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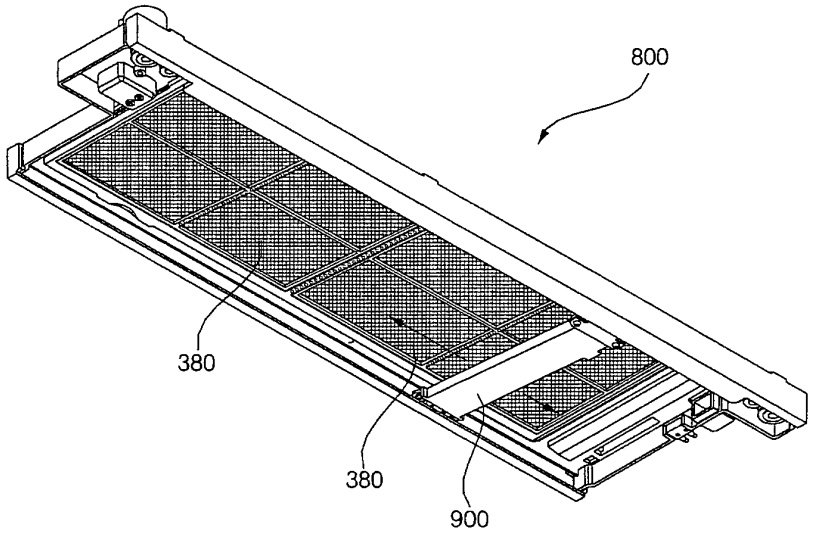
(54) Ceiling type air conditioner with filter cleaning mechanism

(57) A ceiling type air conditioner is disclosed. The ceiling type air conditioner includes: a case fixed to an interior space of a ceiling and for sucking air and discharging heat-exchange air; a base panel fixed to a lower portion of the case and having an air suction port for sucking the air and an air discharge port for discharging the air formed thereon; a front panel disposed on the base panel to open and close the air suction port; and a side panel disposed on the base panel, i.e., disposed in parallel with the front panel on at least one side of the front panel. The side panel is coupled to the base panel so that the base panel is exposed by a user, and this enables a bracket assembly for adjusting the distance between the case and the base panel to be installed inside, thereby making the outer appearance of the air conditioner aesthetic.

FIG. 8



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Description

[0001] The present invention relates to a ceiling type air conditioner, and more particularly, to a ceiling type air conditioner in which side panels are coupled to a base panel so that the base panel can be exposed by a user.

[0002] Typically, a ceiling type air conditioner includes an indoor unit installed above a ceiling for performing a cooling function, an outdoor unit for performing a heat radiating and compression function, and a refrigerant pipe for connecting the indoor and outdoor units.

[0003] The indoor unit is generally disposed in an interior space above the ceiling, and the vertical height of the interior space is called as an " interior height" in the art. Here, regarding the installation of the indoor unit in the interior space, there is a difficulty in adjusting the vertical height.

[0004] That is to say, because the ceiling type air conditioner is launched on the market, with its size already set in the manufacturing process, if the interior height and the size of the indoor unit are different from each other, this causes a great inconvenience to an installer in adjusting the interior height. Moreover, since the indoor unit is installed above the ceiling, there is a risk of falling down and this causes a safety incident in the installation process.

[0005] Meanwhile, the indoor unit has a mesh filter for filtering impurities in sucked air which is installed at an air suction port for sucking the air of a room in order to adjust the temperature of the room and purify the air of the room. However, there is the inconvenience that a user has to frequently remove and wash the filter depending on the frequency of use of the air conditioner, and in recent times, a cleaning unit for automatically cleaning the filter is often installed in order to overcome such a user inconvenience.

[0006] By the way, the air conditioner including the cleaning unit also has the problem that it is necessary to separate the base panel when removing an impurity collecting unit for collecting impurities filtered through the filter and taken out.

SUMMARY OF THE INVENTION

[0007] It would be desirable to provide a ceiling type air conditioner, in which a bracket assembly for adjusting the distance between a case and a base panel is exposed upon removal of a side panel, thereby enabling the manipulation of the bracket assembly.

[0008] The ceiling type air conditioner according to the present invention comprises: a case disposed in an interior space of a ceiling; a base panel disposed below the case, and longitudinally formed in a length direction longer than a width direction, and having an air suction port for sucking air to the case and an air discharge port formed to at least one side of the width direction of the air suction port in parallel with the air suction port and for discharging the air sucked to the case after heat exchange; a front panel disposed on the base panel so as to open and close the air suction port; a side panel coupled to at least one of both ends of the base panel; and a bracket assembly coupled to the case and the base panel and for adjusting the distance between the case and the bas panel, wherein, when the side panel is removed from the base panel by a user, the bracket assembly is exposed so that the bracket assembly can be operated by the user.

[0009] Furthermore, the ceiling type air conditioner according to the present invention may comprise: a filter for filtering impurities of the air sucked form the air suction port; a brush assembly for separating and collecting the impurities filtered through the filter while horizontally moving along the filter; a suction unit for sucking the impurities collected in the brush assembly in communication with the brush assembly when the brush assembly is moved to one side of the suction unit; and an impurity collecting unit for collecting the impurities sucked by the suction unit, wherein, when the side panel is removed from the base panel by the user, the impurity collecting unit is exposed so that the impurity collecting unit can be detached by the user.

[0010] In the ceiling type air conditioner according to the present invention, the bracket assembly for adjusting the distance between the case and the base panel is exposed to the outside upon removal of the side panel. Accordingly, the user can easily adjust the interior height in manipulating the bracket assembly.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain the principle of the invention. In the drawings:

FIG. 1 is a perspective view showing a ceiling type air conditioner according to the present invention;

FIG. 2 is an exploded perspective view showing a state in which a base panel is separated from a case as shown in FIG. 1;

FIG. 3 is an exploded perspective view showing various components to be coupled to the base panel as shown in FIG. 1;

FIGs. 4a and 4b are side cross sectional views showing a method of coupling the side panels as shown in FIG. 1 to the base panel which is implemented in a first embodiment;

FIGs. 5a and 5b are side cross sectional views showing a method of coupling the side panels as shown in FIG. 2 to the base panel which is implemented in a second embodiment;

FIGs. 6a and 6b are side cross sectional views showing a method of coupling the side panels as shown in FIG. 2 to the base panel which is implemented in

a third embodiment;

FIG. 7 is a cross sectional view taken along line A-A of FIG. 1;

FIG. 8 is a perspective view showing a filter disposed at the air suction port as shown in FIG. 3 and a brush assembly for separating impurities filtered through the filter while moving along the filter;

FIGs. 9 and 10 are a perspective view and a side view showing a suction unit for sucking impurities and an impurity collecting unit for collecting impurities;

FIG. 11 is an exploded perspective view showing the impurity collecting unit as shown in FIG. 10;

FIGs. 12a and 12b are side cross sectional views showing an image in which a dust container among the components of the impurity collecting unit as shown in FIGs. 9 and 10 is attached to and detached from the dust container housing; and

FIG. 13 is an exploded perspective view of an impurity collecting unit according to another embodiment.

DETAILED DESCRIPTION OF THE PREFERRED EMBODBMNTS

[0012] Hereinafter, a preferred embodiment of a ceiling type air conditioner according to the present invention will be described in detail with reference to the accompanying drawings.

[0013] FIGs. 1 to 7 illustrate a ceiling type air conditioner 1 according to a preferred embodiment of the present invention. FIG. 1 is a perspective view showing a ceiling type air conditioner 1 according to the present invention. FIG. 2 is an exploded perspective view showing a state in which a base panel 300 is separated from a case 200 as shown in FIG. 1.

[0014] Referring to FIGs. 1 and 2, the ceiling type air conditioner 1 on includes a case 200 fixed to an interior space of a ceiling 100 and for sucking air and discharging heat-exchanged air. The case 200 may have the shape of a rectangular parallelepiped which is opened at the bottom surface and longitudinally formed in a length direction. The case 200 is fixed by a fastening means, such as bolts (not shown), so as to be tightly attached to an upper side of the interior space of the ceiling 100.

