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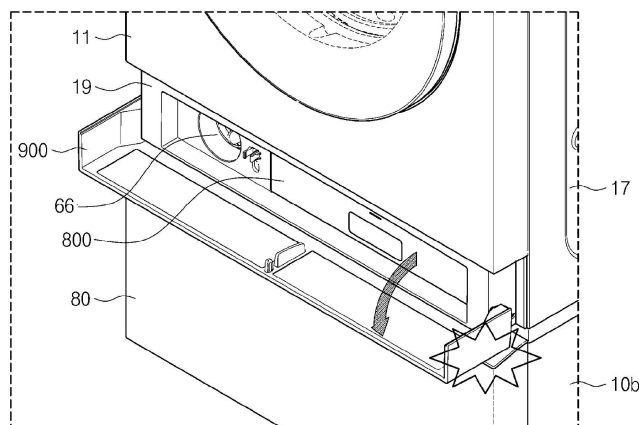
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(54) **LAUNDRY PROCESSING APPARATUS**

(57) The present disclosure relates to a laundry processing apparatus including: a detergent box disposed below a tub to store a detergent supplied to the tub; a detergent cover coupled to a lower part of a cabinet so as

to shield the detergent box; and a movable rotation part provided on at least one of the detergent cover and the cabinet to slide and rotate the detergent cover away from the cabinet.

[Fig 6]



Description

[Technical Field]

[0001] The present disclosure relates to a laundry treating apparatus and a method for controlling the same.

[Background]

[0002] A laundry treating apparatus performs one or more of a washing cycle for removing foreign substances from laundry and a drying cycle for removing moisture from laundry.

[0003] Such a laundry treating apparatus may be largely divided into a front-load type having an opening defined in a front portion thereof and a top-load type having an opening defined in an upper portion thereof. Recently, a front-load type laundry treating apparatus has been introduced in which a detergent box for supplying detergent is extended from a position lower than the opening.

[0004] Such a laundry treating apparatus has advantages in that the detergent box is not disposed above the opening, and thus a hole or a boundary line through which the detergent box extends from and is retracted into a front panel of a cabinet may be omitted, and that the front panel of the laundry treating apparatus itself is made of an integral metal material to enhance aesthetics.

[0005] However, when the detergent box is exposed at the front, not only is the appearance degraded, but the detergent box may also be unintentionally discharged. Accordingly, a cover for shielding a front side of the detergent box is coupled to the cabinet in conventional laundry treating apparatuses.

[0006] The cover has an advantage in that it is coupled to a lower portion of the cabinet of the laundry treating apparatus so as to be pivotable in an up-down direction to selectively open the detergent box.

[0007] However, when a lower portion of the cover is coupled to the lower portion of the cabinet so that an upper end of the cover is pivotable in the up-down direction, when the cover is opened, a connection portion between the cover and the cabinet is exposed to the outside, thereby deteriorating the aesthetic sense.

[0008] In addition, when the cover and the front panel are in close contact with each other in a state in which they are disposed in parallel with each other, the aesthetic sense may be enhanced, but there is a problem in that a top surface of the cover interferes with a bottom of the front panel, and thus the cover is not smoothly opened.

[0009] In particular, when both side surfaces protrude from a front surface of the cover and are coupled to both sides of the cabinet, a coupling configuration may be increased without exposing a coupling portion between the cover and the cabinet to the outside, thereby enhancing the coupling force, but there is a problem in that upper portions of the side surfaces of the cover are

interfered with a lower end of the front panel, thereby making it difficult to open the cover.

[0010] In this case, when the cover is disposed to be largely spaced apart from the bottom of the front panel, the cover does not interfere with the front panel, but not only the aesthetic sense is greatly deteriorated, but also there is a high possibility that user's body or laundry is erroneously inserted into the corresponding gap.

[0011] Accordingly, there is a fundamental problem in that a detergent cover which is disposed in parallel to the front surface and the side surfaces of the cabinet and is in close contact with the front surface and the side surfaces of the cabinet to selectively shield the detergent box cannot be applied in the related art.

[0012] In addition, in conventional laundry treating apparatuses, even when the detergent cover opens the detergent box, there is inconvenience in that the detergent box collides with the detergent cover or the detergent cover interferes with the coupling portion where it is coupled to the cabinet in a process of extending the detergent box.

[0013] In addition, conventional laundry treating apparatuses also have a problem in that the detergent cover excessively pivots downward, making it difficult for a user to close the detergent cover again, or the detergent cover is damaged by colliding with the floor below or an auxiliary apparatus disposed thereunder.

[Summary]

[Technical Problem]

[0014] The present disclosure is intended to provide a laundry treating apparatus capable of maximizing aesthetics by shielding a connection portion between a detergent cover and a cabinet.

[0015] The present disclosure is intended to provide a laundry treating apparatus in which a detergent cover is able to freely pivot in an up-down direction without interfering with a cabinet even when being in close contact with front and side surfaces of the cabinet.

[0016] The present disclosure is intended to provide a laundry treating apparatus capable of pivoting a detergent cover in an up-down direction without interference even when the detergent cover is disposed in close contact with front and side surfaces of a cabinet in a state in which the detergent cover is disposed in parallel with the front and side surfaces of the cabinet.

[0017] The present disclosure is intended to provide a laundry treating apparatus in which both side surfaces of a detergent cover extend with a height corresponding to that of a front surface of the detergent cover so that the detergent cover may pivot in an up-down direction without interference with a cabinet even when it is in close contact with the cabinet.

[0018] The present disclosure is intended to provide a laundry treating apparatus capable of minimizing a gap in a cabinet when a detergent cover shields a detergent

box.

[0019] The present disclosure is intended to provide a laundry treating apparatus in which even when a detergent cover pivots downward to expose a detergent box, there is no risk of collision of the detergent cover with an auxiliary apparatus disposed on the floor or under the laundry treating apparatus.

[0020] The present disclosure is intended to provide a laundry treating apparatus in which a detergent cover does not limit extension and retraction of a detergent box.

[Technical Solutions]

[0021] In order to solve the above-described problems, the present disclosure provides a laundry treating apparatus comprising: a detergent box disposed under a tub and configured to store therein detergent to be supplied to the tub; a detergent cover coupled to a lower portion of a cabinet and configured to shield the detergent box; and a movement-pivot member disposed in at least one of the detergent cover and the cabinet and configured to allow the detergent cover to slide away from the cabinet.

[0022] The movement-pivot member may include: a rotation shaft disposed on one of the detergent cover and the cabinet and configured to form a pivoting center of the detergent cover; and an ascending-descending slit defined in the other of the detergent cover and the cabinet, and configured to rotatably support the rotation shaft and guide the rotation shaft to slide.

[0023] The ascending-descending slit may be defined to have a length greater than a diameter of the rotation shaft.

[0024] The cabinet may include: a front panel having the opening defined therein and disposed upward of the detergent box; a base panel disposed downward of the drum, configured to support the detergent box, and exposing a front portion thereof; and a connection panel disposed in front of the base panel, configured to expose the detergent box, and coupled to the detergent cover.

[0025] The rotation shaft may protrude from each of both sides of the detergent cover, and the ascending-descending slit may be defined at each of both sides of the connection panel.

[0026] The ascending-descending slit may be defined in each side surface of the connection panel so as to extend downward.

[0027] The connection panel may be disposed rearward of the front panel, and the detergent cover may be disposed in parallel with the front panel when shielding the detergent box.

[0028] The detergent cover may include: an exposed surface disposed under a front portion of the front panel and configured to shield the detergent box; and coupling surfaces extending from both sides of the exposed surface to both sides of the connection panel, respectively, and the rotation shaft may protrude from an inner side of each coupling surface and may be coupled to the ascending-descending slit.

[0029] A lower end of the ascending-descending slit may be disposed forward of an upper end thereof.

[0030] The laundry treating apparatus may further comprise a stopper disposed in at least one of the detergent cover and the cabinet and configured to limit an opening angle of the detergent cover.

[0031] The stopper may be configured to restrict the detergent cover from pivoting further downward beyond an angle at which an exposed surface of the detergent cover is disposed in parallel with the floor.

[0032] The stopper may include: a movable shaft disposed in one of the detergent cover and the cabinet so as to be spaced apart from the rotation shaft; and a guide slit defined in the other of the detergent cover and the cabinet and configured to support the movable shaft so as to be reciprocable.

[0033] The guide slit may be defined to extend in a downwardly convex curve from a position rearward of the ascending-descending slit toward a position upward of the ascending-descending slit.

[0034] An upper end of the guide slit may be disposed upward of a lower end of the ascending-descending slit, and a lower end of the guide slit may be disposed rearward of an upper end of the ascending-descending slit.

[0035] The guide slit may include: a guide groove extending from an upper end to a lower end of the guide slit in the downwardly convex curve and configured to guide the movable shaft; and a distal end extending from a lower end of the guide groove rearward and upward and configured to support the movable shaft.

[0036] The laundry treating apparatus may further comprise: a hook protruding from a rear surface of the detergent cover and detachably fixed to the cabinet; and a guide protruding at a position downward of the hook and configured to guide extension of the detergent box, and the guide may have a height equal to or greater than a height of the hook.

[Advantageous Effects]

[0037] The present disclosure may maximize aesthetics by shielding the connection portion between the detergent cover and the cabinet.

[0038] The present disclosure may allow the detergent cover to freely pivot in the up-down direction without interfering with the cabinet even when the detergent cover is in close contact with the front and side surfaces of the cabinet.

[0039] The present disclosure may allow the detergent cover to pivot in the up-down direction without interference even when the detergent cover is disposed in close contact with the front and side surfaces of the cabinet in the state in which the detergent cover is disposed in parallel with the front and side surfaces of the cabinet.

[0040] The present disclosure may allow both side surfaces of the detergent cover to extend with the height corresponding to that of the front surface of the detergent cover so that the detergent cover may pivot in the up-

down direction without interference with the cabinet even when it is in close contact with the cabinet.

[0041] The present disclosure may minimize the gap in the cabinet when the detergent cover shields the detergent box.

[0042] The present disclosure may have no risk of collision of the detergent cover with the auxiliary apparatus disposed on the floor or under the laundry treating apparatus even when the detergent cover pivots downward to expose the detergent box.

[Brief Description of the Drawings]

[0043]

FIG. 1 is a view illustrating an outer appearance of a laundry treating apparatus according to the present disclosure.

FIG. 2 is a view illustrating an inner cross-section when a laundry treating apparatus according to the present disclosure is equipped as a composite apparatus.

FIG. 3 is a detailed view illustrating an internal structure of a cabinet of a laundry treating apparatus according to the present disclosure.

FIG. 4 illustrates an outer appearance of an auxiliary apparatus that may be included in a laundry treating apparatus according to the present disclosure.

FIG. 5 illustrates an outer appearance of an auxiliary apparatus that may be included in a laundry treating apparatus according to the present disclosure.

FIG. 6 illustrates an embodiment of a detergent box and a detergent cover according to the present disclosure.

FIG. 7 illustrates a coupled structure of a detergent cover in a laundry treating apparatus according to the present disclosure.

FIG. 8 illustrates an embodiment in which the detergent cover may be opened without interfering with the front panel.

FIG. 9 illustrates another embodiment in which the detergent cover may be opened without interference with the front panel.

FIG. 10 illustrates in detail a process in which the detergent cover pivots with respect to the connection panel.

FIG. 11 illustrates an embodiment in which the detergent cover pivots by an angle so as to be exactly parallel to the base.

FIG. 12 illustrates an embodiment in which the detergent cover is fixed to the connection panel while not interfering with extension and retraction of the detergent box.

FIG. 13 illustrates a structural embodiment of the detergent cover and the connection panel.

[Best Mode]

[0044] Hereinafter, embodiments disclosed herein will be described in detail with reference to the accompanying drawings. In the present document, the same or similar components are assigned with the same or similar reference numerals even in different embodiments, and the description thereof is substituted by the first description. A singular expression used herein includes a plural expression unless the context clearly indicates otherwise. In addition, in describing the embodiments disclosed herein, when it is determined that a detailed description of related known technologies may obscure the gist of the embodiments disclosed herein, the detailed description thereof will be omitted. In addition, it should be noted that the accompanying drawings are only for making it easy to understand the embodiments disclosed herein, and the technical idea disclosed herein should not be interpreted as being limited by the accompanying drawings.

[0045] FIG. 1 is a view illustrating an outer appearance of a laundry treating apparatus according to the present disclosure.

[0046] The laundry treating apparatus according to the present disclosure may be equipped as one of a washing machine 1 and a dryer 2, or may include one or more of a composite apparatus 4 in which the washing machine 1 and the dryer 2 are integrated, and an auxiliary apparatus 5 disposed under the composite apparatus 4.

[0047] Hereinafter, the laundry treating apparatus according to the present disclosure will be described as including the composite apparatus 4 and the auxiliary apparatus 5 disposed under the composite apparatus 4. However, this is only for description, and does not exclude cases in which the laundry treating apparatus according to the present disclosure is equipped as the washing machine 1, is equipped as the dryer 2, or includes the washing machine 1 and the dryer 2 arranged vertically.

[0048] The composite apparatus 4 according to the present disclosure may include a cabinet 10 forming an outer appearance thereof. An opening through which laundry may be inserted and withdrawn may be defined in a front portion of the cabinet 10, and the opening may be opened and closed by a door 200.

[0049] The door 200 may be pivotably coupled to the cabinet 10 to selectively open and close the opening. When the door 200 is fixed or locked to the cabinet 10, the door 200 may be configured such that only a transparent material is exposed on a front surface thereof. To this end, the front surface of the door 200 may be made of glass, or a transparent material such as a plastic or acrylic material.

[0050] A control panel 100 that receives a command for controlling the laundry treating apparatus according to the present disclosure or displays information to the outside may be disposed above the door 200.

[0051] The cabinet may include a front panel 11 form-

ing a front surface, and the control panel 100 may be installed in the front panel 11.

[0052] The control panel 100 may include an input unit to receive various commands from a user. The control panel 100 may include a display for displaying information of the laundry treating apparatus to the outside. At least a portion of the control panel 100 may be equipped as a touch panel to perform both functions of the input unit and the display.

[0053] The control panel 100 may have a width greater than a height, and may be formed in an oval shape or a racetrack shape. Therefore, the control panel 100 may display more information than when it is formed in a circular shape, or may easily display a completed sentence, phrase, or the like.

[0054] The control panel 100 may receive a command to perform the course, or display a state of performing the course, information necessary to perform the course, and the like.

[0055] The control panel 100 may include one or more of a plurality of buttons or a touch panel for receiving a command from a user, a microphone for receiving a user's voice, a camera or a proximity sensor for receiving a user's motion or state, a screen for displaying visual information to a user, and a speaker for transmitting auditory information to a user.

[0056] When the laundry treating apparatus according to the present disclosure is of a front-load type in which the opening is defined in the front portion of the cabinet, the control panel 100 may be disposed in the front portion of the cabinet 10 at a position above the door 11. Accordingly, accessibility and visibility may be secured.

[0057] In one example, when the laundry treating apparatus according to the present disclosure is of a top-load type in which the opening is defined in an upper portion of the cabinet, the control panel 100 may be defined in a top surface of the cabinet 10 at a position in front of the door 200.

[0058] When the auxiliary apparatus 5 is disposed under the composite apparatus 4, the control panel 100 may be equipped as a composite panel capable of controlling one or more of the composite apparatus 4 and the lower auxiliary apparatus 5 at once.

[0059] The composite apparatus 4 may further include a main communication module that is in communication with an external entity.

[0060] The main communication module may be provided in any configuration as long as it is able to be in communication with at least one of the auxiliary apparatus 5, an external terminal, a router, and a server provided separately from the composite apparatus 4.

[0061] For example, the main communication module may be a wireless communication module that supports communication according to Wi-Fi, Bluetooth, NFC, or the like.

[0062] The main communication module may be connected to the control panel 100 or installed in the control panel 100 to transmit a signal input from the control panel

100 to the auxiliary apparatus 5, the external terminal, the router, and the server.

[0063] In addition, the main communication module may transmit signals received from the auxiliary apparatus 5, the external terminal, the router, and the server to the control panel 100.

[0064] When the composite apparatus 4 according to the present disclosure performs a function of the dryer 2, a filter 99 for filtering drum air at a position outside a drum may be disposed in an upper portion of the cabinet 10.

