air by using a refrigerant, an air conditioning blower 70 for sucking the outdoor air of the indoor unit of the air conditioner into the

indoor unit of the air conditioner, making the air pass through the heat exchanger 60, and externally discharging the air from the indoor air of the air conditioner, and a main control box 65 for electronically controlling the indoor unit of the air conditioner including the air conditioning blower 70.

**[0057]** The heat exchanger 60 is mounted in at least one of the cabinet 50 and the upper panel 100 to be slantly positioned between the cabinet 50 and the upper panel 100. The air conditioning blower 70 is mounted in the cabinet 50 to be positioned at the lower portion of the heat exchanger 60. The air conditioning blower 70 includes a fan housing 71 having its front surface opened and its top surface formed with a discharge hole, and being mounted in the cabinet 50, a fan 72 rotatably positioned in the fan housing 71, a blowing motor 73 having its shaft connected to the fan 72 to rotate the fan 72, and an orifice 74 mounted on the front surface of the fan housing 71. A center purification unit 80 for purifying the air sucked into the air conditioning blower 70 is installed at the front portion of the air conditioning blower 70. The center purification unit 80 includes one or more center filters 81, 82 and 83, and a center filter holder 90 mounted on the air conditioning blower 70 so that the center filter 81 can be detachably connected thereto. The center filter holder 90 is slantly opened in the forward direction. The main control box 65 is mounted at the front portion of the air conditioning blower 70 to be placed between the heat exchanger 60 and the center purification unit 80.

**[0058]** The bottom and rear surfaces of the upper panel 100 are opened, the left and right sides 101 and 102 thereof are inclined from the front surface 103, and the top surface 104 thereof is orthogonal to the front surface 103.

**[0059]** In the upper panel 100, side air discharge holes 105 and 106 for discharging the air are formed in the left and right sides 101 and 102, respectively, and left and right discharge hole panels 107 and 108 are rotatably installed to open and close the side air discharge holes 105 and 106, respectively. In addition, an upper air discharge hole 110 for discharging the air is formed at the front upper portion or the top surface 104 of the upper panel 100, and an upper discharge hole panel 111 is rotatably installed to open and close the upper air discharge hole 110. Hereinafter, for the convenience of explanation, it is presumed that the upper air discharge hole 110 is formed at the top surface 104 of the upper panel 100, and that the upper discharge hole panel 111 is placed on the top surface 104 of the upper panel 100 to be rotatable in the up-down direction.

**[0060]** The suction panels 200 and 300 include a left suction panel 200 placed at the lower portion of the left side 101 of the upper panel 100, and a right suction panel 300 placed at the lower portion of the right side 102 of the upper panel 100. Air suction holes 201 and 301 for sucking the air are formed at the left and right suction panels 200 and 300, respectively. Hereinafter, the air suction hole 201 is referred as a left air suction hole 201,

and the air suction hole 301 is referred to as a right air suction hole 301. Suction filters 203 and 303 for purifying the air sucked into the left and right air suction holes 201 and 301 are placed in the left and right suction panels 200 and 300, respectively. Hereinafter, the filter 203 is referred to as a left suction filter 203, and the filter 303 is referred to as a right suction filter (not shown). The left and right suction filters 203 and 303 are automatically cleaned by a filter cleaning unit 700 provided at the main body 2.

**[0061]** The filter cleaning unit 700 includes filter cleaner kits 701 (and not shown) movably installed on the left and right suction filters 203 (and not shown), a kit suction force generation unit 705 connected to the filter cleaner kits 701 (and not shown) through dust hoses 703 and 704, for generating a suction force of sucking filter impurities such as dust from the left and right suction filters 203 (and not shown), a cyclone 706 for separating the sucked filter impurities from the air, a dust collection unit 708 for collecting the filter impurities separated in the cyclone 706, and a kit control box 709 for electronically controlling the filter cleaning unit 700. Hereinafter, the filter cleaner kit 701 is referred to as a left filter cleaner kit 701, and the filter cleaner kit 702 is referred to as a right filter cleaner kit (not shown). In addition, the dust hose 703 is referred to as a left dust hose 703, and the dust hose 704 is referred as a right dust hose 704. The kit suction force generation unit 705 can be formed in various types such as a blower and a pump. In this embodiment, the kit suction force generation unit 705 is provided as a blower and referred to as a kit blower 705. The dust collection unit 708 can be formed in various types such as a dust bag and a box. In this embodiment, it is presumed that the dust collection unit 708 is provided as a box and referred to as a dust box 708.

**[0062]** The front panel 500 is a kind of door for opening and closing the front surface of the main body 2. The height of the front panel 500 is similar or equal to the height between the bottom end of the base 10 and the top end of the upper panel 100, and the width of the front panel 500 is similar or equal to the width between the left suction panel 200 and the right suction panel 300. The front panel 500 is hinge-coupled to be rotated around any one of the left and right sides of the casing. That is, the left side top end of the front panel 500 is rotatably coupled to an upper hinge bracket 501 installed on the top surface of the upper panel 100, and the left side bottom end of the front panel 500 is rotatably coupled to a lower hinge bracket 502 installed on the top surface of the base 10. In addition, the front panel 500 is coupled to the main body 2 by a rotation restriction means 504 for restricting a rotation speed and angle. The rotation restriction means 504 is a slider having its one end slidably coupled to the front panel 500 and its other end rotatably coupled to the upper panel 100.

**[0063]** A display 600 for displaying operation information of the air conditioner is installed at the front panel 500. The display 600 is movably or fixedly placed at one

side of the front portion, inner portion and rear portion of the front panel 500.

**[0064]** The aforementioned components will now be explained in more detail.

**[0065]** First, the base 10 will now be explained in detail with reference to Figs. 1 to 7.

**[0066]** Left and right suction panel fitting grooves 11 and 12 into which the left and right suction panels 200 and 300 are fitted in the up-down direction (arrow Z) are formed in the portions of the base 10 corresponding to the left and right suction panels 200 and 300.

**[0067]** A dust box guide groove 842 into which the dust box 708 can be detachably installed is formed in the portion of the base 10 corresponding to the dust box 708. The dust box groove 842 can be positioned in the left-right direction center (arrow Y) of the base 10 for balanced layout design.

**[0068]** A hinge bracket mounting groove 14 in which the lower hinge bracket 502 is mounted is formed at the base 10. The hinge bracket mounting groove 14 can be hidden by a hinge bracket mounting groove cover 14. The hinge bracket mounting groove cover 14 can be slidably connected and disconnected in the up-down direction (arrow Z).

**[0069]** In order to arrange wiring/piping of the filter cleaning unit 700, the base 10 includes a base guide coupled to one side of the wiring/piping of the filter cleaning unit 700. For reference, as discussed later, the wiring of the filter cleaning unit 700 includes left and right photosensor cables 781 and 781 for connecting left and right kit photosensors (not shown) to the kit control box 709 for power supply or communication, and left and right kit power motor cables 753 and 753. In addition, the piping of the filter cleaning unit 700 includes the left and right dust hoses 703 and 704.

**[0070]** The base guide may include base guide insertion portions 20 to 27 formed in a groove shape at the base 10, so that one side of the wiring/piping of the filter cleaning unit 700, namely, one sides of the left and right photosensor cables 781 and 781, the left and right kit power motor cables 753 and 753, or the left and right dust hoses 703 and 704 are inserted thereto.

**[0071]** The base guide insertion portions 20 to 27 include a first base guide insertion portion 20 positioned between the left suction panel fitting groove 11 and the dust box groove 13 in the left-right direction (arrow Y), one sides of the left kit power motor cable 753 and the left dust hose 703 being inserted thereto, and a second base guide insertion portion 21 positioned between the right suction panel fitting groove 12 and the dust box groove 13, one sides of the right kit power motor cable 753 and the right dust hose 704 being inserted thereto.

**[0072]** The first and second base guide insertion portions 20 and 21 are elongated at the base 10 in the forward-backward direction (arrow X) so as to guide the left and right kit power motor cables 753 and 753 and the left and right dust hoses 703 and 704 in the forward-backward direction (arrow X).

**[0073]** The first and second base guide insertion portions 20 and 21 have their top surfaces opened so that the left and right kit power motor cables 753 and 753 and the left and right dust hoses 703 and 704 can be inserted thereto in the up-down direction (arrow Z).

**[0074]** The first and second base guide insertion portions 20 and 21 have their rear surfaces opened so that the wiring/piping of the left and right kit power motor cables 753 and 753 and the left and right dust hoses 703 and 704 can be extended to the rear portion of the base 10.

**[0075]** The first and second base guide insertion portions 20 and 21 have inclined paths 20A and 21 A inclined to the rear portion of the base 10 with regard to the top surface of the base 10 at their front portions which are connection portions to the left and right filter cleaner kits 701 (and not shown) in the forward-backward direction (arrow X). In the left and right kit power motor cables 753 and 753 and the left and right dust hoses 703 and 704, bent are the portions wired/piped in the first and second base guide insertion portions 20 and 21 and the portions connected to the left and right filter cleaner kits 701 (and not shown). The bent portions of the left and right dust hoses 703 and 704 can be smoothly wired/piped by the inclined paths 20A and 21A of the left and right base guide insertion portions 20 and 21.

**[0076]** The first and second base guide insertion portions 20 and 21 include corner paths 20B and 21 B at their rear portions so that the first and second base guide insertion portions 20 and 21 can be bent toward the center of the base 10 in the left-right direction (arrow Y). Accordingly, in the left and right kit power motor cables 753 and 753' and the left and right dust hoses 703 and 704, the portions extending from the first and second base guide insertion portions 20 and 21 to the rear portion of the base 10 can be smoothly piped toward the cyclone 706.

**[0077]** In order to prevent separation of the wiring/piping of the filter cleaning unit 700, the first and second base guide insertion portions 20 and 21 include inwardly protruding first and second stopper protrusions 20C and 21C, respectively. To improve efficiency, the first and second stopper protrusions 20C and 21C may be provided in a plural number in the first and second base guide insertion portions 20 and 21.

**[0078]** The base guide insertion portions 20 to 27 include a third base guide insertion portion 22 positioned between the left suction panel fitting groove 11 and the left base guide insertion portion 20 in the left-right direction (arrow Y), one side of the left photosensor cable 781 being inserted thereto, and a fourth base guide insertion portion 23 positioned between the right suction panel fitting groove 12 and the right base guide insertion portion 21 in the left-right direction (arrow Y), one side of the right photosensor cable 781' being inserted thereto.

**[0079]** The third and fourth base guide insertion portions 22 and 23 are elongated at the base 10 in the forward-backward direction (arrow X) so as to guide the left

and right photosensor cables 781 and 781' in the forward-backward direction (arrow X). Here, the third and fourth base guide insertion portions 22 and 23 can be placed in parallel with the first and second base guide insertion portions 20 and 21 in the left-right direction (arrow Y).

**[0080]** The third and fourth base guide insertion portions 22 and 23 have their top surfaces opened so that the left and right photosensor cables 781 and 781' can be inserted in the up-down direction (arrow Z).

**[0081]** The third and fourth base guide insertion portions 22 and 23 have their rear surfaces opened so that the wiring of the left and right photosensor cables 781 and 781' can be extended to the rear portion of the base 10.

**[0082]** The base guide insertion portions 20 to 27 include a fifth base guide insertion portion 24 positioned at the rear portions of the first and third base guide insertion portions 20 and 22 to communicate with the first and third base guide insertion portions 20 and 22, one sides of the left kit power motor cable 753, the left dust hose 703 and the left photosensor cable 781 being inserted thereto, and a sixth base guide insertion portion 25 positioned at the rear portions of the second and fourth base guide insertion portions 21 and 23 to communicate with the second and fourth base guide insertion portions 21 and 23, one sides of the right kit power motor cable 753', the right dust hose 704 and the right photosensor cable 781' being inserted thereto.

**[0083]** The base guide insertion portions 20 to 27 include a seventh base guide insertion portion 26 positioned between the fifth and sixth guide insertion portions 24 and 25 to communicate with the fifth and sixth base guide insertion portions 24 and 25 in the left-right direction (arrow Y), respectively, one side of the right photosensor cable 781' being inserted thereto.

**[0084]** The base guide insertion portions 20 to 27 include an eighth base guide insertion portion 27 positioned between the fifth and sixth base guide insertion portions 24 and 25 to communicate with the fifth and sixth base guide insertion portions 24 and 25 in the left-right direction (arrow Y), respectively, one side of the right kit power motor cable 753' being inserted thereto. The eighth base guide insertion portion 27 is positioned in a more forward position than the seventh base guide insertion portion 26 in the forward-backward direction (arrow X).

**[0085]** The base guide includes base guide hooking portions 28 to 40 protruding from the base 10 so that one side of the wiring/piping of the filter cleaning unit 700 can be hooked thereon. The base guide hooking portions 28 to 40 can be implemented with a hook structure to hook the upper portions of one side of the wiring/piping of the filter cleaning unit 700.

**[0086]** The base guide hooking portions 28 to 40 may include first, second and third base guide hooking portions 28, 29 and 30 protruded in the fifth base guide insertion portion 24, and positioned between the first base guide insertion portion 20 and the eighth base guide in-

sertion portion 27, for hooking the left dust hose 703 and the left kit power motor cable 753.

**[0087]** The first, second and third base guide hooking portions 28, 29 and 30 can be arranged side by side in the left-right direction (arrow Y) in order to guide the wiring/ piping of the filter cleaning unit 700 in the left-right direction (arrow Y). The first, second and third base guide hooking portions 28, 29 and 30 may be spaced apart from each other in the left-right direction (arrow Y). Therefore, the wiring/piping of the filter cleaning unit 700 becomes firm, simple and easy due to the first, second and third base guide hooking portions 28, 29 and 30, and easily passes between the first, second and third base guide hooking portions 28, 29 and 30.

**[0088]** As the cyclone 706 and the kit control box 709 are installed at the front portion of the base 10 in the forward-backward direction (arrow X), the first, second and third base guide hooking portions 28, 29 and 30 can be positioned at the front portion of the fifth base guide insertion portion 24. Accordingly, the length of the wiring/piping of the filter cleaning unit 700 can be minimized.

**[0089]** The base guide hooking portions 28 to 40 may include a fourth base guide hooking portion 31 protruded from the front portion in the fifth base guide insertion portion 24, and positioned between the first and third base guide insertion portions 20 and 22, for hooking the left photosensor cable 781.

**[0090]** The base guide hooking portions 28 to 40 may include a fifth base guide hooking portion 32 protruded from the right wall in the fifth base guide insertion portion 24, for hooking the right kit power motor cable 753'.

**[0091]** The base guide hooking portions 28 to 40 may include a sixth base guide hooking portion 33 protruded from the rear surface in the fifth base guide insertion portion 24, for hooking the right photosensor cable 781'.

**[0092]** The base guide hooking portions 28 to 40 may include a seventh base guide hooking portion 34 protruded from the left surface in the fifth base guide insertion portion 24, for hooking the right photosensor cable 781'.

**[0093]** The base guide hooking portions 28 to 40 may include an eighth base guide hooking portion 35 protruded in the sixth base guide insertion portion 25, for hooking the right dust hose 704 and the right kit power motor cable 753'. In order to minimize the length of the wiring/piping of the filter cleaning unit 700, the eighth base guide hooking portion 35 is protruded from the front surface of the sixth base guide insertion portion 25 and positioned between the second base guide insertion portion 21 and the eighth base guide insertion portion 27.

**[0094]** The base guide hooking portions 28 to 40 may include a ninth base guide hooking portion 36 protruded from the left surface in the sixth base guide insertion portion 25, for hooking the right kit power motor cable 753'.

**[0095]** The base guide hooking portions 28 to 40 may include a tenth base guide hooking portion 37 protruded between the second and fourth base guide insertion portions 21 and 23 in the front surface of the sixth base guide insertion portion 25, for hooking the right photosensor

cable 781'.

**[0096]** The base guide hooking portions 28 to 40 may include an eleventh base guide hooking portion 38 protruded from the right surface in the sixth base guide insertion portion 25, for hooking the right photosensor cable 781'.

**[0097]** The base guide hooking portions 28 to 40 may include a twelfth base guide hooking portion 39 protruded from the rear surface in the sixth base guide insertion portion 25, for hooking the right photosensor cable 781'.

**[0098]** The base guide hooking portions 28 to 40 may include a thirteenth base guide hooking portion 40 protruded from the rear surface in the seventh base guide insertion portion 26, for hooking the right photosensor cable 781'.

**[0099]** As the base guide hooking portions 28 to 40 protrude from the base guide insertion portions 20 to 27, the whole structure of the wiring/piping of the filter cleaning unit 700 becomes simple and dense. Moreover, the base guide hooking portions 28 to 40 induce the wiring/piping of the filter cleaning unit 700 closely to the walls of the base guide insertion portions 20 to 27, so that the wiring/piping of the filter cleaning unit 700 gets simple and dense and does not interfere with the peripheral components.

**[0100]** The base guide may include base guide fitting portions 41 and 42 provided at the base 10 to be coupled to one side of the wiring/piping of the filter cleaning unit 700.

**[0101]** The base guide fitting portions 41 and 42 include first and second base guide fitting portions 41 and 42 formed in a groove structure on the bottom surfaces of the first and second base guide insertion portions 20 and 21, an outer cover 800 for covering the left and right dust hoses 703 and 704 discussed later being inserted thereto. In order to firmly pipe the left dust hose 703, the first and second base guide fitting portions 41 and 42 can be provided in a plural number in the forward-backward direction (arrow X).

**[0102]** The left and right suction panels 200 and 300 will now be explained in detail with reference to Figs. 8 to 16.

**[0103]** The left suction panel 200 includes a left suction grill 202 installed to shield the left side space between the cabinet 50 and the front panel 500, the left air suction hole 201 being formed therein, a left suction vane 204 for opening and closing the left air suction hole 201, and a left filter panel 206 positioned at the right side of the left suction grill 202 and combined with the left suction grill 202 to be placed in the main body 2, the left suction filter 203 being fixed thereto. The left suction grill 202 and the left filter panel 206 are combined so that the air sucked into the left air suction hole 201 can be discharged from the left suction panel 200 through the left suction filter 203.

**[0104]** That is, the left suction grill 202 includes a left base grill 210 installed to shield part of the left side space between the cabinet 50 and the front panel 500, the left

air suction hole 201 being formed therein, a left front extension grill 211 extended from the left base grill 210 to the front portion of the main body 2, a left rear extension grill 212 extended from the left base grill 210 to the rear portion of the main body 2, left upper and lower barrier grills 213 and 214 positioned at the upper and lower portions in the left suction grill 202, respectively, and a left top grill 215 positioned on the top surface of the left suction grill 202 to surface-contact the upper panel 100.

**[0105]** The front portion 210' of the left base grill 210 connected to the left front extension grill 211 can be bent at least once in the right direction. The left base grill 210 includes a left suction grill fitting protrusion 210A fitted into the left suction panel fitting groove 11 of the base 10 almost in the up-down direction (arrow Z). The left front extension grill 211 is bent from the left base grill 210 in the right direction, and hidden by the front panel 500. A fastening member hole 211A is perforated in the upper portion of the left front extension grill 211 almost in the forward-backward direction (arrow X) so that the left front extension grill 211 can be fastened to the lower panel 150 by a fastening member B such as a bolt. The left rear extension grill 212 is bent from the left base grill 210 in the right direction so as to shield the portion which is not shielded by the left base grill 210 in the left side space between the cabinet 50 and the front panel 500. The left upper and lower barrier grills 213 and 214 overlap with the top and bottom ends of the left filter panel 206, respectively. A left suction vane upper fitting hole 213C is perforated in the left upper barrier grill 213 in the up-down direction (arrow Z) so that the left suction vane 204 can be rotatably coupled thereto. A left suction vane lower fitting hole 214C is perforated in the left lower barrier grill 214 in the up-down direction (arrow Z) so that the left suction vane 204 can be rotatably coupled thereto. A left dust hose through hole 214D is formed in the left lower barrier grill 214 so that the left dust hose 703 can pass therethrough.

**[0106]** The left suction vane 204 includes a left suction vane panel 220 for shielding the left air suction hole 201, and left suction vane upper and lower rotation shafts 222 and 224 protruded from the top and bottom ends of the left suction vane panel 220 and rotatably fitted into the left suction grill 202, respectively. At least one of the left suction vane upper and lower rotation shafts 222 and 224 is connected to a left suction vane motor 226 in order to automatically rotate the left suction vane 204. The left suction vane motor 226 can be connected to the left suction vane 204 directly or indirectly through a pulley and belt or a gear set. In this embodiment, it is presumed that the left suction vane motor 226 is connected directly to the left suction vane 204. In addition, the left suction vane motor 226 is installed at any one of the upper and lower portions of the left suction vane 204. In this embodiment, it is presumed that the left suction vane motor 226 is installed at the lower portion of the left suction vane 204. The left suction vane motor 226 can be installed at the lower portion of the left lower barrier grill 214.

**[0107]** The left filter panel 206 includes a left base filter panel 230 facing the left base grill 210 almost in the left-right direction (arrow Y), the left suction filter 203 being fixed thereto, a left front extension filter panel 231 extended from the left base filter panel 230 to the front portion of the main body 2, a left rear extension filter panel 232 extended from the left base filter panel 230 to the rear portion of the main body 2, and left upper and lower filter panels 233 and 234 being positioned at the upper and lower portions of the left filter panel 206, and overlapping with the left upper and lower barrier grills 213 and 214 of the left suction grill 202, respectively.

**[0108]** A left suction filter hole 230A is formed at the portion of the left base filter panel 230 corresponding to the left suction panel 203 so that the air sucked into the left air suction hole 201 can flow into the main body 2. The left suction filter hole 230A can face the left air suction hole 201 almost in the left-right direction (arrow Y) so as to make the air sucked into the left air suction hole 201 flow straight. The left front extension filter panel 231 is bent in the left direction from the left base filter panel 230 to the left suction grill 202 to partially overlap with the left front extension grill 211. The left rear extension filter panel 232 is bent in the left direction from the left base filter panel 230 to the left suction grill 202 to partially overlap with the left rear extension grill 212. Left upper and lower photosensor holes 232A and 232B are formed at the upper and lower portions of the left rear extension filter panel 232, respectively, so that left kit photosensors 782 and 784 can be mounted thereon. The left upper and lower filter panels 233 and 234 partially overlap with the left upper and lower barrier grills 213 and 214, respectively.

**[0109]** The left suction grill 202 and the left filter panel 206 described above can be combined by the fastening member B such as the bolt or screw not to be separated from each other.

**[0110]** That is, a left suction grill fastening portion 212A to which the fastening member B such as the bolt can be fastened almost in the left-right direction (arrow Y) is provided at the left rear extension grill 212, and a left filter panel fastening portion 232C corresponding to the left filter panel fastening portion 212A is provided at the left rear extension filter panel 232. The left suction grill fastening portion 212A and the left filter panel fastening portion 232C are positioned in the left suction panel 200. The left suction grill fastening portion 212A is protruded from the left rear extension grill 212 to the front portion of the main body 2 to be at least partially inserted into the left filter panel fastening portion 232C. Moreover, the left filter panel fastening portion 232C is formed in a groove structure so that the left suction grill fastening portion 212A can be inserted thereto. Accordingly, as the left suction grill fastening portion 212A is fixedly inserted into the left filter panel fastening portion 232C, the combination positions of the left suction grill fastening portion 212A and the left filter panel fastening portion 232C can easily overlap with each other.

**[0111]** A fastening member hole 213A is perforated in

the left upper barrier grill 213 in the up-down direction (arrow Z) so that the left upper barrier grill 213 can be fastened to the left filter panel 206, particularly, the left upper filter panel 233 by the fastening member B such as the bolt, and a fastening member hole 233A corresponding to the fastening member hole 213A of the left upper barrier grill 213 is formed in the left upper filter panel 233.

**[0112]** A fastening member hole 214A is perforated in the left lower barrier grill 214 in the up-down direction (arrow Z) so that the left lower barrier grill 214 can be fastened to the left filter panel 206, particularly, the left lower filter panel 234 by the fastening member B such as the bolt, and a fastening member hole 234A corresponding to the fastening member hole 214A of the left lower barrier grill 214 is formed in the left lower filter panel 234.

**[0113]** The left suction grill 202 and the left filter panel 206 can be clamping-fastened by a clamp 240.

**[0114]** The clamp 240 includes a first clamp coupling portion 242 coupled to the left suction grill 202, a second clamp coupling portion 244 coupled to the left filter panel 206, and a clamp connection unit 246 for connecting the first and second clamp coupling portions 242 and 244.