[0015] Hereinafter, for the convenience of explanation, in FIGs. 1 and 2, the length direction (i.e., lateral direction) of the case 200 is defined by reference numeral X, a direction (i.e., front-back direction) horizontally orthogonal to the length direction of the case 200 is defined by reference numeral Y, and a direction (i.e, up-and-down direction) vertically orthogonal to the length direction of the case 200 is defined by reference numeral Z.

[0016] Various heat exchange parts 180 for sucking air of a room 170 therebelow, heat-exchanging it, and then discharging it are disposed within the case 200. The concrete configurations and functions of the various heat exchange parts 180 will be omitted.

[0017] Additionally, the ceiling type air conditioner 1 further includes a base panel 300 coupled to a lower portion of the case 200 so as to cover the opened bottom surface the case 200. The base panel 300 is formed in a length direction (X direction), longitudinally longer than a width direction (Y direction). The base panel 300 is formed in a lateral direction (X direction), longer by a predetermined length than the opened bottom surface of the case 200 is.

[0018] FIG. 3 is an exploded perspective view showing various components to be coupled to the base panel 300 as shown in FIG. 1. Referring to FIG. 3, an air suction port 305 for longitudinally communicating the inside and outside of the case 200 in the X direction is formed on the base panel 300, and an air discharge port 310 for communicating the inside and outside of the case 200 is formed, in parallel with the air suction port 305, at a portion spaced a predetermined distance apart in the Y direction from the air suction port 305.

[0019] At at least one side of both longitudinal ends of the base panel 300, a service space may be formed in which a component (bracket assembly 700 to be described later) is located. The component is for adjusting a so-called " interior height" , which is the vertical height of the interior space of the ceiling 100 for installing the air conditioner 1 therein, that is, the vertical distance between the top surface of the ceiling 100 and a ceiling finishing material (not shown) disposed at a lower portion of the ceiling 100. More specifically, the service space refers to an interior space of the ceiling 100 corresponding to the left and right outer surfaces of the case 200. A plurality of pass-through slots 340 are formed on the base panel 300 so that the bracket assembly 700 is located in the interior space corresponding to the service space.

[0020] A front panel 400 for opening and closing the air suction port 305 for sucking air is disposed on the lower surface of the base panel 300. The front panel opens the air suction port 305 formed on the base panel 300 to guide sucked air when the air conditioner 1 operates, or serves to make the outer appearance good by closing the air suction port 305 and forming the outer appearance of the lower surface of the ceiling 100 when the air conditioner 1 does not operate.

[0021] The ceiling type air conditioner 1 further includes side panels 600 disposed on the base panel 300 corresponding to at least one side of the front panel 400. In other words, the side panels 600 are coupled to at least one of both ends of the base panel 300. When the side panels 600 are coupled to both ends of the base panel 300, the pass-through slots 340 are enclosed from the outside by the side panels 600.

[0022] The side panels 600 are coupled so as to be arbitrarily detachable from the base panel 300 by a user. The side panels 600 of this type expose any one of both left and right ends of the base panel 300 to the outside and expose the service area as well upon being removed from the base panel 300 by the user.

[0023] Referring to FIGs. 2 and 3, a display portion 650 for displaying operation information of the ceiling type air

conditioner 1 is disposed on at least one of the side panels 600 disposed in parallel with both sides of the front panel 400. The display portion 650 is preferably disposed so as to be surface-matched with the outer surfaces, i.e., lower surfaces, of the side panels 600.

[0024] The display portion 650 includes a screen display portion (not shown) disposed on the side panels 600 and for representing an image and an exterior portion (not shown) made of a semitransparent material, which is disposed on the screen display portion, and which is subjected to observation from the outside by optical transmission of the screen display portion when the screen display portion is operated, or is kept from observation from the outside by preventing optical transmission of the screen display portion when the screen display portion is not operated. The exterior portion is provided so as to have a texture identical or similar to the outside of the side panels 600, thus forming some part of the outer appearance of the air conditioner 1 along with the side panels 600 when the screen display portion is not operated.

[0025] The side panels 600 may be coupled to the base panel 300 in the following various manners.

[0026] FIGs. 4a and 4b are side cross sectional views showing a method of coupling the side panels 600 as shown in FIG. 1 to the base panel 300 which is implemented in one embodiment. Referring to FIGs. 4a and 4b, the side panels 600 may include hooks 610 disposed at either the base panel 300 or the side panels 600 and latching portions 320 for latching the hooks 610 at the other one.

[0027] The side panels 600 of this type are attached to and detached from the base panel 300 in such an operation of latching the hooks 610 and the latching portions 320 with each other and unlatching them. Here, a plurality of hooks 610 are formed spaced apart at a plurality of locations of the upper surfaces of the side panels 600, and a plurality of latching portions 320 are formed spaced apart so as to correspond to the formation positions of the hooks 610 on the lower surface of the base panel 300.

[0028] Meanwhile, the side panels 600 may have such a structure in which the front and back both ends of the side panels 600 are fitted to the front and back both ends of the base panel 300 in order to avoid the side panels 600 from being recessed from the base panel 300 by a certain vibration caused by the operation of the air conditioner after coupling to the base panel 300.

[0029] That is to say, front and back bent portions 620 are formed on the side panels 600 which are projected and bent upward to a predetermined height toward the base panel 300 so that the front and back both ends of the side panels 600 cover the front and back both ends of the base panel 300 and are latched thereto when the side panels 600 are coupled to the base panel 300. When the front and back bent portions 620 are coupled to the base panel 300 by an operation of inserting and latching the hooks 610 to the latching portions 320, they are coupled to the front and back both ends of the base panel 300 by a forced fitting operation, thereby anchoring the side panels 600 to the base panel 300.

[0030] FIGs. 5a and 5b are side cross sectional views showing a method of coupling the side panels 600 as shown in FIG. 2 to the base panel 300 which is implemented in another embodiment. Referring to these drawings, the side panels 600 are attached to and detached from the base panel 300 by sliding movement. The side panels 600 and the base panel to which the side panels 600 are coupled by sliding movement may be formed in the same straight line so as to be make sliding coupling easier. Alternatively, the side panels 600 and the base panel 300 has not to be formed in a straight line, but the side panels 600 may be formed of a flexible material so as to be more easily coupled to the lower surface of the base panel 300 by sliding movement.

[0031] In the coupling method according to such a modified example, it is preferred that projections 610a having a T-shaped cross section are formed on the lower surfaces of the side panels 600, and groove-shaped guide rails 320a having a T-shaped cross section are formed on the base panel 300 so as to fit the projections 610a formed on the side panels 600 thereto.

[0032] Here, according to the foregoing embodiment and modified example, there is a risk that the side panels 600 to be attached to and detached from the base panel 300 may fall down after being separated from the base panel 300, and further, there is a risk of the loss of the side panels 600. In one embodiment of the present invention, the side panels 600 further include fall preventing portions 650 and 650a for preventing the side panels 600 from being removed and fall down from the base panel 300. The fall preventing portions 650 and 650a may be either connecting members or wires connecting the side panels 600 and the base panel 300.

[0033] FIGs. 6a and 5b are side cross sectional views showing a method of coupling the side panels 600 as shown in FIG. 2 to the base panel 300 which is implemented in still another embodiment. Referring to these drawings, the side panels 600 include a first coupling portion 610b for coupling to the base panel 300, and the base panel 300 includes a second coupling portion 320b for coupling to the first coupling portion 610b. Here, the still another embodiment employs an one-touch type coupling and decoupling method in which the first coupling portion 610b and the second coupling portion 610b are coupled or decoupled by pushing the side panels 600 toward the base panel 300.

[0034] The one-touch type coupling and decoupling method is the general term for a method in which the side panels are decoupled from the base panel 300 if a user pushes the side panels 600 by the application of a predetermined external force, with the first coupling portion 610b and the second coupling portion 320b being coupled to each other, and the side panels 600 are coupled to the base panel 300 by disposing the side panels 600 in proximity to the first coupling portion 610b and the sec-

ond coupling portion 320b and then pushing the side panels 600 in a direction toward the base panel 300.