[0065] The filter 99 may filter foreign substances of a circulation duct that is received in the cabinet 10 and circulates air, and the circulation duct may be disposed in the cabinet 10 so as to be closer to the upper portion than a lower portion of the cabinet 10 so that the filter 99 may be withdrawn upward from a top panel 13 of the cabinet. The structure of the circulation duct will be described later.

[0066] The door 200 may be coupled to the cabinet 10 in the form of a push button. When the door 200 is pressed toward the cabinet 10, the door 200 may sequentially repeat opening and closing of the opening.

[0067] When the door 200 is provided in the form of a push button, even in a situation in which a user is not able to pull the door 200, such as holding laundry in both hands of the user, the door 200 may be sequentially fixed to the cabinet 10 or separated from the cabinet 10 when pressed toward the opening or the cabinet 10.

[0068] The door 200 is pivotably coupled to a hinge disposed on one side of the opening. Accordingly, it is preferable that a locking portion where the door 200 is coupled or fixed to the cabinet 10 is installed in an area facing the hinge with respect to the opening.

[0069] The door 200 may have a pressing portion 250 positioned on the outer surface of the door to guide a user to press a position corresponding to the locking portion. The pressing portion 250 may be indicated so as to be distinguished from other areas on the surface, or may be visually distinguished by being provided as a separate lamp or the like.

[0070] The door 200 may further include a sensing portion 240 that receives a pressing or touch by a user and separates the door 200 from the cabinet 10.

[0071] The sensing portion 240 may be provided with a component capable of sensing a user's physical contact. For example, the sensing portion 240 may include any component as long as it is able to sense a user's physical contact, such as a touch film, a touch panel, a physical button, a piezoelectric element, and the like installed on the door 200.

[0072] When the user touches or presses the sensing portion 240, the door 200 may be opened from the cabinet 10 even when it is not pressed toward the cabinet 10. Accordingly, damage or scratches may be prevented in advance when the door 200 is pressed by a user, an object, or the like.

[0073] The sensing portion 240 may be disposed near the pressing portion 250. Accordingly, a user may intuitively

tively recognize that the sensing portion 240 and the pressing portion 250 are areas that receive a user's input.

[0074] The sensing portion 240 may be embedded in the door 200, but may be visible on the outer surface of the door 200. Therefore, the sensing portion 240 may further include a separate light emitter. In one example, an area in which the sensing portion 240 is installed may be indicated on the surface of the door 200 by marking, shading, or the like.

[0075] The laundry treating apparatus according to the present disclosure may further include the auxiliary apparatus 5 disposed under the composite apparatus 3. The auxiliary apparatus 5 may be disposed under the composite apparatus 3, and the composite apparatus 3 may be seated on top of the auxiliary apparatus 5.

[0076] The auxiliary apparatus 5 may include an auxiliary cabinet 10b disposed under the cabinet 10 of the composite apparatus 4 and a drawer 80 extended forward from the auxiliary cabinet 10b.

[0077] An auxiliary input unit 84 capable of receiving an extension command for extending the drawer 80 forward from a user may be disposed at a front portion of the drawer 80.

[0078] The auxiliary input unit 84 may receive an additional command in addition to the extension command. Accordingly, the auxiliary input unit may be provided as a multi-functional input unit.

[0079] The multi-functional input unit 84 may be provided as any component as long as it is able to be in contact with a user's body and receive the extension command. For example, it may be provided as a touch panel or a button.

[0080] A vertical level at which the composite apparatus 4 is disposed may increase because of the auxiliary apparatus 5. Accordingly, when the composite apparatus 4 is of the front-load type in which the door 200 is disposed at the front portion of the cabinet 10, the position of the opening 14 is also raised, so that a user may easily access the door 200 without bending or bending the waist less.

[0081] The detailed configurations of the composite apparatus and the auxiliary apparatus will be described later.

[0082] In one example, the auxiliary apparatus 5 according to the present disclosure may be seated on top of the cabinet 10. In this case, the auxiliary apparatus 5 may include the auxiliary cabinet 10b, but the drawer 80 may be omitted.

[0083] Alternatively, the auxiliary apparatus 5 may be disposed at an upper portion of the inside of the cabinet 10 and share the cabinet with the composite apparatus 4.

[0084] In this case, the auxiliary input unit 84 may be disposed at a front side of an upper portion of the auxiliary apparatus 10 or may be disposed at a front side of the auxiliary apparatus 10.

[0085] Hereinafter, a description will be made based on the auxiliary apparatus 5 being disposed under the cabinet 10 and including the drawer 80. However, it is not

excluded that the auxiliary apparatus 5 is disposed on top of the cabinet 10.

[0086] The composite apparatus 4 according to the present disclosure may further include a detergent box for storing detergent required when using a washing cycle for removing foreign substances from laundry. The detergent box needs to be extended to the outside of the cabinet 10 in order to replenish detergent and to be washed whenever necessary.

[0087] However, the front panel of the cabinet 10 where the door 200 is installed may be manufactured as an integral plate. In addition, the entire front panel may be made of a metal material. Therefore, it may be difficult to define a hole or the like through which the detergent box is extended through the front panel.

[0088] In addition, the front panel may be provided so as not to expose any apparatus except for exposing the control panel 100 and the door 200 in order to maximize aesthetics, and may extend downward from the top panel of the cabinet 10.

[0089] Accordingly, the detergent box according to the present disclosure may be disposed at a position lower than the front panel and be extended forward. The front panel may be disposed at a vertical level spaced apart from a bottom surface of the cabinet by a predetermined distance, and the detergent box may be seated on the bottom surface of the cabinet and extended forward.

[0090] In order to prevent the detergent box from being exposed to the outside, the laundry treating apparatus according to the present disclosure may further include a detergent cover 900 pivotably coupled to the cabinet to shield the detergent box.

[0091] FIG. 2 is a view illustrating an inner cross-section when a laundry treating apparatus according to the present disclosure is equipped as a composite apparatus.

[0092] The laundry treating apparatus according to the present disclosure may include a tub 20 that is accommodated in the cabinet 10 and stores water therein, and a drum 30 that is rotatably accommodated in the tub 20 and stores water therein.

[0093] The tub 20 may include a tub body 21 formed in a cylindrical shape and having a tub inlet 22 defined at a front portion thereof.

[0094] The tub body 21 may be made of a plastic material or the like, and the tub inlet 22 may be formed in a cylindrical shape having the diameter smaller than the diameter of the tub body 21 and protrude from the front portion of the tub body 21.

[0095] The tub inlet 22 may be in communication with the opening 14 of the cabinet 10.

[0096] In one example, the tub 20 may further include a gasket 23 sealing a space between the tub inlet 22 and the opening 14.

[0097] The gasket 23 may be provided as a component separate from the tub body 21. It may be provided in a ring shape that seals the space between the tub inlet 22 and the opening 14.

[0098] The gasket 23 may be made of an elastic material. Therefore, the gasket 23 may maintain a state of sealing the space between the opening 14 and the tub inlet 22 even when vibration is generated in the tub 20, and may prevent vibration from being transmitted to the opening 14 or the door 200.

[0099] The drum 30 may include a drum body 31 that is rotatably disposed in the tub body 21 and stores laundry therein, and a drum inlet 35 that is defined at a front portion of the drum body 31 and is in communication with the tub inlet 22 and the opening 14.

[0100] The drum body 31 may be formed in a cylindrical shape, and through holes 33 in communication with the inside of the tub body 21 may be defined in a rear surface or an outer circumferential surface of the drum body 31. The drum body 31 may be made of a metal material.

[0101] The laundry treating apparatus according to the present disclosure may include a water supply structure 50 for supplying water to the tub 20 and a drain structure 60 for draining water from the tub 20.

[0102] The water supply structure 50 may include a water supply valve 51 that is coupled to the cabinet 10, is connected to an external water supply source, and selectively supplies water, and a water supply pipe 52 that extends from the water supply valve 51 and transmits water supplied from the external water supply source. The water supply pipe 52 may be coupled to the tub body 21, or may have a distal end coupled to the gasket 23.

[0103] As long as the water supply pipe 52 is able to supply water to the tub 20, the water supply pipe 52 may be coupled to any point of the tub 20.

[0104] The drain structure 60 may include a discharge pipe 61 that is connected to a lower portion of the tub 20 and discharges water from the tub 20, a drain pump 62 that provides power to discharge water supplied from the discharge pipe 61 to the outside of the cabinet 10, and a drain pipe 63 that extends from the drain pump 62 to the outside of the cabinet 10 and discharges water.

[0105] The laundry treating apparatus according to the present disclosure may further include a water level sensor 24 for sensing the water level of the tub 20. The water level sensor 24 may be provided in any configuration as long as it is able to sense the water level inside the tub 20. For example, the water level sensor 24 may include a communication pipe in communication with the tub 20 and having a closed distal end, and a device that is disposed on the communication pipe and senses a pressure change inside the communication pipe.

[0106] The laundry treating apparatus according to the present disclosure may further include a support 70 that supports the tub 20 inside the cabinet 10.

[0107] The support 70 may include one or more of a suspension supporting a lower portion of the tub 20 and a spring supporting an upper portion of the tub 20.

[0108] The laundry treating apparatus according to the present disclosure may include a driver 40 having the same structure as that of a general washing machine 1.

[0109] In addition, the laundry treating apparatus according to the present disclosure may further include a heat supply structure 90 capable of circulating air inside the tub 20 or the drum 30 and heating the air.

[0110] The heat supply structure 90 may be disposed lower than the tub 20.

[0111] However, because the tub 20 is the closest component to the drum 30 and the drain structure 60 is disposed under the tub 20, the heat supply structure 90 may be seated and disposed on the tub 20.

[0112] The heat supply structure 90 may be seated on top of the tub 20. That is, the heat supply structure 90 may be disposed above the opening of the tub.

[0113] The heat supply structure 90 may include one or more of a circulation flow channel 91 that extends from the tub 20 in at least one of front-rear and left-right directions and circulates air inside the tub 20, an evaporator 92 that is accommodated in the circulation flow channel 91, cools the air, and condenses moisture, a condenser 93 that is disposed downstream of the evaporator and heats the air, a compressor 94 that is disposed outside the circulation flow channel 91 and supplies a refrigerant for heating the air to the condenser 93, an expansion valve that expands and cools the refrigerant discharged from the condenser 93 and transfers the expanded and cooled refrigerant to the evaporator 92, and a circulation fan 96 that is disposed inside the circulation flow channel 91 and provides power for circulating the air.

[0114] The circulation flow channel 91 may be provided such that one end thereof is connected to an upper rear side of the tub body 21 and a distal end thereof is connected to an upper front side of the tub body 21 or the gasket 24.

[0115] The circulation fan 96 may operate such that air is sucked into the circulation flow channel 91 from a rear portion of the drum 30 and is discharged into the drum body 31 through the drum inlet 35.

[0116] Accordingly, hot air generated by the heat supply structure 90 may be introduced into the drum inlet 35 to be uniformly supplied to the drum body 31, and thus laundry may be uniformly dried. In addition, air that has dried the laundry may pass through the through holes 33 by the negative pressure provided by the blower fan 96 and be introduced into one end of the circulation flow channel 91 without difficulty.

[0117] As a result, the heat supply structure 90 may be provided to supply hot air into the drum body 31 even though the drum 30 is accommodated in the tub 20 and a plurality of through holes 33 are defined in the outer circumferential surface of the drum 30 to increase air resistance.

[0118] Because the tub 20 is disposed under the heat supply structure 90, a water collection member and a water storage tank for collecting condensate may be omitted in the heat supply structure 90. That is, water condensed in the circulation flow channel 91 may be collected in the tub 20 and discharged to the drain struc-

ture 60.

[0119] The laundry treating apparatus according to the present disclosure may perform a plurality of courses for treating laundry based on the above configuration. The courses may include a washing course for removing foreign substances from laundry and a drying course for removing moisture from laundry.

[0120] The laundry treating apparatus according to the present disclosure may include an integrated controller in which a controller for performing the washing course and a controller for performing the drying course are integrated, and the integrated controller may be embedded in the control panel 100 or may be equipped as a control panel disposed separately from the control panel 100 and mounted inside the cabinet 10.

[0121] The laundry treating apparatus according to the present disclosure may include the driver 40 that is coupled to the tub 20 and rotates the drum 30.

[0122] The driver 40 may include a stator 41 coupled to the rear portion of the tub body 21, a rotor 42 rotated by the stator 41, and a rotation shaft 43 connecting the rotor 42 with the drum 30.

[0123] The tub body 21 may have a bearing housing installed on a rear surface thereof, through which the rotation shaft 43 passes, and which rotatably supports the rotation shaft 43.

[0124] The detergent box 800 may be disposed below the tub 20. The detergent box 800 may be disposed below the front panel. The detergent box 800 may be in communication with the drain structure 60 or a circulation structure 65 to be described later and supply detergent to the tub 20.

[0125] FIG. 3 is a detailed view illustrating an internal structure of a cabinet of a laundry treating apparatus according to the present disclosure.

[0126] The circulation flow channel 91 may be disposed on top of the tub 20 and extend in a '⌊' shape to secure an air flow volume or area sizes of the evaporator and the condenser.

[0127] That is, after extending forward from one side of the upper rear side of the tub body 21, the circulation flow channel 91 may extend to the other side of the upper front side of the tub body 21.

[0128] The circulation flow channel 91 may include an inflow portion 91a extending from the rear side of the tub body 21 to the front side thereof, a flow portion 91b extending from the inflow portion to a front other side of the tub body 21 or to the gasket 24, and an outflow portion 91c extending downward from the flow portion to be in communication with a side defined inward of the gasket 24.

[0129] The duct may be disposed on top of the tub 20 and extend in the left-right direction, and the filter 99, the evaporator 92, and the condenser 93 may be sequentially arranged therein.

[0130] The circulation fan 96 may be in communication with the circulation flow channel 91.

[0131] The circulation fan 96 may be installed inside

the circulation flow channel 91, or may include a housing connecting the flow portion with the outflow portion.

[0132] The circulation fan 96 may be disposed at the front side of the tub body 21 and evenly distribute the weight of the rear side of the tub body 21 to which the driver 40 is coupled.

[0133] The circulation fan 96 may operate such that air flows from the inflow portion to the outflow portion.

[0134] A water supply pipe 51 of the water supply structure 50 may be connected to the gasket 24. A nozzle 500 coupled to a distal end of the water supply structure 51 may be installed at the gasket 24. The nozzle 500 may evenly spray water supplied from the water supply pipe 51 into the drum body 31.

[0135] The laundry treating apparatus according to the present disclosure may further include the circulation structure 65 for circulating and supplying the water of the tub 20 again.

[0136] The circulation structure 65 may include a circulation pump that is in communication with the drain pump 62 or is disposed on one side of the drain pump 62, and a circulation hose that supplies water drained from the tub body 21 back to the tub 20.

[0137] Accordingly, water in the tub 20 may be reused during the washing cycle or a rinsing process to save water, and washing efficiency may be increased by uniformly dissolving detergent or the like through the circulation structure 65.

[0138] The laundry treating apparatus according to the present disclosure may further include the detergent box 800 for storing therein detergent to be supplied to the tub 20.

[0139] The detergent box 800 may be disposed below the tub 200. The detergent box 800 may prevent interference with the heat supply structure 90 disposed above, and may be exposed to a user without difficulty even when the composite apparatus 4 is raised due to the auxiliary apparatus 5.

[0140] The detergent box 800 may include a detergent body that accommodates detergent therein and a detergent pump that sprays detergent accommodated in the detergent body to the tub 20. Accordingly, water from the tub 20 may be prevented from arbitrarily entering the detergent box 800 or detergent may be prevented from being arbitrarily supplied.

[0141] The detergent box 800 may supply detergent to at least one of the drain structure 60 or the circulation structure 65.

[0142] When detergent is supplied to the circulation structure 65, the detergent may be supplied to the tub 20 as the circulation pump or the like is operated, the detergent may be more easily dissolved in water during a circulation process, and the detergent may be evenly supplied to laundry.

[0143] A filter 66 may be disposed between the drain pump 62 and the circulation structure 65, thereby preventing foreign substances discharged from the tub 20 from being reintroduced into the circulation structure 65.

[0144] The filter 66 may be disposed on one side of the detergent box 800 and exposed to the front, and may be forwardly detachable.

[0145] The cabinet may further include a base 15 supporting the filter 66 and the detergent box 800.

[0146] The base 15 may form the bottom surface of the cabinet 10.

[0147] The base 15 may support the support 70, and may support the detergent box 800 and the filter 66 so as not to interfere with the support 70.

[0148] The detergent box 800 may be detachable from the base 15, and may be extended forward from the base 15. Accordingly, a user may continuously replenish detergent in the detergent box 800 or wash the detergent box 800.