**[0115]** The first and second clamp coupling portions 242 and 244 are formed in a ring structure to be fitted around a left suction grill clamp protrusion 202A of the left suction grill 202 or a left filter panel clamp protrusion 206A of the left filter panel 206. The left suction grill clamp protrusion 202A and the left filter panel clamp protrusion 206A are positioned on the outer surface of the left suction grill 202 or the left filter panel 206 so that the clamp 240 can be clamped outside the left suction panel 200. Particularly, the left rear extension grill 212 and the left rear extension filter panel 232 are fastened by the fastening member B. Therefore, in order for the left front extension grill 211 and the left front extension filter panel 232 to be clamped by the clamp 240, the left suction grill clamp protrusion 202A may protrude from the left front extension grill 211, and the left filter panel clamp protrusion 206A may protrude from the left front extension filter panel 231.

**[0116]** The clamp connection unit 246 can be formed in a wave structure so that it can be firmly fitted into the left suction panel 202 to stably clamp the left suction panel 202, and easily clamped or unclamped to/from the left suction panel 202 by an elastic force. That is, when the clamp connection unit 246 is clamped to the left suction panel 200, the center portion 246A of the clamp connection unit 246 is closely attached to the left suction panel 200, and the portions 246B and 246C between the center portion 246A of the clamp connection unit 246 and the first and second clamp coupling portions 242 and 244 are spaced apart from the left suction panel 200. Here, the portions 246B and 246C between the center portion 246A of the clamp connection unit 246 and the first and second clamp coupling portions 242 and 244 may have a curved line structure so that the clamp 240 can be ap-



appropriately elastically deformed. The clamp 240 is not limited to the above embodiment. The clamp 240 can be provided in a plural number, and the clamping position of the clamp 240 can be variously modified.

**[0117]** As described above, when the left suction grill 202 and the left filter panel 206 are mutually combined, the mutual combination positions thereof may be limited so that they can easily overlap with each other and cannot hang down or get loose with the passage of time.

**[0118]** A left suction panel stopper for determining the combination positions of the left suction grill 202 and the left filter panel 206 includes a first stopper rib 250 positioned between the left suction grill 202 and the filter panel 206, and incorporated with at least one of the left suction grill 202 and the left filter panel 206, for maintaining an interval between the left suction grill 202 and the left filter panel 206.

**[0119]** The first stopper rib 250 is fixed to the left suction grill 202, particularly, the left front extension grill 211. When the left suction grill 202 and the left filter panel 206 are combined, the left filter panel 206, particularly, the left front extension filter panel 231 can be hooked on the first stopper rib 250.

**[0120]** The left front extension filter panel 231 overlaps with the inner surface of the left front extension grill 211. Therefore, the first stopper rib 250 protrudes from the inner surface of the left front extension grill 211. The first stopper rib 250 may be positioned at the center of the left suction grill 200 in the up-down direction (arrow Z). The first stopper rib 250 can be provided in a plural number and arranged in the up-down direction (arrow Z), which is not intended to be limiting. That is, one first stopper rib 250 can be provided, or a plurality of first stopper ribs 250 can be dispersively arranged in the up-down direction (arrow Z).

**[0121]** The left suction panel stopper may include second and third stopper ribs provided at any one of the left suction grill 202 and the left filter panel 206, and fitted into the other.

**[0122]** The second and third stopper ribs are provided at the left suction grill 202, and fitted into second and third stopper rib fitting grooves 206B and 206B of the left filter panel 206. Here, the second and third stopper ribs can be independently constructed. In addition, as in this embodiment, the left upper and lower barrier grills 213 and 214 of the left suction grill 202 can be fitted into the second and third stopper rib fitting grooves 206B and 206B. As the left upper and lower barrier grills 213 and 214 serve as the second and third stopper ribs, the whole structure can be simplified. Moreover, as the second and third stopper ribs are uniformly distributed in the up-down direction (arrow Z) with the first stopper rib 250, the left suction grill 202 and the left filter panel 206 can be uniformly combined.

**[0123]** The left suction panel stopper may include stopper jaws 254 and 255 protruded from any one of the left suction grill 202 and left filter panel 206, and hooked on the other.

**[0124]** The stopper jaws 254 and 255 may include a suction grill stopper jaw 254 protruded from the left suction grill 202 and hooked on the left filter panel 206, and a filter panel stopper jaw 255 protruded from the left filter panel 206 and hooked on the left suction grill 202.

**[0125]** The suction grill stopper jaw 254 may be protruded particularly from the left front extension grill 211, and hooked on the left front extension filter panel 231 of the left filter panel 206. Especially, the suction grill stopper jaw 254 may be combined with the filter panel stopper jaw 255 of the left front extension filter panel 231 so that the left filter panel 206 can be hooked thereon. One suction grill stopper jaw 254 may be positioned at the center portion of the left front extension suction grill 211 in the up-down direction (arrow Z), which is not intended to be limiting. The suction grill stopper jaw 254 may be provided in a plural number and dispersively arranged in the up-down direction (arrow Z). The suction grill stopper jaw 254 may be spaced apart from the first stopper rib 250 in the combination direction of the left suction grill 202 and the left filter panel 206, namely, almost in the left-right direction (arrow Y), so that the filter panel stopper jaw 255 can be fitted into the space between the suction grill stopper jaw 254 and the first stopper rib 250.

**[0126]** The filter panel stopper jaw 255 may be protruded particularly from the left front extension filter panel 231. The filter panel stopper jaw 255 may be combined with the suction grill stopper jaw 254 so that the left suction grill 202 can be hooked thereon. One filter panel stopper jaw 255 may be positioned at the center portion of the left front extension filter panel 231 in the up-down direction (arrow Z), which is not intended to be limiting. The left filter panel stopper jaw 255 can be provided in a plural number and dispersively arranged in the up-down direction (arrow Z). Particularly, the filter panel stopper jaw 255 can be fitted between the suction grill stopper jaw 254 and the first stopper rib 250 in the combination direction of the left suction grill 202 and the left filter panel 206, namely, almost in the left-right direction (arrow Y). The filter panel stopper jaw 255 may have an inclined structure to be easily fitted between the suction grill stopper jaw 254 and the first stopper rib 250.

**[0127]** As described above, when the left suction grill 202 and the left filter panel 206 are mutually combined, if the filter panel stopper jaw 255 is fitted between the suction grill stopper jaw 254 and the first stopper rib 250, the filter panel stopper jaw 255, the suction grill stopper jaw 254 and the first stopper rib 250 are collected in one point and associated with each other. As a result, the left suction grill 202 and the left filter panel 206 can be easily combined/separated and reinforce each other.

**[0128]** In addition, as mentioned above, when the mutual combination positions of the left suction grill 202 and the left filter panel 206 are limited by the stopper, the combination positions thereof easily overlap with each other. Moreover, the left suction grill 202 and the left filter panel 206 do not relatively hang down or get loose.

**[0129]** Meanwhile, as the filter cleaning unit 700 uses

power and is electronically controlled, the left suction panel 200 may include a cable guide 260 for guiding cable wiring of the filter cleaning unit 700. The cable guide 260 can guide wiring of the left photosensor cable 781 which is a filter cleaner kit position sensing unit discussed later, and also guide wiring of the left kit power motor cable 753 discussed later. In this embodiment, it is presumed that the cable guide 260 is placed outside the left suction panel 200 to guide the left photosensor cable 781 wired outwardly from the left suction panel 200.

**[0130]** The left kit photosensors 782 and 784 are mounted in the left filter panel 206 of the left suction panel 200, particularly, the left rear extension filter panel 232. Therefore, the cable guide 260 may be placed in the left filter panel 206, particularly, the left rear extension filter panel 232 in order to neatly wire the left photosensor cable 781 and prevent peripheral interference.

**[0131]** The cable guide 260 may have a hook structure on which the left photosensor cable 781 is hooked, an annular structure through which the left photosensor cable 781 passes, a buried structure in which the left photosensor cable 781 is buried, or a guide rail structure into which the left photosensor cable 781 is inserted. The cable guide 260 can be variously modified in structure. Moreover, two or more structures may be mixedly used.

**[0132]** In this embodiment, the cable guide 260 has the hook structure to be easily integrally molded with the left filter panel 206. That is, the cable guide 260 includes a first cable guide rib 262 protruded from the left filter panel 206, particularly, the left rear extension filter panel 232, and a second cable guide rib 263 bent and extended from the first cable guide rib 262. The first cable guide rib 262 may vertically or slantly protrude from the left rear extension filter panel 232. The second cable guide rib 263 protrudes from the left rear extension filter panel 232 by a predetermined length so as to secure a wiring space of the left photosensor cable 781 between the first cable guide rib 262 and the left rear extension filter panel 232. The up-down direction length L1 of the first cable guide rib 262 may be increased so that the first cable guide rib 262 can overlap with the large portion of the left photosensor cable 781 to firmly wire the photosensor cables 781 and 781'. That is, the up-down direction length L1 of the first cable guide rib 262 may be much longer than the protruding length L2 thereof.

**[0133]** The second cable guide rib 263 may be bent toward the left rear extension filter panel 232 so that the left photosensor cable 781 can be wired closely to the left rear extension filter panel 232. The second cable guide rib 263 may be almost parallel with the left rear extension filter panel 232 or inclined from a surface level with the left rear extension filter panel 232 in order to easily wire the left photosensor cable 781 and prevent separation of the left photosensor cable 781.

**[0134]** The cable guide 260 can be provided in a single or plural number at the left rear extension filter panel 232. When the cable guide 260 is provided in a plural number, if the kit control box 709 is positioned in a lower position

than the left kit photosensors 782 and 784, the cable guides 260 may be arranged in a row in the up-down direction (arrow Z), irregularly arranged in the up-down direction (arrow Z), or arranged in the left-right direction (arrow Y) or the forward-backward direction (arrow X).

**[0135]** Moreover, a cable guide groove 264 may be formed in the portion of the left suction panel 200 corresponding to the cable guide 260, namely, the left rear extension filter panel 232, so that the left photosensor cable 781 can be wired between the left rear extension filter panel 232 and the cable guide 260. The cable guide groove 264 may be gradually widened toward an opening portion 264A into which the left photosensor cable 781 is inserted. The cable guide groove 264 is gradually widened from the left filter panel 206 to the left suction grill 202 in the left-right direction (arrow Y). The cable guide groove 264 can be formed by bending part of the left rear extension filter panel 232 inwardly into the left suction panel 200.

**[0136]** As described above, the cable guide 260 for guiding the wiring of the left photosensor cable 781 is provided at the left suction panel 200, thereby neatly wiring the left photosensor cable 781 and preventing peripheral interference. Furthermore, as the cable guide groove 264 is provided at the left suction panel 200, although the cable guide 260 is not much protruded from the left suction panel 200, the wiring space of the left photosensor cable 781 is sufficiently secured.

**[0137]** In the meantime, the left suction panel 200 may include a dust hose guide 270 for guiding the left dust hose 703 of the filter cleaning unit 700. As the left filter cleaner kit 701 is positioned in the left suction panel 200, the dust hose guide 270 may be placed in the left suction panel 200 so that the left dust hose 703 can be wired in the left suction panel 200.

**[0138]** The dust hose guide 270 may be provided in at least one of the left suction grill 202 and the left filter panel 206 of the left suction panel 200. In this embodiment, it is presumed that the dust hose guide 270 is provided at the left suction grill 202. Particularly, the dust hose guide 270 may be provided over the left base grill 210 and the left front extension grill 211.

**[0139]** The dust hose guide 270 is provided so that at least part of the left dust hose 703 can be stretched or bent in the movement direction of the left filter cleaner kit 701, namely, in the up-down direction (arrow Z). That is, the dust hose guide 270 may include a dust hose wiring portion 272 provided at the left suction panel 200, for wiring the left dust hose 703 in the movement direction of the left filter cleaner kit 701, namely, in the up-down direction (arrow Z), and a dust hose fixation portion 274 for fixing the left dust hose 703 to one side of the dust hose wiring portion 272. The dust hose wiring portion 272 can be formed by the left front extension grill 211 and the dust hose guide rib 273 spaced apart from the left front extension grill 211. In order to prevent interference of the left dust hose 703 and the left air suction hole 201, the dust hose wiring portion 272 has its surface communi-

cating with the inside of the left suction panel 200 opened, not the side of the left air suction hole 201. The dust hose wiring portion 272 communicates with the left dust hose through hole 214D so that the left dust hose 703 can pass through the left dust hose through hole 214D. That is, the bottom surface of the dust hose wiring portion 272 corresponding to the left dust hose through hole 214D may be opened, or the dust hose wiring portion 272 may have a through hole through which the left dust hose 703 passes. The dust hose fixation portion 274 may have a clamp structure, shield the opened surface of the dust hose wiring portion 272, have a hook structure, use a fastening member such as a bolt or screw, or adopt a bonding method. The dust hose fixation portion 274 may be variously modified. In this embodiment, it is presumed that the dust hose fixation portion 274 is a dust hose fixation rib protruded from the dust hose wiring portion 272 and fitted into any one of the first and second slots 802A and 804A of the outer cover 800. For the convenience of explanation, the dust hose fixation portion 274 is referred to as the dust hose fixation rib 274. The dust hose fixation rib 274 may fix the left dust hose 703 wired at the upper portion in the left suction panel 200, or the left dust hose 703 wired at the lower portion in the left suction panel 200. In this embodiment, as the left dust hose 703 passes through the left dust hose through hole 214D positioned at the lower portion of the left suction panel 200, the dust hose fixation rib 274 fixes the left dust hose 703 wired at the lower portion in the left suction panel 200 to allow movement of part of the left dust hose 703 wired in the left suction panel 200. The dust hose fixation rib 274 may be provided in a plural number so that part of the left dust hose 703 can be firmly fixed to the dust hose wiring portion 272. The plurality of dust hose fixation ribs 274 may be arranged in the movement direction of the left filter cleaner kit 701, namely, the up-down direction (arrow Z), or in the circumferential direction of the dust hose wiring portion 272.

**[0140]** As described above, the dust hose guide 270 helps to easily wire the left dust hose 703 without peripheral interference, and move part of the left dust hose 703 during the movement of the left filter cleaner kit 701. Accordingly, although the left dust hose 703 moves with the left filter cleaner kit 701, the left dust hose 703 is not twisted or separated from the left filter cleaner kit 701 or the cyclone 706. Particularly, the left dust hose 703 does not interrupt the flow of the air sucked into the left air suction hole 201.

**[0141]** The right suction panel 300 is similar or identical in structure to the left suction panel 200, and thus detailed explanations thereof are omitted.

**[0142]** The left and right suction filters 203 and 303 will now be described in detail with reference to Figs. 4, 8, 9, 12, 13 and 15.

**[0143]** In a state where the left suction filter 203 is placed in the left suction panel 200, particularly, the left filter panel 206, it can be automatically cleaned by the filter cleaning unit 700. Therefore, the left suction filter

203 is fixed to the left filter panel 206. In the left suction filter 203, a filter net 280 for filtering the flow passing through the left suction filter 203 can be attached directly to the left filter panel 206, or attached to a filter frame 282 fixedly mounted on the left filter panel 206. In this embodiment, it is presumed that the left suction filter 203 includes the filter net 208 and the filter frame 282. For the convenience of explanation, the filter net 280 of the left suction filter 203 is referred as a left filter net 280 and the filter frame 282 of the left suction filter 203 is referred as a left filter frame 282.

**[0144]** The left filter net 280 may be provided as a pre-filter type with a mesh structure.

**[0145]** The left filter frame 282 includes a base portion 283 in which the left filter net 280 is placed, and a flange portion 284 extending from the base portion 283 and surface-contacting the left suction panel 200, particularly, the left filter panel 206. The base portion 283 of the left filter frame 282 has a size to be inserted into the left suction panel 200 through the left suction filter hole 230A of the left filter panel 206. More preferably, the base portion 283 of the left filter frame 282 is formed in the almost same size as the size of the left suction filter hole 230A.

The base portion 283 of the left filter frame 282 protrudes toward the left filter cleaner kit 701 so that the left filter net 280 can be closely attached to the left filter cleaner kit 701. Accordingly, the base portion 283 of the left filter frame 282 may protrude from the left suction filter hole 230A inwardly to the left suction panel 200. The flange portion 284 of the left filter frame 282 surface-contacts the left filter panel 206 of the left suction panel 200. Here, the flange portion 284 of the left filter frame 282 surface-contacts the left base filter panel 230 of the left filter panel 206 so that the left suction filter 203 can be fixedly placed in the left filter panel 206 through the left suction filter hole 230A. Therefore, as the left suction filter 203 is hooked on the left suction panel 200, the left suction filter 203 and the left filter cleaner kit 701 are closely attached to each other, but do not interfere with each other. Moreover, the gap between the left suction filter 203 and the left suction filter hole 230A can be removed, and the assembly position of the left suction filter 203 can be easily determined.

**[0146]** The left suction filter 203 can be fixed to the left suction panel 200 by a hook manner, a fastening manner using a bolt or screw, a press-fit manner, an attachment manner, a welding manner, or other various manners. In this embodiment, it is presumed that the left suction filter 203 is fixed to the left suction panel 200 by the hook manner which does not need a special assembly tool. That is, a filter fixation hook 286 for fixing the left suction filter 203 by the hook manner is provided at the left suction panel 200, particularly, the left filter panel 206. For the convenience of explanation, the filter fixation hook 286 of the left filter panel 206 is referred to as a left filter fixation hook 286. The left filter fixation hook 286 is positioned outside the left suction panel 200. That is, as the

flange portion 284 of the left filter frame 282 surface-contacts the left base filter panel 230 outside the left suction panel 200, the left filter fixation hook 286 is placed in the left base filter panel 230. The left filter fixation hook 286 can be provided in a plural number along the circumference of the left suction filter hole 230A, for firmly fixing the left suction filter 203. The left filter fixation hook 286 described above includes a left filter fixation hook base portion protruding from the left base filter panel 230 to the outer portion of the left suction panel 200, and a left filter fixation hook extension portion extended from the left filter fixation hook base portion and hooked on the flange portion 284 of the left filter frame 282. The left filter fixation hook 286 may be hooked through the flange portion 284 of the left filter frame 282. That is, a left filter fixation hook through hole 284A is formed in the flange portion 284 of the left filter frame 282 so that the left filter fixation hook 286 can pass therethrough.

**[0147]** As described above, when the left suction filter 203 is fixed to the left suction panel 200, a handle for connecting and disconnecting the left suction filter 203, or a guide for connecting and disconnecting the left suction filter 203 is not necessary. Therefore, the left suction filter 203 and the left suction panel 200 can be simplified in structure and free from design limitations. When the left suction filter 203 is connected or disconnected, it is not damaged due to interference. Prevented is a design limitation in securing a space for connecting or disconnecting the left suction filter 203. Also prevented is leakage of the flow from a gap made by unskilled operation in connection or disconnection of the left suction filter 203, or a recess for connecting or disconnecting the left suction filter 203. As a result, the air purifying efficiency can be improved.

**[0148]** Moreover, as the left suction filter 203 is fixed to the left suction panel 200 through the left suction filter hole 203A, the fixation processing space of the left suction filter 203 is enlarged to ease the fixation of the left suction filter 203.

**[0149]** As the left suction filter 203 is fixed to the left suction panel 200 by the hook manner, a special tool for fixing the left suction filter 203 is not required, which makes it more easier to fix the left suction filter 203.

**[0150]** Since the left filter fixation hook 286 passes through the left filter fixation hook through hole 284A of the left filter frame 284, the left suction filter 203 can be more firmly fixed.

**[0151]** The base portion 283 of the left filter frame 272 in which the left filter net 280 is placed protrudes toward the left filter cleaner kit 701. Accordingly, the left suction filter 203 and the left filter cleaner kit 701 are closely attached to each other, to minimize leakage of the suction force of the filter cleaning unit 700. As a result, cleaning performance of the filter cleaning unit 700 can be improved.

**[0152]** In addition, as the flange portion 283 of the left filter frame 282 surface-contacts the left filter panel 206, the fixation position of the left suction filter 203 can be

easily determined, and the gap between the left suction filter 203 and the left suction filter hole 230A can be completely shielded.

**[0153]** The right suction filter 303 is similar or identical in structure to the left suction filter 203, and thus detailed explanations thereof are omitted.

**[0154]** The filter cleaning unit 700 will now be explained in detail with reference to Figs. 4, 5 and 12 to 21. For reference, the filter cleaning unit 700 will be explained in the order of the left and right filter cleaner kits 701 (and not shown), the left and right dust hoses 703 and 704, the kit blower 705, the cyclone 706, the dust box 708 and the kit control box 709.

**[0155]** The left filter cleaner kit 701 is positioned in the left suction panel 200 so as to easily collect the impurities from the left suction filter 203.

**[0156]** The left filter cleaner kit 701 is provided at the left suction filter 203 with a very small size not to interrupt the flow sucked into the left air suction hole 201 in the cleaning standby mode of the left suction filter 203. The left filter cleaner kit 701 can be moved along the left suction filter 203 to clean the whole left suction filter 203. The left filter cleaner kit 701 can be moved in any direction. In this embodiment, the left suction filter 203 is long in the up-down direction (arrow Z) and narrow in the forward-backward direction (arrow X). Therefore, it is presumed that the left filter cleaner kit 701 is moved only in the up-down direction (arrow Z).

**[0157]** The left filter cleaner kit 701 can be manually moved, or automatically moved by power. In this embodiment, it is presumed that the left filter cleaner kit 701 is automatically moved by power.

**[0158]** The left filter cleaner kit 701 includes a kit case 710 with a dust chamber 711 for collecting the impurities from the left suction filter 203, and a kit movement unit 750 for automatically moving the kit case 710 by power.

**[0159]** The part of the kit case 710 can be independently used as the dust chamber 711, or the whole portion of the kit case 710 can be used as the dust chamber 711. In the kit case 710, the dust chamber 711 can be defined as one or plural spaces. In this embodiment, it is presumed that the dust chamber 711 is provided as one independent space in the part of the kit case 710.

**[0160]** The kit case 710 includes kit bodies 712 and 713 for defining the external appearance of the kit case 710, a dust suction hole 720 for sucking the impurities from the left suction filter 203 being formed in the portion of which facing the left suction filter 203, and a dust chamber body 714 being placed in the kit bodies 712 and 713 to independently define the dust chamber 711, and communicating with the dust suction hole 720 and the kit blower 705.

**[0161]** The kit bodies 712 and 713 include a kit front body 712 being placed to face the left suction filter 203 and having the dust suction hole 720, and a kit rear body 713 combined with the kit front body 712 so that the dust chamber body 714 can be placed therebetween.

**[0162]** The dust suction hole 720 is formed in the lower

portion of the kit front body 712. As the left filter cleaner kit 701 is moved in the up-down direction (arrow Z), the dust suction hole 720 can be elongated in the forward-backward direction (arrow X) and shortened in the up-down direction (arrow Z). That is, the forward-backward direction width 720W of the dust suction hole 720 is equal to or larger than that of the left suction filter 203, and the up-down direction length 720L of the dust suction hole 720 is smaller than the forward-backward direction width 720W of the dust suction hole 720.

**[0163]** The kit front body 712 has first and second slots 721 and 722 formed in the front and rear portions of the dust suction hole 720, respectively.

**[0164]** The kit front body 712 includes first and second kit front body ribs 723 and 724 protruded from the kit front body 712 toward the kit rear body 713, and placed between the first and second slots 721 and 722 and the dust suction hole 720, respectively. First and second kit wheel shaft holes 723A and 724A, which are partially opened so that a kit wheel shaft 752A described later can pass therethrough, are formed in the first and second kit front body ribs 723 and 724. The first and second kit wheel shaft holes 723A and 724A of the first and second kit front body ribs 723 and 724 may be formed in the higher portion than the dust chamber 711 so that the kit wheel shaft 752A can be placed outside the dust chamber 711. First and second agitator shaft holes 723B and 724B, which are partially opened so that an agitator shaft 762 explained later can pass therethrough, are formed in the first and second kit front body ribs 723 and 724. The first and second agitator shaft holes 723B and 724B of the first and second kit front body ribs 723 and 724 are formed to correspond to the dust chamber 711 in the up-down direction (arrow Z) so that the agitator shaft 762 can pass through the dust chamber 711. Therefore, the kit wheel shaft 752A and the agitator shaft 762 can be easily assembled.