[0035] In this case, one sides of the side panels 600 (i.e., the rear ends of the side panels 600 in the drawings), are connected to the base panel 300 by a hinge 650b, and an elastic member (not shown) for supporting the side panels 600 downward is interposed in the hinge 650b.

[0036] The hinge 650b serves to fix the rear ends of the side panels 600 to the base panel 300 and prevent them from being removed and falling down from the base panel 300 upon opening and closing the side panels 600. Moreover, the elastic member is interposed in the hinge 650b, thereby enhancing the feeling of opening and closing of the side panel 600.

[0037] FIG. 1 is a side cross sectional view taken along line A-A of FIG. 1. Referring to FIG. 7, the ceiling type air conditioner 1 further includes a bracket assembly 700 disposed on the base panel 300 to which the side panels 600 are coupled, and for fixing the base panel 300 to a lower portion of the case 200. The bracket assembly 700 is exposed to the outside by the user upon removing the side panels 600 by being disposed on the base panel 300 to which the side panels 600 are coupled.

[0038] Generally, the vertical height of the interior space of the ceiling where the case 200 is disposed is called as an " interior height" in the art as described above. By the way, since the case 200 is manufactured in a predetermined size, if the size of the case 200 is too large or too small, this may cause a difficulty when an installer installs the base panel 300 to the case 200. The bracket assembly 700 serves to couple the base panel 300 to the case 200 and adjust the distance between the case 200 and the base panel 300 in order to adjust the interior height.

[0039] More specifically, the bracket assembly 700 includes a fixing bracket 710 for connecting the base panel 300 to the case 200 in order to temporarily fix the same thereto and a fastening member 720 for adjusting the distance between the case and the base panel while connecting the case 200 and the base panel 300.

[0040] A lower end portion of the fixing bracket 710 is fixed to the base panel 300, and an upper end portion thereof is formed in a hook shape bent in one side and latched at a projecting end 250 projecting outward from the left and right of the case 200. A fastening hole (not shown) of a predetermined size for passing the fastening member 720 through is formed on the projecting end 250, and couples the case 200 and the base panel 300 in an operation of fastening the fastening member 720 and adjusts the distance between the case 200 and the base panel 300 by moving up and down the base panel 300.

[0041] Here, the fastening member 720 may be a fastening bolt having a constant thickness. However, the present invention is not limited thereto, and the fastening member 720 of this invention may be any member with any name only if it has a screw thread machined and formed on the outer periphery thereof and is inserted and fastened to the fastening hole by a rotating movement.

[0042] In addition to the bracket assembly 700, an impurity collecting unit 1100 to be described later for collecting impurities in sucked air through the air suction port 305 may be disposed in the service space of the base panel 300 where the bracket assembly 700 is located. Hereinafter, the configuration and functions of the impurity collecting unit 110 will be explained in more detail.

[0043] FIG. 8 is a perspective view showing a filter 380 disposed at the air suction port as shown in FIG. 3 and a brush assembly 900 for separating impurities filtered through the filter 380 while moving along the filter 380. Referring to FIG. 8, a filter 380 for filtering impurities in the sucked air is disposed at the air suction port 305. As referred to FIG. 8, the filter 380 may rest on a filter housing 800 disposed at the air suction port 305.

[0044] A brush assembly 900 is disposed on the filter housing 800 so as to be movable along the filter 380. The brush assembly 900 serves to separate and move impurities filtered through the filter 380 while moving along the filter 380. The brush assembly 900 is moved along the filter 380 automatically or manually. As above, the ceiling type air conditioner according to one embodiment of the present invention possesses such an advantage that user' s convenience can be increased because the user does not need to remove the filter 380 from the air conditioner 1 to clean the filter 380 and the brush assembly 900 automatically cleans the filter 380 while moving along the filter 380.

[0045] The impurities separated from the filter 380 and moved to any one side of the filter housing 800 by the brush assembly 900 are sucked, moved, and collected, by a suction unit 1000 communicating with the brush assembly 900, into the impurity collecting unit 1100 which is disposed in the service space corresponding to the outer sides of the left and right both ends of the case 200 and enclosed from the outside or exposed to the outside by attachment or detachment of the side panels 600. Here, because the impurity collecting unit 1100 is disposed so as to be exposed from the outside upon removing the side panels 600, the impurity collecting unit 1100 can be detached from the air conditioner 1 by the user' s simple operation of removing the side panels 600, thereby increasing user convenience.

[0046] FIGs. 9 and 10 are a perspective view and a side view showing a suction unit 1000 for sucking impurities and an impurity collecting unit 1100 for collecting impurities. Referring to these drawings, the suction unit 1000 is disposed so as to communicate with one side of the brush assembly 900, and serves to provide a predetermined suction pressure to the brush assembly 900 and suck the impurities and also serves to separate only the impurities sucked and collect them into the impurity collecting unit 1100. The suction unit 1000 and the impurity collecting unit 1100 communicate with each other so as to collect the impurities.

[0047] The impurity collecting unit 1100 includes a dust

container 1110 for collecting the impurities separated from the filter 380 by the brush assembly 900 by moving them and a dust container housing 1120 fixed to the outer surface of the case 200, to and from which the dust container 1110 is attached and detached, and which is exposed upon removal of the side panels 600 by the user.

[0048] FIG. 11 is an exploded perspective view showing the impurity collecting unit 1100 as shown in FIG. 10. Referring to FIG. 11, a lower portion of the dust container housing 1120 is opened such that the dust container 1110 can be moved and attached in a linear direction of the inside of the dust container housing 1120 from the bottom, or such that the dust container 1110 can be moved and detached in a downward linear direction from the inside of the dust container housing 1120.

[0049] The dust container 1110 may be coupled to the dust container housing 1120 by slidably moving in a direct upward direction (i.e., Y direction) from the lower portion of the dust bin housing 1120, or may be removed from the dust container housing 1120 by slidably moving in a direct downward direction (i.e., X direction) from the inside of the dust container housing 1120.

[0050] FIGs. 12a and 12b are side cross sectional views showing an image in which a dust container 1110 among the components of the impurity collecting unit 1100 as shown in FIGs. 9 and 10 is attached to and detached from the dust container housing 1120. Referring to FIGs. 12a and 12b, at least one projection 1111 projecting toward the inner surface of the dust container housing 1120 is formed on the outer surface of the dust container 1110, and a guide groove portion 1121 for guiding the at least projection 1111 to be fitted and moved in the linear direction is longitudinally formed on the inner surface of the dust container housing 1120.

[0051] A first through hole 1116 for communicating the inside and outside of the dust container 1110 is formed on the projection 1111. A second through hole 1126 corresponding to the size of the first through hole 1116 is formed at a portion of the dust container housing 1120 corresponding to the first through hole 1116, with the dust container 1110 being coupled with the dust container housing 1120. In a case where the first through hole 1116 and the second through hole 1126 are coupled by fitting the dust container 1110 to the dust container housing 1120, they are aligned with each other so as to form one communicating hole for communicating the suction unit 1000 and the impurity collecting unit 1100, thereby achieving communication with the suction unit 1000. The impurities sucked and separated by the suction unit 1000 are moved and collected in the dust container 1110 through the first through hole 1116 and the second through hole 1126.

[0052] The projection 1111 functions to seal the alignment between the first through hole 1116 and the second through hole 1126 by tightly attaching the dust container 1110 to the inner surface of the dust container housing 1120 upon coupling the dust container 1110 to the dust container housing 1120. However, the function of sealing the first through hole 1116 and the second through hole 1126 is not necessarily restricted to the projection 1111. That is to say, a sealing member (not shown) for sealing to prevent the impurities moved from the suction unit 1000 from leaking out may be disposed between the first through hole 1116 and the second through hole 1126.

[0053] The dust container 1110 includes a handle portion 1112 formed so as to project downward of the dust container housing 1120, with the dust container 1110 being coupled to the dust container housing 1120. The handle portion 1112 is a portion that is gripped by the hand of the user so as to make easier the attachment and detachment of the dust container 1110.