[0149] The base 15 may further include a stepped panel 16 that is disposed under the front panel 11 and guides extension and retraction of one or more of the detergent box 800 and the filter 66.

[0150] The stepped panel 16 may include a hole through which the detergent box 800 and the filter 66 are extended and retracted, and may prevent the base 15 from being exposed to the outside.

[0151] The stepped panel 16 may be provided separately from the front panel 11. Accordingly, the front panel 11 and the stepped panel 16 may be made of different materials. As a result, even when the front panel 11 is made of a metal material having high rigidity or difficulty in molding, the stepped panel 16 may be made of a material that is easily molded so as to guide extension and retraction of one or more of the detergent box 800 and the filter 66 or expose one or more of them.

[0152] FIG. 4 illustrates an outer appearance of an auxiliary apparatus that may be included in a laundry treating apparatus according to the present disclosure.

[0153] The auxiliary apparatus 5 may be constructed to be smaller in height and volume than the composite apparatus 4.

[0154] The auxiliary apparatus, as an auxiliary laundry treating apparatus, may be additionally installed on the composite apparatus 4. In one example, the auxiliary apparatus 5 may be provided independently.

[0155] When the laundry treating apparatus according to the present disclosure is equipped as the auxiliary apparatus 5, the cabinet 10 may include the auxiliary cabinet 10b having a height smaller than a width in the left-right direction and a length in the front-rear direction.

[0156] Because the auxiliary cabinet 10b has a small height, it may be disposed under the composite apparatus 4.

[0157] In one example, the auxiliary apparatus 5 may be disposed on top of the composite apparatus 4, but hereinafter, for convenience of description, a description will be made based on the auxiliary apparatus 5 being disposed under the composite apparatus 4 or being disposed independently.

[0158] The auxiliary cabinet 10b may have an opening at a front portion thereof.

[0159] The auxiliary apparatus 5 may further include the drawer 80 disposed in the auxiliary cabinet 10b so as to be retractable and extendable through the opening.

[0160] The drawer 80 may include a drawer body 82 that accommodates therein a tub for accommodating water therein or a rotatable drum, a drawer panel 81 that is disposed in front of the drawer body 81 and opens and closes the opening, and a rail 83 that allows the drawer body 82 to be extended from and retracted into the auxiliary cabinet 10b.

[0161] The drawer body 82 may be formed in a casing shape with an open upper portion, and may further include an auxiliary door 29 for opening or closing the tub and the drum inside.

[0162] Because the auxiliary apparatus 5 includes the drawer 80, even when another laundry treating apparatus or a home appliance is disposed on top of the auxiliary apparatus 5, it may be prevented from being disturbed in use.

[0163] FIG. 5 illustrates an internal structure embodiment in which a laundry treating apparatus according to the present disclosure is equipped as an auxiliary apparatus.

[0164] The auxiliary apparatus 5 may include, in the drawer 80, an auxiliary tub 20b that accommodates water therein and an auxiliary drum 30b that is rotatably disposed in the auxiliary tub and accommodates laundry therein.

[0165] The auxiliary tub 20b and the auxiliary drum 30b may have heights smaller than diameters, and may have inlets through which laundry is inserted at upper portions thereof.

[0166] The auxiliary apparatus 5 may further include a water level sensor 26b for sensing the water level of the auxiliary tub 20b. The water level sensor 26b may sense the water level of the auxiliary tub 20b in a manner of being in communication with the auxiliary tub 20b at a position outside the auxiliary tub 20b and sensing a pressure change inside the auxiliary tub 20b.

[0167] The auxiliary apparatus 5 may include an auxiliary door 29 coupled to an upper portion of the auxiliary tub 20b to prevent water or laundry inside the auxiliary tub 20b from being arbitrarily discharged.

[0168] In addition, the auxiliary apparatus 5 may include an auxiliary driver 40b that is coupled to the auxiliary tub 20b and rotates the auxiliary drum 30b.

[0169] The auxiliary driver 40b may be disposed under the auxiliary tub 20b and rotate the auxiliary drum 30b.

[0170] The auxiliary driver 40b may include an auxiliary stator 41d that is coupled to a lower portion of the auxiliary tub 20b and generates a rotating magnetic field, an auxiliary rotor 42b that is rotated by the auxiliary stator 41b, and an auxiliary rotation shaft 43b that is rotated by the auxiliary rotor and is coupled to a lower portion of the auxiliary drum 30b.

[0171] The auxiliary apparatus 5 according to the present disclosure may further include an auxiliary water supply structure 50b that supplies water to the auxiliary

tub 20b.

[0172] The auxiliary water supply structure 50b may include an auxiliary water supply valve 51b coupled to the auxiliary cabinet 10b, an auxiliary water supply pipe 52b that extends from the auxiliary water supply valve 51b to the drawer and supplies water, and an auxiliary box 53b that guides water supplied along the auxiliary water supply pipe 52b to the tub.

[0173] The auxiliary water supply pipe 52b may be formed in a structure extending forward by a length by which the drawer 80 is extended from the auxiliary cabinet 10b. The auxiliary box 53b may be constructed so that detergent is injected therein and stored therein.

[0174] The auxiliary apparatus 5 according to the present disclosure may further include an auxiliary drain structure 60b that drains water to the auxiliary tub 20b.

[0175] The auxiliary drain structure 60b may include an auxiliary discharge pipe 61b that discharges water from the auxiliary tub 20b, an auxiliary pump 62b that is coupled to the auxiliary discharge pipe 61b and provides power for discharging water, and an auxiliary drain pipe 63b extending from the auxiliary pump 62b to the outside of the auxiliary cabinet 10b.

[0176] The auxiliary drain pipe 63b may be formed in a structure extending forward by a length by which the drawer 80 is extended from the auxiliary cabinet 10b.

[0177] The support 70 may include an auxiliary suspension 70d connecting an inner surface of the drawer 80 to an outer surface of the auxiliary tub 20b.

[0178] FIG. 6 illustrates an embodiment of a detergent box and a detergent cover according to the present disclosure.

[0179] As described above, the cabinet 10 may further include the stepped panel 16 disposed under the front panel 11. An entirety of the front panel 11 and the stepped panel 16 may form the front surface of the cabinet 10. The height of the cabinet 10 may be set as the sum of the height of the front panel 11 and the height of the stepped panel 16.

[0180] However, the stepped panel 16 may be disposed rearward of a lower end of the front panel 11. A front surface of the stepped panel 16 may be disposed rearward of a front surface of the front panel 11 so that the front panel 11 and the stepped panel 16 may form a step.

[0181] Both sides of the front panel 11 and both sides of the stepped panel 16 may be coupled to the side panels 17 of the cabinet.

[0182] The cabinet 10 may further include a connection panel 19 disposed in front of the stepped panel 16 and having a through hole through which one of the detergent box 800 and the filter 66 is extended.

[0183] In addition, the connection panel 19 may be coupled to a front portion of the stepped panel 16.

[0184] The connection panel 19 may prevent not only the stepped panel 16 but also components disposed under the front panel 11 from being exposed to the front. Accordingly, when a user or the like approaches the detergent box 800 and the filter 66, a user's body or

laundry may be prevented from being erroneously inserted into a space between the front panel 11 and the base 15.

[0185] The connection panel 19 may prevent components other than the detergent box 800 and the filter 66 from being exposed between a lower portion of the front panel 11 and the drawer 80 or the floor.

[0186] The front panel 11, the stepped panel 16, the side panels 17, and the base 15 may be made of a metal material in order to ensure durability and maintain a shape even under external impact or vibration.

[0187] However, the connection panel 19 may be made of a material different from those of the front panel 11, the stepped panel 16, the side panels 17, and the base 15 in order to freely form a configuration of extending or retracting the detergent box 800 and the filter 66 or supporting the same, and being coupled to the detergent cover 900. For example, the connection panel 19 may be made of a plastic or resin-based material.

[0188] The connection panel 19 may also be disposed to form a step with the front panel 11. That is, a front surface of the connection panel 19 may also be disposed rearward of the front panel 11.

[0189] The detergent cover 900 may be pivotably coupled to the connection panel 19 to shield one or more of the detergent box 800 and the filter 66 and selectively expose one or more of the detergent box 800 and the filter 66.

[0190] The detergent cover 900 may have an area size corresponding to that of the front surface of the connection panel 19 and may have a shape corresponding to that of the front surface of the connection panel 19.

[0191] When the detergent cover 900 may be coupled to the connection panel 19, may form a portion of the front surface of the cabinet 10 when shielding the detergent box 800 and the filter 66, and may be disposed under the front panel 11.

[0192] The detergent cover 900 may be coupled to the connection panel 19 so as to be pivotable in the up-down direction.

[0193] Specifically, the detergent cover 900 may be pivotably coupled to the connection cover 19 at a lower portion thereof or at a portion adjacent to the lower portion, rather than at an upper portion. Accordingly, when the detergent cover 900 pivots to open or close the connection cover 19, an upper end of the detergent cover 900 may be moved away from or closer to the connection panel 19.

[0194] The opening of the connection cover 19 by the detergent cover 900 may mean that an upper end of the detergent cover 900 pivots downward from the connection cover 19 to expose one or more of the detergent box 800 and the filter 66.

[0195] In addition, the shielding of the connection cover 19 by the detergent cover 900 may mean that the upper end of the detergent cover 900 pivots upward toward the connection cover 19 to shield one or more of the detergent box 800 and the filter 66.

[0196] When the detergent cover 900 is opened, the detergent cover 900 may be disposed downward of the detergent box 800 and the filter 66. Accordingly, when the detergent cover 900 opens the connection panel 19, the detergent cover 900 may be prevented from shielding the detergent box 800 and the filter 66 and blocking them from a user's view.

[0197] In one example, the detergent cover 900 may be disposed in parallel with the front panel 11 when the connection panel 19 is closed. That is, the front surface of the front panel 11 and the front surface of the detergent cover 900 may be disposed in parallel with each other. That is, the detergent cover 900 and the connection panel 19 may compensate for the step between the front panel 11 and the stepped panel 16, and the detergent cover 900 may compensate for a step between the connection panel 19 and the front panel 11. Accordingly, the detergent cover 900 and the front panel 11 may provide a sense of unity and aesthetic appearance as if they were formed as a single structure.

[0198] In one example, when the detergent cover 900 shields the connection panel 19, the detergent cover 900 and the connection panel 19 may be disposed to face each other.

[0199] In this regard, a top surface of the detergent cover 900 is disposed to face a bottom surface of the front panel 11. In this case, when the detergent cover 900 has a predetermined thickness or greater, the bottom surface of the front panel 11 and the top surface of the detergent cover 900 may interfere with each other, and thus the opening of the detergent cover 900 may be hindered.

[0200] In one example, when the upper end of the detergent cover 900 pivots downward at 90 degrees or more while being away from the connection panel 19, at least a portion of the detergent cover 900 may pivot further downward of the base 15 and may collide with the drawer 80 or generate unnecessary noise.

[0201] In order to solve this problem, the laundry treating apparatus according to the present disclosure may be constructed to freely pivot the detergent cover 900 toward or from the connection panel 19 without interference with the front panel 11, and to prevent the detergent cover 900 from colliding with the drawer 80 or excessively pivoting.

[0202] FIG. 7 illustrates a coupled structure of a detergent cover in a laundry treating apparatus according to the present disclosure.

[0203] The lower portion of the front panel 11 and the upper portion of the connection panel 19 form a substantially vertical step.

[0204] In addition, the width of the connection panel 19 is smaller than the distance between the side panels 17, so that the connection panel 19 and the side panels 17 also form substantially vertical steps.

[0205] The detergent cover 900 may be formed in a shape similar to a 'C' shape having a front surface and side surfaces respectively extending from both side surfaces of the front surface.

[0206] When the detergent cover 900 is coupled to the connection panel 19, the front surface thereof may be disposed in parallel with the front panel 11, and both side surfaces thereof may be disposed in parallel with the respective side panels 17.

[0207] A top surface formed at an upper end of the front surface and top surfaces formed at upper ends of the side surfaces of the detergent cover 900 have lengths corresponding to those of a bottom surface formed at a lower end of the front surface and bottom surfaces formed at lower ends of the side surfaces of the front panel 11. The top surface of the front surface and the top surfaces of the side surfaces of the detergent cover 900 are formed in shapes so as to be engaged with or face the bottom surface of the front surface and the bottom surfaces of the side surfaces of the front panel 11. The top surface of the front surface and the top surfaces of the side surfaces of the detergent cover 900 may be constructed so as to be in contact with the bottom surface of the front surface and the bottom surfaces of the side surfaces of the front panel 11.

[0208] Rear surfaces formed at rear ends of the side surfaces of the detergent cover 900 may be disposed to face the side panels 17, and may have a length and a shape corresponding to those of exposed surfaces of the side panels 17 that are further extended downward of the lower end of the front panel 11 and exposed. The rear surfaces of the side surfaces of the detergent cover 900 may be constructed to be in contact with front exposed surfaces of the side panels 17.

[0209] As a result, the detergent cover 900 may be disposed under the front panel 11 and on a lower portion of the front surface of the side panel 17 to compensate for all the steps formed by the connection panel 19.

[0210] The detergent cover 900 may include a movement-pivot member 920 rotatably coupled to the connection panel 19.

[0211] The movement-pivot member 920 may be provided so as to pivotably couple the detergent cover 900 to the connection panel 19. The movement-pivot members 920 may not couple the lower portion of the front surface of the detergent cover 900 to the connection panel 19, but may pivotably couple both side surfaces of the detergent cover 900 to both side surfaces of the connection panel 19, respectively. Accordingly, even when the detergent cover 900 opens the connection panel 19, the movement-pivot members 920 may be prevented from being exposed to the outside.

[0212] The movement-pivot members 920 may form a pivoting center of the detergent cover 900.

[0213] All areas of the detergent cover 900 may shield or open the connection panel 19 while pivoting about the movement-pivot members 920.

[0214] When the detergent cover 900 is opened, the movement-pivot members 920 may be disposed at positions lower than a bottom surface of the detergent box 800 so that the detergent box 800 and the detergent cover 900 are prevented from interfering with each other.

[0215] Because the top surface of the detergent cover 900 is disposed to face the bottom surface of the front panel 11, a vertex of a side surface of the detergent cover 900 farthest from a corresponding movement-pivot member 920 may require a space having a diameter corresponding to a distance to the movement-pivot member 920 for pivoting.

[0216] For example, in a state in which the detergent cover 900 faces or is in contact with the front panel 11 and the side panels 12 by shielding the connection panel 19, a vertical length from each movement-pivot member 920 to the top surface of and the detergent cover 900 or the bottom surface of the front panel 11 may be a first height H smaller than a height of the detergent cover 900.

[0217] However, because the top surface of the detergent cover 900 is disposed to face the bottom surface of the front panel 11 rather than being formed in an arc shape with respect to each movement-pivot member 920, front and rear vertices of the top surface of the detergent cover 900 are disposed at distances greater than the first height H from each movement-pivot member 920.

[0218] For example, when each movement-pivot member 920 is disposed to be biased forward at the lower portion of each side surface of the detergent cover 900, a first distance a between the movement-pivot member 920 and the rear vertex of the detergent cover 900 is much greater than a second distance b between the movement-pivot member 920 and the front vertex of the detergent cover 900. The second distance b is greater than the first height H.

[0219] Therefore, even when the detergent cover 900 is provided with the movement-pivot members 920, because there is no space having a length corresponding to the first distance a in an upward direction of the detergent cover 900, the top surfaces of the side surfaces of the detergent cover 900 may interfere with the front panel 11 and may not pivot.

[0220] FIG. 8 illustrates an embodiment in which the detergent cover may be opened without interfering with the front panel.

[0221] Referring to (a) in FIG. 8, the front panel 11 may be formed in a shape in which a bottom surface 11c facing the detergent cover 900 is disposed to be spaced apart from each movement-pivot member 920 by a distance equal to or greater than the first distance a, which is a distance between the movement-pivot member 920 and a point of each side surface of the detergent cover 900 farthest from the movement-pivot member 920.

[0222] As long as the bottom surface 11c of the front panel 11 is able to be disposed to be spaced apart from each movement-pivot member 920 by the first distance a or more, the bottom surface 11c of the front panel 11 may be formed in any shape.

[0223] For example, the bottom surface 11c of the front panel 11 may be formed in a shape that is uniformly spaced apart from each movement-pivot member 920 by the first distance a in order to minimize a separation

distance to the detergent cover 900. That is, the bottom surface 11c may be formed in a curved shape.