**[0165]** The kit front body 712 may have a dust chamber line rib 725 positioned at the upper portion of the dust suction hole 720, and closely attached to the dust chamber body 714, for partitioning off the dust chamber 711. Accordingly, as the dust chamber line rib 725 is compressed to the dust chamber body 714, the dust chamber 711 can be easily sealed up.

**[0166]** In the kit rear body 713, only a motor built-in portion 730 in which a kit power motor 754 described later is built more relatively protrudes in the separation direction from the left suction filter 203 than the other portions. Although the kit power motor 754 is built in the kit body 712, the small and dense structure can be obtained. A kit power motor heat radiation hole 731 for radiating heat generated by driving of the kit power motor 754 is formed in the motor built-in portion 730 of the kit rear body 713. The kit power motor heat radiation hole 731 serves to prevent overheating of the kit power motor 754 and thermal damage of the left filter cleaner kit 701. The motor built-in portion 730 of the kit rear body 713 includes a kit power motor movement prevention rib 732

protruded from the kit rear body 713 and closely attached or fitted into the kit power motor 754. The kit power motor movement prevention rib 732 may be provided as a single or plural number so as to prevent movement of the kit power motor 754. Therefore, the kit power motor 754 can be easily built in the motor built-in portion 730 of the kit rear body 713, and the assembly position thereof can be easily determined. In addition, the kit power motor 754 can be firmly supported.

**[0167]** A dust hose connector opening portion 733 with a large size is formed in the kit rear body 713 so that a dust hose connector 790 described later can easily pass therethrough. Thus, the dust hose connector 790 can be easily connected or disconnected to/from the dust chamber body 714.

**[0168]** A kit power motor shaft hole 713A, which is partially opened so that a shaft 754A of the kit power motor 754 explained later can be inserted thereto, is formed in the kit rear body 713.

**[0169]** The dust chamber body 714 is positioned so that the dust chamber 711 can be provided between the dust chamber body 714 and the kit front body 712. That is, the surface of the dust chamber body 714 corresponding to the dust suction hole 720 is opened, and a dust vent 742 connected to the kit blower 705 is formed in the opposite surface 741 to the opened surface. The dust vent 742 includes a base portion 742A with a predetermined size, and an extension portion 742B outwardly extending from one side of the base portion 742A. The extension portion 742B of the dust vent 742 may be provided as a single or plural number. In this embodiment, it is presumed that two extension portions 742B are placed to face each other around the center of the dust vent 742. First and second agitator shaft holes 714C and 714D combined with the first and second agitator shaft holes 723B and 724B of the first and second kit front body ribs 723 and 724 are formed in the dust chamber body 714 so that the agitator shaft 762 can pass therethrough. The dust chamber body 714 includes first and second dust chamber body ribs 743 and 744 outwardly protruded from the dust chamber 711 and closely attached to the first and second kit front body ribs 723 and 724, respectively. First and second kit wheel shaft holes 714A and 714B combined with the first and second kit wheel shaft holes 723A and 724A of the first and second kit front body ribs 723 and 724 are formed in the first and second dust chamber body ribs 743 and 744, respectively, so that the kit wheel shaft 752A can pass therethrough. A kit power motor shaft hole 714E combined with the kit power motor shaft hole 713A of the kit rear body 713 is formed in any one of the first and second dust chamber body ribs 743 and 744 so that the shaft 754A of the kit power motor 754 can be inserted thereto.

**[0170]** The lower portion of the dust chamber 711 may be formed in a hopper structure so as to easily discharge the impurities collected in the dust chamber 711 through the dust vent 742. That is, the bottom surface of the dust chamber 711 can be downwardly inclined.

**[0171]** As described above, since the dust chamber body 714 for the dust chamber 711 is provided in the kit case 710, the suction force is less leaked by the kit blower 705, and thus sufficiently maintained in the dust chamber 711. In addition, the outer portion of the dust chamber 711 in the kit case 710 is not contaminated with the impurities collected in the dust chamber 711.

**[0172]** The components of the kit case 710 can be assembled as follows, by using the fastening members B such as the bolts or screws not to be separated from each other.

**[0173]** A first fastening hole 726A protruding toward the kit rear body 713 so that the fastening member B can be fastened thereto is formed in the upper portion of the kit front body 712. The first fastening hole 726A of the kit front body 712 is positioned at the front or rear edge of the kit front body 712 not to interfere with the dust chamber body 714. A second fastening hole 726B protruding toward the dust chamber body 714 so that the fastening member B can be fastened thereto is formed in the lower portion of the kit front body 712.

**[0174]** A first fastening hole 736 overlapping with the first fastening hole 726A of the kit front body 712 so that the fastening member B can be fastened thereto is formed in the portion of the kit rear body 713 corresponding to a first fastening boss 726 of the kit front body 712. A second fastening hole 737 overlapping with the second fastening hole 726B of the kit front body 712 so that the fastening member B can be fastened thereto is formed in the portion of the kit rear body 713 corresponding to a second fastening boss 727 of the kit front body 712. A third fastening hole 738 is formed in the kit rear body 713 so that the kit rear body 713 can be fastened to the dust chamber body 714 by the fastening member B.

**[0175]** A first fastening hole 745A overlapping with the second fastening hole 737 of the kit rear body 713 is formed in the upper portion of the dust chamber body 714 so that the dust chamber body 714 can be fastened to the kit rear body 713. A second fastening hole 745B overlapping with the second fastening hole 726B of the kit front body 712 so that the fastening member B can be fastened thereto is formed in the lower portion of the dust chamber body 714.

**[0176]** As described above, in order to easily overlap the mutual combination positions of the components of the kit case 710, a kit case stopper is provided as follows.

**[0177]** The kit case stopper includes a kit front body rib protruded from the kit front body 712, and a dust chamber body hooking member 746 protruded from the dust chamber body 714 to be fitted into the kit front body rib, and hooked on the kit front body rib. As mentioned above, as the first and second kit front body ribs 723 and 724 are formed at the kit front body 712, the kit front body rib can be commonly used with the first and second kit front body ribs 723 and 724. The dust chamber body hooking member 746 can be provided in a pair in each of the first and second dust chamber body ribs 743 and 744 so that the first and second kit front body ribs 723 and 724 can

be fitted thereto.

**[0178]** The kit case stopper includes a first stopper boss portion 727 protruding from the kit front body 712, and a second stopper boss portion 746 provided at the dust chamber body 714 so that the first stopper boss portion 727 can be inserted thereto. The upper portion of the second stopper boss portion 746 is opened so that the first stopper boss portion 727 can be easily inserted thereto. The second fastening hole 726B of the kit front body 712 may be formed in the first stopper boss portion 727, and the second fastening hole 745B of the dust chamber body 714 may be formed in the second stopper boss portion 746. Accordingly, the second fastening hole 726B of the kit front body 712 and the second fastening hole 745B of the dust chamber body 714 easily directly overlap with the first and second stopper boss portions 727 and 746, thereby easing the fastening process.

**[0179]** The kit case stopper includes a stopper fitting groove 747 formed in the dust chamber body 714 so that the kit front body 712 can be fitted thereto. The stopper fitting groove 747 may be positioned directly above the second stopper boss portion 746 to be easily fitted around the kit front body 712.

**[0180]** The kit case stopper includes a kit stay rib 726 protruded from the kit front body 712 and closely attached to the kit rear body 713. The kit stay rib 726 is positioned at the upper portion of the dust chamber line rib 725 not to interfere with the dust chamber body 714. The kit stay rib 726 may be provided in a single or plural number at the kit front body 712. The kit stay rib 726 serves to maintain an interval between the kit front body 712 and the kit rear body 713. Accordingly, the kit front body 712 and the kit rear body 713 do not relatively hang down or press each other. Also, the kit body 710 can be reinforced.

**[0181]** In the meantime, the kit movement unit 750 can be implemented by mounting a wheel rotated by power on the left filter cleaner kit 701, or using a pulley manner, a screw fastening manner, or a trailer manner. Besides, the kit movement unit 750 may be variously modified within the technical scope of the present invention. In this embodiment, it is presumed that the kit movement unit 750 is implemented by using the wheel rotated by power.

**[0182]** Therefore, the kit movement unit 750 may include a kit wheel 752 rotatably installed at the kit case 710, and a kit power motor 754 built in the kit case 752, for supplying a rotation force to the kit wheel 752.

**[0183]** The kit wheel 752 can be provided in a plural number to firmly support the left filter cleaner kit 701 and balance and stabilize the up-down movement of the left filter cleaner kit 752. That is, for example, the kit wheels 752 can be formed at the front and rear portions of the kit case 710, respectively, to be spaced apart from each other around the left suction filter 203.

**[0184]** The two kit wheels 752 are placed outside the dust chamber 711 in the kit case 710 not to be contaminated with the impurities collected in the dust chamber 711. Particularly, the two kit wheels 752 may be placed in the first and second slots 721 and 722 of the kit front

body 712 to be rotated in contact with the left suction panel 200 or the left suction filter 203. In this embodiment, it is presumed that the two kit wheels 752 contact the left suction panel 200, particularly, the left filter panel 206. In addition, the two kit wheels 752 are placed at the upper portions of the first and second slots 721 and 722 of the kit front body 712 not to interfere with an agitator 760 explained later.

**[0185]** The two kit wheels 752 can be separated from each other and individually rotated, or mutually connected and cooperated. In this embodiment, for the simplification of the structure, it is presumed that the two kit wheels 752 are mutually linked to each other through the kit wheel shaft 752A.

**[0186]** At least one of the two kit wheels 752 may have a gear type engaged with a filter cleaner kit rack gear 756 of the left filter panel 203, namely, a pinion gear type. In this embodiment, it is presumed that the two kit wheels 752 have the pinion gear type, and that the two filter cleaner kit rack gears 756 are provided to correspond to the two kit wheels 752. The filter cleaner kit rack gears 756 are arranged in the up-down direction (arrow Z) which is the movement direction of the left filter cleaner kit 701. Accordingly, the left filter cleaner kit 701 can be smoothly moved in the up-down direction (arrow Z). In addition, such movement of the left filter cleaner kit 701 can be guided.

**[0187]** The kit power motor 754 may be provided in a single or plural number. In this embodiment, as the two kit wheels 752 are mutually linked through the kit wheel shaft 752A, one kit power motor 754 is provided to simplify the whole structure.

**[0188]** The kit power motor 754 can be installed inside or outside the kit case 710. In this embodiment, it is presumed that the kit power motor 754 is built in the kit case 710. Therefore, the kit case 710 serves as a protection film for the kit power motor 754, thereby reducing driving noise of the kit power motor 754, preventing damage of the kit power motor 754 by moisture or dust, firmly fixing the kit power motor 754, and preventing separation and damage of the kit power motor 754 by an external force.

**[0189]** The kit power motor 754 is fixed to the kit case 710, particularly, the kit rear body 713 by the fastening member B such as the bolt or screw.

**[0190]** The kit wheels 752 can be connected to the kit power motor 754 directly, or indirectly through a kit power transfer unit. In this embodiment, since the agitator 760 explained later also uses power, it is presumed that the kit wheels 752 and the kit power motor 754 are indirectly connected through the kit power transfer unit for common use.

**[0191]** The kit power transfer unit can be formed in a gear type, a belt-pulley type, or other various power transfer types. In this embodiment, it is presumed that the kit power transfer unit is formed in the gear type. That is, the kit power transfer unit includes a kit drive gear 758 fixed to the shaft of the kit power motor 754, and engaged with any one of the two kit wheels 752. The kit wheels

752 can perform the function of the kit power transfer unit, which simplifies the structure. The present invention is not limited to this embodiment. For example, the kit power transfer unit may have two kit drive gears 758 engaged with the two kit wheels 752, respectively.

**[0192]** Meanwhile, the left filter cleaner kit 701 may further include the agitator 760 placed in the dust chamber 711 to friction-contact the left suction filter 203 through the dust suction hole 720. The agitator 760 may be rotatably placed in the dust chamber 711 to smoothly friction-contact the left suction filter 203. That is, the agitator 760 includes an agitator shaft 762 rotatably installed in the dust chamber 711, and agitator bristles 764 fixed to the agitator shaft 762 to friction-contact the left suction filter 203. As the left filter cleaner kit 701 is moved merely in the up-down direction (arrow Z), the forward-backward direction (arrow X) length of the agitator 760 is almost identical to or longer than that of the left suction filter 203.

**[0193]** In addition, the agitator 760 can be forcibly rotated by power. That is, a kit driven gear 766 rotated by the rotation force of the kit power motor 754 is fixed to the agitator shaft 762. The kit driven gear 766 is engaged with at least one of the two kit wheels 752 and supplied with the rotation force of the kit power motor 754 through the kit wheel 752. The present invention is not limited thereto. For example, the kit driven gear 766 may be supplied with a rotation force of a special power source, not the kit power motor 754 of the agitator 760, or may be directly engaged with the kit drive gear 758. That is, the kit driven gear 766 can be variously modified within the technical scope of the present invention.

**[0194]** As described above, the impurities can be easily separated from the left suction filter 203 and sucked into the dust chamber 711 due to the friction-contact of the agitator 760 and the left suction filter 203. Moreover, as the agitator 760 is rotated by power, the impurities can be more easily separated from the left suction filter 203.

**[0195]** In the meantime, the left filter cleaner kit 701 may further include agitator cleaner teeth 768 placed in the kit case 710 to contact the agitator 760, particularly, the agitator bristles 764, for removing the impurities sticking to the agitator 760.

**[0196]** The agitator cleaner teeth 768 can be individually molded from the kit case 710 and fixed to the kit case 710, or integrally molded with the kit case 710. The agitator cleaner teeth 768 may be provided in a plural number in the forward-backward direction (arrow X) to remove the impurities from the whole agitator 760. The plurality of agitator cleaner teeth 768 may be arranged in the forward-backward direction (arrow X) at regular or irregular intervals. The agitator cleaner teeth 768 may be positioned at the upper or lower portion of the agitator 760. Each of the agitator cleaner teeth 768 may be formed with a triangular section, a quadrangular section, an arc shape or other various geometrical shapes within the technical scope of the present invention in consider-

ation of a suction force loss by the kit blower 705, the impurities left on the left suction filter 203, or curling of the agitator bristles 764.

**[0197]** As described above, when the agitator cleaner teeth 768 are provided, a cleaning process of the agitator 760 can be omitted to improve convenience. In addition, the agitator 760 can always function well.

**[0198]** On the other hand, a filter cleaner kit movement guide 770 may be further installed to guide movement of the left filter cleaner kit 701, and maintain the left filter cleaner kit 701 to be adjacent to the left suction filter 203.

**[0199]** The filter cleaner kit movement guide 770 includes a filter cleaner kit movement guide protrusion 772 protruding from the kit case 710, particularly, the kit rear body 713, and a filter cleaner kit movement guide rail 774 placed at the left suction panel 200 or the left suction filter 203, the filter cleaner kit movement guide protrusion 772 being inserted thereto and moved thereon.

**[0200]** The filter cleaner kit movement guide protrusions 772 may protrude to the front and rear portions of the kit case 710, respectively, for firmly supporting the kit case 710. Two filter cleaner kit movement guide protrusions 772 can be provided at the front and rear surfaces of the kit case 710, respectively, to be spaced apart from each other in the up-and down direction (arrow Z), for firmly supporting the kit case 710 in the up-down direction (arrow Z). Each of the filter cleaner kit movement guide protrusions 772 may be formed in a round shape such as a hemispherical shape so as to improve assembly easiness with the filter cleaner kit movement guide rail 774 and minimize friction.

**[0201]** The filter cleaner kit movement guide rail 774 can be protruded from the left suction panel 200 or the left suction filter 203, or formed in a groove structure at the left suction panel 200 or the left suction filter 203.

**[0202]** As mentioned above, as the filter cleaner kit movement guide 770 is provided, even if the left filter cleaner kit 701 is moved in the up-down direction (arrow Z) to reduce the suction force loss of the kit blower 705, the left filter cleaner kit 701 can be adjacent to the left suction filter 203 and less shaken.

**[0203]** Meanwhile, a filter cleaner kit position sensing unit may be further provided to sense the position of the left filter cleaner kit 701.

**[0204]** The filter cleaner kit position sensing unit may be formed by a switch manner or an infrared or photosensor manner, and provided in a single or plural number. In this embodiment, it is presumed that the filter cleaner kit position sensing unit is formed by the photosensor manner. It is also presumed that the filter cleaner kit position sensing unit senses whether the left filter cleaner kit 701 reaches the topmost position and the bottommost position.

**[0205]** That is, the filter cleaner kit position sensing unit may include first position sensing units 782 and 784 positioned at the upper and lower portions of the left suction panel 200, respectively, and a second position sensing unit 786 placed in the left filter cleaner kit 701 to corre-

spond to the first position sensing units 782 and 784.

**[0206]** The first position sensing units 782 and 784 outwardly protrude from the left suction panel 200 not to interfere with the left filter cleaner kit 701. Especially, in this embodiment, as the lower panel 150 is adjacent to the front portion of the left suction panel 200, the first position sensing units 782 and 784 protrude toward the rear portion of the left suction panel 200. Accordingly, the first position sensing units 782 and 784 are fixed to the left filter panel 206.

**[0207]** The first position sensing units 782 and 784 include a pair of sensors 782A and 784A spaced apart from each other, respectively, so that the second position sensing unit 786 can enter therebetween.

**[0208]** The first position sensing units 782 and 784 are connected to the kit control box 709 through the left photosensor cable 781, for receiving power and communicating with the kit control box 709, respectively. As the first position sensing unit 782 is positioned at the upper portion of the left suction panel 200, the left photosensor cable 781 connected to the first position sensing unit 782 can be wired in the cable guide 260 of the left suction panel 200.

**[0209]** The right filter cleaner kit is similar or identical in structure to the left filter cleaner kit 701, and thus detailed explanations thereof are omitted.

**[0210]** The left dust hose 703 has its one end connected to the left filter cleaner kit 701 and its other end connected to the cyclone 706 communicating with the kit blower 705. The left dust hose 703 may be formed in a flexible structure to be elastically extended or contracted. The left dust hose 703 can be connected directly to the left filter cleaner kit 701. As in this embodiment, the left dust hose 703 can be connected to the left filter cleaner kit 701 indirectly through the dust hose connector 790.

**[0211]** The dust hose connector 790 may be fitting-coupled to the left dust hose 703, and detachably coupled to the left filter cleaner kit 701, particularly, the dust chamber body 714. Therefore, the dust hose connector 790 may include a dust hose connector fastening portion 792 connected or disconnected to/from the dust chamber 711, particularly, the dust chamber body 714 by turning, and a dust hose connector extension portion 794 extended from the dust hose connector fastening portion 792 to the outer portion of the left filter cleaner kit 701, and coupled to the left dust hose 703.

**[0212]** The dust hose connector fastening portion 792 includes a ring-shaped dust hose connector fastening portion flange 792A communicating with the dust vent 742 of the dust chamber body 714, a first dust hose connector rib 792B protruded from the dust hose connector fastening portion flange 792A, inserted into the dust chamber 711 through the extension portion 742B of the dust vent 742 of the dust chamber body 714, and hooked on the dust chamber body 714 inside the dust chamber 711 by turning, and a second dust hose connector rib 792C protruded from the dust hose connector fastening portion flange 792A, and hooked on the dust chamber



body 714 outside the dust chamber 711.

**[0213]** The dust hose connector fastening portion flange 792A may be larger than the base portion 742A of the dust vent 742 of the dust chamber body 714 to contact the dust chamber body 714 outside the dust chamber 711.

**[0214]** The first dust hose connector rib 792B may be formed in a hook structure. The first dust hose connector ribs 792B are provided to correspond to the extension portions 742B of the dust vent 742 of the dust chamber body 714, respectively.

**[0215]** The second dust hose connector rib 792C surface-contacts the dust chamber body 714. The second dust hose connector rib 792C may be provided in a single or plural number. In this embodiment, it is presumed that two second dust hose connector ribs 792C are provided to face each other around the dust vent 742 of the dust chamber body 714.

**[0216]** The first and second dust hose connector ribs 792B and 792C may be spaced apart in the circumferential direction of the dust hose connector fastening portion 792 in order to firmly combine the dust hose connector 790 and the dust chamber body 714.

**[0217]** On the other hand, when the dust hose connector 790 is connected to the dust chamber 711, a rotation angle range of the dust hose connector 790 may be restricted by a dust hose connector rotation restriction stopper (not shown) so that the dust hose connector 790 cannot be separated from the dust chamber 711.

**[0218]** The dust hose connector rotation restriction stopper includes a first dust hose rotation restriction rib provided at any one of the left filter cleaner kit 701 and the dust hose connector 790, and a pair of second dust hose rotation restriction ribs provided at the other and spaced apart from each other around the first dust hose rotation restriction rib. In this embodiment, it is presumed that the first dust hose rotation restriction rib is provided at the dust hose connector 790 and the second dust hose rotation restriction ribs are provided at the left filter cleaner kit 701, particularly, the dust chamber body 714.

**[0219]** Structurally, the second dust hose connector rib 792C of the dust hose connector 790 can perform the function of the first dust hose rotation restriction rib. Therefore, the first dust hose rotation restriction rib may be omitted. As the second dust hose connector rib 792C serving as the first dust hose rotation restriction rib is positioned outside the dust chamber 711, the second dust hose rotation restriction ribs are provided at the dust chamber body 714 to be positioned outside the dust chamber 711.

**[0220]** The left dust hose 703 can be tied and piped/wired, by the outer cover 800, with the left kit power motor cable 753 positioned in the left suction panel 200 among the cables connected to the left filter cleaner kit 701.

**[0221]** The outer cover 800 may be made of a plastic material to stably protect the left dust hose 703 and the left kit power motor cable 753.

**[0222]** The outer cover 800 can be structured to be

bent to improve easiness of the layout design. That is, the outer cover 800 includes slot patterns 802 and 804 arranged in the longitudinal direction (arrow L) of the outer cover 800, for reducing stress concentration in the bent state of the outer cover 800 and improving the bending freedom degree of the outer cover 800. Especially, the slot patterns 802 and 804 of the outer cover 800 may be provided in a plural number along the circumferential direction (arrow C) of the outer cover 800 not to limit the bending direction of the outer cover 800. Here, at least some of the plurality of slot patterns 802 and 804 of the outer cover 800 are spaced apart from each other in the longitudinal direction of the outer cover 800. Accordingly, the outer cover 800 can be bent without reducing rigidity and restricting the design by inference between the plurality of slot patterns 802 and 804. In this embodiment, it is presumed that the plurality of slot patterns 802 and 804 of the outer cover 800 include first slot patterns 802 positioned at one side in the circumferential direction of the outer cover 800, and second slot patterns 804 positioned at the other side in the circumferential direction of the outer cover 800 and spaced apart from the first slot patterns 802 in the longitudinal direction of the outer cover 800.

**[0223]** In this embodiment, the plurality of first slots 802A defining the first slot patterns 802 of the outer cover 800 can be formed in the same shape. Differently from this embodiment, the plurality of first slots 802A may be formed in two or more shapes. The plurality of first slots 802A of the outer cover 800 may be arranged in regular or irregular patterns. The plurality of first slots 802A of the outer cover 800 may be spaced apart from each other at regular or irregular intervals in the longitudinal direction of the outer cover 800.

**[0224]** The second slot patterns 804 of the outer cover 800 are formed in the regions in which the first slot patterns 802 of the outer cover 800 are not formed in the circumferential direction of the outer cover 800. That is, as in this embodiment, both ends 804B and 804C of the plurality of second slots 804A defining the second slot patterns 804 of the outer cover 800 can correspond to both ends 802B and 802C of the first slots 802A of the outer cover 800 in the circumferential direction of the outer cover 800. Differently from this embodiment, the first and second slots 802A and 804A of the outer cover 800 may partially overlap with each other in the circumferential direction of the outer cover 800. The first slot patterns 802 are formed in some region in the circumferential direction of the outer cover 800, and the second slot patterns 804 are formed in the other region in circumferential direction of the outer cover 800. Accordingly, when the outer cover 800 is bent, stress is not much concentrated in the circumferential direction of the outer cover 800. Moreover, the outer cover 800 can be easily bent.

**[0225]** In this embodiment, the plurality of second slots 804A of the outer cover 800 can be formed in the same shape. Differently from this embodiment, the plurality of second slots 804A may be formed in two or more shapes.

The plurality of second slots 804A of the outer cover 800 may be arranged in regular or irregular patterns. The plurality of second slots 804A of the outer cover 800 may be spaced apart from each other at regular or irregular intervals in the longitudinal direction of the outer cover 800.