[0054] Additionally, the dust container 1110 includes an attaching/detaching portion 1113 which is disposed at the handle portion 1112 and couples or decouples the dust container 1110 with the dust container housing 1120. One end 1114A of the attaching/detaching portion 1113 is disposed at the handle portion 1112 corresponding to the portion to be gripped by the hand of the user, and the other end 1114B thereof is extended to the dust container housing 1120 by a predetermined length. A middle part of the attaching/detaching portion 1113 is fixed to one side of the handle portion 1112 by a hinge 1117. Therefore, when the one end 1114A is rotated to one side or the other side with respect to the hinge 1117 by an external force, the other end 1114B is rotated to one side or the other side with respect to the hinge 1117, and thus spaced apart from the dust container housing 1120 or comes into contact with the inner surface of the dust container housing 1120.

[0055] In order to make easier the coupling and decoupling of the dust container 1110 and the dust container housing 1120, a latching hole 1124 for connecting and passing through the inside and outside of the dust container housing 1120 so as to latch or unlatch the other end 114B of the attaching/detaching portion 1113 may be formed on the dust container housing 1120 where the other end 114B of the attaching/detaching portion 113 is located upon coupling the dust container 1110 with the dust container housing 1120. The latching hole 1124 serves to couple or decouple between the dust container 1110 and the dust container housing 1120 by being latched or unlatched with the other end 1114B of the attaching/detaching portion 1113. However, the component for latching the other end 1114B of the attaching/detaching portion 1113 to the dust container housing 1120 or unlatching it therefrom is not restricted to the latching hole 1124 passing through the inside and outside of the dust container housing 1120. That is, a latching groove for latching the other end 1114B of the attaching/detaching portion 1113 may be formed if it is a component for coupling or decoupling the dust container 1110 to and from the dust container 1110, with the other end 1114B of the attaching/detaching portion 1113 being contacted with or spaced apart from the dust container housing 1120 by an external force.

[0056] If the other end 1114B of the attaching/detach-

ing portion 1113 is spaced apart from the dust container housing 1120 and removed from the latching hole 1124, this represents a case where the dust container 1110 and the dust container housing 1120 are decoupled from each other. If the other end 1114B of the attaching/detaching portion 1113 is contacted with the inner surface of the dust container housing 1120 and latched in the latching hole 1124, this represents a case where the dust container 1110 and the dust container housing 1120 are coupled to each other.

[0057] The attaching/detaching portion 1113 includes an elastic member 1117 disposed between the attaching/detaching portion 1113 and the handle portion 1112 and for providing a predetermined elastic force so that the other end 1114B of the attaching/detaching portion 1113 can be contacted with the inner surface of the dust container housing 1120. The elastic member 1117 may be a spring, one end 1114A of which is contacted with and supported by the handle portion 1112 and the other end 1114B of which is contacted with and supported by the attaching/detaching portion 1113. In a case where the other end 1114B of the attaching/detaching portion 1113 is contacted with the inner surface of the dust container housing 1120 to thus transmit a predetermined external force to the attaching/detaching portion 1113 while the user is gripping the one end 1114A of the attaching/detaching portion 1113 in the same manner as gripping the handle portion 1112 or the user is moving the dust container 1110 into the dust container housing 1113 and coupling it thereto, the elastic member 1117 is elastically deformed (for example, compressively deformed) and provides a predetermined elastic force to the one end 1114A of the attaching/detaching portion 1113. In this manner, the dust container 1110 is moved into the dust container housing 1120, and when the external force provided to the attaching/detaching portion 1113 is eliminated by the time the other end 1114B of the attaching/detaching portion 1113 reaches the latching hole 1124, the elastic member 1117 is restored to the original condition and rotates the one end 1114A of the attaching/detaching portion 1113 to one side. At this time, the other end 1114B of the attaching/detaching portion 1113 is latched at the latching groove, thus coupling the dust container 1110 to the dust container housing 1120.

[0058] As above, the ceiling type air conditioner 1 according to one embodiment of the present invention can further increase user convenience because the user can attach and detach the dust container 1110 to and from the dust container housing 1120 by an operation of easily manipulating the attaching/detaching portion 1113.

[0059] The impurity collecting unit 1110 further includes a dust container cover 1115 to be coupled to the dust container 1110. The dust container cover 1115 is detachably coupled to the dust container 1110. As a detaching method thereof, various methods, such as a rotating method for fixing one side by a hinge (not shown) or a separation method for separating the entire dust container cover 1115, may be employed. When the dust container 1115 is filled with impurities, the user removes the dust container 1110 from the dust container housing 1120, and then separates the dust container cover 1115 from the dust container 1110 and discharges the impurities to the outside. At this time, the dust container cover 1115 serves to prevent the impurities from being poured from the dust container 1110 when the dust container 1110 is excessively moved due to user carelessness upon removing the dust container 1110 from the dust container housing 1120.

[0060] FIG. 13 is an exploded perspective view of an impurity collecting unit 1100' according to another embodiment. The same reference numerals as those in the foregoing embodiment represent the same members. Referring to FIG. 13, the impurity collecting unit 1100' includes a dust container housing 1120 inclined in an oblique direction with respect to an approximately vertical direction and a dust container 1110 inclined in an oblique direction with respect to an approximately vertical direction like the dust container housing 1120 so as to be attached to and detached from the dust container housing 1120.

[0061] As discussed above, unlike the impurity collecting unit 1100 which is coupled to the dust container housing 1120 by sliding movement in a vertical direction from the bottom of the dust container housing 1120, or removed from the dust container housing 1120 by sliding movement in a vertical direction from the inside of the dust container housing 1120, the impurity collecting unit 1100' is attached to and detached from the dust container housing 1120 by sliding movement of the dust container 1110 in an oblique direction. The impurity collecting unit 1100' can further increase user convenience as compared to the impurity collecting unit 1100 according to the first embodiment because the user may raise his or her head less or raise his or her hand less to attach and detach the dust container to and from the dust container housing 1120.

[0062] Unexplained reference numerals 410 and 420 are a moving panel 410 and a coupling panel 420 which are the main components of the front panel 400. The coupling panel 420 is detachably coupled to the base panel 300 and serves to reinforce a length portion that is relatively longer in a longitudinal direction (i.e., X direction) than in a width direction (i.e., Y direction), and the moving panel 410 is movably disposed with respect to the base panel 300 and serves to open and close the air suction port 305.

[0063] An installation procedure of the ceiling type air conditioner 1 will be described below.

[0064] First, an installer moves the base panel 300 to the ceiling where the case 200 is fixed, and then as shown in FIG. 7, temporarily fixes the base panel 300 to the case 200 by an operation of latching the fixing bracket 710 disposed on the base panel 300 at the projecting end 250 disposed on the case 200. By temporarily fixing the base panel 300 to the case 200 by means of the fixing bracket 710, the base panel 300 can be prevented from

falling down upon installation of the base panel 300, thereby ensuring the safety of the installer.

[0065] Next, as referred to FIG. 7, the installer separates the side panels 600 from the base panel 300 to expose the bracket assembly 700 to the outside. With the bracket assembly 700 exposed, the installer matches the lower surface of the base panel 300 with the outer appearance of the ceiling by adjusting the distance between the case 200 and the base panel 300 by using the fastening member 720.

[0066] Here, the bracket assembly 700 is located in the service space that is exposed to the outside by the removal of the side panels 600. Therefore, in the case that the user installs the air conditioner 1 in another position, the installation work can be performed easily after exposing the service space to the outside by removing only the side panels 600 from the base panel 300 without disassembling the entire base panel 300.

[0067] Additionally, the procedure of separating the impurity collecting unit 1100 from the ceiling type air conditioner 1 will be described below.

[0068] First, when the impurity collecting unit 1100 is filled with impurities according to the frequency of use, the user exposes the service space to the outside by removing only the side panels 600 from the base panel 300. At this time, since the impurity collecting unit 1100 is exposed to the outside, the user can easily remove the impurity collecting unit 1100 even without other components (e.g., base panel 300) from the air conditioner 1.