[0224] In addition, portions of the front panel 11, which substantially interfere with the detergent cover 900, may be portions facing the side surfaces of the detergent cover 900. Therefore, only lower ends of both side surfaces of the front panel 11 may be recessed or form a step by a thickness corresponding to the side surfaces of the detergent cover 900. Even in this case, both side surfaces of the front panel 11 should be recessed or form steps to positions spaced apart from the movement-pivot members 920 by the first distance a or more.

[0225] As a result, the bottom surface 11c of the front panel may have a different shape from the top surface of the detergent cover 900.

[0226] Referring to (b) in FIG. 8, because the bottom surface 11c is disposed to be spaced apart from the movement-pivot members 920 by the first distance a or more, an area in which the top surface of the detergent cover 900 and the front panel 11 interfere with each other may disappear.

[0227] That is, because the top surfaces of the side surfaces of the detergent cover 900 do not interfere with the front panel 11, the detergent cover 900 may freely pivot about the movement-pivot members 920 and shield or open the connection panel 19.

[0228] FIG. 9 illustrates another embodiment in which the detergent cover may be opened without interference with the front panel.

[0229] When the bottom surface 11c of the front panel has a different shape from the top surface of the detergent cover 900, there is always a gap between the bottom surface 11c of the front panel and the top surface of the detergent cover 900.

[0230] In this case, even when the detergent cover 900 shields the connection panel 19, a gap exists between the detergent cover 900 and the cabinet 10, which may deteriorate the aesthetic sense, and at the same time, may cause a problem in which a user's body or laundry is inserted into the gap and damaged.

[0231] Therefore, in the laundry treating apparatus according to the present disclosure, when the detergent cover 900 shields the connection panel 19, the detergent cover 900 may be opened and closed without interference with the front panel 11 even when the detergent cover 900 is disposed so that there is no or a minimum gap with respect to the front panel 11 and the side panels 17.

[0232] For example, the laundry treating apparatus according to the present disclosure includes each movement-pivot member 920 disposed in at least one of the detergent cover 900 and the connection cover 19 to pivotably couple the detergent cover 900 to the connection cover 19, wherein the movement-pivot member 920 may slide the detergent cover 900 away from the front panel.

[0233] That is, each movement-pivot member 920 may move the detergent cover 900 from the front panel 11

downward or forward and downward so that the front panel 11 and the movement-pivot member 920 are spaced apart from each other by the first length a or more.

[0234] To this end, each movement-pivot member 920 according to the present disclosure may include a rotation shaft 921 disposed in one of the detergent cover 900 and the connection cover 19 and pivotably coupling the detergent cover 900 to the connection cover 19, and an ascending-descending slit 922 defined in the other of the detergent cover 900 and the connection cover 19, rotatably supporting the rotation shaft 921, and slidably receiving the rotation shaft 921 therein.

[0235] For example, each rotation shaft 921 may extend from a respective side surface of the detergent cover 900 toward a corresponding side surface of the connection cover 19.

[0236] Each rotation shaft 921 may be disposed closer to a lower portion than an upper portion of the respective side surface of the detergent cover 900, and may be disposed closer to a front portion than a rear portion thereof. Because the rotation shaft 921 is disposed at a front lower portion of the respective side surface of the detergent cover 900, when the detergent cover 900 pivots about the rotation shafts 921 to open the connection cover 91, the entire front surface of the detergent box 800 may be exposed to the front.

[0237] The ascending-descending slit 922 may guide the rotation shaft 921 in a direction away from the bottom surface of the front panel 11. The rotation shaft 921 may slide along an extension direction of the ascending-descending slit 922 in a state in which a free end thereof is accommodated in the ascending-descending slit 922. The rotation shaft 921 may move the detergent cover 900 to be closer to or farther away from the bottom surface of the front panel 11 while reciprocating between an upper end and a lower end of the ascending-descending slit 922.

[0238] Each ascending-descending slit 922 may extend downward from a respective side surface of the connection cover 91.

[0239] For example, each ascending-descending slit 922 may be defined to be forwardly and downwardly inclined in the respective side surface of the connection cover 91. Accordingly, as compared to cases in which the ascending-descending slit 922 is configured to move the rotation shaft 921 by the same distance, but is oriented in different directions, the ascending-descending slit 922 oriented as above may allow the upper rear corner of the respective side surface of the detergent cover 900, which is disposed to be farthest apart from the corresponding rotation shaft 921, to be spaced farthest from a rear portion of the bottom surface of the front cover 11.

[0240] The ascending-descending slit 922 may include an upper end 9222 that may rotatably support the rotation shaft 921 and limit upward movement of the rotation shaft 921, and a lower end 9221 that may rotatably support the rotation shaft 921 and limit downward movement of the rotation shaft 921. A distance between the upper end

9222 and the upper end 9221 may be greater than a diameter of the rotation shaft 921.

[0241] In one example, the laundry treating apparatus according to the present disclosure may further include a stopper 930 for limiting the pivoting angle of the detergent cover 900.

[0242] The stopper 930 may be configured such that the detergent cover 900 limits the degree of opening of the connection cover 900 even when the detergent cover 900 opens the connection cover 19. Accordingly, even when the detergent cover 900 opens the front side of the connection cover 19, the upper end of the detergent cover 900 may be prevented from being lowered below the base 15 or colliding with the upper end of the drawer 80.

[0243] The stopper 930 may be formed in any shape as long as it is able to be in contact with the detergent cover 900 and limit additional pivoting of the detergent cover 900. For example, the stopper 930 may protrude from a lower portion of the base 15 or an upper portion of the drawer 80 to be in contact with the detergent cover 900.

[0244] Alternatively, the laundry treating apparatus according to the present disclosure may place the stopper 930 between the detergent cover 900 and the connection panel 19 so as to prevent the stopper 930 from being exposed to the outside.

[0245] The stopper 930 may include a movable shaft 931 disposed in one of the detergent cover 900 and the connection panel 19, and a guide slit 932 disposed in the other of the detergent cover 900 and the connection panel 19 and supporting the movable shaft 931 so as to be reciprocable.

[0246] The movable shaft 931 may freely move in a direction in which the guide slit 932 extends, but movement thereof may be limited when it comes into contact with one end and the other end of the guide slit 932.

[0247] Accordingly, pivoting of the detergent cover 900 may be limited using the fact that the movable shaft 931 is limited from moving within the guide slit 932.

[0248] The guide slit 932 may extend in a direction corresponding to a direction in which the detergent cover 900 pivots in a reciprocating manner.

[0249] The guide slit 932 may extend in a curved shape. Specifically, the guide slit 932 may be defined in an arc shape spaced apart from the rotation shaft 921 by a predetermined distance. The guide slit 932 may extend from a position above the rotation shaft 921 or the ascending-descending slit 932 to a position at the rear of the rotation shaft 921 or the ascending-descending slit 932 with respect to the rotation shaft 921. As a result, the guide slit 932 may extend in an upwardly convex curved shape.

[0250] When each movable shaft 931 is constructed to protrude from a respective side surface of the detergent cover 900, the guide slit 932 may be defined to be recessed in a corresponding side surface of the connection panel 19 or to pass through the corresponding side surface of the connection panel 19 with a thickness

allowing the movable shaft 931 to be moveable.

[0251] The guide slit 932 may be spaced apart from the rotation shaft 921 by a distance corresponding to a distance between the movable shaft 931 and the rotation shaft 921.

[0252] A lower end of the guide slit 932 may be disposed at the rear of the ascending-descending slit 922, and an upper end thereof may be disposed above the ascending-descending slit 922.

[0253] The guide slit 932 may control the pivoting angle of the detergent cover 900 while limiting the movement area of the movable shaft 931. The detergent cover 900 may pivot about each rotation shaft 921 until each movable shaft 931 comes into contact with either the upper end and the lower end of the corresponding guide slit 932.

[0254] The pivoting angle of the detergent cover 900 may vary depending on the shape and length of the guide slit 932.

[0255] In one example, the guide slit 932 may have a distal end extending further rearward or upward from the lower end thereof. The angle and shape of the guide slit 932 extending from the lower end to the distal end may be different from those of the curve of the guide slit 932 extending from the upper end to the lower end.

[0256] The distal end of each guide slit 932 further extends rearward from the lower end of the guide slit 932 to allow the detergent cover 900 to be more closely in contact with a corresponding side panel 17 when each rotation shaft 921 moves to the upper end of a corresponding ascending-descending slit.

[0257] In addition, the distal end of each guide slit 932 further extends rearward from the lower end of the guide slit 932, such that a rear portion of the detergent cover 900 is allowed to slide in conjunction with a front portion of the detergent cover 900 that slides due to the ascending-descending slit 921, thereby allowing the entire detergent cover 900 to slide by a predetermined length.

[0258] FIG. 10 illustrates in detail a process in which the detergent cover pivots with respect to the connection panel.

[0259] Referring to (a) in FIG. 10, the detergent cover 900 may be in a state of shielding the connection panel 19. The exposed surface 910 of the detergent cover 900 may be disposed in parallel with the front surface of the front panel 11. The front panel 11 and the exposed surface 910 may form a continuous plane.

[0260] The ascending-descending slit 922 may include the upper end 9221 and the lower end 9222, and may extend in a straight form from the upper end 9221 to the lower end 9222.

[0261] The upper end 9221 of the ascending-descending slit 922 may be disposed rearward of the lower end 9222.

[0262] In a state in which the detergent cover 900 shields the connection panel 19 or the detergent box 800, the rotation shaft 921 may be disposed at the upper end 9221 of the ascending-descending slit 922, and the movable shaft 931 may be disposed at a distal end 9324

of the guide slit 932.

[0263] Referring to (b) in FIG. 10, the guide slit 932 may include an upper end 9321 disposed above the ascending-descending slit 922 or the rotation shaft 921, a guide groove 9322 extending in an arc or upwardly convex curved shape from the upper end 9321, and a lower end 9323 disposed downward of the guide groove 9322 and disposed at the rear of the rotation shaft 921.

[0264] The lower end 9323 may be an area disposed at the lowermost portion of the guide slit 932.

[0265] The guide slit 932 may further include the distal end 9324 capable of further moving the movable shaft 931 rearward or rearward and upward from the lower end 9323.

[0266] The lower end 9323 and the distal end 9324 of the guide slit 932 may be configured to correspond to the length and angle of the ascending-descending slit 922.

[0267] Alternatively, the lower end 9323 and the distal end 9324 of the guide slit 932 may have a distance therebetween smaller than the length of the ascending-descending slit 922 and may be arranged at a more gentle angle with respect to the bottom surface of the front panel.

[0268] The ascending-descending slit 922, and the lower end 9323 and the distal end 9324 of the guide slit 932 may be components that linearly move the entire detergent cover 900.

[0269] A portion from the upper end 9321 to the guide groove 9322 of the guide slit 932, the lower end 9323 of the guide slit 932, the rotation shaft 921, and the movable shaft 931 may be components that pivot the detergent cover 900 forward of the connection panel 19 or upward toward the connection panel 19.

[0270] When the detergent cover 900 starts to be opened, the rotation shaft 921 may first slide to the lower end of the ascending-descending slit 922.

[0271] In this process, the detergent cover 900 may move forward and downward along the extension direction of the ascending-descending slit 922, and the upper rear portion of the detergent cover 900 may move forward and downward from the front panel 11 and may be spaced apart from the bottom surface of the front panel 11.

[0272] When the rotation shaft 921 is completely moved to the lower end of the ascending-descending slit 922, an upper rear vertex of each side surface of the detergent cover 900 may not be in contact with the front panel 11 in any case. When the rotation shaft 921 is completely moved to the lower end of the ascending-descending slit 922, because the lower end of the ascending-descending slit 922 is more biased forward than the upper end, the center of gravity of the detergent cover 900 is shifted forward, and thus the detergent cover 900 may pivot forward.

[0273] The distal end 9324 of the guide slit 922 may be disposed to further extend upward or rearward from the lower portion 9323 of the guide slit 922 so that the entire side surface of the detergent cover 900 is able to slide in the extension direction of the ascending-descending slit

922.

[0274] When the rotation shaft 921 is disposed at the upper end of the ascending-descending slit 922, the movable shaft 931 may move further upward from the lower portion 9323 of the guide slit 922 to the distal end of the guide slit 922.

[0275] When the rotation shaft 921 is disposed at the lower end of the ascending-descending slit 922, the movable shaft 931 may move further downward from the upper end 9324 of the guide slit 922 to the lower portion of the guide slit 922.

[0276] As a result, when the detergent cover 900 is spaced apart from the connection panel 19, the entire detergent cover 900 may be spaced farther away from the bottom surface of the front panel 11 while sliding downward. Accordingly, because there is no possibility that the top surface of the detergent cover 900 will interfere with the front panel 11, the detergent cover 900 may smoothly pivot forward.

[0277] Referring to (c) in FIG. 10, the rotation shaft 921 may rotate forward in a state of being supported at the lower end of the ascending-descending slit 922. The detergent cover 900 may pivot forward about the rotation shaft 921.

[0278] The movable shaft 931 may move from the lower portion 9323 of the guide slit 932 to the upper end 9321 along the guide groove 9322, and the detergent cover 900 may continuously pivot about the rotation shaft 921 to open the connection panel 19.

[0279] When the movable shaft 931 reaches the upper end 9321, the movable shaft 931 may stop without further moving forward. As a result, the movable shaft 931 may also stop the detergent cover 900 to prevent the detergent cover 900 from further pivoting.

[0280] The process in which the detergent cover 900 closes the connection panel 19 may be performed by reversing the above-described process.

[0281] Because the angle at which the movable shaft 931 rotates with respect to the rotation shaft 921 varies depending on the position at which the upper end 9321 of the guide slit 932 is disposed, the opening angle of the detergent cover 900 may be determined.

[0282] The lower end 9222 of the ascending-descending slit 922 may be disposed downward of the lower end 9323 of the guide slit 932. As a result, the detergent cover 900 may be slid or withdrawn further forward and rearward, so that the top surface of the detergent cover 900 may not interfere with the front panel 11. In addition, the entire detergent cover 900 may be disposed downward of the connection panel 19. Accordingly, the detergent box 800 may be freely extended forward without interfering with the opened detergent cover 900.

[0283] When the detergent cover 900 shields the detergent box 800, the rotation shaft 921 may be disposed forward of the movable shaft 931, and the movable shaft 931 may be disposed rearward of the rotation shaft 921. The rotation shaft 921 and the movable shaft 931 may be disposed at the same vertical level. The upper end 9221

of the ascending-descending slit 922 may be defined at the same position as the lower end 9323 or the distal end 9324 of the guide slit 932.

[0284] FIG. 11 illustrates an embodiment in which the detergent cover pivots by an angle so as to be exactly parallel to the base.

[0285] The detergent cover 900 is coupled to the side surfaces of the connection panel 19 so as to be pivotable in the up-down direction. When the detergent cover 900 pivots downward from the cabinet 10 so as to open the detergent box 800, in a case in which the detergent cover 900 pivots at 90 degrees or more from the front panel 11, the detergent cover 900 may collide with the drawer 80 or a user may have to bend his/her waist further to close the detergent cover 900.

[0286] Therefore, the laundry treating apparatus according to the present disclosure may be configured so that the detergent cover 900 does not pivot by 90 degrees or more even when it is completely opened from the connection panel 19.

[0287] In one example, the detergent box 800 is extended from the connection panel 19 in a direction parallel to the floor. Accordingly, when the detergent cover 900 is constructed to pivot from the cabinet 10 at an angle less than 90 degrees, even when the detergent cover 900 is completely opened, at least a portion of the detergent cover 900 may be disposed to face the detergent box 800.

[0288] Accordingly, there may be a problem in that the detergent cover 900 interferes with the extension of the detergent box 800 or limits the extension length thereof.

[0289] Therefore, the laundry treating apparatus according to the present disclosure may be configured such that the detergent cover 900 is opened up to 90 degrees with respect to the front panel 11 or the connection panel 19. Accordingly, the detergent cover 900 may not collide with the drawer 80 or the like while not interfering with the extension and retraction of the detergent box 800 when it is opened, and a user may not have to bend his/her body excessively to close the detergent cover 900. In addition, when the detergent cover 900 is accurately opened up to 90 degrees, the aesthetics of the design may be maximized.

[0290] Referring to (a) in FIG. 11, the movable shaft 931 and the guide slit 932 may be provided such that the detergent cover 900 pivots by only up to 90 degrees when it is opened, and the detergent cover 900 is parallel to the front panel 11 when it is closed.