**[0226]** The plurality of second slots 804A of the outer cover 800 are arranged along the longitudinal direction of the outer cover 800 alternately with the plurality of first slots 802A of the outer cover 800. Therefore, when the outer cover 800 is bent, stress can be uniformly applied in the circumferential direction of the outer cover 800.

**[0227]** The outer cover 800 has a cutting portion 806 formed by cutting one side of the outer cover 800 in the circumferential direction. Since the outer cover 800 can be spread due to the cutting portion 806, the outer cover 800 can be easily combined with the left dust hose 703 and the left kit power motor cable 753, and softly bent. The outer cover 800 can partially overlap around the cutting portion 806 in its circumferential direction. Therefore, the outer cover 800 is not opened to firmly tie the left dust hose 703 and the left kit power motor cable 753. The cutting portion 806 of the outer cover 800 may be provided to split any one of the first and second slot patterns 802 and 804 of the outer cover 800 in the circumferential direction of the outer cover 800. In this embodiment, it is presumed that the cutting portion 806 of the outer cover 800 splits the second slot patterns 804. As the second slot patterns 804 of the outer cover 800 are split by the cutting portion 806 of the outer cover 800, the outer cover 800 can be more softly bent.

**[0228]** The right dust hose 704 is similar or identical in structure to the left dust hose 703, and thus detailed explanations thereof are omitted.

**[0229]** One kit blower 705 may be provided to be shared by the left and right filter cleaner kits 701 (and not shown), or two kit blowers 705 may be provided to correspond to the left and right filter cleaner kits 701 (and not shown), respectively. In this embodiment, for the simplification of the structure, it is presumed that the kit blower 705 is shared by the left and right filter cleaner kits 701 (and not shown).

**[0230]** In the kit blower 705, a suction hole 705A for sucking the air communicates with the cyclone 706, and an exhaust hole 705B exhausts the forcible flow by the kit blower 705 into the main body 2. A kit blower filter (not shown) may be placed at the suction hole 705A of the kit blower 705 so as to filter off fine dust from the air separated in the cyclone 706. Since the air exhausted from the kit blower 705 is the air filtered by the cyclone 706, it can be exhausted into the main body 2. The kit blower 705 can be connected to the cyclone 706 through a pipe. In addition, as in this embodiment, the kit blower 705 can be placed at the upper portion of the cyclone 706 and combined with the cyclone 706. As the kit blower 705 is placed closely to the cyclone 706, the flow loss can be reduced, the whole structure can be simplified, and the space can be efficiently used.

**[0231]** One cyclone 706 may be provided to be shared by the left and right filter cleaner kits 701 (and not shown), or two cyclones 706 may be provided to correspond to the left and right filter cleaner kits 701 (and not shown), respectively. In this embodiment, for the simplification of the structure, it is presumed that the cyclone 706 is shared by the left and right filter cleaner kits 701 (and not shown).

**[0232]** Accordingly, the cyclone 706 includes a shell 810 being connected to the left and right filter cleaner kits 701 (and not shown) and the kit blower 705, and having a centrifugation space 811 for centrifugally separating the air and the impurities. That is, the shell 810 is formed in a cylindrical shape for easy centrifugation in the centrifugation space 811. The shell 810 has left and right dust suction holes 810A and 810B to which the left and right dust hoses 703 and 704 are coupled, respectively, so that the shell 810 can be connected to the left and right filter cleaner kits 701 (and not shown). The left and right dust suction holes 810A and 810B of the cyclone 706 are positioned at the upper portion of the shell 810 for easy centrifugation in the centrifugation space 811. The left and right dust suction holes 810A and 810B of the cyclone 706 are provided in the centrifugation space 811 in the centrifugal direction for easy centrifugation in the centrifugation space 811. The left and right dust suction holes 810A and 810B of the cyclone 706 are placed to face each other around the center of the shell 810 not to interfere with each other. The left and right dust suction holes 810A and 810B of the cyclone 706 outwardly protrude from the shell 810 and have an almost circular pipe shape in order to be easily coupled to the left and right dust hoses 703 and 704.

**[0233]** The shell 810 has a dust discharge hole 810C for discharging the impurities centrifugally separated in the centrifugation space 811 to the dust box 708. The dust discharge hole 810C of the cyclone 706 may be positioned at the lower portion of the shell 810 to easily discharge the impurities dropped to the lower portion of the centrifugation space 811 by the centrifugation. The dust discharge hole 810C of the cyclone 706 outwardly protrudes from the cyclone 706 and has an almost rectangular pipe shape to be easily coupled to the dust box 708. The shell 810 has an air vent 810D for discharging the air separated in the centrifugation space 811 to the kit blower 705. The air vent 810D of the cyclone 706 is positioned at the upper portion of the shell 810 to discharge only the air separated in the centrifugation space 811. Furthermore, the air vent 810D of the cyclone 706 is positioned at the center of the top surface of the shell 810 not to interfere with the impurities separated in the centrifugation space 811.

**[0234]** The shell 810 includes an upper shell 812 having its bottom surface opened to be separable, and a lower shell 814 combined with the lower portion of the upper shell 812. The upper shell 812 and the lower shell 814 can be separated in the up-down direction (arrow Z) around the dust discharge hole 810D of the cyclone 706.

That is, in the shell 810, the upper shell 812 is formed between the top end of the shell 810 and the top surface of the dust discharge hole 810D of the cyclone 706, and the lower shell 814 is formed in the other portion. The upper shell 812 and the lower shell 814 can be mutually fastened by the fastening member B such as the bolt or screw. That is, the upper shell 812 has a first upper shell boss 812A to which the fastening member B is fastened in the up-down direction (arrow Z), and the lower shell 814 has a first lower shell boss 814A overlapping with the first upper shell boss 812A in the up-down direction (arrow Z) so that the fastening member B can be fastened thereto. The first upper shell boss 812A and the first lower shell boss 814A are positioned outside the shell 810 not to interfere with the centrifugation space 811. The upper shell 812 has a second upper shell boss 812A overlapping with a kit blower boss 705D of the kit blower 705 so that the upper shell 812 can be mutually fastened to the kit blower 705 by the fastening member B such as the bolt or screw. The lower shell 814 has a second lower shell boss 814B so that the cyclone 706 can be fastened to the base 10 by the fastening member B such as the bolt or screw. The upper shell 812 may include an upper shell rib 812C surface-contacting part of the lower shell 814 to hermetically seal the upper shell 812 and the lower shell 814. The upper shell rib 812C can be inserted into the lower shell 814 to be hidden.

**[0235]** The cyclone 706 may include a core 816 positioned at the center of the centrifugation space 811 for easy centrifugation. The core 816 is formed in an almost cylindrical shape to prevent a flow resistance. As the core 816 is provided, the impurities can be dropped along the edges of the centrifugation space 811, and the air can be raised in the centrifugation space 811 and discharged to the kit blower 705. The core 816 includes an upper core 817 positioned in the upper shell 812, and a lower core 818 spaced apart from the upper core 817 in the up-down direction (arrow Z), and combined with the lower shell 814. The upper core 817 protrudes in the up-down direction (arrow Z) from the top surface of the shell 810 to the lower position than the left and right dust suction holes 810A and 810B of the cyclone 706. An air path 817A communicating with the air vent 810D of the cyclone 706 is formed in the upper core 817, for discharging the centrifugally separated air through the air vent 810D of the cyclone 706. That is, the upper core 817 may be formed in a hollow pipe shape. As the upper core 817 is provided, the impurities sucked into the left and right dust suction holes 810A and 810B of the cyclone 706 and the air discharged to the air vent 810D of the shell 810 are not mixed but centrifugally separated. The lower core 818 protrudes from the bottom surface of the shell 810 in the up-down direction (arrow Z). The lower core 818 is formed in a cylindrical shape with its top surface opened. A lower core rib 818A for multi-dividing the lower core 818 is provided in the lower core 818. Accordingly, the lower core 818 serves to prevent mixing of the centrifugally separated impurities and air, and the lower core

rib 818A serves to prevent the centrifugally separated impurities from being introduced into the lower core 818 and leaked to the kit blower 705 with the centrifugally separated air.

**[0236]** The cyclone 706 is combined with a cyclone orifice 819 being coupled to the air vent 810D of the cyclone 706, and having a cyclone orifice path 819A widened toward the outer portion of the cyclone 706, namely, from the cyclone 706 to the kit blower 705. The cyclone orifice 819 serves to appropriately maintain the suction force by the kit blower 705. In addition, the cyclone 706 can be easily manufactured. The size 819D of the cyclone orifice path 819A on the side of the kit blower 705 is almost identical to the size of the suction hole 705A of the kit blower 705, and the size on the side of the cyclone 706 is smaller than the size 819D on the side of the kit blower 705. As the size of the air path 817A of the upper core 817 is almost identical to the size 819D of the cyclone orifice path 819A on the side of the kit blower 705, the cyclone orifice 819 may be combined with the upper core 705 to maintain the suction force of the kit blower 705. In order to simplify the manufacturing process, the cyclone orifice 819 can be integrally molded with the upper core 817. The cyclone orifice 819 is placed at the upper portion of the cyclone 706, and supports the kit blower 706 at the lower portion of the kit blower 706. The cyclone orifice 819 is not fastened to the cyclone 706 or the kit blower 705, but interposed between the cyclone 706 and the kit blower 705. On the other hand, the cyclone orifice 819 may be firmly combined with the cyclone 706 by a cyclone orifice rib 810E protruding the cyclone 706 to surround the cyclone orifice 819. A first cyclone orifice sealing 810F can be interposed between the cyclone orifice 819 and the cyclone orifice rib 810E of the cyclone 706. The cyclone orifice 819 can be firmly combined with the kit blower 705 by a kit blower boss 705D protruding from the kit blower 705 to surround the cyclone orifice 819. A second cyclone orifice sealing 705E can be interposed between the cyclone orifice 819 and the kit blower boss 705D of the kit blower 705.

**[0237]** The left and right suction filters 203 and 303 are positioned at the lower portion in the main body 2 and the margin space exists therein. Therefore, the cyclone 706 can be placed at the lower portion in the main body 2, and mounted on the main body 2, particularly, the base 10.

**[0238]** A cyclone stopper may be provided to easily position the cyclone 706 in the correct cyclone mounting position of the main body 2, particularly, the base 10. The cyclone stopper may include a cyclone stopper rib 820 provided at the base 10 to surround the cyclone 706, for defining the correct cyclone mounting position of the base 10. The cyclone stopper rib 820 can surround the whole circumference of the cyclone 706. As in this embodiment, the cyclone stopper rib 820 may surround part of the circumference of the cyclone 706. Accordingly, the cyclone stopper rib 820 can be easily closely attached to the cyclone 706, and the cyclone 706 can be easily connected

and disconnected. In addition, the cyclone stopper rib 820 can guide connection and disconnection of the cyclone 706 almost in the forward-backward direction (arrow X). The cyclone stopper includes a cyclone stopper hook 824 provided in the cyclone 706 to be inserted into a cyclone stopper hook slot 822 of the main body 2, particularly, the base 10. As the cyclone stopper is intended to define the correct mounting position of the cyclone 706, the cyclone stopper hook slot 822 may be longer than the cyclone stopper hook 824 in the connection/disconnection direction of the cyclone 706, namely, almost in the forward-backward direction (arrow X) so that the cyclone stopper hook 824 can be easily inserted thereto. In order to implement the simple and dense structure, the cyclone stopper hook slot 822 may be positioned inside the cyclone stopper rib 820. Meanwhile, as shown in Fig. 19, a vent 719 can be formed at the dust hose 703 connected to the dust suction hole 810B along the cylindrical direction, for smoothly guiding the air flow to a separator.

**[0239]** The dust box 708 includes a dust box base 830, a dust box cover 832 for opening and closing the dust box base 830, and a dust box locking unit 834 provided to be locked in a state where the dust box cover 832 covers the dust box base 830.

**[0240]** The dust box base 830 has a predetermined dust collection space 830A for collecting the impurities separated in the cyclone 706. The dust box base 830 has a cyclone connection opening portion 830B connected to the cyclone 706. The cyclone connection opening portion 830B is positioned on the rear surface of the dust box 708 so that the dust box 708 can be connected or disconnected to/from the cyclone 706 in the forward-backward direction (arrow X). The cyclone connection opening portion 830B may protrude to the outer portion of the dust box 708 so that the dust box 708 can be easily connected or disconnected to/from the cyclone 706. The cyclone connection opening portion 830B is positioned at the upper portion of the dust box 708 to prevent the impurities in the dust box 708 from flowing backward to the cyclone 706. The dust box base 830 has a dust discharge opening portion opened and closed by the dust box cover 832, for discharging the impurities collected in the dust collection space 830A to the dust box 708. The dust discharge opening portion is formed by opening the whole top surface of the dust box base 830.

**[0241]** As in this embodiment, the dust box cover 832 can be completely separated from the dust box base 830. In addition, the dust box cover 832 may be hinge-coupled to one side of the dust box base 830, slidably connected or disconnected to/from the dust box base 830, or provided to open and close the dust box base 830 by a pop-up manner. The dust box cover 832 can be variously modified.

**[0242]** The dust box locking unit 834 may adopt a lock-and-lock manner as in this embodiment, a hook manner, a key manner or a latch and striker combination manner. The dust box locking unit 834 can be variously modified.

**[0243]** In this embodiment, the dust box locking unit 834 includes a locking rib 835 provided at any one of the dust box base 830 and the dust box cover 832, and a locking flap 836 being provided at the other, being elastically attached to one of the dust box base 830 and the dust box cover 832 provided with the locking rib 835, and having a locking rib insertion portion 836A into which the locking rib 835 is inserted. In this embodiment, it is presumed that the locking rib 835 is provided at the dust box base 830 and the locking flap 836 is provided at the dust box cover 832.

**[0244]** The locking rib 835 is provided outside the dust box base 830 to be easily combined with the locking flap 836. The locking rib 835 is placed on the left or right surface of the dust box base 830 not to interfere with the cyclone 706 or a dust box handle 838 explained later. The locking rib 835 almost vertically protrudes from the dust box base 830 to be firmly combined with the locking flap 836.

**[0245]** The locking flap 836 is provided outside the dust box cover 832 to be easily combined with the locking rib 835. The locking flap 836 is bent with regard to the center of the locking rib insertion portion 836A to be elastically attached to the dust box base 830. That is, the locking flap 836 includes a locking flap attachment portion 836B protruded from the dust box cover 832, and inclined inwardly to the dust box 708 with regard to the up-down direction (arrow Z), and a locking flap extension portion 836C extended from the bottom end of the locking flap attachment portion 836B, and bent to the outer portion of the dust box 708, for maintaining an attachment force of the locking flap attachment portion 836B. The locking flap attachment portion 836B may be formed in a straight line shape or a wave shape. It can be variously modified within the technical scope of the present invention.

**[0246]** Accordingly, in a state where the dust box cover 832 covers the dust box base 830, when the locking rib 835 is fitted into the locking flap 836, the dust box cover 832 can be firmly locked not to be separated from the dust box base 830. Conversely, as indicated by a dotted line in Fig. 21, when the locking rib 835 is separated from the locking flap 836 by elastically deforming the locking flap 836 to the outer portion of the dust box 708 in the lock state of the dust box cover 832, the dust box cover 832 can be easily unlocked.

**[0247]** The dust box locking unit 834 may be provided at each of the left and right surfaces of the dust box 708 in order to firmly lock the dust box cover 832.

**[0248]** The dust box 708 has the dust box handle 838 for easy connection or disconnection. The dust box handle 838 is positioned at the front portion of the dust box 708 so that the dust box 708 can be connected or disconnected to/from the main body 2 in the forward-backward direction (arrow X) in the open state of the front panel 500. Furthermore, the dust box handle 838 is provided in the dust box base 830 rather than the dust box cover 832 so that the dust box 708 can be firmly handled through the dust box handle 838.

**[0249]** When the dust box 708 enters the main body 2, it can be guided by a dust box guide 840.

**[0250]** As described above, as the cyclone 706 is mounted on the base 10, the dust box guide 840 guides the dust box 708 to enter the main body 2 along the base 10 so that the dust box 708 can be connected directly to the cyclone 706.

**[0251]** Therefore, the dust box guide 840 include a dust box guide groove 842 provided at the main body 2, particularly, the base 10 so that the dust box 708 can be inserted or separated in the connection/disconnection direction to/from the cyclone 706. The dust box guide groove 842 is opened almost in the forward-backward direction (arrow X) so that the dust box 708 can enter the main body 2 from the front portion of the main body 2 in the open state of the front panel 500. As the dust discharge hole 810C of the cyclone 706 is positioned at the lower portion of the cyclone 706 and the cyclone connection opening portion 830B is positioned at the upper portion of the dust box 708, the dust box guide groove 842 is formed with a predetermined depth so that, when the cyclone 706 and the dust box 708 are connected, the dust discharge hole 810C of the cyclone 706 and the cyclone connection opening portion 830B of the dust box 708 can be positioned on the same horizontal line and directly connected to each other.

**[0252]** As mentioned above, as the dust box guide 840 includes the dust box guide groove 842, the simple and dense structure can be attained. When the dust box 708 is positioned in the main body 2, it can be firmly supported. In addition, the connection positions of the dust box 708 and the cyclone 706 can easily overlap with each other.

**[0253]** The dust box guide 840 includes a dust box retainer rib 844 protruding from the main body 2, particularly, the base 10 to be positioned in the dust box guide 840, particularly, the dust box guide groove 842, and supporting the dust box 708. The dust box retainer rib 844 may include one or more combinations, and may be placed in the forward-backward direction (arrow X) and the left-right direction (arrow Y). Here, if a plurality of dust box retainer ribs 844 are provided, preferably, they are designed to have an appropriate height to horizontally support the dust box 708. In this embodiment, in order to firmly support the dust box 708, the dust box retainer rib 844 has a vertical portion 844A placed in the entering direction of the dust box 708, namely, the forward-backward direction (arrow X), and a horizontal portion 844B placed in the left-right direction (arrow Y) vertical to the entering direction of the dust box 708.

**[0254]** When the dust box 708 moves along the dust box guide 840, the dust box retainer rib 844 reduces the friction between the dust box 708 and the dust box guide 840 to smoothly move the dust box 708.

**[0255]** Meanwhile, when the dust box 708 is supported by the dust box retainer rib 844, the dust box 708 floats from the bottom of the dust box guide groove 842. Therefore, a dust box shielding rib 845 may be provided to

shield the space between the dust box 708 and the dust box guide groove 842. The dust box shielding rib 845 protrudes from the bottom of the dust box guide groove 842 by a predetermined height in order to hide the dust box retainer rib 844 at the front end of the dust box guide groove 842.

**[0256]** The dust box guide 840 includes a dust box guide rib 846 provided at any one of the dust box 708 and the main body 2, particularly, the base 10, and a dust box guide rail 848 provided at the other so that the dust box guide rib 846 can be inserted thereto. In this embodiment, it is presumed that the dust box guide rib 846 is provided at the dust box 708 and the dust box guide rail 848 is provided at the main body 2, particularly, the base 10.

**[0257]** The dust box guide rib 846 protrudes from the dust box 708 to surface-contact the top surface of the base 10 at the upper portion of the base 10.

**[0258]** The dust box guide rail 848 may be provided in a groove shape in the dust box guide groove 842. As in this embodiment, the dust box guide rail 848 may be protruded from the top surface of the base 10 in a hook shape.

**[0259]** Accordingly, the dust box guide 840 makes the dust box 708 easily connected or disconnected to/from the cyclone 706. In addition, when the dust box 708 is positioned in the main body 2, the dust box guide 840 makes the dust box 708 firmly mounted and fixed in the main body 2.

**[0260]** When the dust box 708 is positioned in the main body 2 by a dust box connection/disconnection unit 850, the dust box 708 can be fixed to the correct mounting position of the main body 2 or separated from the main body 2.

**[0261]** The dust box connection/disconnection unit 850 includes a dust box hook 852 provided at any one of the dust box 708 and the main body 2, particularly, the base 10, and hook-fastened to the other. In this embodiment, it is presumed that the dust box hook 852 is provided at the dust box 708 so that the hook-fastening of the dust box hook 852 can be manually released. The dust box hook 852 is hooked on the horizontal portion 844B of the dust box retainer rib 844. Therefore, it is not necessary to provide a special hole or rib at the base 10 for the hook-fastening of the dust box hook 852, thereby attaining the simple and dense structure.

**[0262]** In order to firmly hook-fasten the dust box hook 852, the dust box connection/disconnection unit 850 may further include a dust box hook elastic member 854 hinge-coupled by a dust box hook hinge pin 852A to rotate the dust box hook 852 in the dust box 708 in the up-down direction (arrow Z), and to elastically support the dust box hook 852 in the hook fastening direction. The dust box hook elastic member 854 may be a coil spring, a plate spring, a spiral spring, a rubber or a spongy. Besides, the dust box hook elastic member 854 can be variously modified. In this embodiment, it is presumed that the dust box hook elastic member 854 is the coil spring.

The dust box hook elastic member 854 can be combined with the dust box hook hinge pin 852A. If a dust box hook lever 856 explained later is used, the dust box hook elastic member 854 can be placed between the dust box handle 838 and the dust box hook lever 856 in consideration of mounting convenience and structural simplification.

**[0263]** So as to easily release the hook-fastening of the dust box hook 852, the dust box connection/disconnection unit 850 includes the dust box hook lever 856 extended from the dust box hook 852 to manually rotate the dust box hook 852, and coupled to the dust box hook elastic member 854. The dust box hook lever 856 is extended to protrude from the dust box hook 852, for easily controlling the dust box hook 852. The dust box hook lever 856 can be placed between the dust box handle 838 and the dust box base 830 to be modulized with the dust box 708.

**[0264]** Accordingly, as the dust box connection/disconnection unit 850 is provided, the dust box hook 852 can be firmly hook-fastened by the dust box hook elastic member 854, and softly unhooked by the operation of the dust box hook lever 856 without interfering with the base 10.

**[0265]** On the other hand, the dust box 708 and the cyclone 706 can communicate with each other through a dust connector 860.

**[0266]** The dust connector 860 has its one side coupled to any one of the cyclone 706 and the dust box 708 and its other side closely attached to the other by an elastic force. In this embodiment, as the dust box 708 moves to be connected or disconnected to/from the cyclone 706, it is presumed that the dust connector 860 is coupled to the cyclone 706 to be fixed to the cyclone 706 and closely attached to the dust box 708.

**[0267]** The dust connector 860 includes a dust connector base 862 coupled to the cyclone 706, and a dust connector lip 864 extended from the dust connector base 862 to the dust box 708, and closely attached to the dust box 708 by the elastic force.

**[0268]** The dust connector base 862 is provided with a dust path 862A so that the cyclone 706 and the dust box 708 can communicate with each other. The dust connector base 862 has a dust connector fitting groove 862B into which the cyclone 706 can be fitted. The dust connector fitting groove 862B may be formed in a ring shape to be fitted around the whole circumference of the dust discharge hole 810C of the cyclone 706. In order to be firmly coupled to the cyclone 706, the dust connector 860 includes a dust connector fitting hole 862C into which a dust connector protrusion 810G of the cyclone 706 can be fitted, the dust connector fitting hole 862C being connected to one side of the dust connector fitting groove 862B.

**[0269]** The dust connector lip 864 is outwardly extended from the dust connector 860 in the distant direction from the dust connector base 862 in order to be elastically deformed in the connection/disconnection direction of the cyclone 706 and the dust box 708.

**[0270]** The dust connector 860 is made of an elastic material such as PP or rubber to be easily connected or disconnected to/from the cyclone 706, and to give a sufficient elastic force to the dust connector lip 864.

5 **[0271]** The dust connector 860 serves to easily connect and firmly seal up the dust box 708 and the cyclone 706, and easily disconnect the dust box 708 from the cyclone 706. When the dust box 708 is connected to the cyclone 706, the dust box 708 is merely closely attached to the dust connector 860. Therefore, when the dust box 708 is disconnected from the cyclone 706, components are not deformed nor damaged at all.

10 **[0272]** To prevent an overload of the main control box 65, the kit control box 709 is individually constructed and electrically connected to the main control box 65 for communication, for controlling the filter cleaning unit 700.