[0069] Next, the user decouples between the dust container 1100 and the dust container housing 1120 by manipulating the attaching/detaching portion 1113 by an operation of gripping the handle portion 1112 of the dust container 1110 among the components of the impurity collecting unit by a hand. At this time, if the user moves the hand portion 1112 downward, the dust container 1110 is removed from the dust container housing 1120.

[0070] Finally, the user discharges the impurities filled in the dust container 1110 to the outside and couples the dust container 1110 to the dust container housing 1120 in the reverse order of the aforementioned removal procedure of the dust container 1110, and couples the side panels 600 to the base panel 300.

[0071] As described above, the ceiling type air conditioner 1 according to the present invention possesses the advantage that user' s convenience can be increased because it is possible to separate only the side panels 600 from the base panel 300 and attach and detach the dust container 1110.

[0072] The preferred embodiments of a ceiling type air conditioner according to the present invention have been described in detail with reference to the accompanying drawings. However, the embodiments of the present invention are not necessarily limited thereto, and any person having ordinary skill in the art may easily find various modifications or other embodiments equivalent to the present invention. Therefore, the scope of the present invention is covered by the appended claims as set forth in the following.

Claims

1. A ceiling type air conditioner, comprising:

a case disposed in an interior space of a ceiling;
a base panel disposed below the case, and longitudinally formed in a length direction longer than a width direction, and having an air suction port for sucking air to the case and an air discharge port formed to at least one side of the width direction of the air suction port in parallel with the air suction port and for discharging the air sucked to the case after heat exchange;
a front panel disposed on the base panel so as to open and close the air suction port;
a side panel coupled to at least one of both ends of the base panel; and
a bracket assembly coupled to the case and the base panel and for adjusting the distance between the case and the base panel,

wherein, when the side panel is removed from the base panel by a user, the bracket assembly is exposed so that the bracket assembly can be operated by the user.

2. The ceiling type air conditioner of claim 1, further comprising:

a filter for filtering impurities of the air sucked form the air suction port;
a brush assembly for separating and collecting the impurities filtered through the filter while horizontally moving along the filter;
a suction unit for sucking the impurities collected in the brush assembly in communication with the brush assembly when the brush assembly is moved to one side of the suction unit; and
an impurity collecting unit for collecting the impurities sucked by the suction unit,

wherein, when the side panel is removed from the base panel by the user, the impurity collecting unit is exposed so that the impurity collecting unit can be detached by the user.

3. The ceiling type air conditioner of claim 1, wherein the bracket assembly comprise:

a fixing bracket for connecting the base panel to the case in order to temporarily fix the base panel to the case; and
a fastening member for adjusting the distance between the case and the base panel.

4. The ceiling type air conditioner of claim 3, wherein the fastening member is a fastening bolt, and adjusts the distance between the case and the base panel by rotating the fastening bolt.

5. The ceiling type air conditioner of claim 1, wherein hooks are provided at either the base panel or the side panel, and latching portions disposed to latch the hooks are provided at the other one.

6. The ceiling type air conditioner of claim 1, wherein the side panel is attached to and detached from the base panel by sliding movement.

7. The ceiling type air conditioner of claim 1, wherein the side panel comprises a first coupling portion, and the base panel comprises a second coupling portion coupled to the first coupling portion, and
if a user pushes the side panel in a direction toward the base panel, the first coupling portion and the second coupling portion are coupled or decoupled.

8. The ceiling type air conditioner of claim 7, wherein the side panel further comprises an elastic member rotatably hinged to the base panel, and for providing a rotary force rotating the side panels downward when the first coupling portion and the second coupling portion are decoupled.

9. The ceiling type air conditioner of any one of claims 3 to 6,
wherein the side panel further comprises falling preventing potions for preventing the side panel from being removed and falling down from the base panel.

10. The ceiling type air conditioner of claim 9, wherein the fall preventing portion is either a connecting member or a wire connecting the side panel and the base panel.

11. The ceiling type air conditioner of claim 1, wherein the side panel is disposed at each side of the front panel, and
the ceiling type air conditioner further comprises a display portion disposed on at least one of the side panels and for displaying operation information of the ceiling type air conditioner.

12. The ceiling type air conditioner of claim 11, wherein the display portion is disposed so as to be surface-matched with the lower surface of the side panel.

13. The ceiling type air conditioner of claim 11 or 12, wherein the display portion comprises:

a screen display portion disposed on the side panel and for representing an image; and
an exterior portion made of a semitransparent material, which is disposed on the screen display portion, and which is subjected to observation from the outside by optical transmission of the screen display portion when the screen display portion is operated, or is kept from observation from the outside by preventing optical transmission of the screen display portion when the screen display portion is not operated.