[0291] To this end, positions, shapes, lengths, and the like of the movable shaft 931 and the guide slit 932 may be determined.

[0292] For example, the guide slit 932 may extend from the upper end 9321 to the lower end 9323 so that the angle between the ends is 90 degrees with respect to the ascending-descending slit 922 or the rotation shaft 921. That is, the upper end 9321 may be disposed vertically above the ascending-descending slit 922 or the rotation shaft 921, and the lower end 9323 may be disposed

horizontally rearward of the ascending-descending slit 922 or the rotation shaft 921.

[0293] The rotation shaft 921 and the movable shaft 931 may be disposed at the same vertical level on each side surface of the detergent cover 900. That is, in a state in which the detergent cover 900 is disposed in parallel with the front panel 11, when the rotation shaft 921 is disposed at a front side on each side surface of the detergent cover 900, the movable shaft 931 may be disposed at the rear of the rotation shaft 921 and at the same vertical level as the rotation shaft 921.

[0294] When the detergent cover 900 is completely opened, the movable shaft 921 is disposed at the lower end 9222 of the ascending-descending slit 922. Accordingly, the upper end of the guide slit 9321 may be disposed at a position a vertically above the lower end 9222 of the ascending-descending slit 922. That is, the upper end of the guide slit 9321 may be disposed forward of a position b vertically above the upper end 9221 of the ascending-descending slit 922.

[0295] Referring to (b) in FIG. 11, in a state in which the rotation shaft 921 is disposed at the lower end of the ascending-descending slit 921, the detergent cover 900 may pivot until the movable shaft 931 is disposed at the upper end of the guide slit 9321. In this regard, the rotation shaft 921 and the movable shaft 931 may be disposed in parallel to the vertical direction a of the lower end 9222 of the ascending-descending slit 922. Accordingly, the detergent cover 900 may pivot by 90 degrees T from the front panel 11 or the connection panel 19 and be fixed. Therefore, the detergent cover 900 may be always spaced apart from the top surface of the drawer 80 by a separation length h.

[0296] FIG. 12 illustrates an embodiment in which the detergent cover is fixed to the connection panel while not interfering with extension and retraction of the detergent box.

[0297] Referring to (a) in FIG. 12, the detergent cover 900 may be disposed to face the connection panel 19 so as to shield the detergent box 800. However, the detergent cover 900 may always receive a force allowing the detergent cover 900 to move downward or pivot forward due to the ascending-descending slit 922, and when vibration occurs inside the cabinet 10, the detergent cover 900 may arbitrarily pivot and open the detergent box 800.

[0298] Accordingly, the laundry treating apparatus according to the present disclosure may further include a fixing portion 940 capable of fixing the detergent cover 900 to a front portion of the connection panel 19.

[0299] The fixing portion 940 may be formed in any structure and shape as long as it is able to detachably couple the detergent cover 900 to the cabinet 10.

[0300] For example, the fixing portion 940 may include a hook 941 protruding rearward from a rear surface formed at a rear end of a front surface of the detergent cover 900, and a detachable portion 942 disposed in the cabinet 10 and detachably coupled to the hook 941.

[0301] The hook 941 may be configured to sequentially repeat coupling and separation with respect to the detachable portion 942 whenever it is pressed toward the detachable portion 942. That is, the fixing portion 940 may be formed of a push button type.

[0302] The detachable portion 942 may be installed inside the connection panel 19, or may be installed on the stepped panel 16 and be exposed to the outside through the connection panel 19.

[0303] When the detachable portion 942 fixes the hook 941, the detergent cover 900 may maintain a state of shielding the connection panel 19 or the detergent box 800 even when vibration is applied or gravity or pivoting momentum is added thereto.

[0304] Referring to (b) in FIG. 11, when the hook 941 is separated from the detachable portion 942, the detergent cover 900 may expose the detergent box 800 while the rotation shaft 921 moves to the lower end of the ascending-descending slit 922 by gravity.

[0305] The pivoting angle of the detergent cover 900 may be limited by the movable shaft 931 and the guide slit 932.

[0306] When the hook 941 protrudes from the rear surface of the detergent cover 900 in a state in which the pivoting angle of the detergent cover 900 is limited by the stopper 930, the detergent box 800 may be caught by the hook 941 when being extended.

[0307] When the detergent box 800 is caught by the hook 941, the hook 941 may be damaged, and the detergent cover 900 may be damaged as an impact is transmitted thereto.

[0308] Accordingly, the present disclosure may further include a guide part 950 that protrudes from the detergent cover 900 so as to face the detergent box 800 or come into contact with the detergent box 800 faster than the hook 941.

[0309] Based on a state in which the detergent cover 900 shields the connection panel 19, the guide part 950 may be disposed below the hook 941.

[0310] The guide part 950 may extend in a height direction of the detergent cover 900 at the position below the hook 941, and may have a thickness greater than that of the hook 941.

[0311] A portion of the guide part 950 facing the detergent box 800 on the rear surface of the detergent cover 900 may have a protrusion height smaller than that of a portion thereof facing the hook 941.

[0312] In addition, a portion having a maximum protrusion height of the guide part 950 may be disposed closer to the portion thereof facing the hook 941 or an upper end thereof than a portion thereof facing the detergent box 800 or a lower end thereof.

[0313] A protrusion height of the portion of the guide part 950 facing the hook 941 or the upper end thereof from the detergent cover 900 may be equal to or greater than a protrusion height h1 of the hook 941 from the detergent cover 900.

[0314] In addition, a protrusion height h2 of the portion

of the guide part 950 facing the detergent box 800 or the lower end thereof may be smaller than the protrusion height h_1 of the hook 941.

[0315] When the detergent cover 900 is completely opened, the protrusion height h_2 of the lower end of the guide part 950 may be equal to or smaller than a spacing from the rear surface of the detergent cover 900 to the lowermost cross-section of the detergent box 800.

[0316] The guide part 950 may be provided such that at least a portion thereof gradually increases in height from the portion thereof facing the detergent box 800 or the lower end thereof to the portion thereof facing the hook 941 or the upper end thereof.

[0317] That is, an exposed surface of the guide part 950 may have an inclination.

[0318] Referring to (c) in FIG. 11, when the detergent box 800 is extended from the connection panel 19, the lowest surface of the detergent box 800 may come into contact with the lower end of the guide part 950 or may start to be in contact with a portion spaced apart from the lower end of the guide part 950 by a predetermined distance toward the upper end.

[0319] The detergent box 800 may move along the exposed surface of the guide part 950 toward the upper end of the guide part 950, pass over an upper portion of a free end of the hook 941, and then be extended.

[0320] In addition, the detergent box 800 may push the guide part 950 downward while moving along the exposed surface of the guide part 950, thereby also allowing the hook 941 to be spaced apart from the detergent box 800.

[0321] As a result, the detergent box 800 may be extended or retracted while the bottom surface thereof is in contact with the guide part 950, so that it may be fundamentally blocked from being in contact with or interfering with the hook 941.

[0322] The detergent box 800 may further include an accommodation casing 820 that accommodates detergent therein, and a front cover 810 coupled to a front portion of the accommodation casing 820. A bottom surface of the front cover 810 may extend further downward than a front portion of a bottom surface of the accommodation casing 820.

[0323] In this case, when the detergent box 800 is extended, the detergent box 800 may move toward the hook 941 while the bottom surface of the front cover 810 is in contact with the guide part 950, and may pass over the upper portion of the free end of the hook 941 while moving further forward from the upper end of the guide part 950.

[0324] Accordingly, the bottom surface of the accommodation casing 820 may also be completely extended forward without interfering with the hook 941.

[0325] The process of retracting the detergent box 800 into the connection panel 19 may be performed by reversing the above-described process.

[0326] Because the detergent box 800 may accommodate detergent and the like therein and have a relatively

great width in the front-rear direction, the detergent box 800 may receive a downward force when being extended from the connection panel 19.

[0327] The guide part 950 may prevent the detergent box 800 from sagging downward while supporting the lower portion of the detergent box 800. The guide part 950 may support the lower portion of the detergent box 800 when the detergent box 800 is extended, and the detergent box 800 may be extended along an upper portion of the guide part 950 and may be guided so that the front surface of the detergent box 800 is not sagged downward, but faces forward or is lifted forward and upward.

[0328] When the front cover 810 is extended from the connection panel 19, it may be immediately supported by the guide part 950 and may slide along the guide part 950. Therefore, even when an inclination is disposed at the bottom surface of the accommodation casing 820 or a height of a front portion of the accommodation casing 820 is small, because of the guide part 950, the entire detergent box 800 may be prevented from sagging.

[0329] In addition, because of the guide part 950, the detergent box 800 may be partially extended from the connection panel 19 and supported by the detergent cover 900.

[0330] The guide part 950 may extend on a cover panel 910 from a position below the hook 941 to a bottom surface of the cover panel 910 in order to immediately guide and support the detergent box 800 when the detergent box 800 is extended.

[0331] At least a portion of an exposed surface of the guide part 950 may be set to have a height so as to be in parallel with the bottom surface of the detergent box 800 when the detergent box 800 is retracted into the connection cover 19.

[0332] For example, a maximum height of the guide part 950 may be set to a height so as to be in parallel with the bottom surface of the detergent box 800 when the detergent box 800 is retracted into the connection cover 19.

[0333] Alternatively, a minimum height of the guide part 950 may be set to a height so as to be in parallel with the bottom surface of the detergent box 800 when the detergent box 800 is retracted into the connection cover 19.

[0334] For example, a height H_1 of one end of the guide part 950 facing the hook 941 may be set to a height so as to be in parallel with the bottom surface of the detergent box 800 when the detergent box 800 is retracted into the connection cover 19.

[0335] Alternatively, a height H_2 of the other end of the guide part 950 facing the detergent box 800 may be set to a height so as to be in parallel with the bottom surface of the detergent box 800 when the detergent box 800 is retracted into the connection cover 19.

[0336] The guide part 950 may be disposed at a position to support a center of the detergent box 800 in the width direction.

[0337] FIG. 13 illustrates a structural embodiment of

the detergent cover and the connection panel.

[0338] The detergent cover 900 may include the cover panel 910 that shields the detergent box 800 and the filter 66 and is exposed to the outside, the movement-pivot member 920 that pivotably couples the cover panel 910 to the connection panel 19, and the stopper 930 that limits an angle at which the cover panel 910 pivots from the connection panel 19.

[0339] The cover panel 910 may include an exposed surface 911 that is constructed to shield the connection panel 19 or the detergent box 800, and coupling surfaces 912 or side surfaces extending from both sides of the exposed surface 911 to both sides of the connection panel 19 or both sides of the cabinet 10.

[0340] The exposed surface 911 may form a front surface of the detergent cover 900, and the coupling surfaces 912 may form side surfaces of the detergent cover 900.

[0341] The hook 941 that prevents the cover panel 910 from being arbitrarily separated from the connection panel 19 may be disposed on an upper portion of a rear surface formed at a rear end of the exposed surface 911, and the guide part 950 that guides extension and retraction of the detergent box 800 may be disposed to be spaced downwardly apart from the hook 941.

[0342] The hook 941 and the guide part 950 may be disposed at the center of the exposed surface 911.

[0343] Each movement-pivot member 920 may include the rotation shaft 921 disposed on an inner surface formed at an inner side of each coupling surface 912, and the ascending-descending slit 922 that is defined in each side surface of the connection panel 19 or each side surface of the cabinet 10, rotatably supports the rotation shaft 921, and varies the position of the rotation shaft 921.

[0344] The ascending-descending slit 922 may include the upper end 9221, and the lower end 9222 disposed downward of the upper end 9221 so as to be spaced apart from the same by a distance equal to or greater than the diameter of the movable shaft 921.

[0345] Each stopper 930 may include the movable shaft 931 disposed on the inner surface of each coupling surface 912 so as to be spaced apart from the movable shaft 931, and the guide slit 932 that is defined in each side surface of the connection panel 19 or each side surface of the cabinet 10, moves the movable shaft 931 along an arc direction or a curve, and limit a movement distance of the movable shaft 931.

[0346] The movable shaft 931 may be disposed closer to a free end of the coupling surface 912 than to the rotation shaft 921, and the guide slit 932 may have a thickness allowing the movable shaft 931 to move from the upper end 9321 to the lower end 9323 thereof. Each guide slit 932 may be defined by extending through each side surface of the connection panel 19 or by recessing each outward-facing side surface of the connection panel 19.

[0347] The guide slit 932 may further include the guide groove 9322 connecting the upper end with the lower end

and extending in a curved shape, and the distal end 9324 further extending rearward from the lower end 9323.

[0348] The guide groove 9322 may be defined in a curved or arc shape, but may be defined in a straight form from the lower end 9323 to the distal end 9324.

[0349] The connection panel 19 may include a shielding surface 191 disposed in front of the base 15 or in front of the stepped panel 16 to face the cover panel 910, and support surfaces 192 extending rearward from both sides of the shielding surface 191 to support the coupling surfaces 921.

[0350] The shielding surface 191 may include an extension hole 1911 that supports at least a portion of the detergent box 800 and allows the detergent box 800 to be retracted into the cabinet 10 extended therefrom at a position above the base 15, and a filter hole 1912 that is disposed on one side of the extension hole 1191 and allows the filter 66 to be extended and retracted.

[0351] The shielding surface 191 may include a guide hole 1913 through which the hook 941 may extend, and the guide hole 1913 may be defined above the extension hole 1911.

[0352] The connection panel 19 may further include a guide rib 195 that supports the side surfaces or the bottom surface of the detergent box 800 and guides extension and retraction directions of the detergent box 800. The guide rib 195 may be formed to extend rearward from a portion of an outer peripheral surface of the extension hole 1911.

[0353] A plurality of reinforcing ribs 196 may be formed on a rear surface formed at a rear end of the shielding surface 191 for reinforcing rigidity so as to ensure durability even during extension and retraction of the detergent box 800, extension and retraction of the filter 66, contact of the cover panel 910, and the like. The reinforcing ribs 196 may be provided with various thicknesses and lengths in a vertical direction and a horizontal direction.

[0354] At least a portion of the movement-pivot member 920 and at least a portion of the stopper 930 may be installed at the support surface 192. For example, the ascending-descending slit 922 and the guide slit 932 may be defined in the support surface 192.

[0355] The present disclosure may be implemented in various forms, and thus the scope of the rights may not be limited to the above-described embodiments. Therefore, when the modified embodiment includes the elements of the claims of the present disclosure, it should be regarded as belonging to the scope of the present disclosure.

