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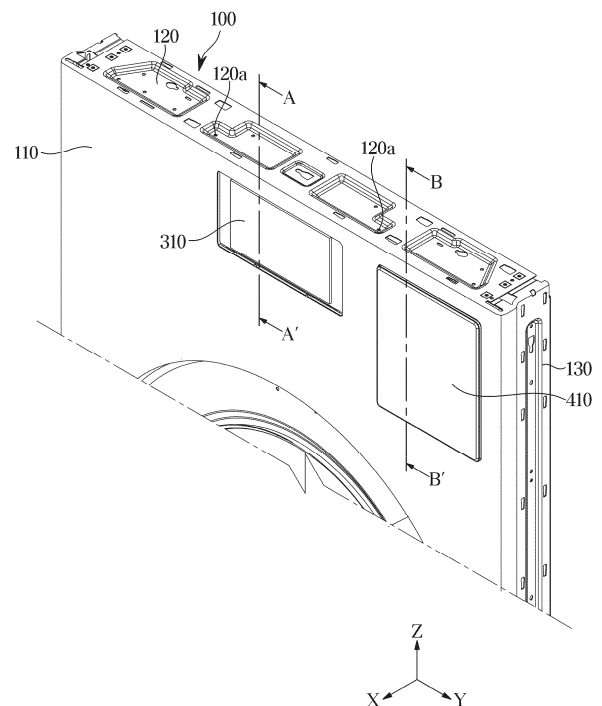
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(54) **CLOTHES TREATING APPARATUS**

(57) The present disclosure relates to a clothes treating apparatus including a tub, a front frame disposed in front of the tub and having a laundry inlet and an opening formed above the laundry inlet, a reinforcing bracket coupled to the front frame between the laundry inlet and the opening to reinforce a strength of the front frame, a control panel provided at a position corresponding to the opening of the front frame, and a guide panel configured to fix the control panel and coupled to the front frame and the reinforcing bracket.

FIG. 6



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Description

[Technical Field]

[0001] The present disclosure relates to a clothes treating apparatus including a drying device.

[Background Art]

[0002] A clothes treating apparatus is an apparatus for treating and/or managing clothes. The clothes treating apparatus may include a drying combined washing machine.

[0003] A drying combined washing machine is an apparatus that performs washing through friction between laundry, water, and a detergent put into a tub by stirring the laundry, water, and detergent together using a driving force of a driving motor.

[0004] A procedure to be performed by the drying combined washing machine may include a washing process of supplying the detergent and water to the tub accommodating laundry and washing the laundry while rotating a drum, a rinsing process of supplying water to the tub and rotating the drum to rinse the laundry, and a dewatering process of discharging the water from the tub and rotating the drum to remove moisture from the laundry.

[0005] The procedure to be performed by the drying combined washing machine may include a drying process of blowing heat generated from a drying device into an accommodation space in which the laundry is accommodated to dry the laundry. The drying combined washing machine may include the drying device to perform the drying process.

[Disclosure]

[Technical Problem]

[0006] The present disclosure is directed to providing a clothes treating apparatus capable of coupling a control panel to a housing without a dividing line.

[0007] The present disclosure is directed to providing a clothes treating apparatus capable of preventing rust from occurring on a cut surface of a front frame forming an opening.

[0008] Technical tasks to be achieved in the present disclosure are not limited to the technical task mentioned above, and other technical tasks not mentioned will be clearly understood by those skilled in the art from the description below.

[Technical Solution]

[0009] An aspect of the present disclosure provides a clothes treating apparatus including a tub, a front frame disposed in front of the tub and having a laundry inlet and an opening formed above the laundry inlet, a reinforcing

bracket coupled to the front frame between the laundry inlet and the opening to reinforce a strength of the front frame, a control panel provided at a position corresponding to the opening of the front frame, and a guide panel configured to fix the control panel and coupled to the front frame and the reinforcing bracket.

[0010] An aspect of the present disclosure provides a clothes treating apparatus including a tub, a front panel disposed in front of the tub, having an opening, and including an opening rib formed at a circumference of the opening, a control panel including a display disposed in the opening, and a guide panel configured to fix the control panel to the front panel and including an accommodation groove recessed to accommodate the opening rib.

[0011] An aspect of the present disclosure provides a clothes treating apparatus including a tub, a drying device configured to dry air flowing into the tub and including an evaporator, a front frame configured to accommodate the tub and the drying device and having an opening formed therein, a housing including a reinforcing bracket coupled to the rear of the front frame to reinforce a strength of the front frame, a control panel including a display disposed in the opening, and a guide panel configured to fix the control panel to the front frame, wherein an upper portion of the guide panel is coupled to the front frame and a lower portion of the guide panel is coupled to the reinforcing bracket.

[Description of Drawings]

[0012]

FIG. 1 is a perspective view of a clothes treating apparatus according to an embodiment of the present disclosure.

FIG. 2 is a side sectional view of the clothes treating apparatus according to an embodiment of the present disclosure.

FIG. 3 is an exploded perspective view of the clothes treating apparatus according to an embodiment of the present disclosure.

FIG. 4 is an exploded perspective view of the clothes treating apparatus according to an embodiment of the present disclosure.

FIG. 5 is an exploded perspective view of a partial configuration of a drying device in the clothes treating apparatus according to an embodiment of the present disclosure.