15 **[0273]** The kit control box 709 contacts the left and right kit power motor cables 753 and 753' connected to the left and right filter cleaner kits 701 (and not shown), the left and right photosensor cables 781 and 781' connected to the left and right kit photosensors 782, 784 (and not shown), and the cable of the kit blower 705. Accordingly, the kit control box 709 is placed adjacently to the left and right filter cleaner kits 701 (and not shown), the left and right kit photosensors 782, 784 (and not shown) and the kit blower 705, and placed on the base 10 to be positioned in the margin space of the main body 2 for spatial efficiency.

20 **[0274]** The kit control box 709 may be fixedly fastened to the base 10 by the fastening member B such as the bolt or screw. That is, the kit control box 709 has a kit control box boss (not shown) to which the fastening member B is fastened. A groove may be formed in the kit control box boss so that a kit control box fastening boss 709A' protruding from the base 10 may be inserted there-  
25 to.

30 **[0275]** When mounted on the base 10, the kit control box 709 can be easily positioned in the correct mounting position in the main body 2, particularly, the base 10 by a kit control box stopper 709' of the base 10. In the case that the kit control box 709 is positioned in the correct mounting position in the main body 2, particularly, the base 10, the kit control box stopper 709' may be provided in a rib structure to be closely attached to at least part of the kit control box 709.  
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40 **[0276]** The kit control box 709 is provided to communicate with a remote controller for wirelessly controlling the air conditioner or a filter cleaner switch provided at the display 600 of the air conditioner, particularly, a control unit (not shown), for controlling the filter cleaning unit 700 according to the operation of the remote controller or the filter cleaner switch. Here, the kit control box 709 may communicate with the remote controller or the filter cleaner switch directly, or indirectly through the main control box 65.  
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50 **[0277]** Fig. 22 is an exemplary view illustrating another example of the outer cover. The outer cover 800 wholly has a hose shape. In order to receive the dust hose 703  
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and the kit power motor cable 753, the outer cover 800 includes a hose reception portion 910 for receiving the dust hose 703, and a cable reception portion 920 for receiving the kit power motor cable 753. Preferably, an opening portion 930 is provided at the hose reception portion 910 along the dust hose 800 so as to smoothly move the dust hose 800, and a hole 940 is provided at the cable reception portion 920. As the opening portion 30 and the hole 940 are provided, the dust hose 703 and the kit power motor cable 753 can smoothly move with the movement of the filter cleaner kit. In addition, the hole 940 serves to prevent the outer cover 800 from tearing. Preferably, a piece 910A of the cable reception portion 910 close to the filter cleaner kit is formed to be shorter than a piece 910B thereof relatively distant from the filter cleaner kit, for giving activity to the more moving portion and stability to the less moving portion. In the functional aspect, the hose reception portion 910, the opening portion 930 and the hole 940 serve as a deformation reception unit for receiving deformation of the outer cover 800, and the cable reception portion 920 serves as a movement guiding unit for guiding the movement direction of the dust hose 800 and the kit power motor cable 753 by restricting the opening direction of the opening portion 930. Meanwhile, the deformation reception unit may be a corrugated pipe with corrugations.

**[0278]** The operation of the air conditioner in accordance with the present invention will now be described.

**[0279]** When the air conditioning blower 70 is driven by an operation request of the air conditioner, the outdoor air of the main body 2 is sucked into the main body 2 through the left and right air suction holes 201 and 301 of the main body 2. The air sucked into the main body 2 is purified through the left and right suction filters 203 and 303 and the center filters 81, 82 and 83, and then sucked into the air conditioning blower 70. The air introduced into the air conditioning blower 70 is sent to the upper portion of the air conditioning blower 70, and heat-exchanged by the heat exchanger 60. The air heat-exchanged by the heat exchanger 60 is externally discharged from the main body 2 through the side air discharge holes 105 and 106 and the upper air discharge hole 110 of the main body 2.

**[0280]** The operation of the filter cleaning unit of the air conditioner in accordance with the present invention will now be described.

**[0281]** When the operation of the filter cleaning unit 700 is requested, power is applied from the kit control box 709 to the kit blower 705 and the kit power motor 754.

**[0282]** Then, a strong suction force is generated from the left and right filter cleaner kits 701 (and not shown) to the kit blower 705 by the kit blower 705. Accordingly, the impurities of the left and right suction filters 203 and 303 are separated from the left and right suction filters 203 and 303, and sucked into the dust chambers 711 (and not shown) of the left and right filter cleaner kits 701 (and not shown) due to the suction force by the kit blower 705. As explained later, the impurities of the left and right

suction filters 203 and 303 are swept off from the left and right suction filters 203 and 303 by the agitator 760, and thus separated well from the left and right suction filters 203 and 303. The impurities sucked into the dust chambers 711 (and not shown) of the left and right filter cleaner kits 701 (and not shown) are sent, with the air, to the centrifugation space 811 of the cyclone 706 through the left and right dust hoses 703 and 704. The impurities sent to the centrifugation space 811 of the cyclone 706 are centrifugally separated from the air by the cyclone principle, dropped to the lower portion of the centrifugation space 811 of the cyclone 706, and collected in the dust box 708 through the dust connector 860. Here, the pure air centrifugally separated from the impurities in the centrifugation space 811 of the cyclone 706 is sent to the kit blower 705 through the cyclone orifice 819, and exhausted into the main body 2 through the exhaust hole 705B of the kit blower 705.

**[0283]** As power is applied to the kit power motor 754, the left and right filter cleaner kits 701 (and not shown) are moved in the up-down direction (arrow Z) along the left and right suction filters 203 and 303 by power of the kit power motor 754. In more detail, when the kit power motor 754 generates power, the kit drive gears 758 are rotated to rotate the kit wheels 752. Therefore, the left and right filter cleaner kits 701 (and not shown) are moved in the up-down direction (arrow Z) by power due to the gear engagement of the kit wheels 752 and the filter cleaner kit rack gears 756. Here, the left and right filter cleaner kits 701 (and not shown) are closely attached to the left and right suction filters 203 and 303 by the filter cleaner kit movement guides 770, and moved merely in the up-down direction (arrow Z). In addition, as the left and right filter cleaner kits 701 (and not shown) are moved in the up-down direction (arrow Z), the outer cover 800 covering the left and right dust hoses 703 and 704 and the left and right kit power motor cables 753 and 753' is stretched in a straight line shape or bent along the dust hose guide 270. That is, with the left and right dust hoses 703 and 803 and the left and right kit power motor cables 753 and 753', when the left and right filter cleaner kits 701 (and not shown) are upwardly moved, the outer cover 800 is inserted into the dust hose guide 270 and stretched, and when the left and right filter cleaner kits 701 (and not shown) are downwardly moved, the outer cover 800 is partially taken out of the dust hose guide 270 and bent.

**[0284]** Moreover, since the kit wheels 752 are rotated to rotate the kit driven gears 766, the agitators 760 of the left and right filter kits 701 (and not shown) are rotated to friction-contact the left and right suction filters 203 and 303. Therefore, the impurities of the left and right suction filters 203 and 303 can be swept off to be efficiently separated from the left and right suction filters 203 and 303.

**[0285]** The operation conditions of the filter cleaning unit 700 can be set as follows.

**[0286]** The filter cleaning unit 700 may be operated during the operation of the air conditioning unit. In case

the filter cleaning unit 700 is operated during the operation of the air conditioning unit, the filter cleaning unit 700 may take the impurities dropped from the left and right suction filters 203 and 303, and interrupt the air flow sent by the air conditioning blower 70. Accordingly, the filter cleaning unit 700 may be operated merely under the non-operation condition of the air conditioning unit. Even if the operation of the air conditioning unit is stopped, the filter cleaning unit 700 may be operated after a predetermined time from stopping of the air conditioning blower 70 of the air conditioning unit not to be affected by the remaining power of the air conditioning blower 70.

**[0287]** The filter cleaning unit 700 can be operated every time before and after the operation of the air conditioning unit, periodically operated according to the number of times of the air conditioning operation of the air conditioner, operated according to the signal of the remote controller or the filter cleaner switch, or operated according to the sensed contamination degrees of the left and right suction filters 203 and 303.

**[0288]** The operation method of the filter cleaning unit 700 can be set as follows.

**[0289]** When the left and right filter cleaner kits 701 (and not shown) are upwardly or downwardly moved along the left and right suction filters 203 and 303, the kit blower 705 can be driven. In addition, when the left and right filter cleaner kits 701 (and not shown) are upwardly and downwardly moved along the left and right suction filters 203 and 303, the kit blower 705 can be driven.

**[0290]** The left and right filter cleaner kits 701 (and not shown) may be simultaneously or alternately operated.

**[0291]** The left and right filter cleaner kits 701 (and not shown) may be upwardly or downwardly moved once, or reciprocated once or a plural number of times.

**[0292]** When the left and right filter cleaner kits 701 (and not shown) are position-sensed by the left and right kit photosensors 782,784 (and not shown), they stop to move in the current movement direction, or change the movement direction.

**[0293]** After the left and right filter cleaner kits 701 (and not shown) are position-sensed by the left and right kit photosensors 782,784 (and not shown), if they are not position-sensed by the left and right kit photosensors 782,784 (and not shown) within a predetermined time, they are regard as being position-sensed by the left and right kit photosensors 782,784 (and not shown). Therefore, the left and right filter cleaner kits 701 (and not shown) can change the movement direction or stop the operation.

**[0294]** According to the operation start request, the left and right filter cleaner kits 701 (and not shown) may start the operation in the current position, or a specific position such as the topmost or bottommost part of the movement path.

**[0295]** According to the operation end request, the left and right filter cleaner kits 701 (and not shown) may be stopped in the current position, or a specific position such as the topmost or bottommost part of the movement path.

**[0296]** The operation start and end of the filter cleaning unit 700 can be determined by time, the number of times of the up-down movement of the left and right filter cleaner kits 701 (and not shown), or the operation of the remote controller or the filter cleaner switch.

**[0297]** Meanwhile, in a state where the front panel 500 is opened and the lower panel 150 is disconnected from the main body 2, the dust box 708 collecting the impurities by the operation of the filter cleaning unit 700 can be disconnected from the main body 2, emptied, and re-mounted on the main body 2.

**[0298]** 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 scope of the present invention as hereinafter claimed.

**[0299]** Various claimable aspects of the present invention will now be described. The following description becomes part of the detailed description of the present invention. The following description must be recognized as the technical ideas of the present invention understood in various viewpoints, or the minimum technology for the air conditioner according to the present invention, not as a limiting boundary of the present invention.

**[0300]** An air conditioner recited in claim 1 in application. In this configuration, the size of the suction force can be reduced, and diffusion of the dust to the whole cleaning unit can be prevented. Preferably, the first opening portion is formed to cover the whole filter, and the second opening portion is formed to combine with the hose.

**[0301]** An air conditioner recited in claim 2 in application.

**[0302]** An air conditioner recited in claim 3 in application.

**[0303]** An air conditioner recited in claim 4 in application.

**[0304]** An air conditioner recited in claim 5 in application.

**[0305]** An air conditioner recited in claim 6 in application.

**[0306]** An air conditioner recited in claim 7 in application.

**[0307]** An air conditioner recited in claim 8 in application.

**[0308]** An air conditioner recited in claim 9 in application.

**[0309]** An air conditioner recited in claim 10 in application. In this configuration, the agitator can be rotated according to the movement of the filter without needing a special complicated structure.

**[0310]** An air conditioner recited in claim 11 in application. In this configuration, the cleaning unit can be moved along the filter without requiring a special complicated structure for moving the cleaning unit.

**[0311]** An air conditioner recited in claim 12 in application.



[0312] An air conditioner recited in claim 13 in application.

[0313] An air conditioner recited in claim 14 in application.

[0314] An air conditioner recited in claim 15 in application.

[0315] An air conditioner recited in claim 16 in application.

[0316] An air conditioner recited in claim 17 in application.

[0317] An air conditioner recited in claim 18 in application. In this configuration, the agitator bristles and the teeth can efficiently cooperate with each other.

[0318] An air conditioner recited in claim 19 in application. In this configuration, the cleaning unit and/or the hose can be easily installed and dismantled.

[0319] An air conditioner recited in claim 20 in application.

[0320] An air conditioner recited in claim 21 in application. In this configuration, the hose can be firmly coupled to the cleaning unit, and smoothly moved according to the movement of the cleaning unit.

[0321] An air conditioner recited in claim 22 in application. Preferably, the connector fastening portion includes a dust hose connector fastening portion flange, a first dust hose connector rib and a second dust hose connector rib. The first dust hose connector rib is inserted into the cleaning unit, rotated and hooked, to fix the hose connector. The second dust hose connector rib restricts the rotation degree of the hose connector so that the hose connector can maintain the hooked state.

[0322] An air conditioner recited in claim 23 in application.

[0323] An air conditioner recited in claim 24 in application.

[0324] An air conditioner recited in claim 25 in application. In this configuration, the hose can smoothly supply the suction force to the cleaning unit in spite of the movement of the cleaning unit. Preferably, the hose is connected to the cleaning unit through the hose connector. The hose connector and the cleaning unit may be integrally or individually formed. Meanwhile, the hose and the cleaning unit are desirably but not essentially coupled in an hermetic state so as to improve the suction force.

[0325] An air conditioner recited in claim 26 in application.

[0326] An air conditioner recited in claim 27 in application.

[0327] An air conditioner recited in claim 28 in application. In this configuration, the hose connector can efficiently cope with the movement of the cleaning unit. Preferably, the hose connector is made of a relatively less flexible material than the hose.

[0328] An air conditioner recited in claim 29 in application. For example, such hermetic connection can be conducted by position fixing by the first dust hose connector rib and the second dust hose connector rib, and surface contact between the dust hose connector fasten-

ing portion flange and the cleaning unit.

[0329] An air conditioner recited in claim 30 in application.

[0330] An air conditioner recited in claim 31 in application.

[0331] An air conditioner recited in claim 32 in application.

[0332] An air conditioner recited in claims 33 and 34 in application. In this configuration, the dust can be efficiently sucked between the first opening portion and the second opening portion spaced apart from each other. Preferably, the chamber has the configuration of claim 34.

## Claims

1. An air conditioner, comprising:

a heat exchanger (60) for exchanging heat with an air;  
 an air suction hole (201, 301) for sucking the air;  
 a filter (203, 303) for filtering off dust passing through the air suction hole; and  
 a cleaning unit (700) comprising a cleaning kit (701) movable along the filter, for removing the dust from the filter by using a suction force, and including a chamber (711) having a first opening portion (720) for sucking the dust and a second opening portion (742) for discharging the dust, **characterized by** further comprising a motor (754) installed at the cleaning unit for the moving the cleaning unit along the filter, wherein the motor (754) is positioned outside the chamber (711) of the cleaning unit.

2. The air conditioner of claim 1, wherein the cleaning unit comprises an agitator (760) positioned at the first opening portion (720) to contact the filter (203, 303).

3. The air conditioner of either claim 1 or 2, wherein the cleaning unit (700) comprises a first body (712) at which the first opening portion (720) is formed, and a second body (714) at which the second opening portion (742) is formed, the first and second bodies defining the chamber (711).

4. The air conditioner of either claim 1 or 2, wherein the cleaning unit comprises a first body (712) at which the first opening portion is formed, a second body (714) at which the second opening portion is formed, the first and second bodies defining the chamber, and a third body (713) in which the motor (754) is positioned.

5. The air conditioner of claim 1, wherein the chamber (711) has a bottom surface downwardly protruded

to collect the dust.

6. The air conditioner of claim 2, wherein the chamber comprises teeth (768) cooperating with the agitator (760) at the lower portion of the first opening portion (720). 5
7. The air conditioner of claim 2, wherein the agitator (760) is positioned in the chamber (712, 714) to cooperate with the movement of the cleaning unit (700). 10
8. The air conditioner of claim 1, wherein the cleaning unit (700) removes the dust from the filter by using a suction force, and includes a first body (712) at which a first opening portion (720) for sucking the dust is formed, and a third body (713) at which the motor (754) is provided. 15
9. The air conditioner of claim 8, wherein the third body (713) comprises at least one hole (731) for heat radiation of the motor. 20
10. The air conditioner of claim 8, wherein the cleaning unit (700) comprises an agitator (760) positioned at the first opening portion (720) to contact the filter (203, 303), a transfer means (758, 752, 766) for transferring rotation of the motor (754) to the agitator, and the second body (714) at which at least part of the transfer means is positioned. 25
11. The air conditioner of claim 10, wherein the first body (712) and the second body (714) define the chamber for the sucked dust. 30
12. The air conditioner of any one of claims 9 to 11, wherein the third body (713) comprises a guide (730) for mounting the motor. 35
13. The air conditioner of claim 1, comprising: 40
- a rotation shaft (752A) cooperating with the motor (754) to move the cleaning unit (710) being provided at the cleaning unit.
14. The air conditioner of claim 13, wherein the cleaning unit comprises an agitator contacting the filter, and a wheel (752) cooperating with the rotation shaft (752A) to rotate the agitator. 45
15. The air conditioner of claim 1, wherein a second opening portion is smaller than the first opening portion, for discharging the dust. 50
16. The air conditioner of claim 15, wherein the area of the chamber is reduced from the first opening portion (720) to the second opening portion (742). 55

## Patentansprüche

1. Klimaanlage, umfassend:
- einen Wärmetauscher (60) zum Wärmeaustausch mit Luft;  
ein Luftansaugloch (201, 301) zum Ansaugen der Luft;  
einen Filter (203, 303) zum Wegfiltern von Staub, der durch das Luftansaugloch hindurchtritt; und  
eine Reinigungseinheit (700), die einen entlang dem Filter beweglichen Reinigungssatz (701) aufweist, zur Beseitigung des Staubs von dem Filter durch Verwendung von Saugkraft, und die eine Kammer (711) enthält, der einen ersten Öffnungsabschnitt (720) zum Ansaugen des Staubs und einen zweiten Öffnungsabschnitt (742) zum Abgeben des Staubs aufweist;  
**dadurch gekennzeichnet, dass** sie ferner einen Motor (754) aufweist,  
der an der Reinigungseinheit angebracht ist, um die Reinigungseinheit entlang dem Filter zu bewegen, worin der Motor (754) außerhalb der Kammer (711) der Reinigungseinheit angeordnet ist.
2. Die Klimaanlage von Anspruch 1, worin die Reinigungseinheit einen Agitator (760) aufweist, der an dem ersten Öffnungsabschnitt (720) zum Kontaktieren des Filters (203, 303) angeordnet ist.
3. Die Klimaanlage von Anspruch 1 oder 2, worin die Reinigungseinheit (700) einen ersten Körper (712), an dem der erste Öffnungsabschnitt (720) ausgebildet ist, sowie einen zweiten Körper (714), an dem der zweite Öffnungsabschnitt (742) ausgebildet ist, aufweist, wobei die ersten und zweiten Körper die Kammer (711) definieren.
4. Die Klimaanlage von Anspruch 1 oder 2, worin die Reinigungseinheit einen ersten Körper (712), an dem der erste Öffnungsabschnitt ausgebildet ist, einen zweiten Körper (714), an dem der zweite Öffnungsabschnitt ausgebildet ist, wobei die ersten und zweiten Körper die Kammer definieren, sowie einen dritten Körper (713), in dem der Motor (754) angeordnet ist, aufweist.
5. Die Klimaanlage von Anspruch 1, worin die Kammer (711) eine Bodenfläche aufweist, die zum Sammeln des Staubs nach unten vorsteht.
6. Die Klimaanlage von Anspruch 2, worin die Kammer Zähne (768) aufweist, die mit dem Agitator (716) an der tieferen Position des ersten Öffnungsabschnitts (720) zusammenwirken.

7. Die Klimaanlage von Anspruch 2, worin der Agitator (716) in der Kammer (712, 714) angeordnet ist, um mit der Bewegung der Reinigungseinheit (700) zusammenzuwirken.
8. Die Klimaanlage von Anspruch 1, worin die Reinigungseinheit (700) Staub von dem Filter mittels Saugkraft entfernt und einen ersten Körper (712), an dem der erste Öffnungsabschnitt (720) zum Ansaugen des Staubs ausgebildet ist, und einen dritten Körper (713), an dem der Motor (754) vorgesehen ist, enthält.
9. Die Klimaanlage von Anspruch 8, worin der dritte Körper (713) zumindest ein Loch (731) zur Wärmeabstrahlung des Motors aufweist.
10. Die Klimaanlage von Anspruch 8, worin die Reinigungseinheit (700) einen Agitator (760), der an der ersten Öffnung (720) zum Kontaktieren des Filters (203, 303) angeordnet ist, ein Übertragungsmittel (758, 752, 766) zum Übertragen der Drehung des Motors (754) auf den Agitator sowie den zweiten Körper (714), an dem zumindest ein Teil des Übertragungsmittels angeordnet ist, aufweist.
11. Die Klimaanlage von Anspruch 10, worin der ersten Körper (712) und der zweite Körper (714) die Kammer für den angesaugten Staub definieren.
12. Die Klimaanlage von einem der Ansprüche 9 bis 11, worin der dritte Körper (713) eine Führung (730) zum Anbringen des Motors aufweist.
13. Die Klimaanlage von Anspruch 1, die eine an der Reinigungseinheit vorgesehene Drehwelle (752A) aufweist, die mit dem Motor (754) zusammenwirkt, um die Reinigungseinheit (710) zu bewegen.
14. Die Klimaanlage von Anspruch 13, worin die Reinigungseinheit einen den Filter kontaktierenden Agitator sowie ein Rad (752), das mit der Drehwelle (752A) zum Drehen des Agitators zusammenwirkt, aufweist.
15. Die Klimaanlage von Anspruch 1, worin ein zweiter Öffnungsabschnitt zum Abgeben des Staubs kleiner als der erste Öffnungsabschnitt ist.
16. Die Klimaanlage von Anspruch 15, worin die Fläche der Kammer von dem ersten Öffnungsabschnitt (720) zum zweiten Öffnungsabschnitt (742) hin verringert ist.
- un échangeur de chaleur (60) destiné à échanger de la chaleur avec l'air ;  
un trou d'aspiration d'air (201, 301) pour aspirer de l'air ;  
un filtre (203, 303) pour filtrer la poussière passant par le trou d'aspiration d'air ; et  
une unité de nettoyage (700) comprenant un kit de nettoyage (701) déplaçable le long du filtre, pour enlever la poussière du filtre en utilisant une force d'aspiration, et comportant une chambre (711) ayant une première partie d'ouverture (720) pour aspirer la poussière et une deuxième partie d'ouverture (742) pour évacuer la poussière,  
**caractérisé par** le fait de comprendre en outre un moteur (754) installé au niveau de l'unité de nettoyage pour déplacer l'unité de nettoyage le long du filtre, où le moteur (754) est positionné à l'extérieur de la chambre (711) de l'unité de nettoyage.
2. Climatiseur de la revendication 1, dans lequel l'unité de nettoyage comprend un agitateur (760) positionné au niveau de la première partie d'ouverture (720) pour se mettre en contact avec le filtre (203, 303).
3. Climatiseur de l'une ou l'autre des revendications 1 ou 2, dans lequel l'unité de nettoyage (700) comprend un premier corps (712) où la première partie d'ouverture (720) est formée, et un deuxième corps (714) où la deuxième partie d'ouverture (742) est formée, les premier et deuxième corps définissant la chambre (711).
4. Climatiseur selon l'une ou l'autre des revendications 1 ou 2, dans lequel l'unité de nettoyage comprend un premier corps (712) au niveau duquel la première partie d'ouverture est formée, un deuxième corps (714) au niveau duquel la deuxième partie d'ouverture est formée, les premier et deuxième corps définissant la chambre, et un troisième corps (713) dans lequel le moteur (754) est positionné.
5. Climatiseur de la revendication 1, dans lequel la chambre (711) a une surface inférieure faisant saillie vers le bas pour collecter la poussière.
6. Climatiseur de la revendication 2, dans lequel la chambre comprend des dents (768) coopérant avec l'agitateur (760) au niveau de la partie inférieure de la première partie d'ouverture (720).
7. Climatiseur de la revendication 2, dans lequel l'agitateur (760) est positionné dans la chambre (712, 714) pour coopérer avec le mouvement de l'unité de nettoyage (700).