Claims

1. A laundry treating apparatus comprising:

a cabinet having an opening defined in a front portion thereof;
a door coupled to the cabinet and configured to

- open and close the opening;
 a tub accommodated in the cabinet and configured to store water therein;
 a drum rotatably disposed in the tub and configured to accommodate laundry therein;
 a driver coupled to the tub and configured to rotate the drum;
 a detergent box disposed under the tub and configured to store therein detergent to be supplied to the tub;
 a detergent cover coupled to a lower portion of the cabinet and configured to shield the detergent box; and
 a movement-pivot member disposed in at least one of the detergent cover and the cabinet and configured to allow the detergent cover to slide away from the cabinet.
2. The laundry treating apparatus of claim 1, wherein the movement-pivot member includes:
- a rotation shaft disposed on one of the detergent cover and the cabinet and configured to form a pivoting center of the detergent cover; and
 an ascending-descending slit defined in the other of the detergent cover and the cabinet, and configured to rotatably support the rotation shaft and guide the rotation shaft to slide.
3. The laundry treating apparatus of claim 2, wherein the ascending-descending slit is defined to have a length greater than a diameter of the rotation shaft.
4. The laundry treating apparatus of claim 2, wherein the cabinet includes:
- a front panel having the opening defined therein and disposed upward of the detergent box;
 a base panel disposed downward of the drum, configured to support the detergent box, and exposing a front portion thereof; and
 a connection panel disposed in front of the base panel, configured to expose the detergent box, and coupled to the detergent cover, wherein the rotation shaft is provided to protrude from each of both sides of the detergent cover, wherein the ascending-descending slit is defined at each of both sides of the connection panel.
5. The laundry treating apparatus of claim 4, wherein the ascending-descending slit is defined in each side surface of the connection panel so as to extend downward.
6. The laundry treating apparatus of claim 5, wherein the connection panel is disposed rearward of the front panel,
- wherein the detergent cover is disposed in parallel with the front panel when shielding the detergent box.
7. The laundry treating apparatus of claim 5, wherein the detergent cover includes:
- an exposed surface disposed under a front portion of the front panel and configured to shield the detergent box; and
 coupling surfaces extending from both sides of the exposed surface to both sides of the connection panel, wherein the rotation shaft is provided to protrude from an inner side of each coupling surface and is coupled to the ascending-descending slit.
8. The laundry treating apparatus of claim 5, wherein a lower end of the ascending-descending slit is disposed forward of an upper end thereof.
9. The laundry treating apparatus of claim 2, further comprising a stopper disposed in at least one of the detergent cover and the cabinet and configured to limit an opening angle of the detergent cover.
10. The laundry treating apparatus of claim 9, wherein the stopper is configured to restrict the detergent cover from pivoting further downward beyond an angle at which an exposed surface of the detergent cover is disposed in parallel with the floor.
11. The laundry treating apparatus of claim 9, wherein the stopper includes:
- a movable shaft disposed in one of the detergent cover and the cabinet so as to be spaced apart from the rotation shaft; and
 a guide slit defined in the other of the detergent cover and the cabinet and configured to support the movable shaft so as to be reciprocable.
12. The laundry treating apparatus of claim 11, wherein the guide slit is defined to extend in a downwardly convex curve from a position rearward of the ascending-descending slit toward a position upward of the ascending-descending slit.
13. The laundry treating apparatus of claim 12, wherein an upper end of the guide slit is disposed upward of a lower end of the ascending-descending slit, wherein a lower end of the guide slit is disposed rearward of an upper end of the ascending-descending slit.
14. The laundry treating apparatus of claim 12, wherein the guide slit includes:

a guide groove extending from an upper end to a lower end of the guide slit in the downwardly convex curve and configured to guide the movable shaft; and

a distal end extending from a lower end of the guide groove rearward and upward and configured to support the movable shaft. 5

15. The laundry treating apparatus of claim 1, further comprising: 10

a hook protruding from a rear surface of the detergent cover and detachably fixed to the cabinet; and

a guide protruding at a position downward of the hook and configured to support a lower portion of the detergent box when the detergent box is extended. 15

16. The laundry treating apparatus of claim 15, wherein the guide protrudes from the rear surface of the detergent cover so that a height thereof is equal to or greater than a height of the hook. 20

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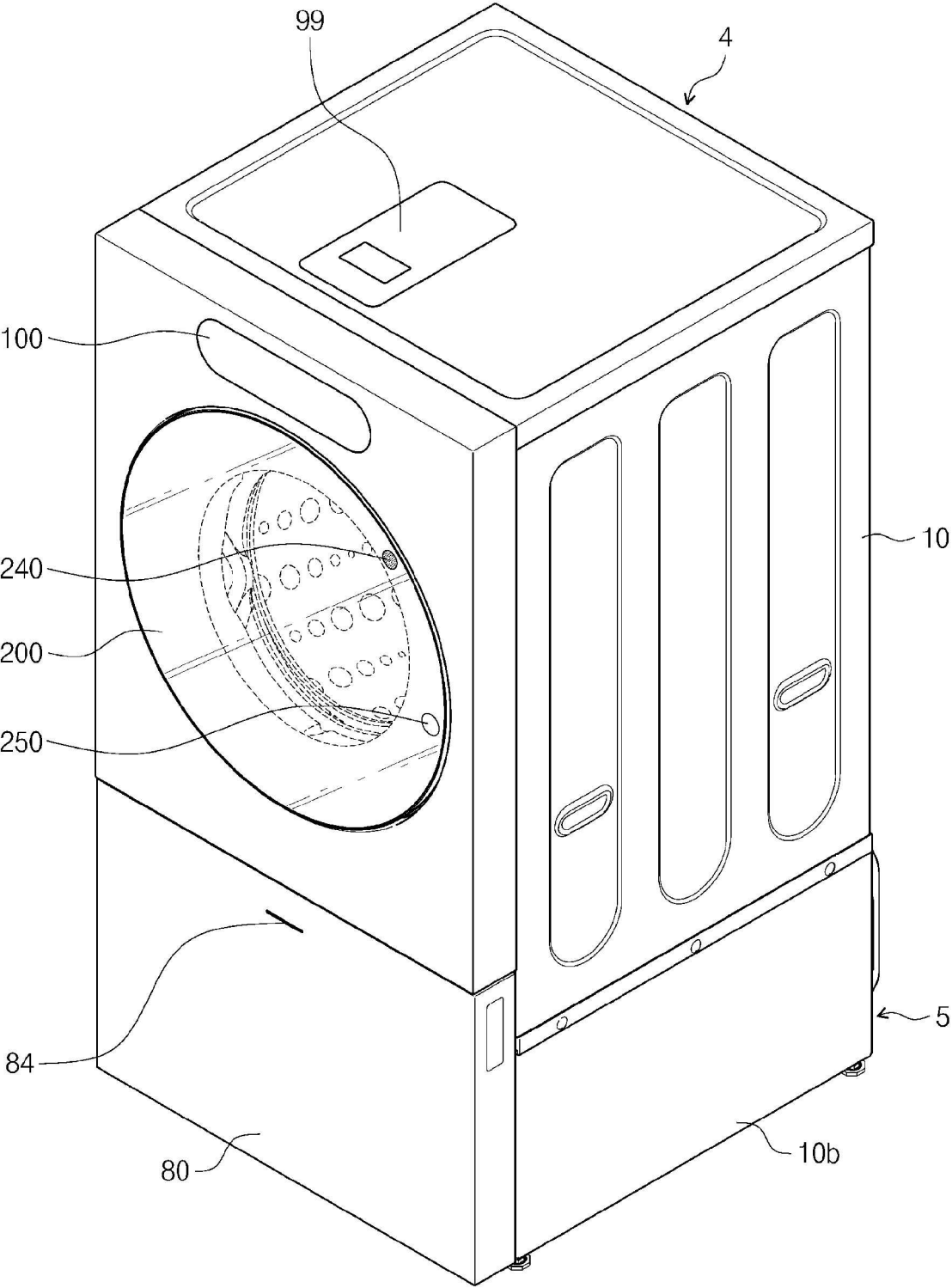
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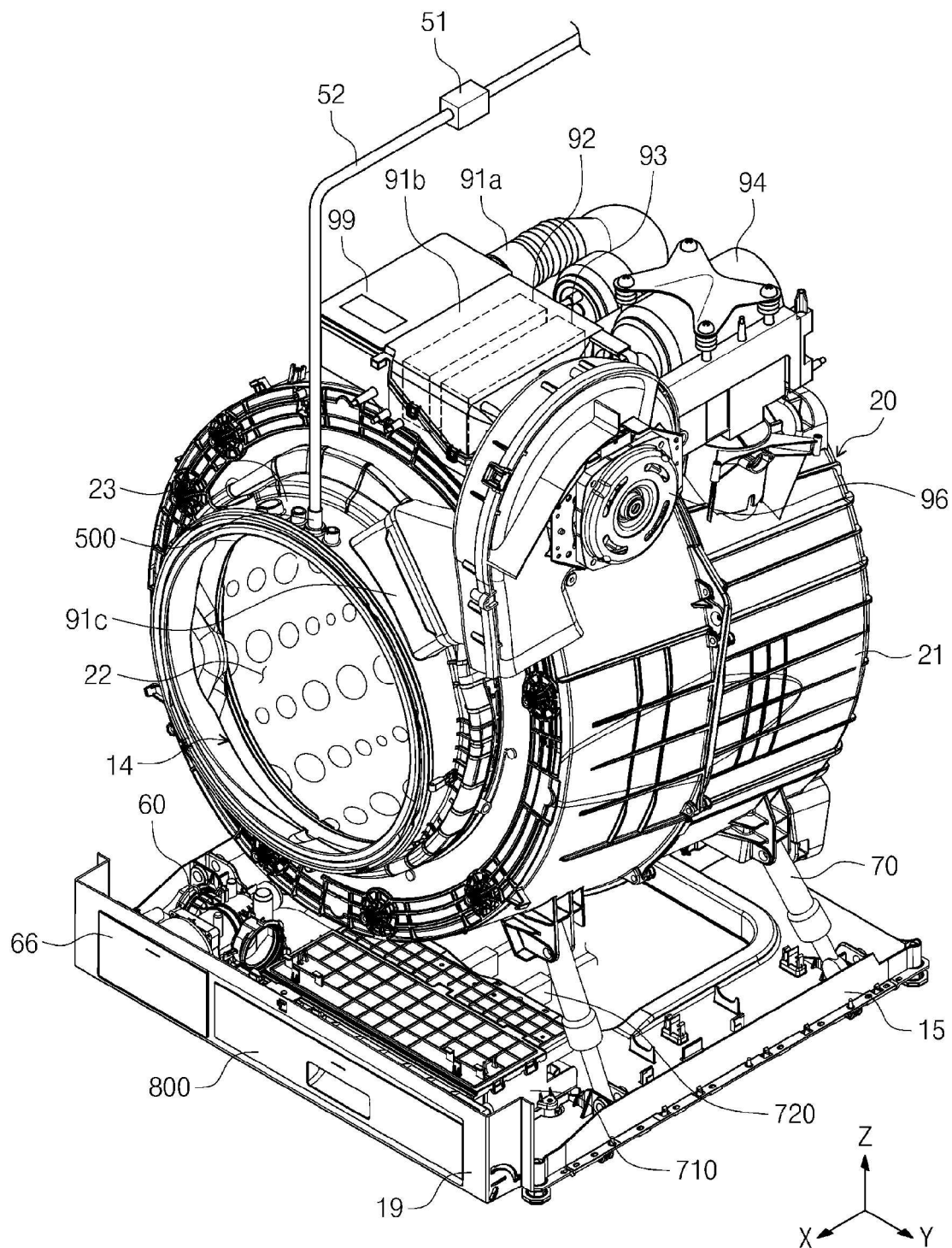
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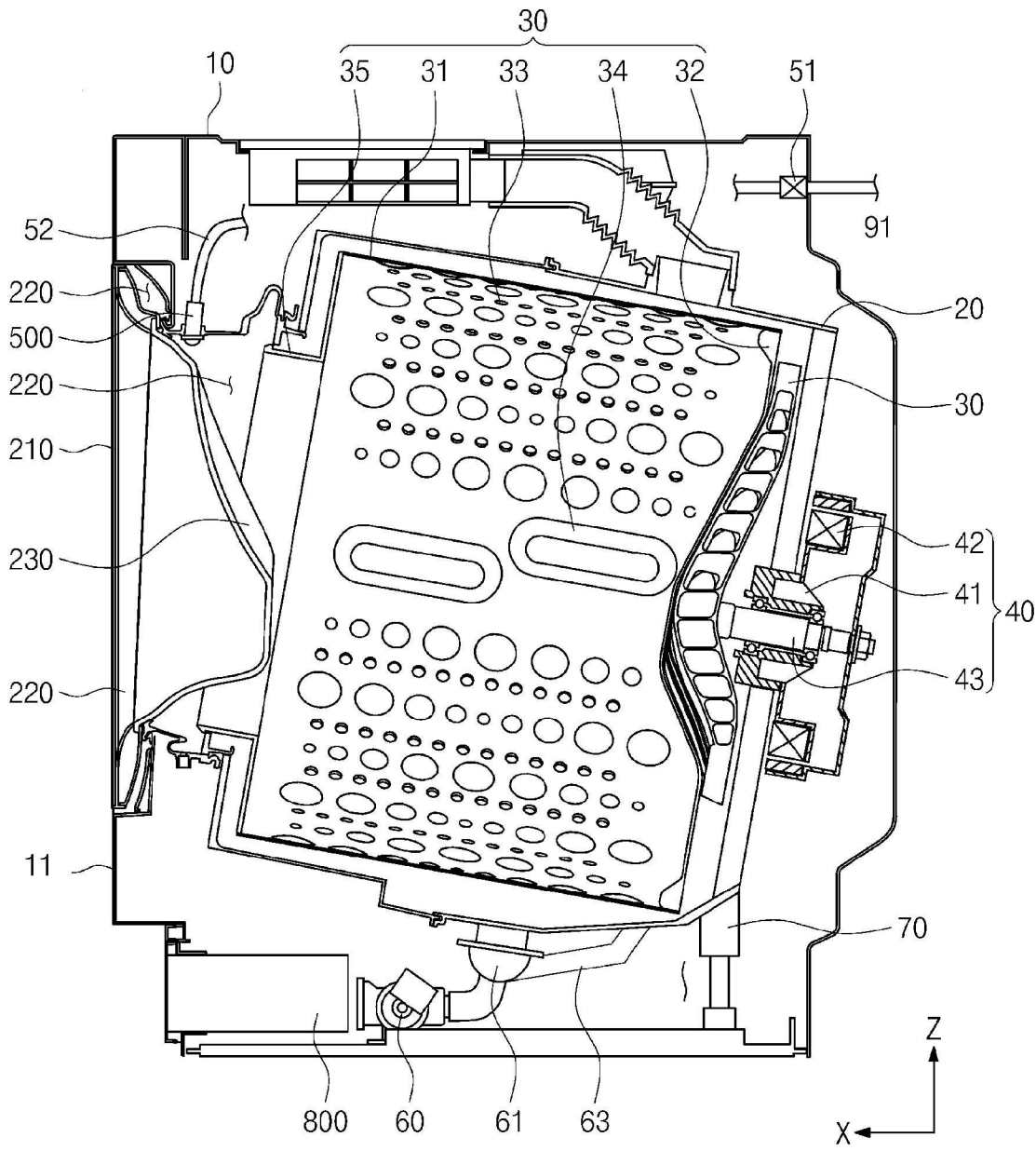
【Fig 1】