FIG. 1

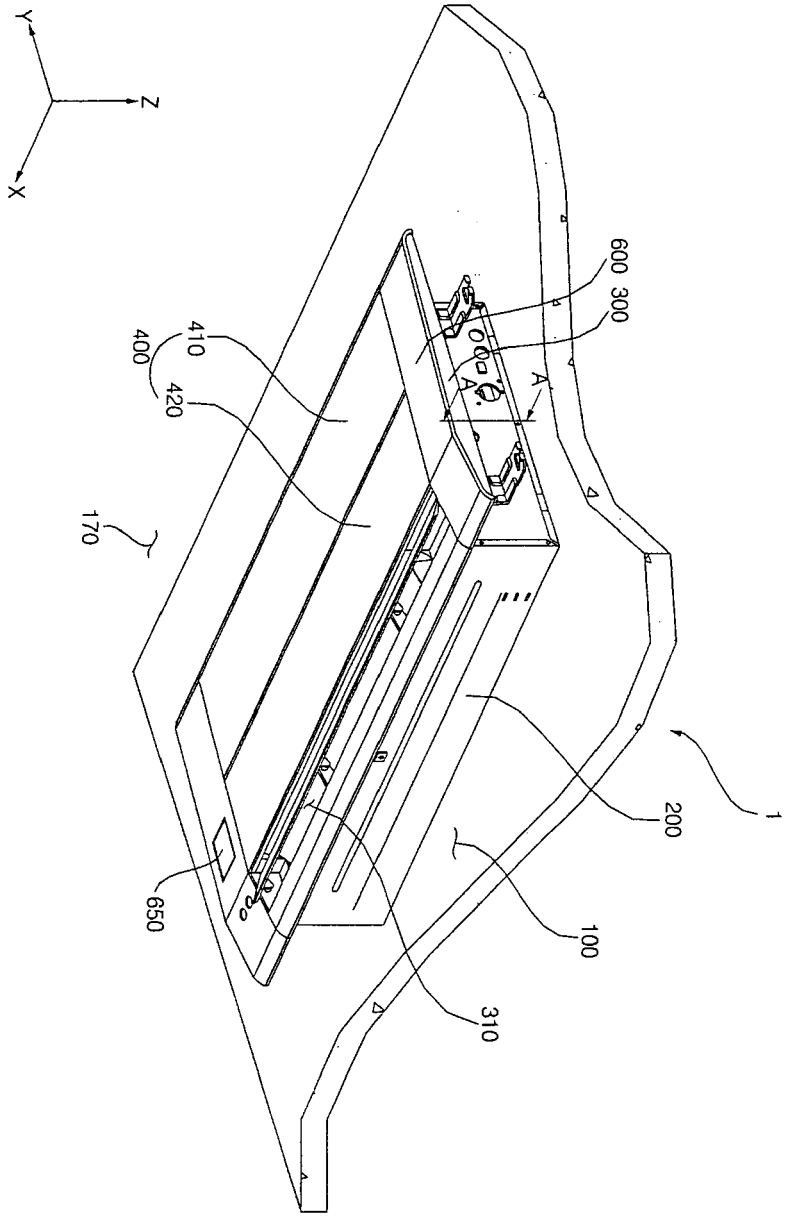


FIG. 2

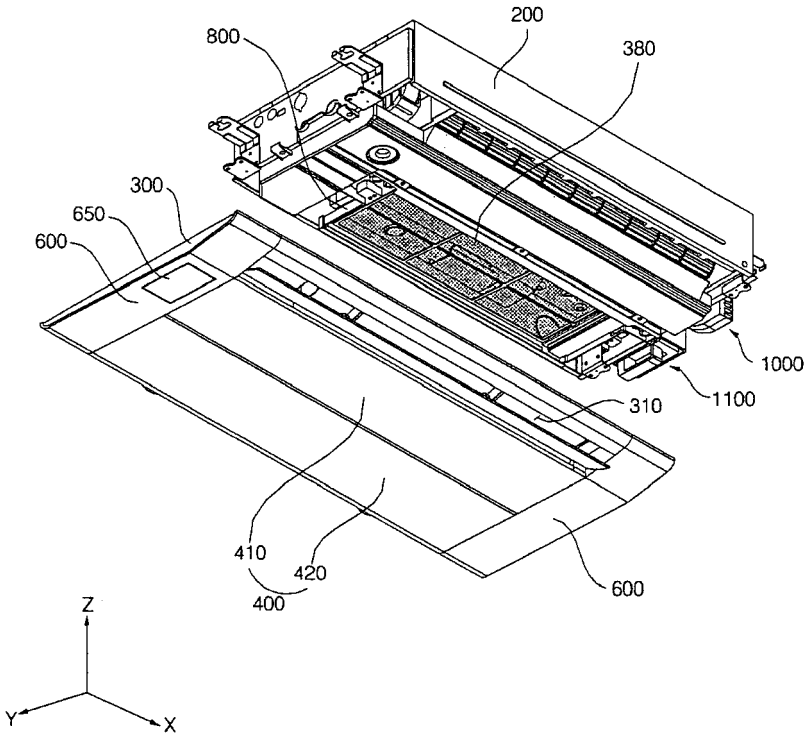


FIG. 3

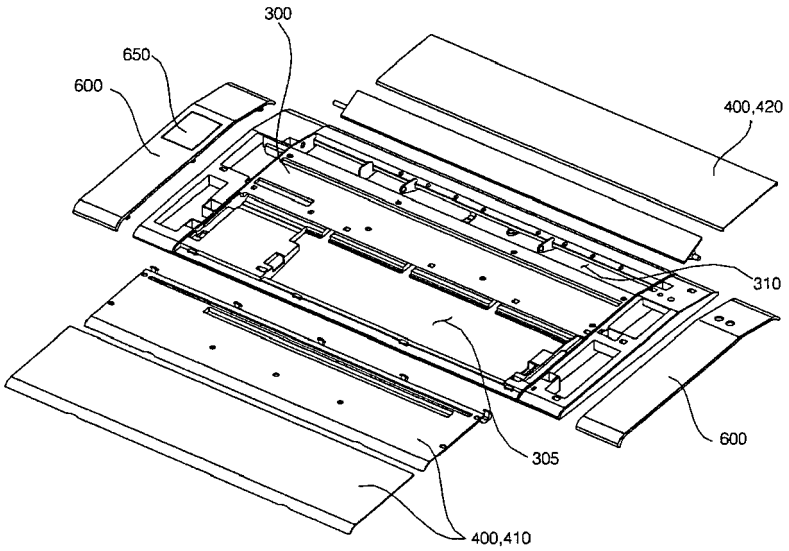
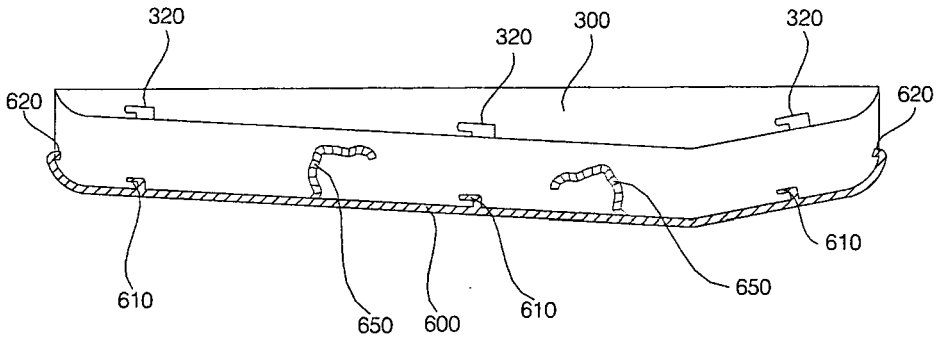


FIG. 4A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650
600
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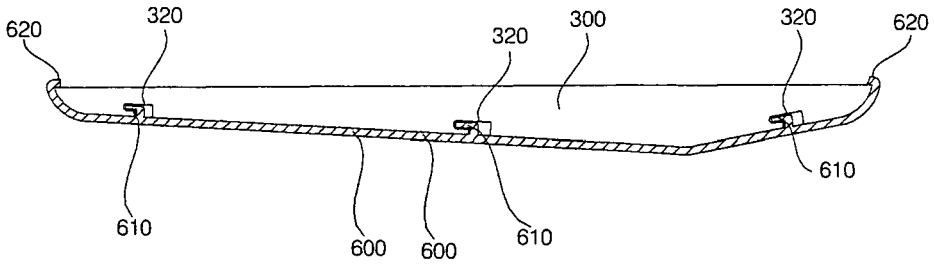
650
610