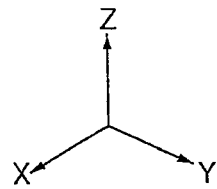
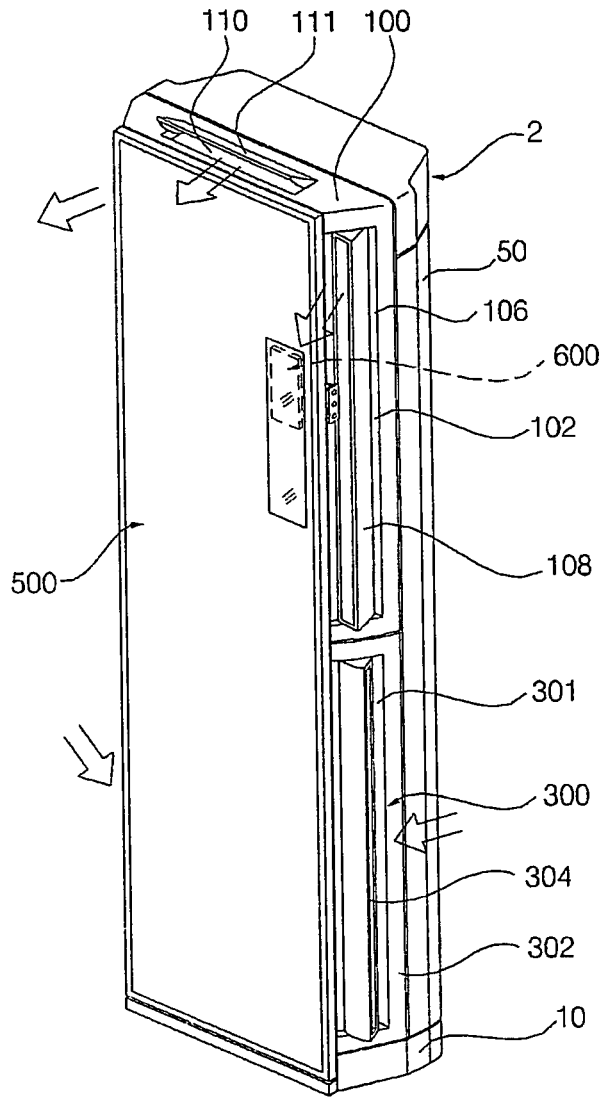
## Revendications

1. Climatiseur, comprenant :
8. Climatiseur de la revendication 1, dans lequel l'unité

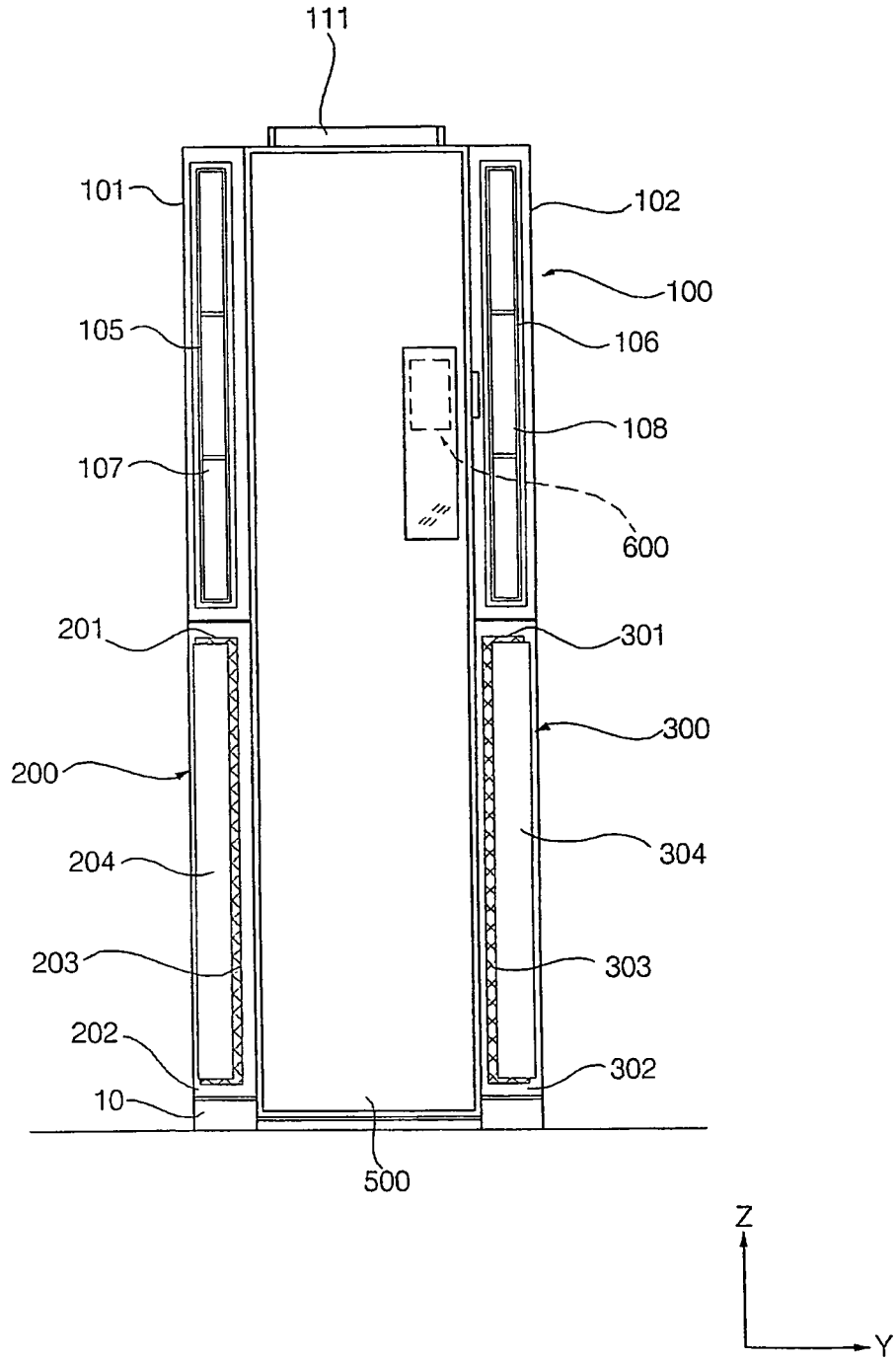
- de nettoyage (700) enlève la poussière du filtre en utilisant une force d'aspiration, et comporte un premier corps (712) au niveau duquel une première partie d'ouverture (720) pour aspirer la poussière est formée, et un troisième corps (713) au niveau duquel le moteur (754) est pourvu. 5
9. Climatiseur de la revendication 8, dans lequel le troisième corps (713) comprend au moins un trou (731) pour un rayonnement thermique du moteur. 10
10. Climatiseur de la revendication 8, dans lequel l'unité de nettoyage (700) comprend un agitateur (760) positionné au niveau de la première partie d'ouverture (720) pour se mettre en contact avec le filtre (203, 303), un moyen de transfert (758, 752, 766) pour transférer la rotation du moteur (754) à l'agitateur, et le deuxième corps (714) au niveau duquel au moins une partie du moyen de transfert est positionnée. 15  
20
11. Climatiseur de la revendication 10, dans lequel le premier corps (712) et le deuxième corps (714) définissent la chambre pour la poussière aspirée. 25
12. Climatiseur de l'une quelconque des revendications 9 à 11, dans lequel le troisième corps (713) comprend un guide (730) pour le montage du moteur.
13. Climatiseur de la revendication 1, comprenant : 30  
un arbre de rotation (752A) coopérant avec le moteur (754) pour déplacer l'unité de nettoyage (710) qui est pourvue au niveau de l'unité de nettoyage. 35
14. Climatiseur de la revendication 13, dans lequel l'unité de nettoyage comprend un agitateur se mettant en contact avec le filtre, et une roue (752) coopérant avec l'arbre de rotation (752A) pour mettre l'agitateur en rotation. 40
15. Climatiseur de la revendication 1, dans lequel la deuxième partie d'ouverture est plus petite que la première partie d'ouverture, pour évacuer la poussière. 45
16. Climatiseur de la revendication 15, dans lequel la surface de la chambre est réduite de la première partie d'ouverture (720) à la deuxième partie d'ouverture (742). 50

55

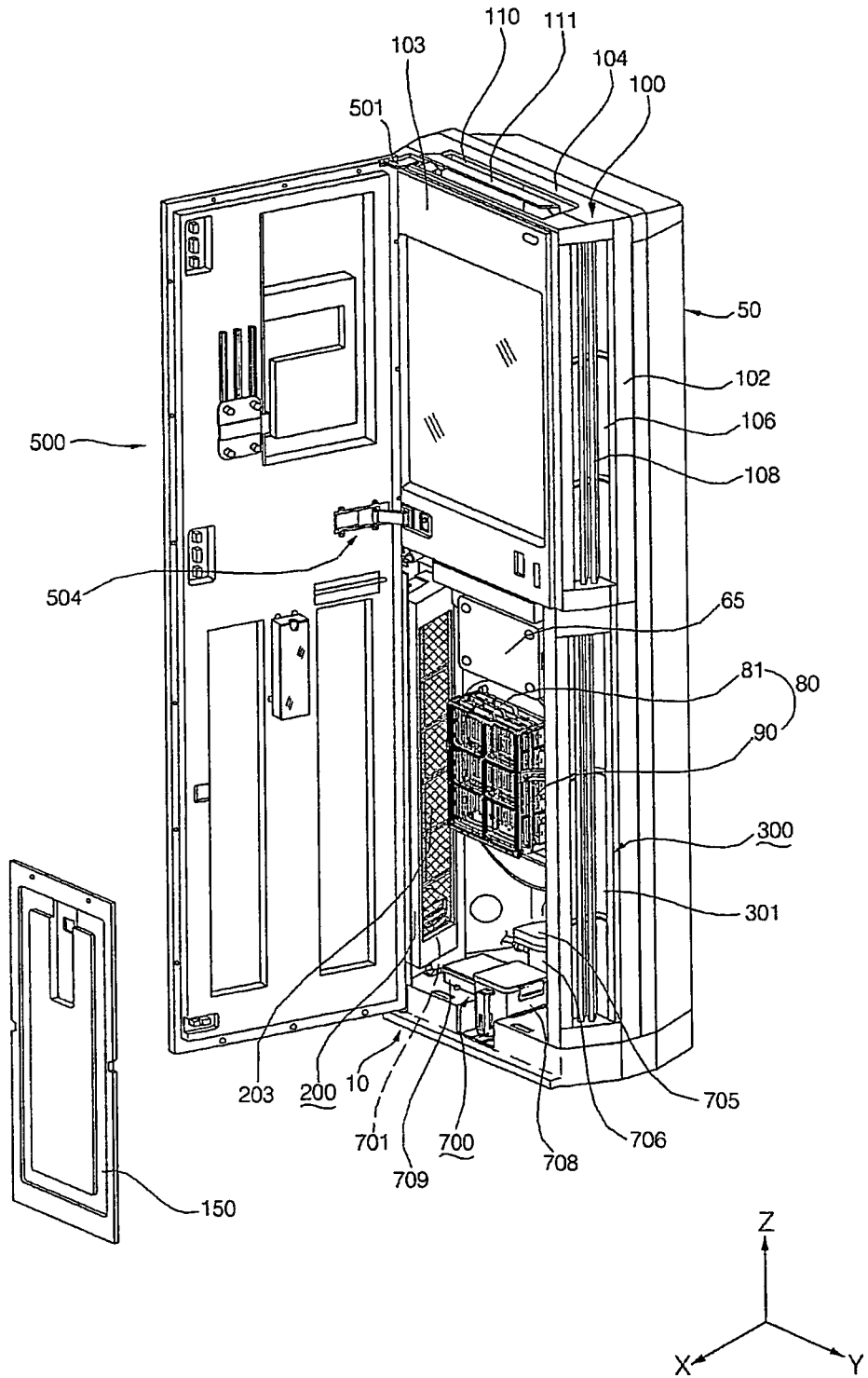
【Figure 1】



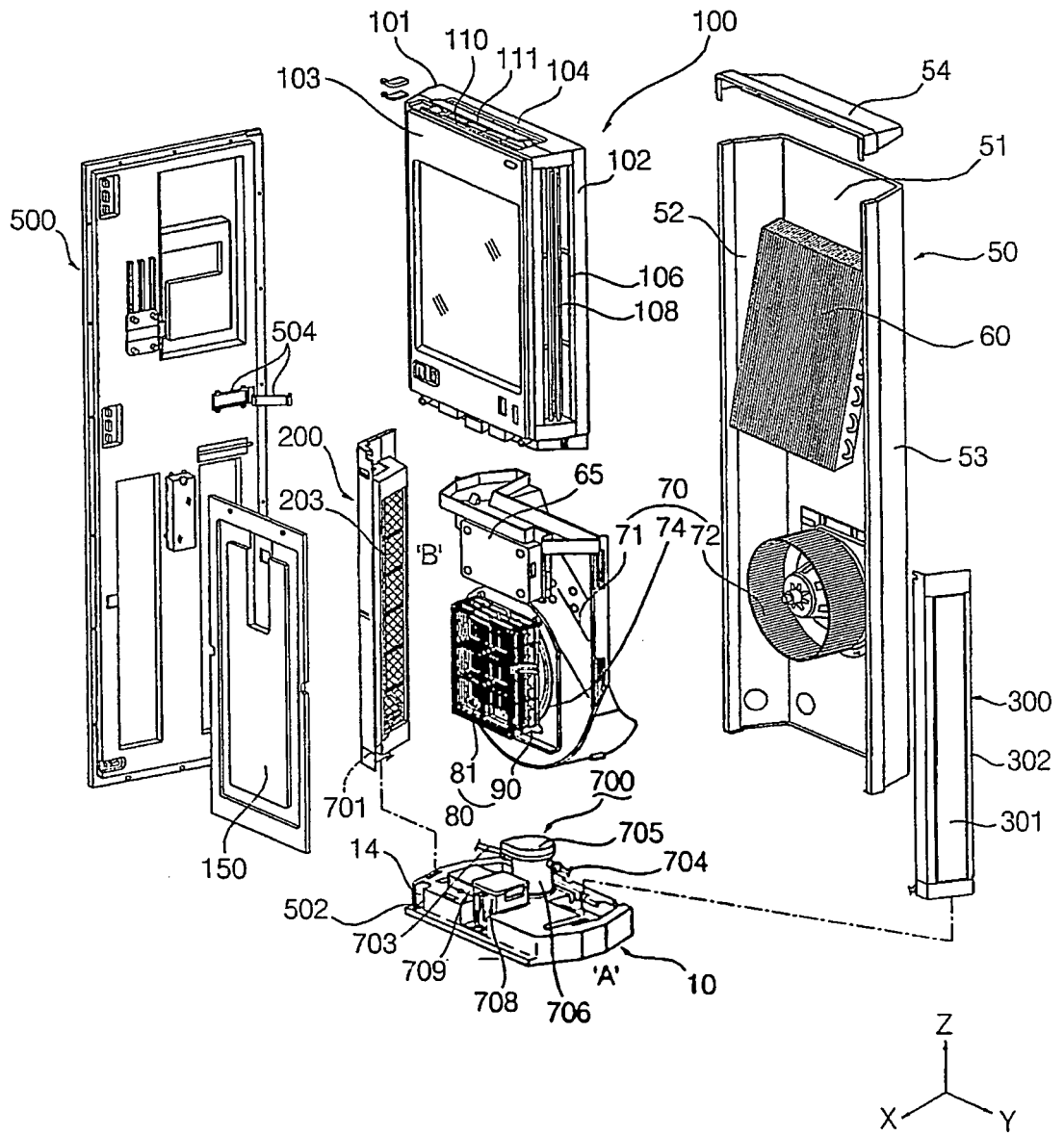
【Figure 2】



【Figure 3】

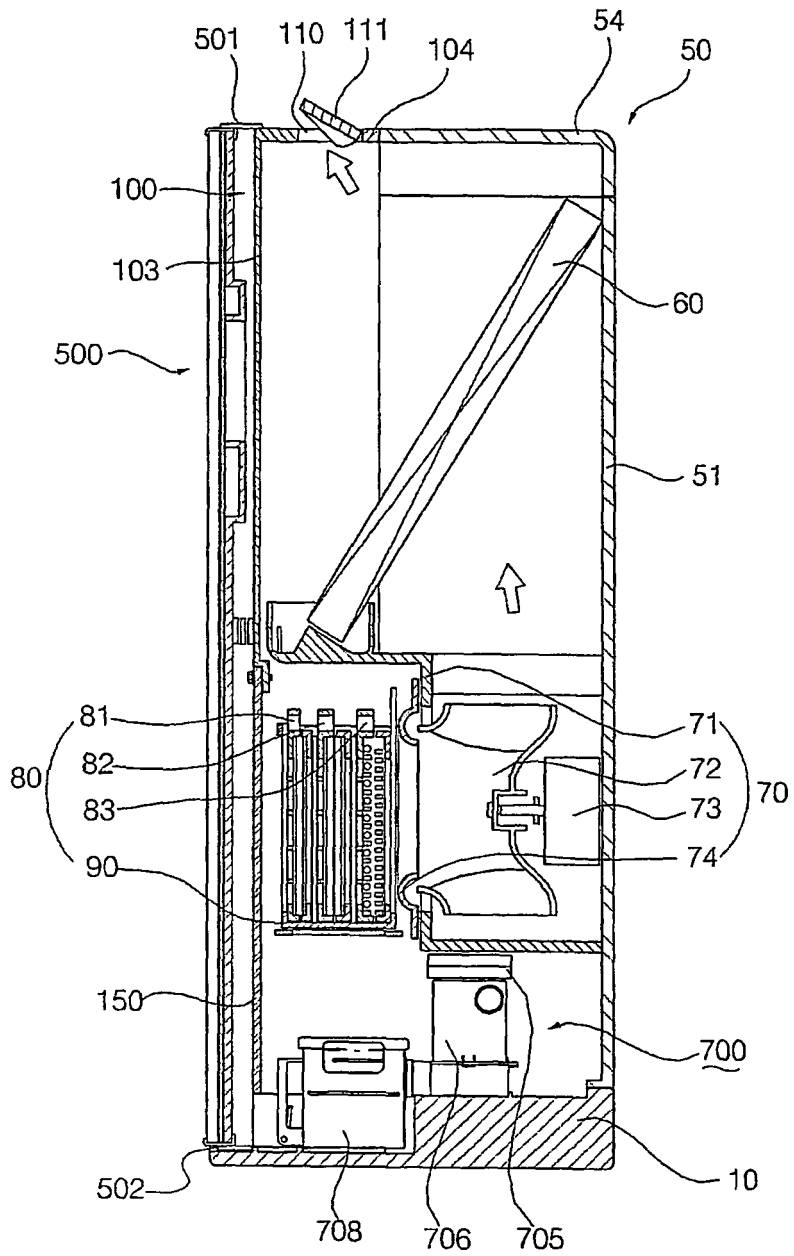


[Figure 4]