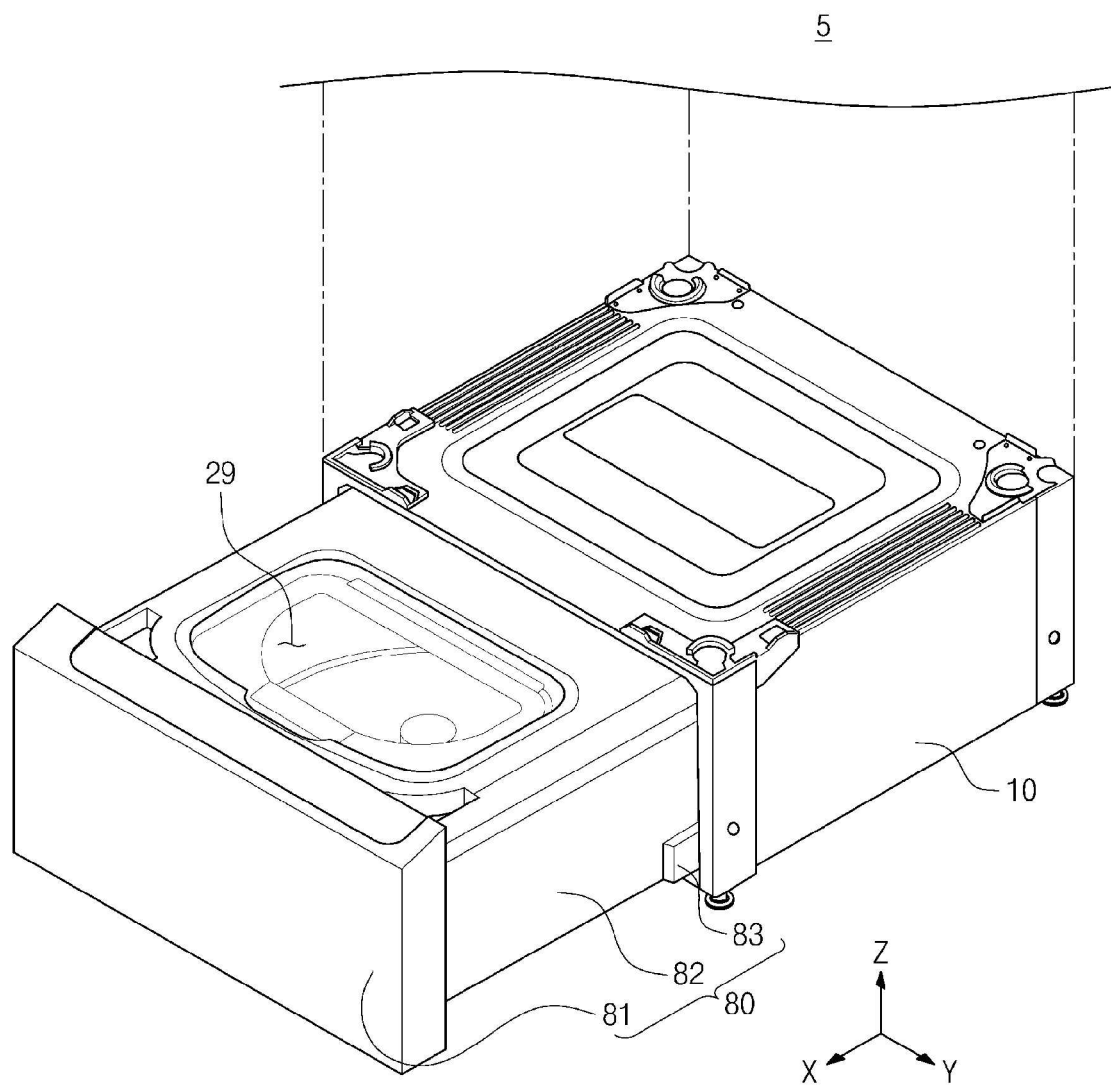
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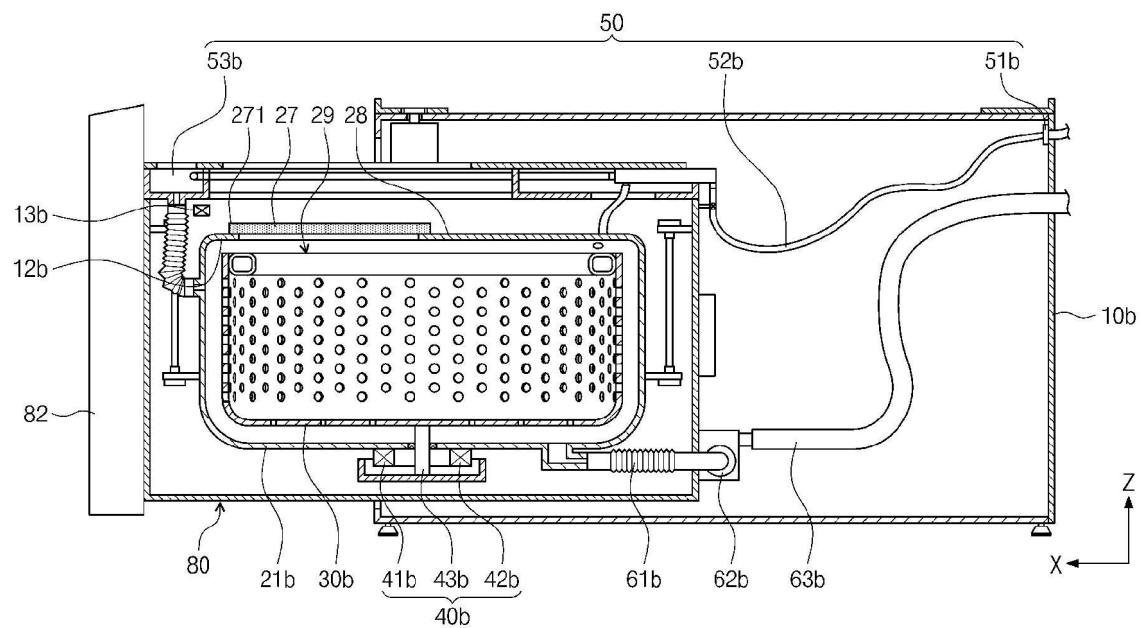
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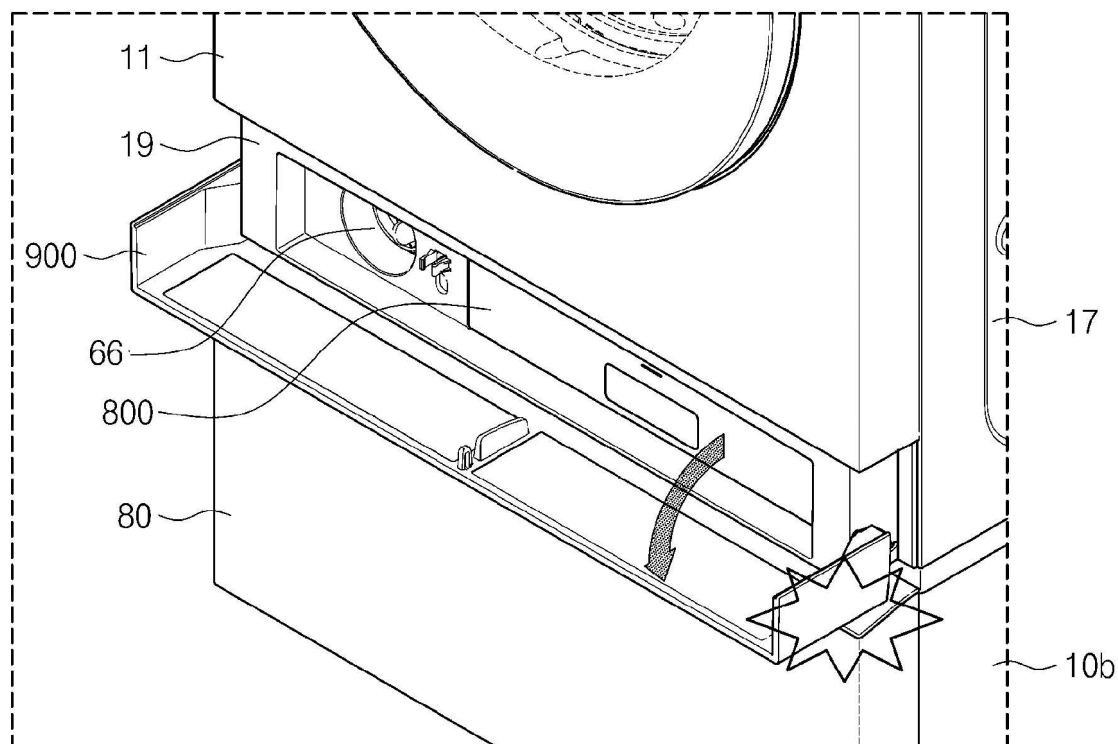
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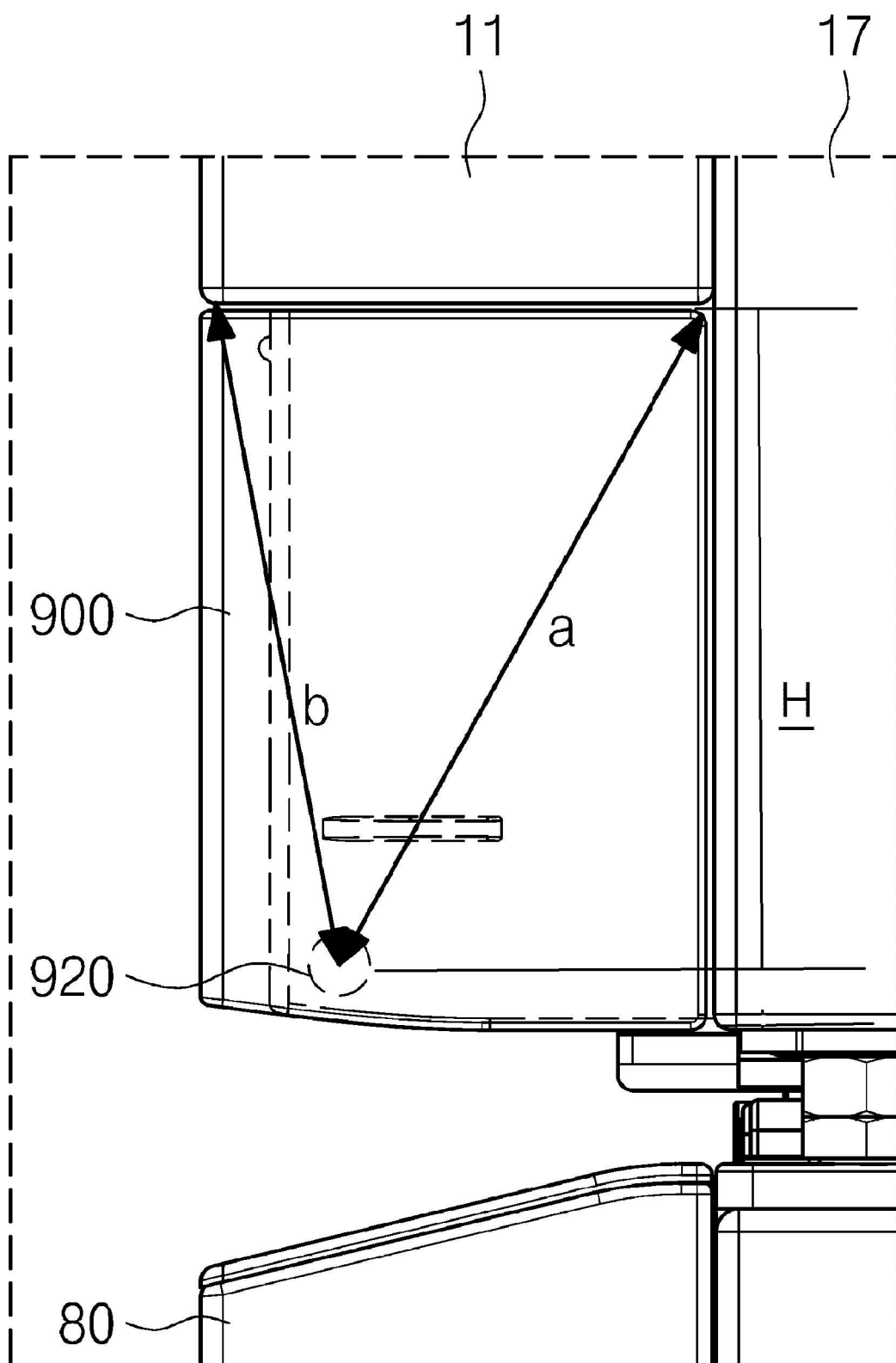
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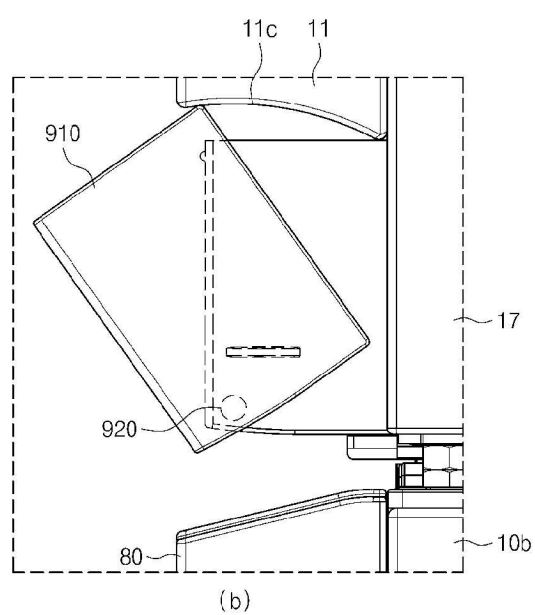
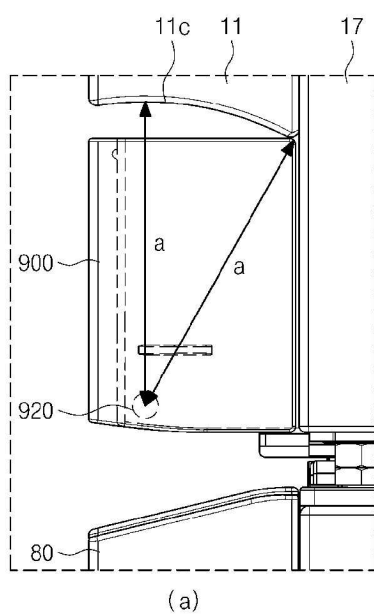
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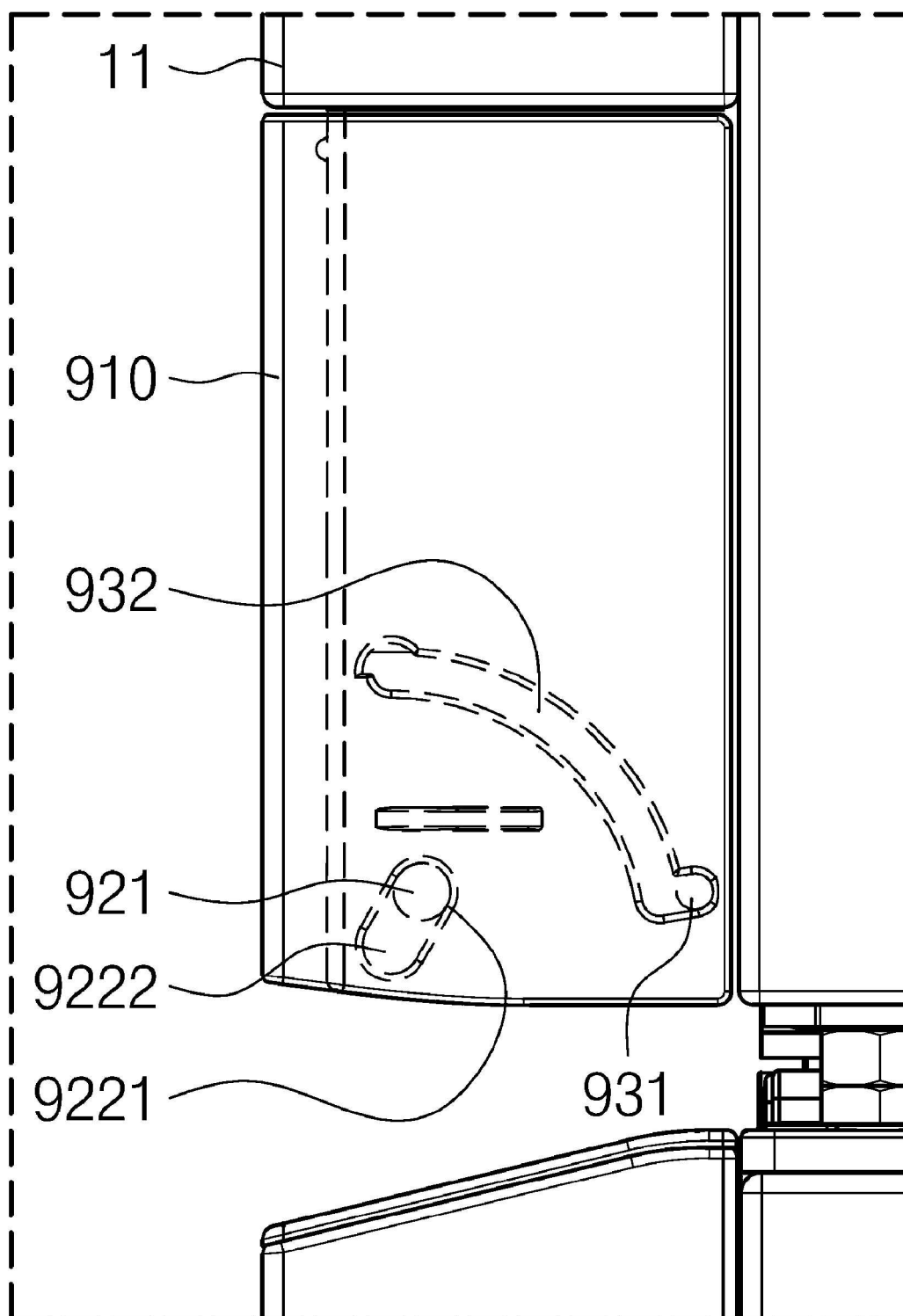
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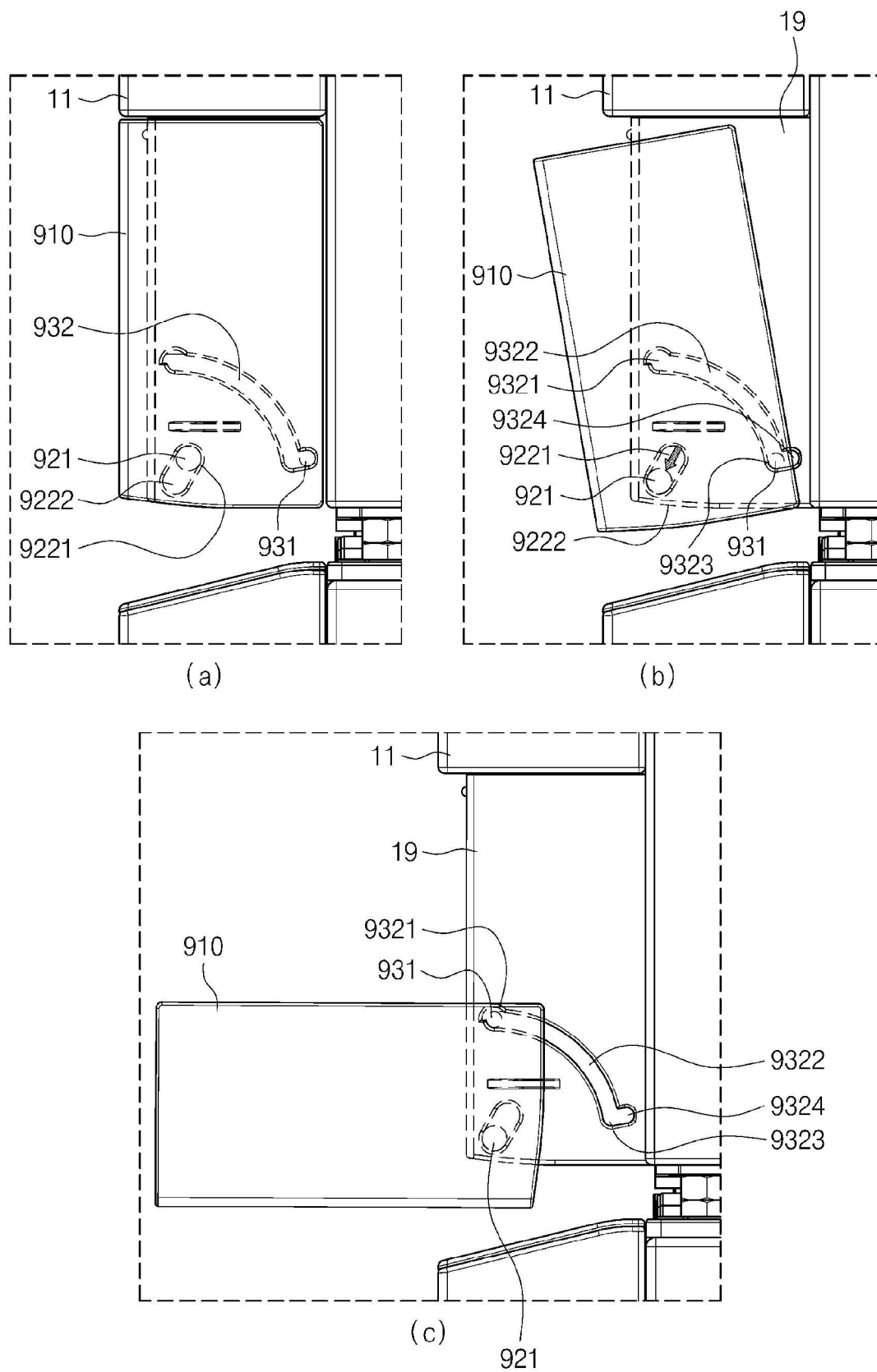
[Fig 8]