FIG. 4B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600
610

FIG. 5A

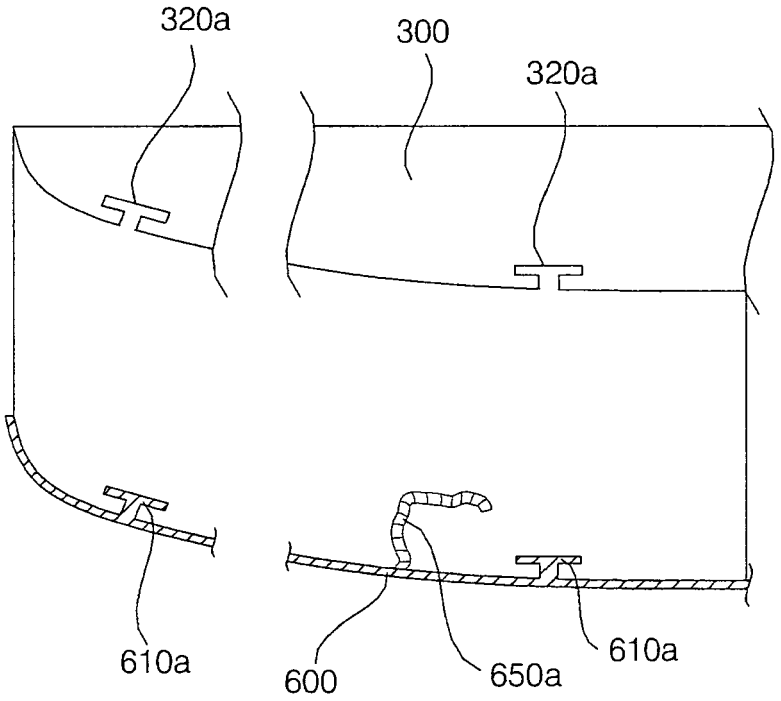

FIG. 5B

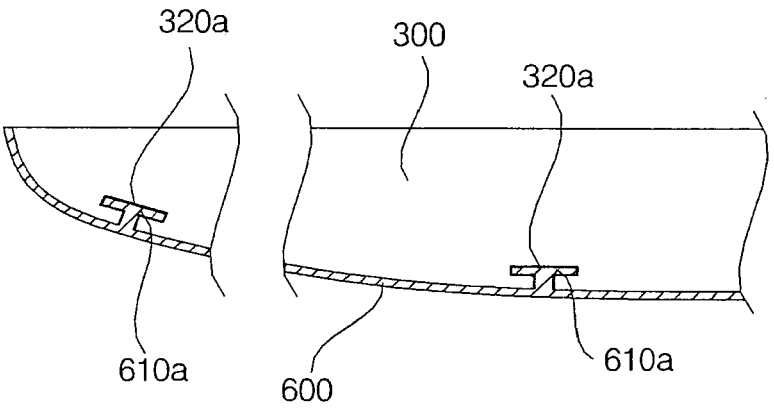

FIG. 6A

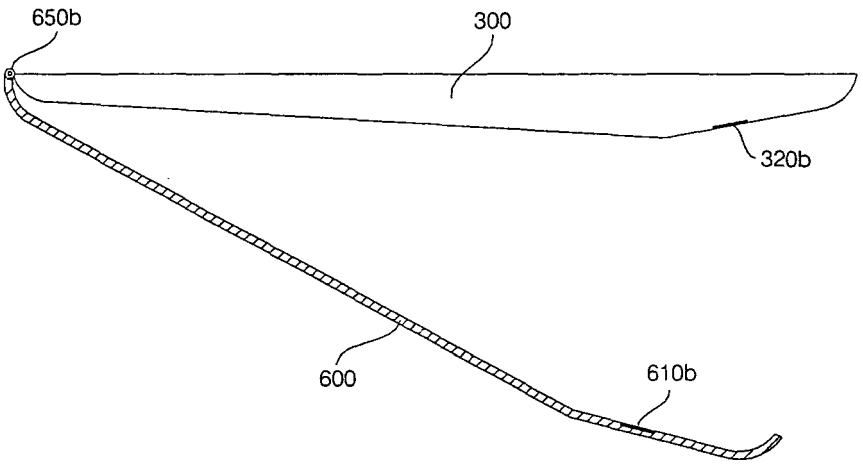

FIG. 6B

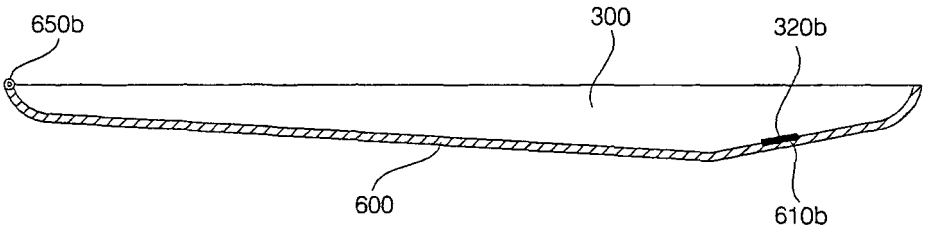

FIG. 7

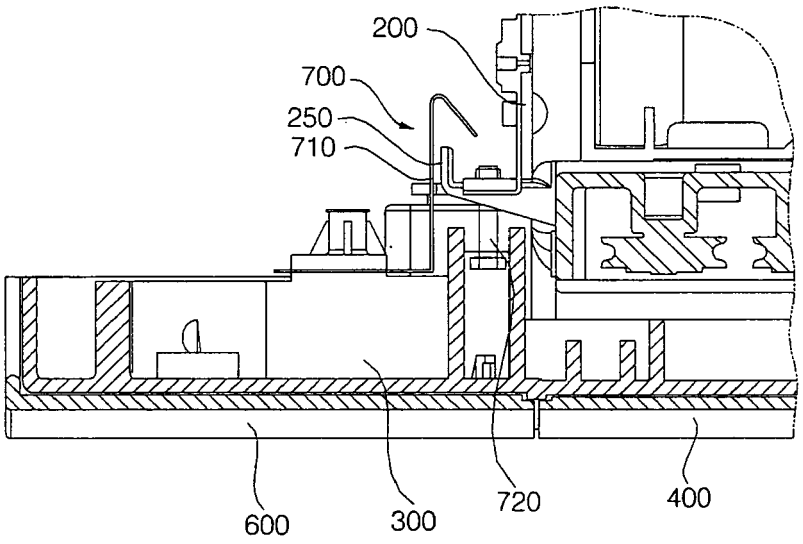