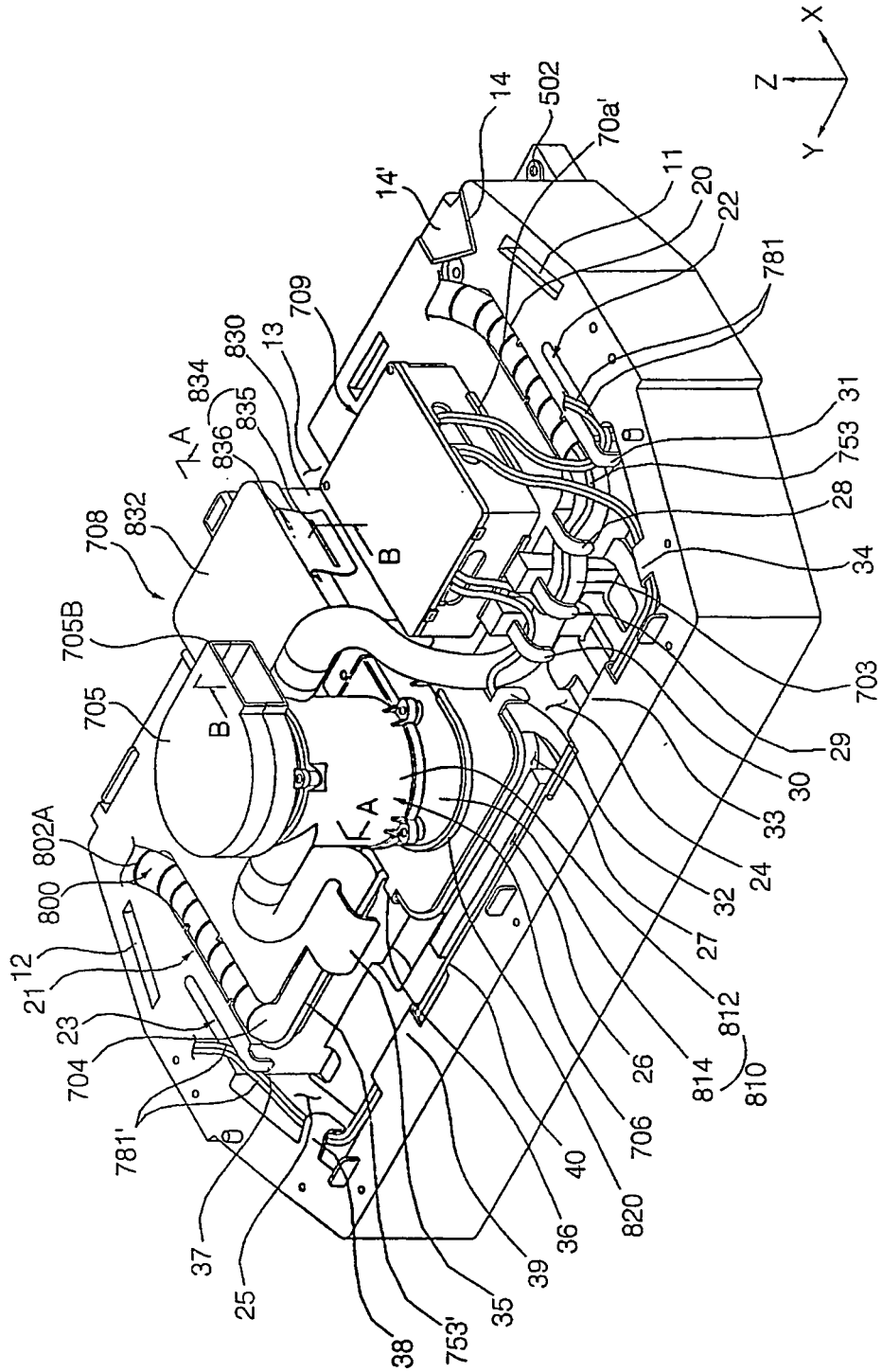




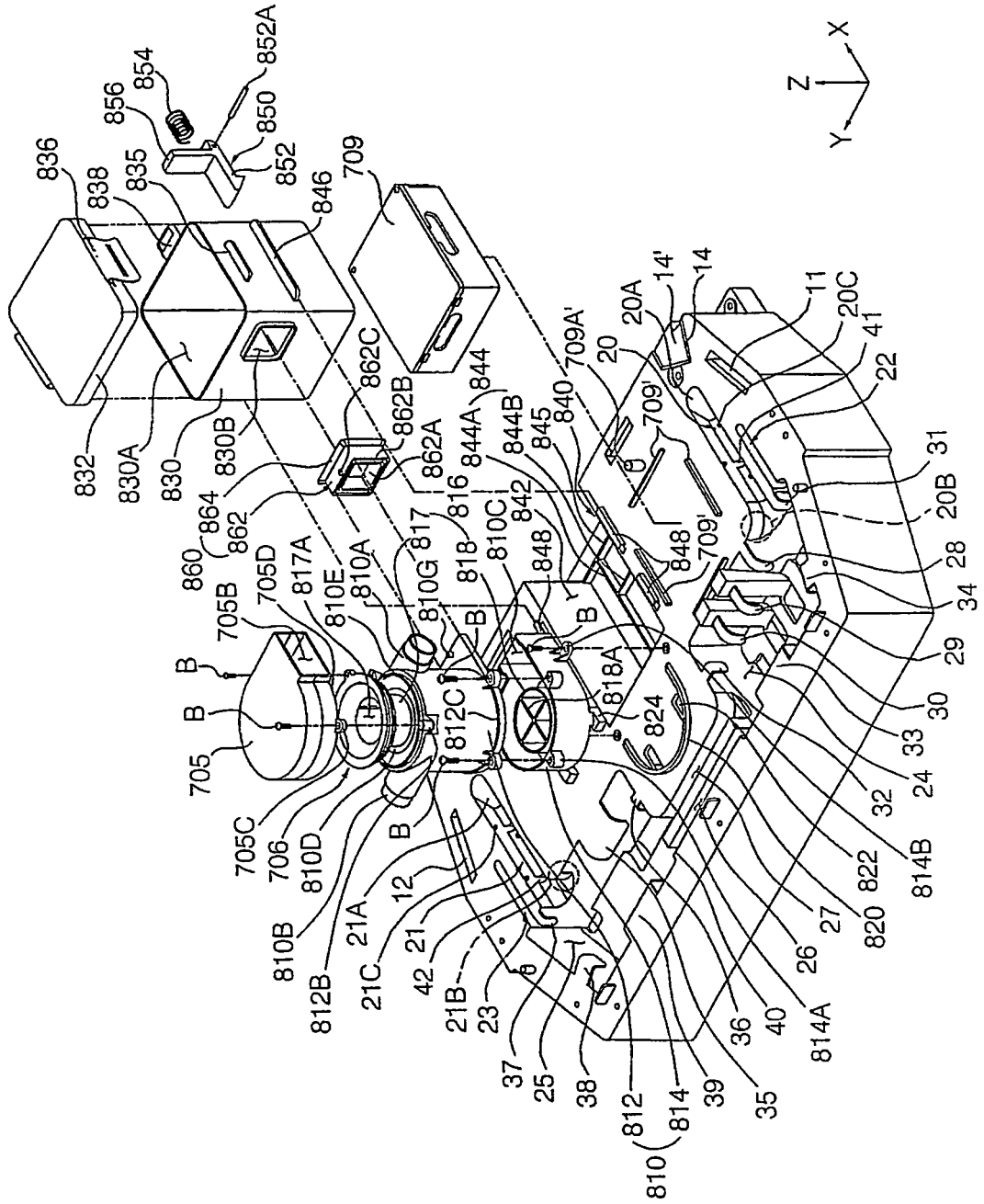
【Figure 5】



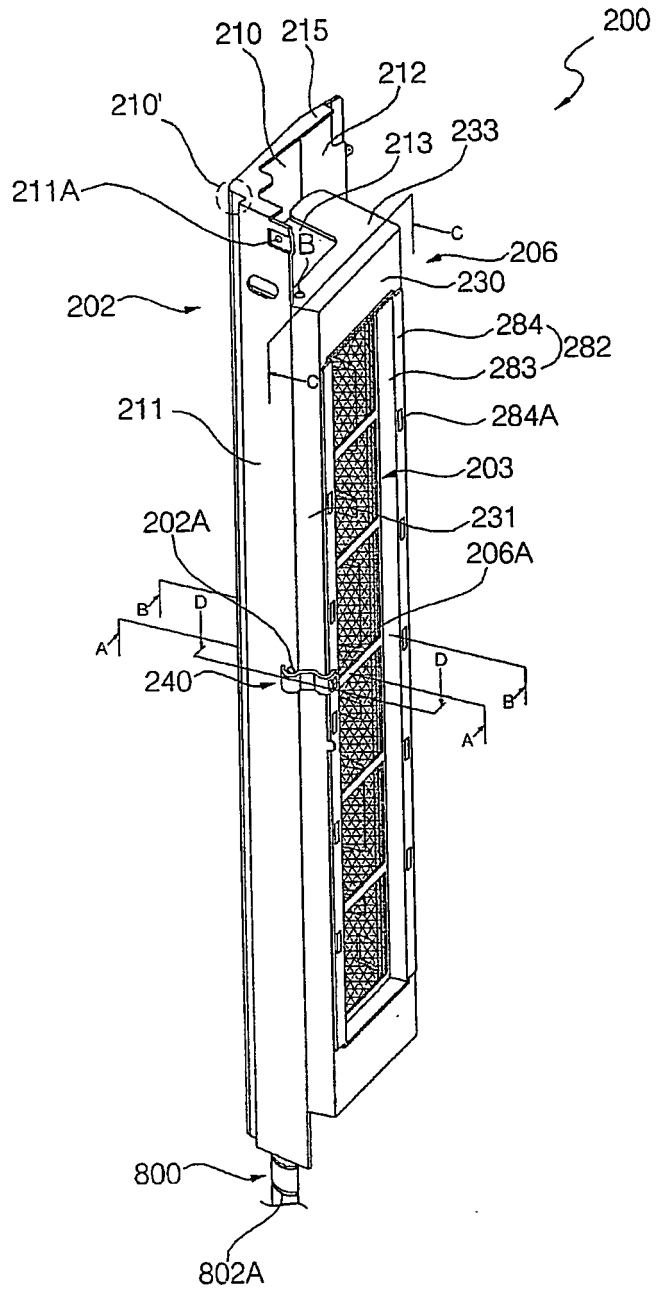
【Figure 6】



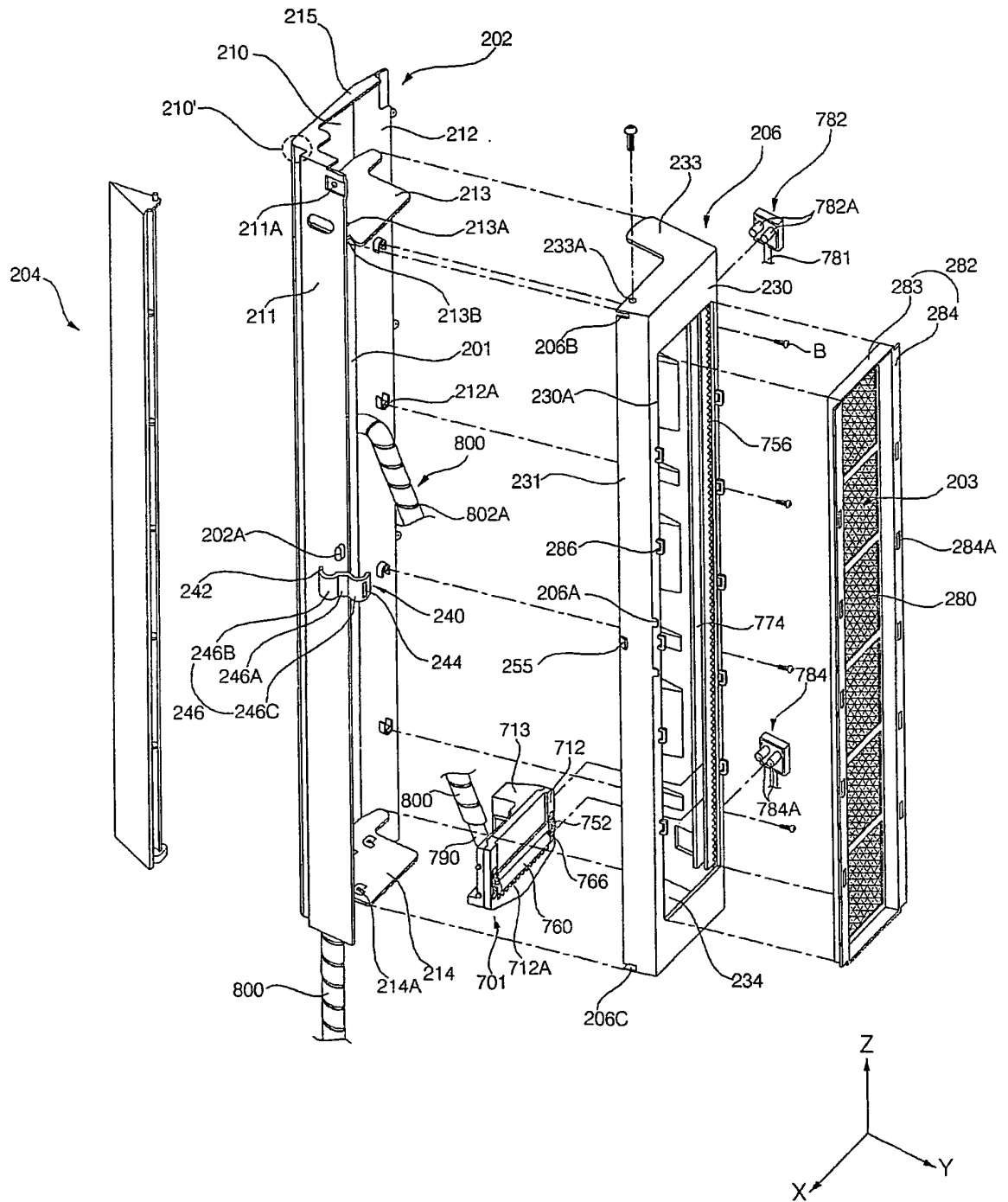
[Figure 7]



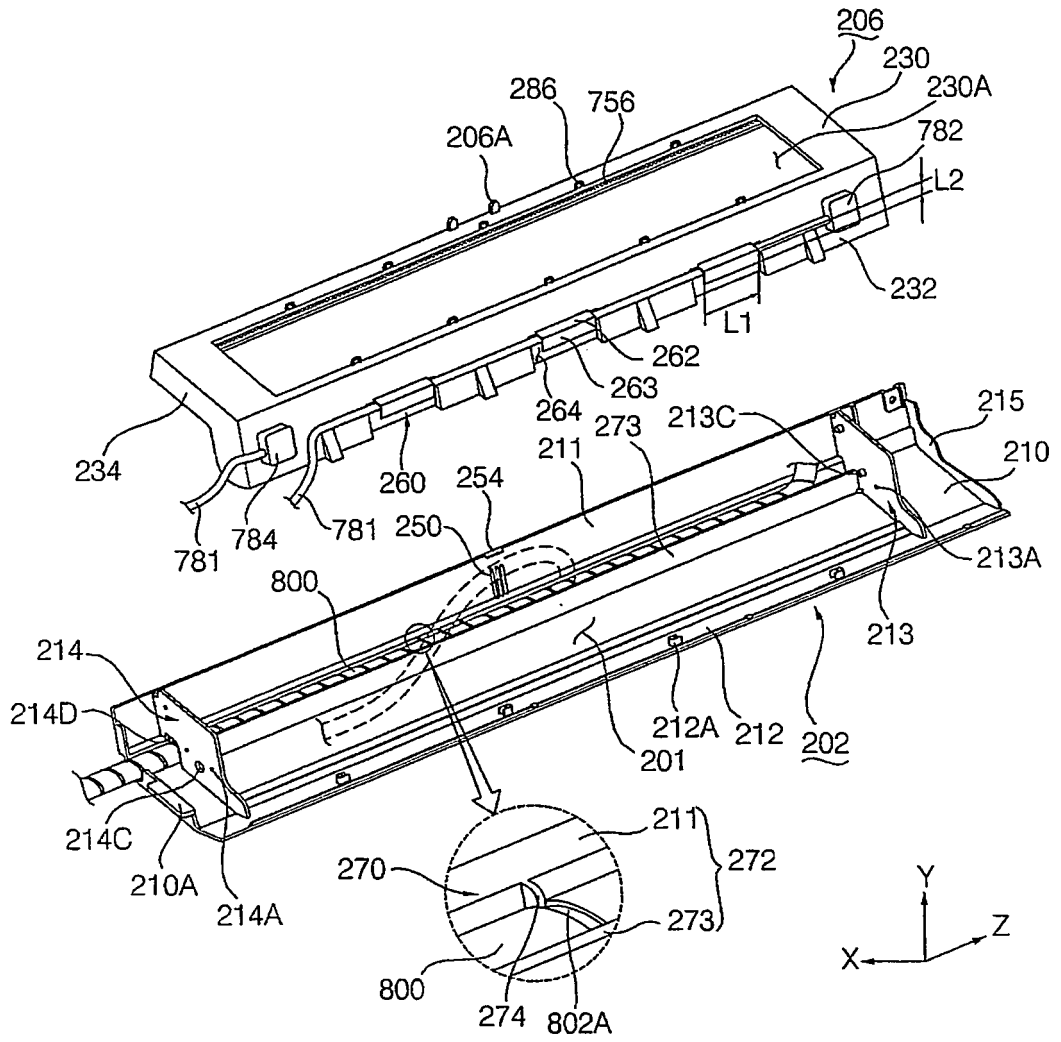
【Figure 8】



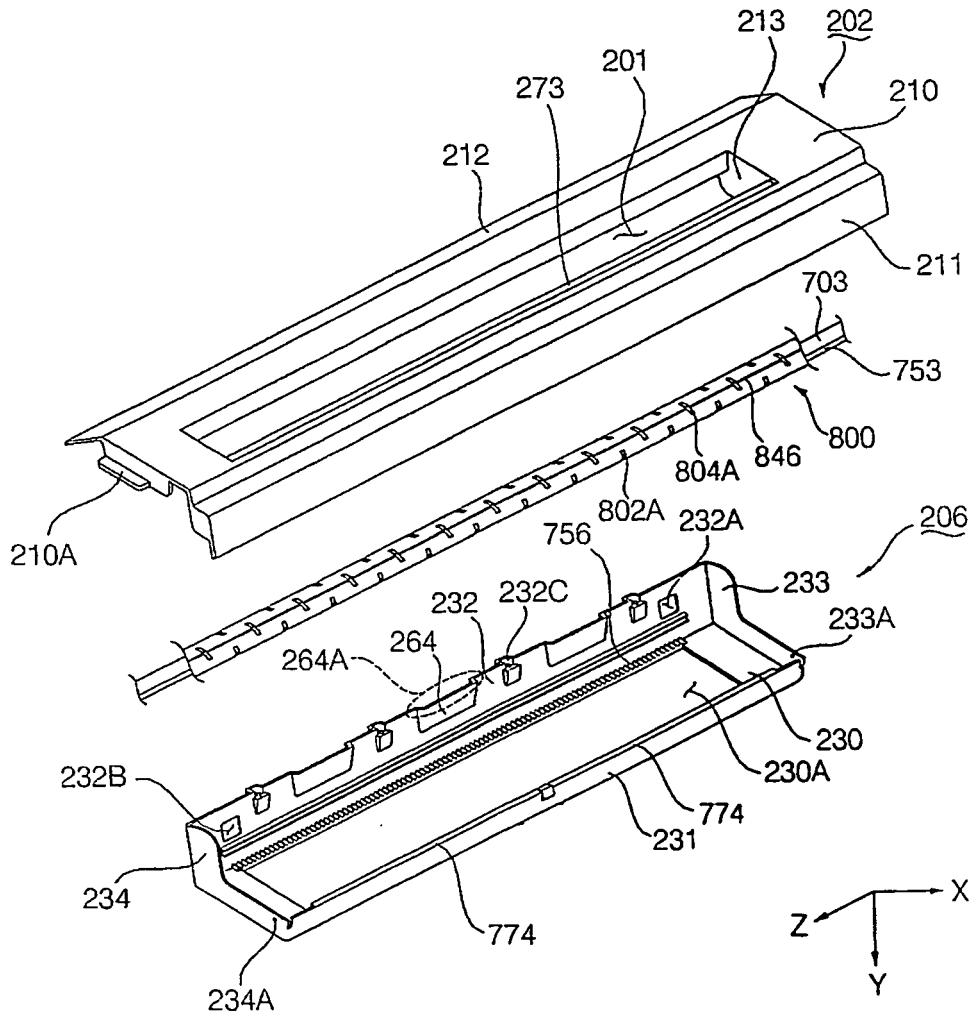
[Figure 9]



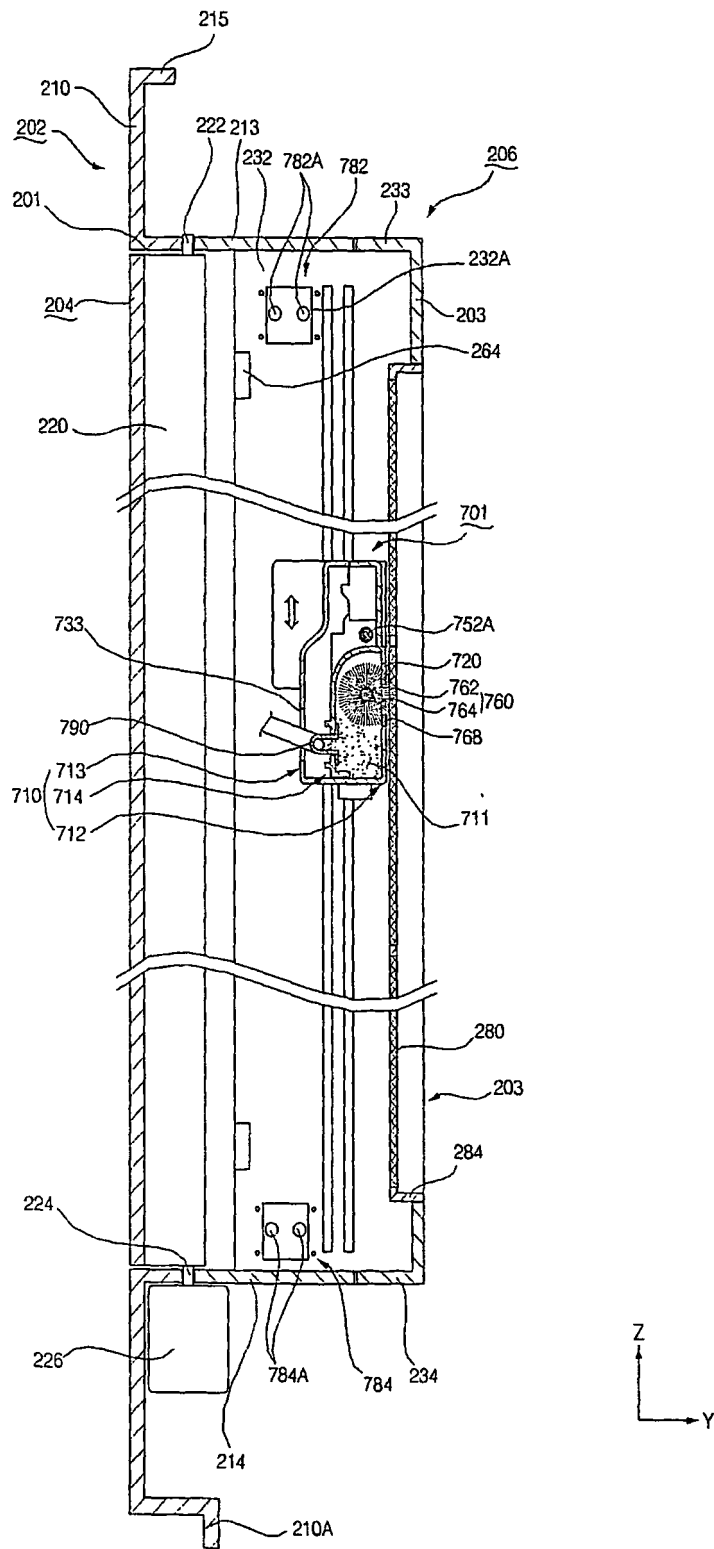
【Figure 10】



【Figure 11】

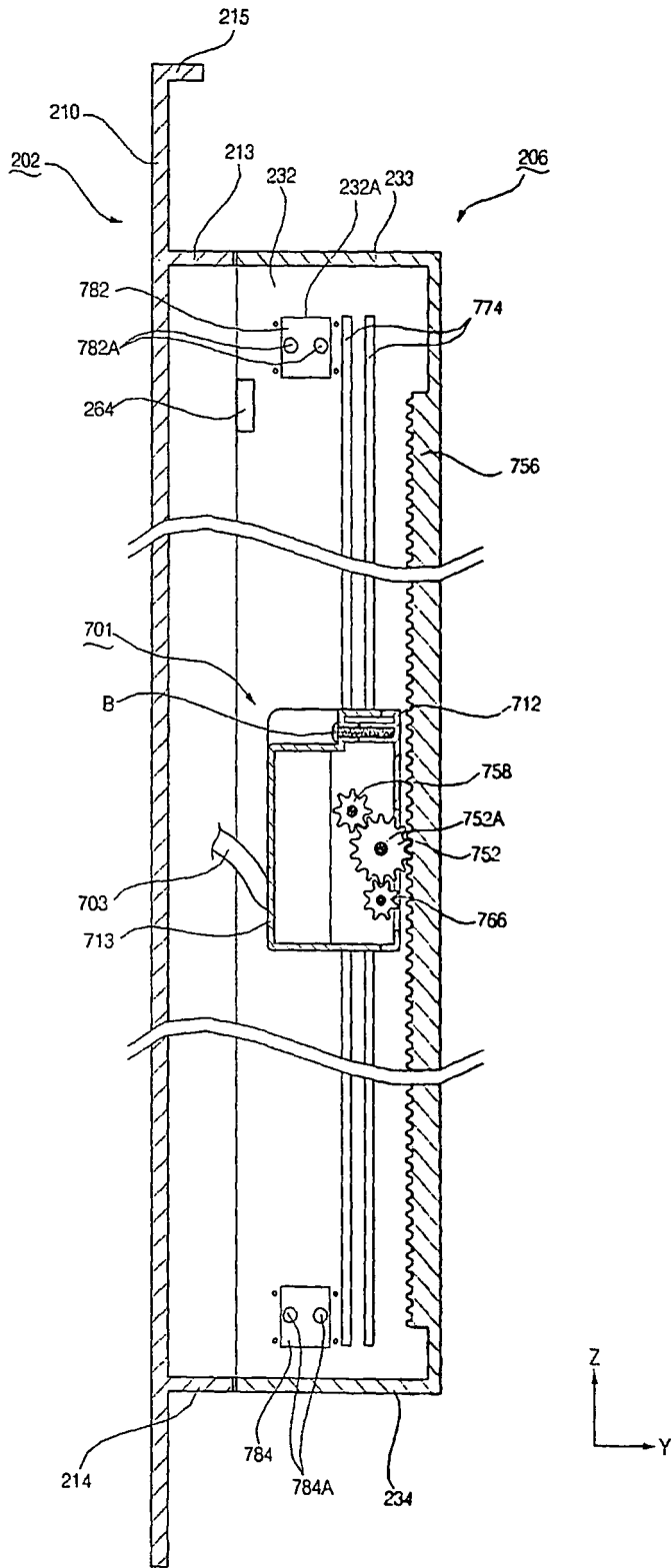


[Figure 12]