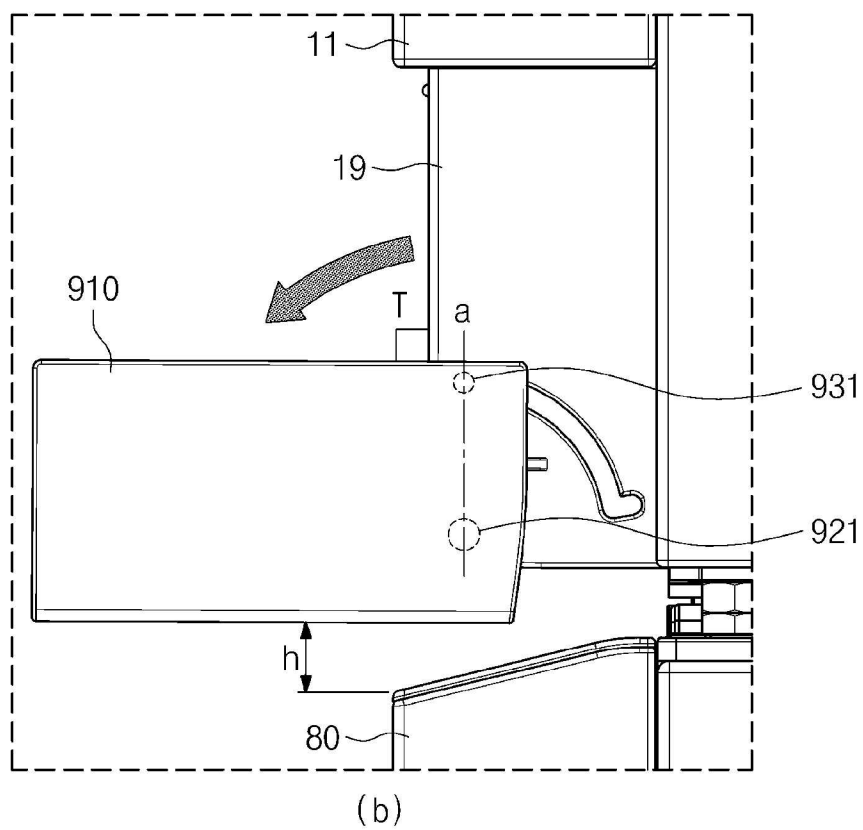
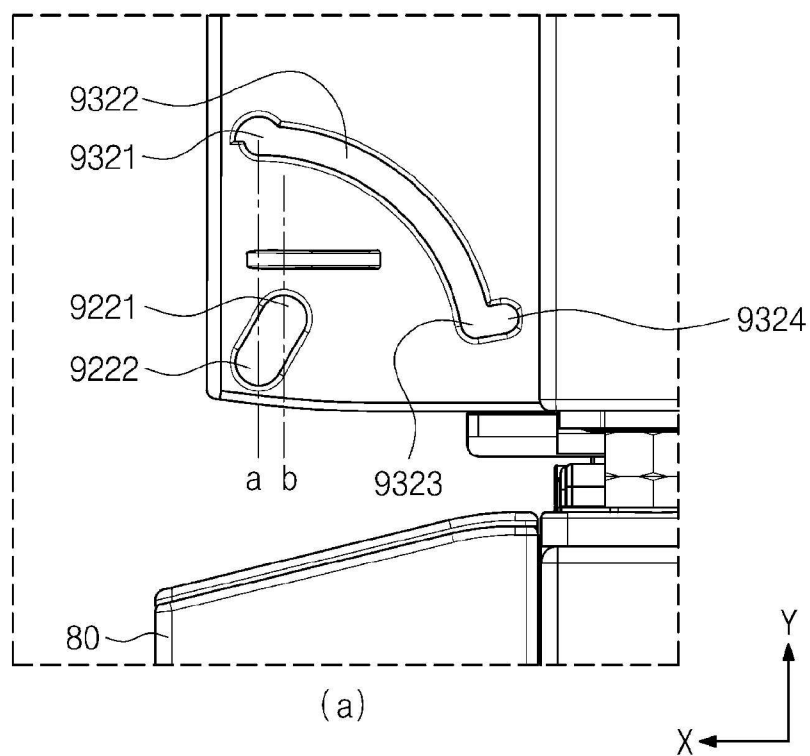
【Fig 9】



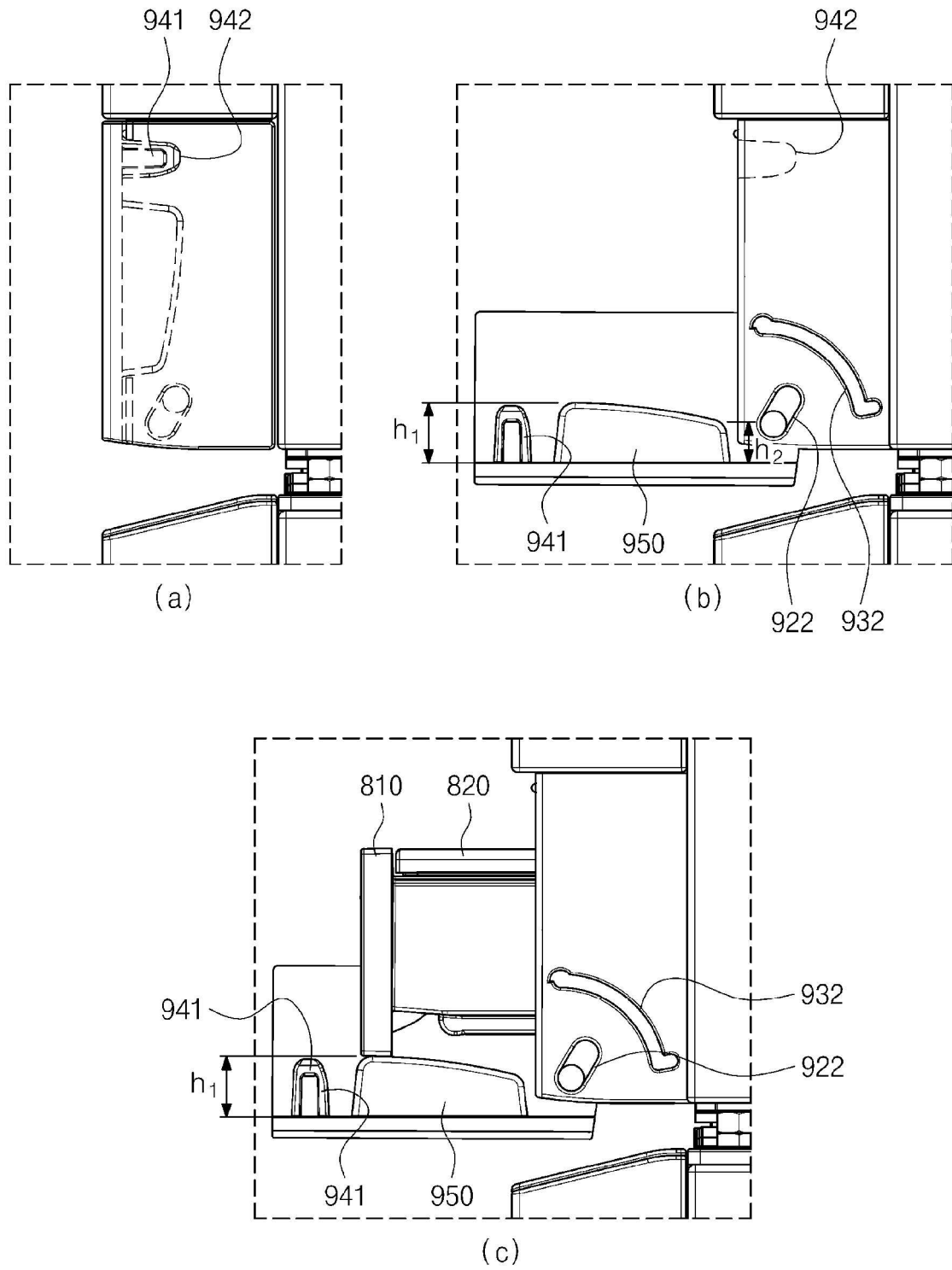
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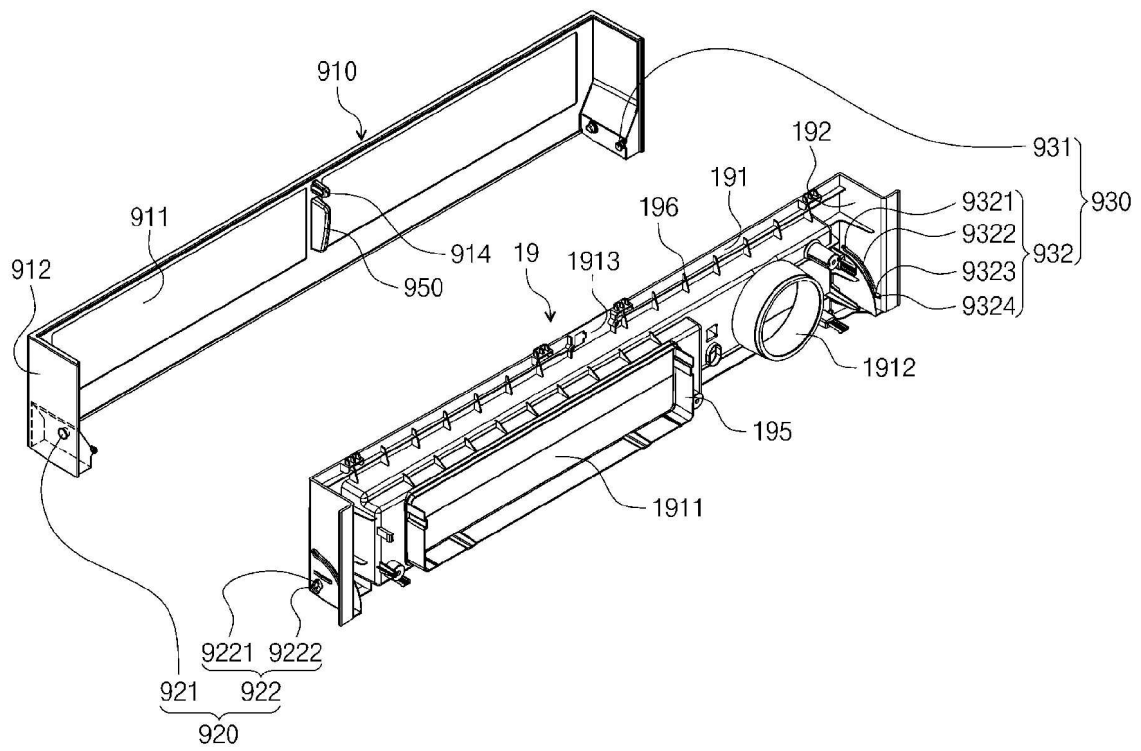
【Fig 11】



【Fig 12】



【Fig 13】



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2024/014573

A. CLASSIFICATION OF SUBJECT MATTER**D06F 39/02**(2006.01)i; **D06F 39/14**(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

D06F 39/02(2006.01); D06F 35/00(2006.01); D06F 37/26(2006.01); D06F 39/08(2006.01); D06F 39/12(2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models: IPC as above

Japanese utility models and applications for utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & keywords: 세제 박스(detergent box), 세제 박스 커버(detergent box cover), 스톱퍼(stopper), 회전(rotation), 슬릿(slot)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 10-2015-0025084 A (LG ELECTRONICS INC.) 10 March 2015 (2015-03-10) See paragraphs [0019]-[0032] and [0059]-[0066] and figures 2-6.	1
Y		2-14
A		15-16
Y	KR 10-2011-0083833 A (SAMSUNG ELECTRONICS CO., LTD.) 21 July 2011 (2011-07-21) See paragraphs [0025]-[0034] and figures 5-7.	2-14
A	KR 20-2000-0013788 U (DAEWOO ELECTRONICS CO., LTD.) 15 July 2000 (2000-07-15) See paragraphs [0021]-[0023] and figures 3-4.	1-16
A	KR 10-2008-0104641 A (LG ELECTRONICS INC.) 03 December 2008 (2008-12-03) See paragraphs [0079]-[0081] and figures 4-7.	1-16

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

“A” document defining the general state of the art which is not considered to be of particular relevance

“D” document cited by the applicant in the international application

“E” earlier application or patent but published on or after the international filing date

“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

“O” document referring to an oral disclosure, use, exhibition or other means

“P” document published prior to the international filing date but later than the priority date claimed

“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

“&” document member of the same patent family

Date of the actual completion of the international search

13 January 2025

Date of mailing of the international search report

13 January 2025

Name and mailing address of the ISA/KR

Korean Intellectual Property Office

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2024/014573

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2017-0037559 A1 (WHIRLPOOL CORPORATION) 09 February 2017 (2017-02-09) See figures 47-50.	1-16

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2024/014573

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
KR	10-2015-0025084	A	10 March 2015	KR	10-2163914	B1	12 October 2020
KR	10-2011-0083833	A	21 July 2011	CN	102127853	A	20 July 2011
				US	2011-0174021	A1	21 July 2011
KR	20-2000-0013788	U	15 July 2000	None			
KR	10-2008-0104641	A	03 December 2008	AU	2008-202222	A1	18 December 2008
				AU	2008-202222	B2	23 September 2010
				CN	101314910	A	03 December 2008
				KR	10-0873681	B1	12 December 2008
				KR	10-2008-0104642	A	03 December 2008
				US	2008-0295546	A1	04 December 2008
US	2017-0037559	A1	09 February 2017	US	10655264	B2	19 May 2020
				US	10914028	B2	09 February 2021
				US	11203831	B2	21 December 2021
				US	2017-0037558	A1	09 February 2017
				US	2020-0248374	A1	06 August 2020
				US	2021-0131016	A1	06 May 2021