FIG. 8

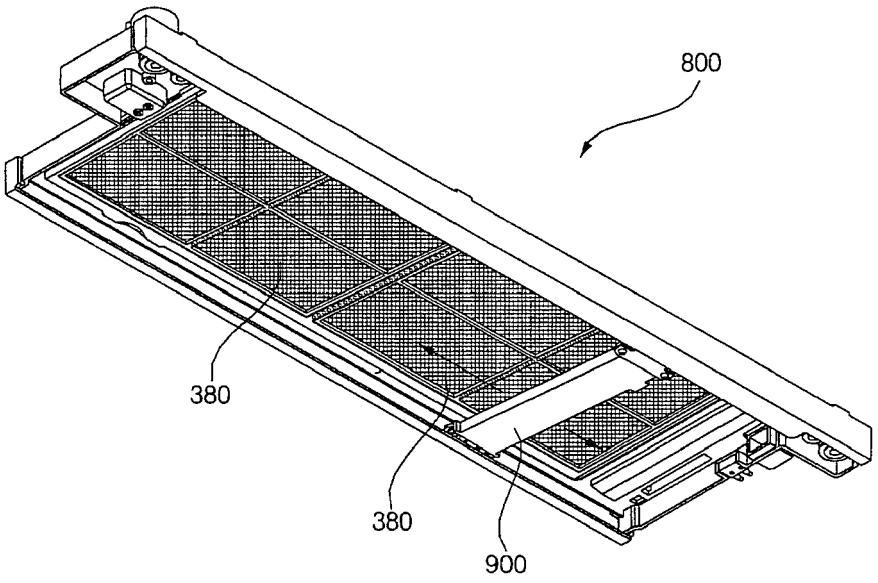

FIG. 9

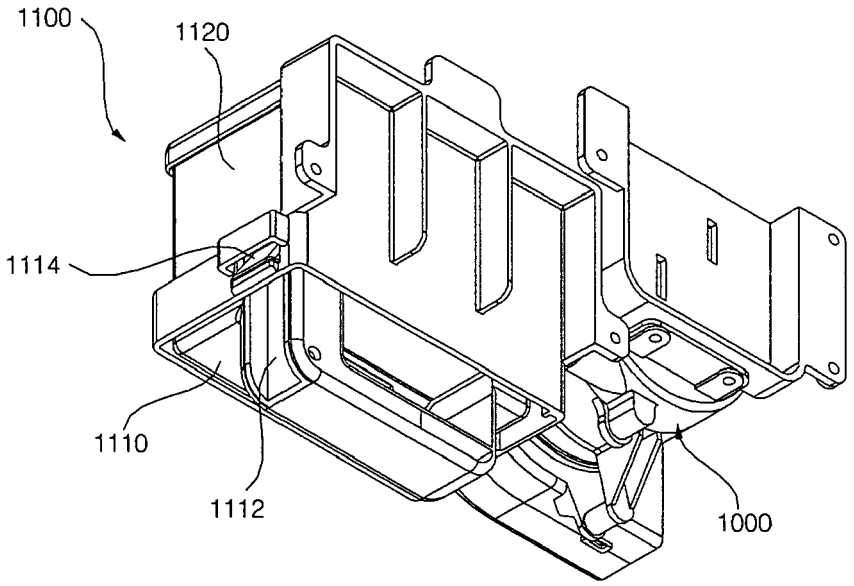

FIG. 10

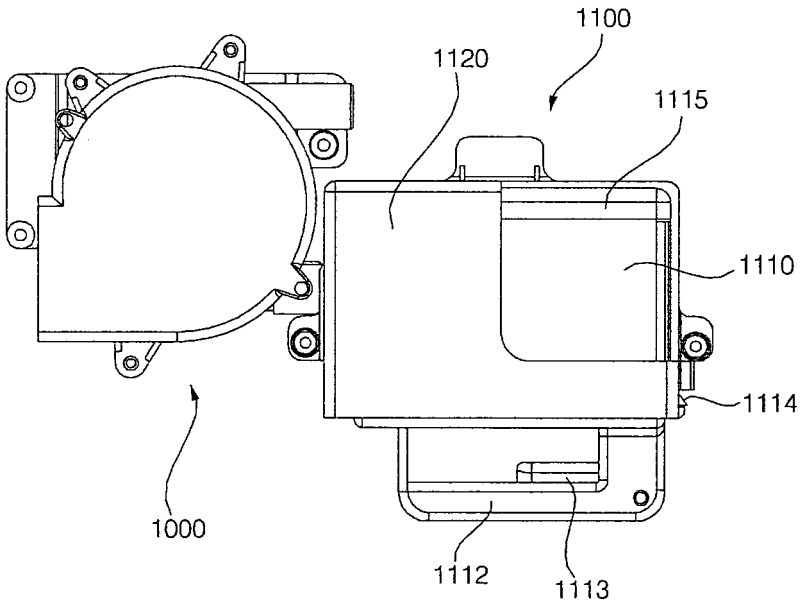

FIG. 11

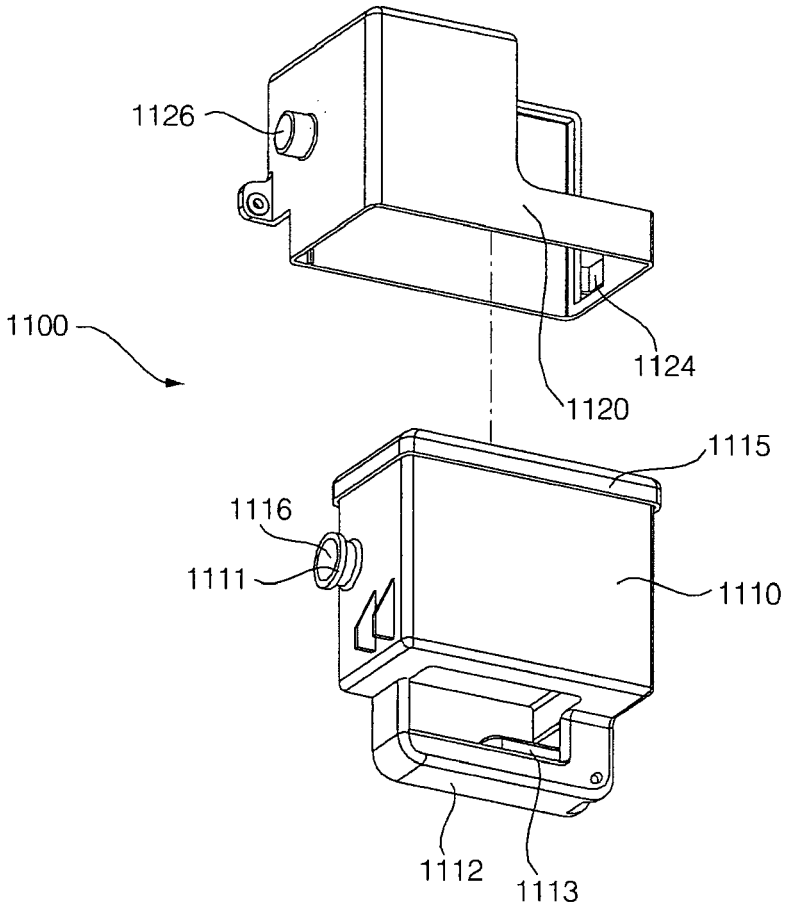

FIG. 12A

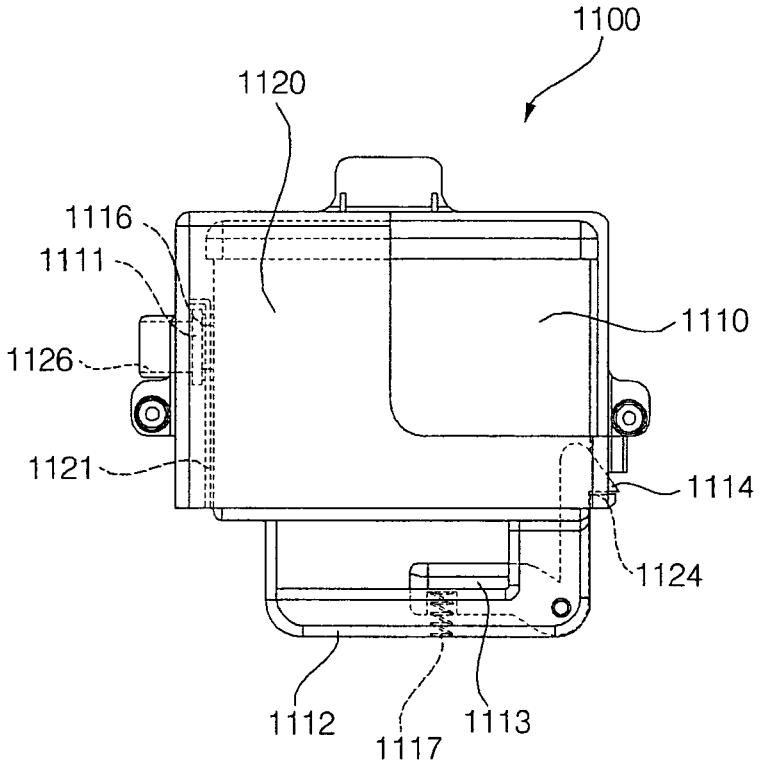

FIG. 12B

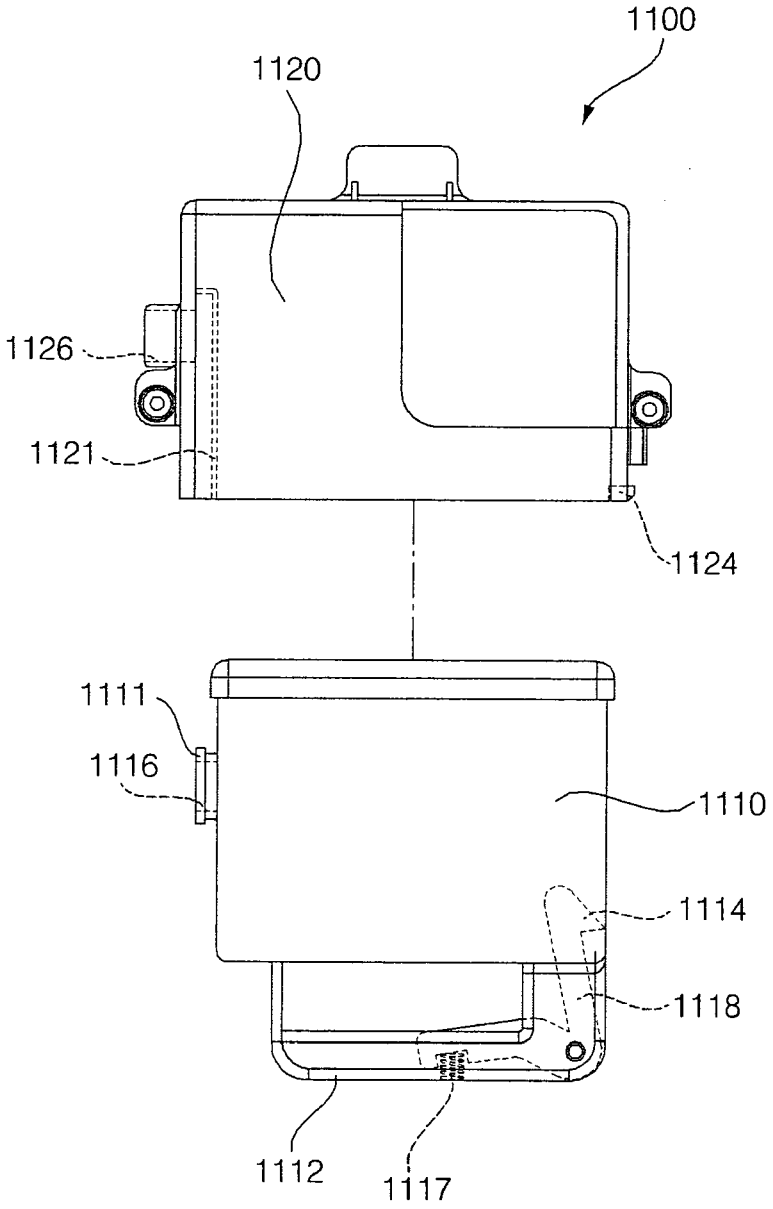

FIG. 13