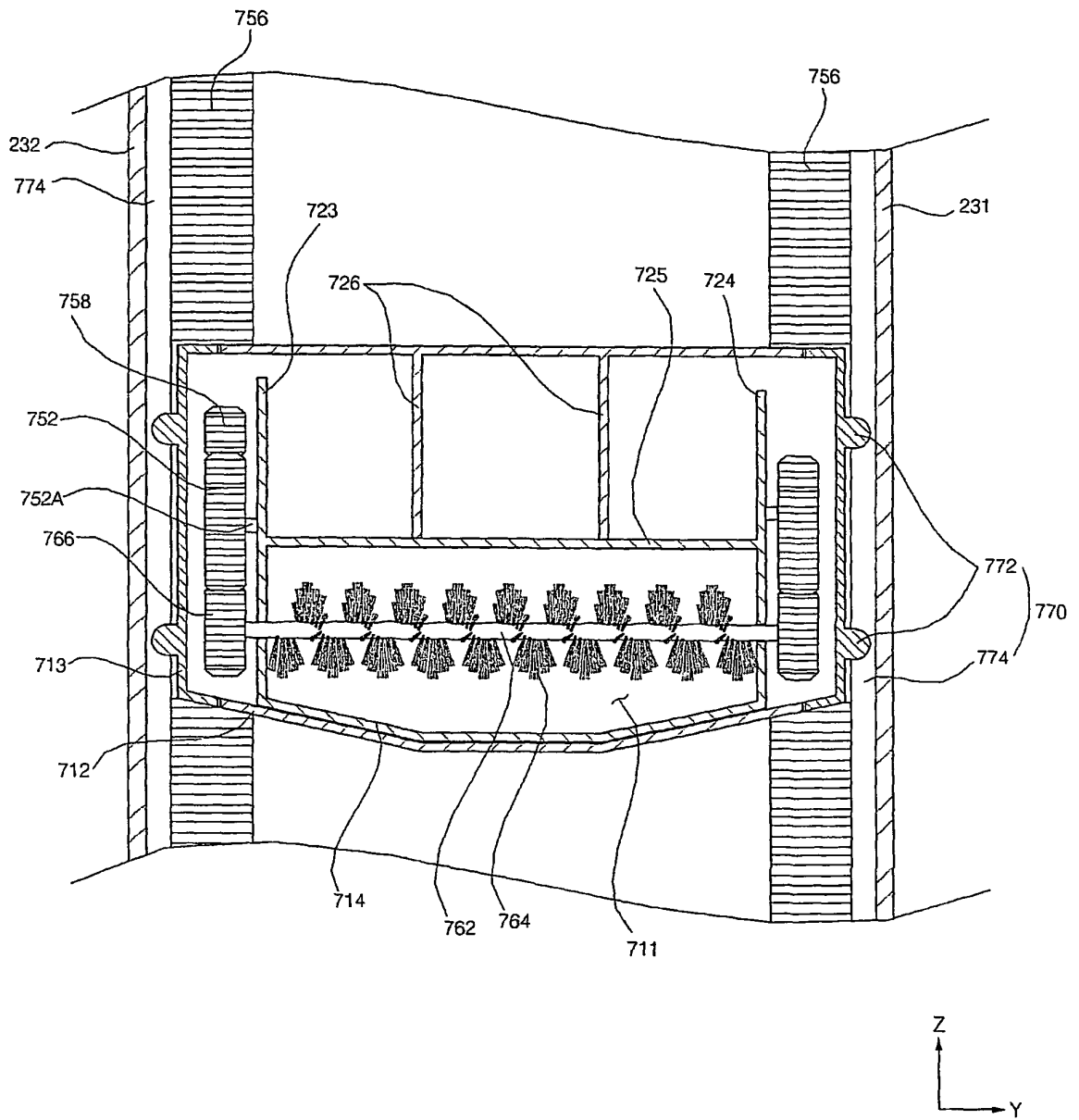




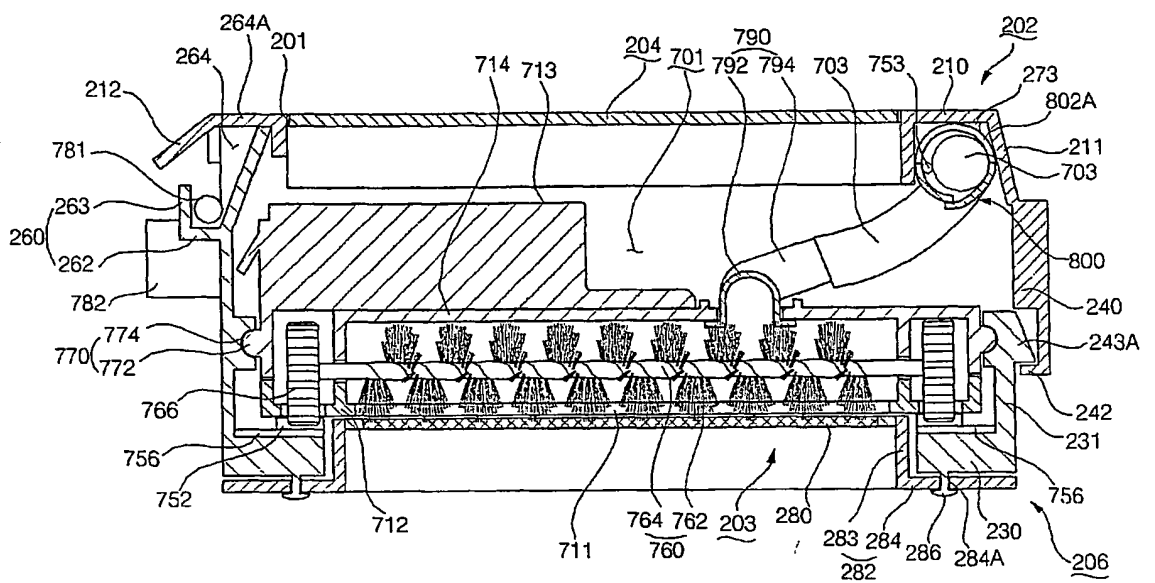
[Figure 13]



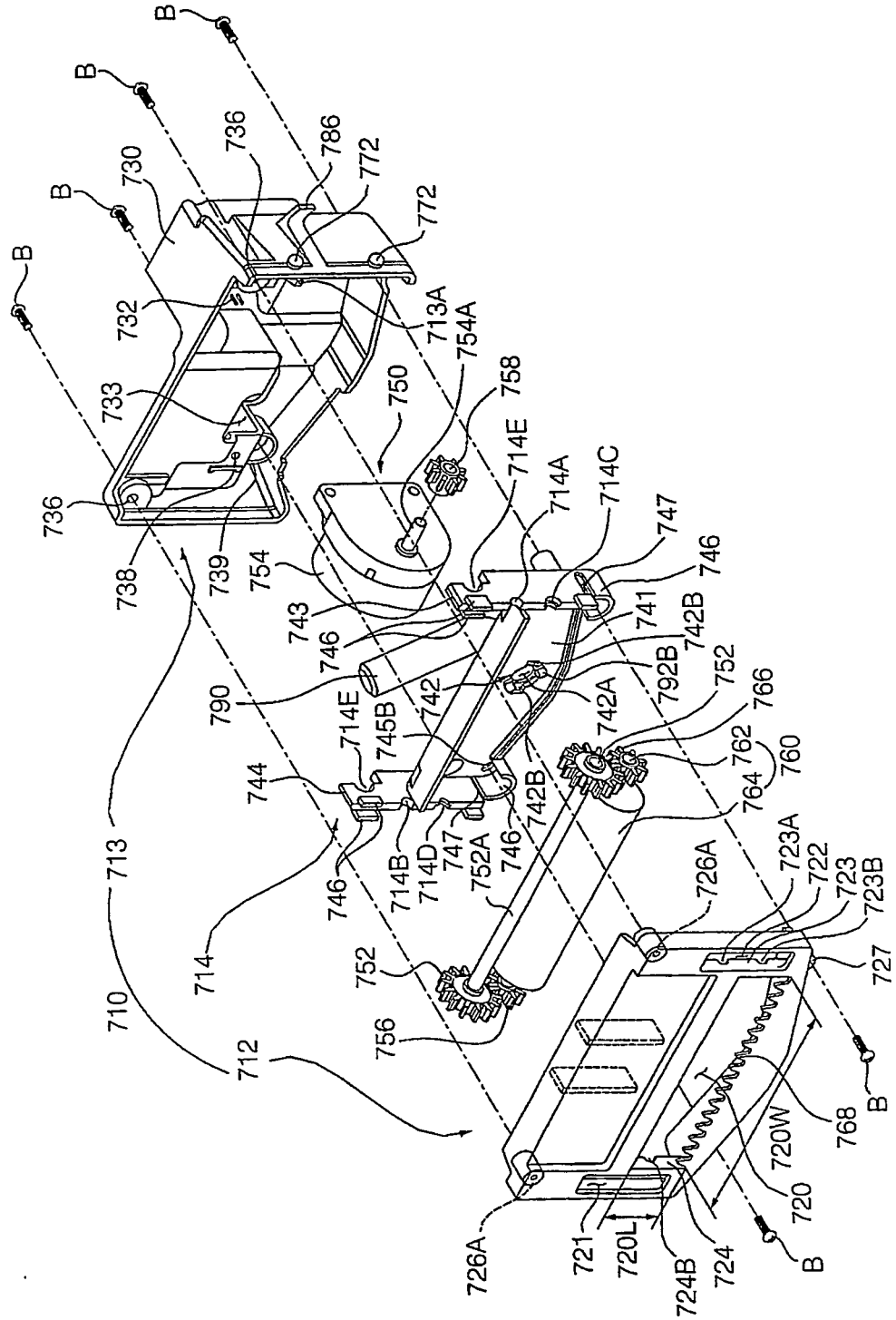
[Figure 14]



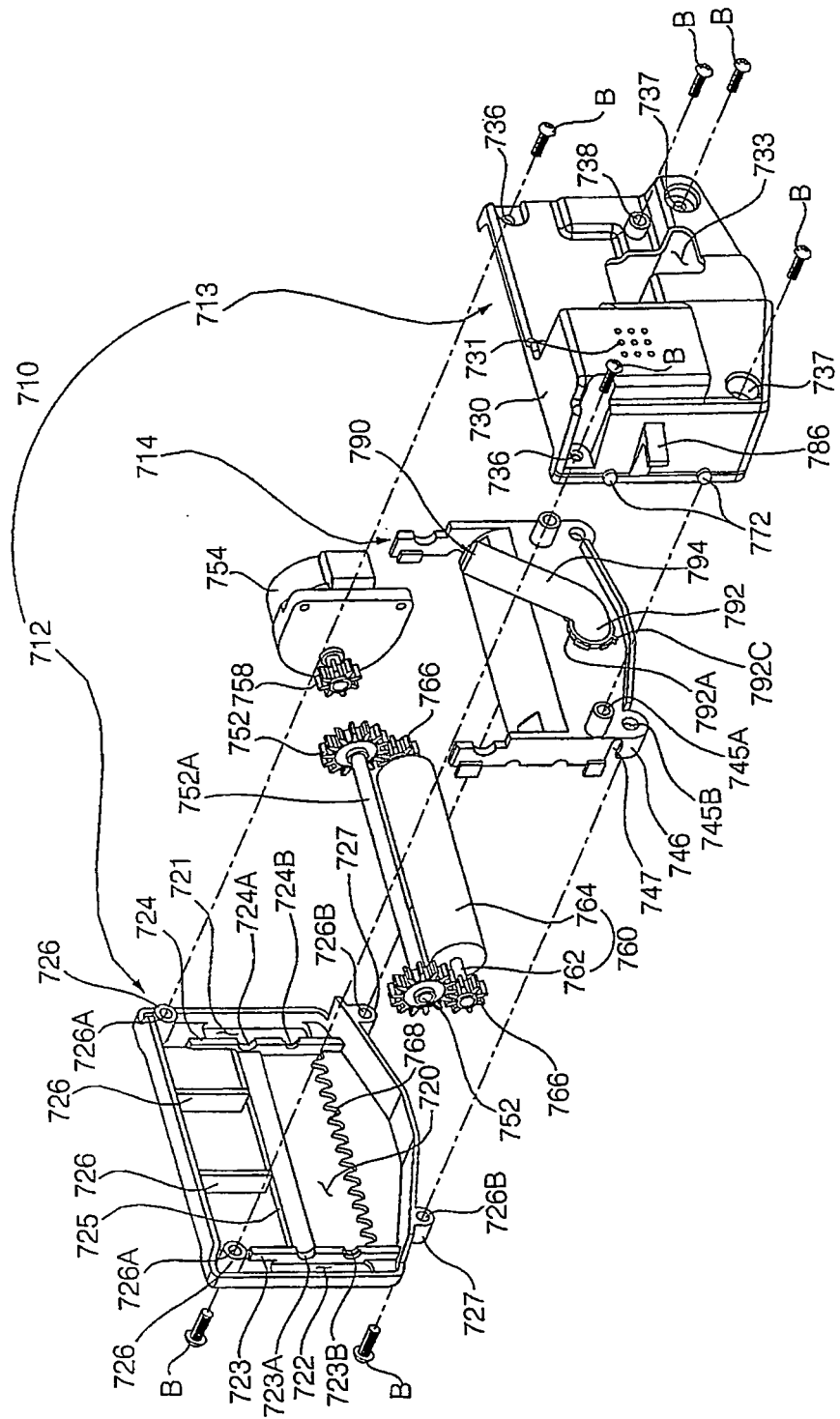
[Figure 15]



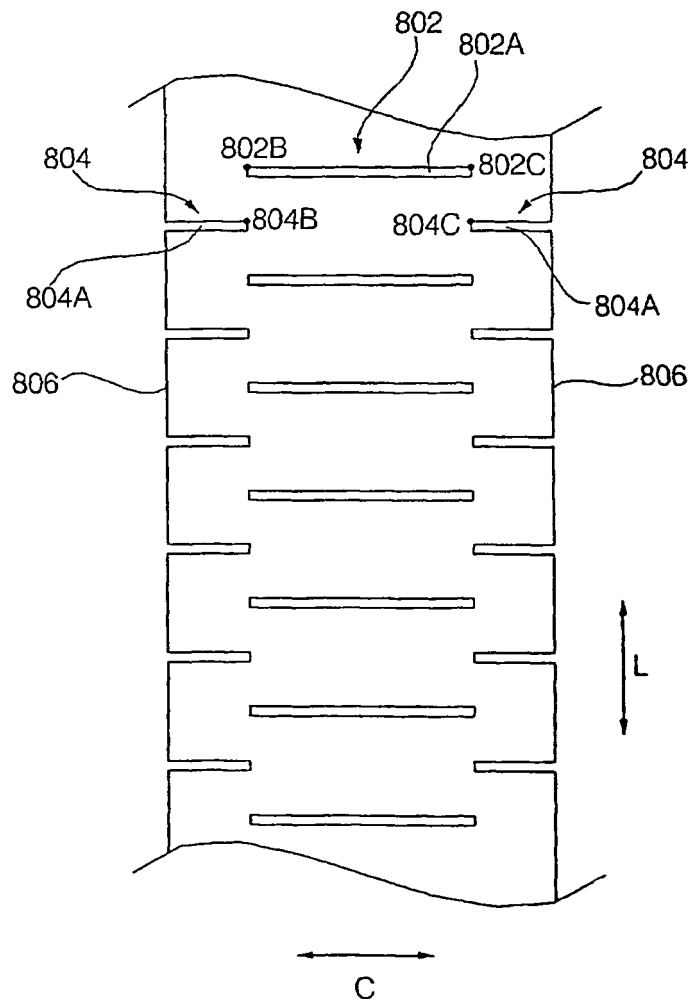
[Figure 16]



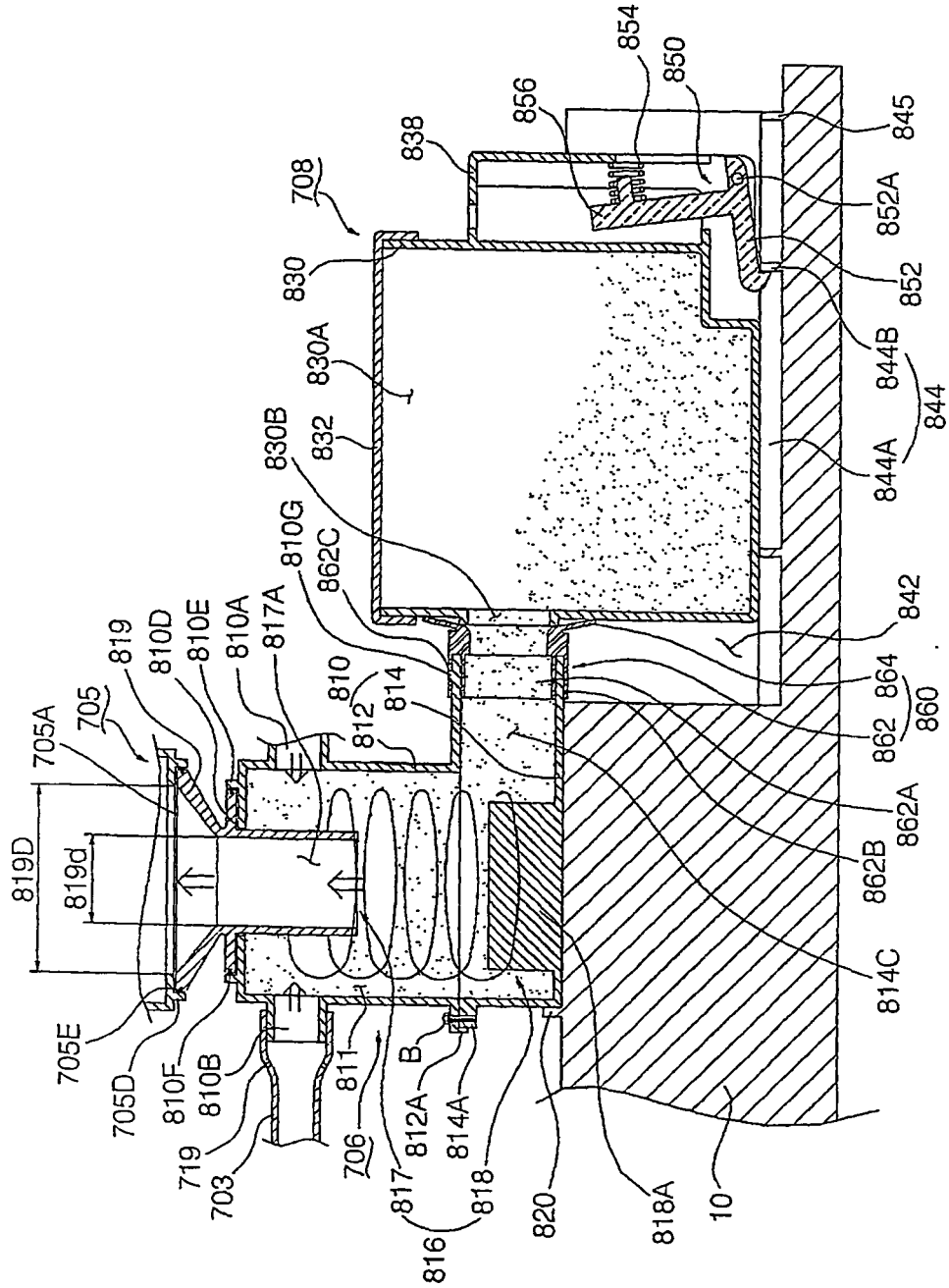
【Figure 17】



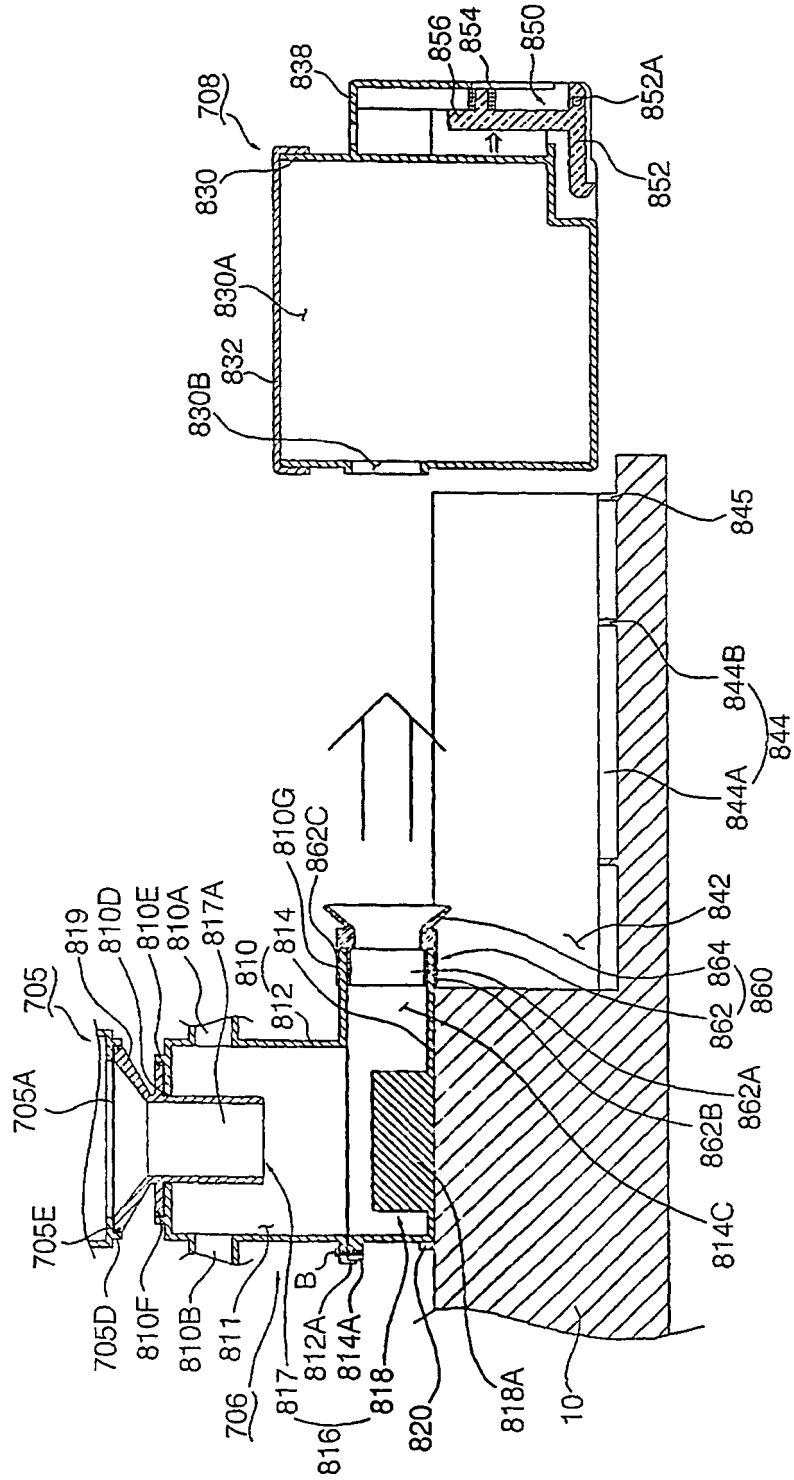
【Figure 18】



【Figure 19】

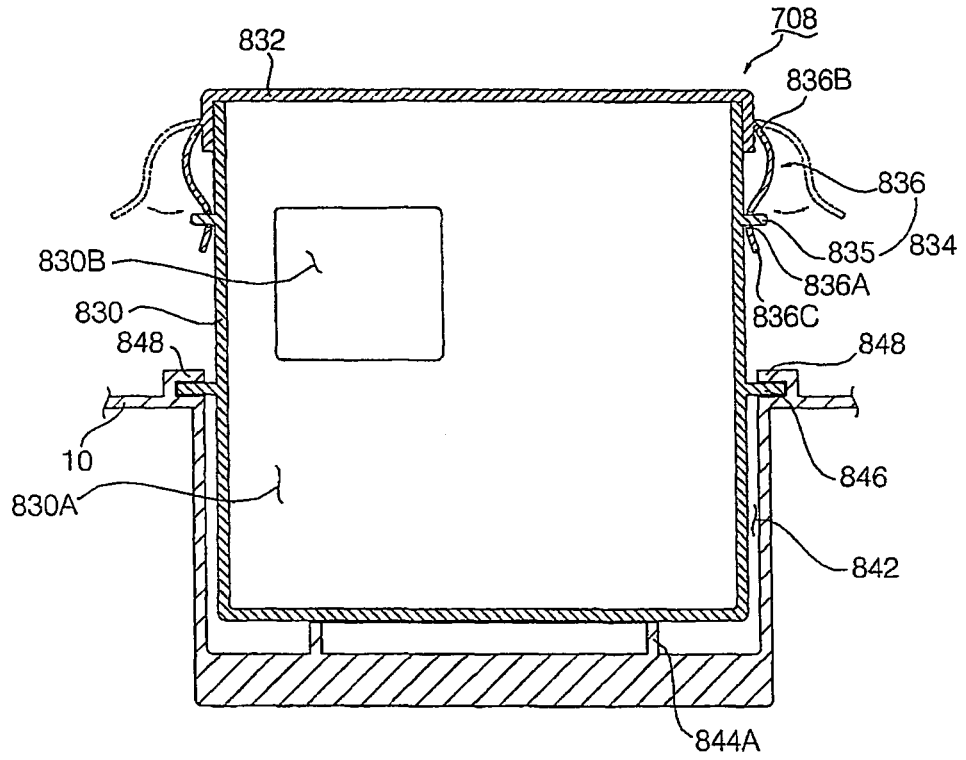


【Figure 20】

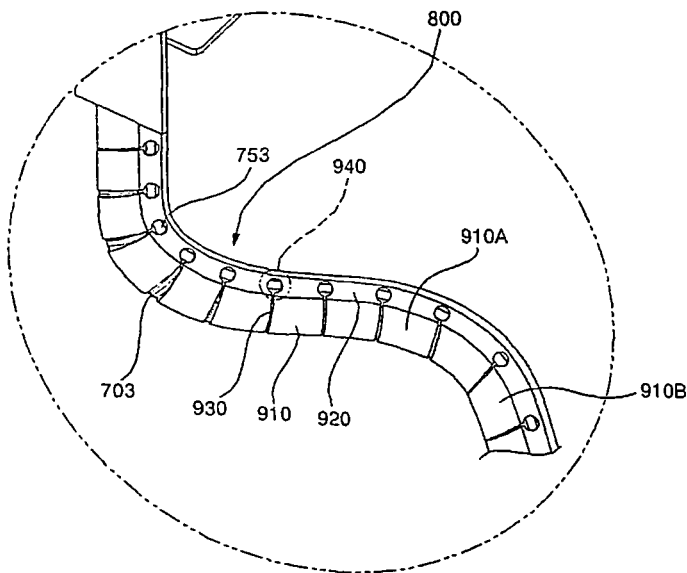




【Figure 21】



【Figure 22】



**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- JP 11226331 A [0004]