FIG. 6 is an enlarged view of a partial configuration of the clothes treating apparatus according to an embodiment of the present disclosure.

FIG. 7 is an enlarged view of a partial configuration of the clothes treating apparatus according to an embodiment of the present disclosure.

FIG. 8 is an exploded perspective view of a partial configuration of the clothes treating apparatus according to an embodiment of the present disclosure.

FIG. 9 is an exploded perspective view of a partial configuration of the clothes treating apparatus according to an embodiment of the present disclosure. FIG. 10 is a perspective view of a guide panel in the clothes treating apparatus according to an embodiment of the present disclosure.

FIG. 11 is an enlarged view of the guide panel in the clothes treating apparatus according to an embodiment of the present disclosure.

FIG. 12 is an enlarged side sectional view of the clothes treating apparatus according to an embodiment of the present disclosure.

FIG. 13 is an enlarged side sectional view of the clothes treating apparatus according to an embodiment of the present disclosure.

FIG. 14 is an enlarged side sectional view of the clothes treating apparatus according to an embodiment of the present disclosure.

FIG. 15 is an enlarged side sectional view of the clothes treating apparatus according to an embodiment of the present disclosure.

[Mode of the Disclosure]

[0013] Various embodiments and terms in this document are not intended to limit the technical features described in this document to specific embodiments, and should be understood to include various modifications, equivalents, or substitutes of the embodiments.

[0014] In connection with the description of the drawings, like reference numbers may be used for like or related components.

[0015] The singular form of a noun corresponding to an item may include one item or a plurality of items, unless the relevant context clearly dictates otherwise.

[0016] In this document, each of phrases such as "A or B," "at least one of A and B," "at least one of A or B," "A, B or C," "at least one of A, B and C," and "at least one of A, B, or C" may include any one of the items listed together in the corresponding one of the phrases, or all possible combinations thereof.

[0017] The term "and/or" includes any combination of a plurality of related components or any one of a plurality of related components.

[0018] Terms such as "first," "second," "primary," and "secondary" may simply be used to distinguish a given component from other corresponding components, and do not limit the corresponding components in any other aspect (e.g., importance or order).

[0019] When any (e.g., a first) component is referred to as being "coupled" or "connected" to another (e.g., a second) component with or without the terms "functionally" or "communicatively", this means that the any component may be connected to the other component directly (e.g., by a wire), wirelessly, or through a third component.

[0020] The terms "comprises," "has," and the like are intended to indicate that there are features, numbers,

steps, operations, components, parts, or combinations thereof described in this document, and do not exclude the presence or addition of one or more other features, numbers, steps, operations, components, parts, or combinations thereof.

[0021] When any component is referred to as being "connected," "coupled," "supported" or "in contact" with another component, this includes a case in which the components are indirectly connected, coupled, supported, or in contact with each other through a third component as well as directly connected, coupled, supported, or in contact with each other.

[0022] When any component is referred to as being located "on" or "over" another component, this includes not only a case in which any component is in contact with another component but also a case in which another component is present between the two components.

[0023] A washing machine according to various embodiments may perform washing, rinsing, dewatering, and drying processes. The washing machine is an example of a clothes treating apparatus, and the clothes treating apparatus is a concept encompassing an apparatus for washing clothes (objects to be washed, objects to be dried), an apparatus for drying clothes, and an apparatus capable of washing and drying clothes.

[0024] Washing machines according to various embodiments may include a top-loading washing machine in which a laundry inlet for putting in or taking out laundry is provided to face the top or a front-loading washing machine in which a laundry inlet is provided to face the front. A washing machine according to various embodiments may include a washing machine of another loading method other than a top-loading washing machine and a front-loading washing machine.

[0025] In the case of a top-loading washing machine, laundry may be washed using a water current occurred by a rotating body such as a pulsator. In the case of a front-loading washing machine, laundry may be washed by rotating a drum to repeatedly raise and drop the laundry. A front-loading washing machine may include a drying combined washing machine capable of drying laundry accommodated inside the drum. A drying combined washing machine may include a hot air supply for supplying high-temperature air into the drum and a condenser for removing moisture from air discharged from the drum. For example, a drying combined washing machine may include a heat pump. A washing machine according to various embodiments may include a washing machine using a washing method other than the above-described washing method.

[0026] A washing machine according to various embodiments may include a housing accommodating various components therein. The housing may be provided in the form of a box with a laundry inlet formed on one side thereof.

[0027] A washing machine may include a door for opening and closing the laundry inlet. The door may be rotatably mounted on the housing by hinges. At least a

portion of the door may be transparent or translucent so that the inside of the housing is visible.

[0028] A washing machine may include a tub provided inside the housing to store water. The tub may be provided in a substantially cylindrical shape with a tub opening formed on one side thereof, and may be disposed inside the housing so that the tub opening is disposed to correspond to the laundry inlet.

[0029] The tub may be connected to the housing by a damper. The damper may absorb vibration that occurs when the drum rotates to attenuate the vibration to be transmitted to the housing.

[0030] A washing machine may include a drum provided to accommodate laundry.

[0031] The drum may be disposed inside the tub such that a drum opening provided on one side thereof corresponds to the laundry inlet and the tub opening. Laundry may sequentially pass through the laundry inlet, tub opening, and drum opening to be put into the drum or taken out from the drum.

[0032] The drum may perform each operation according to a washing, rinsing, and/or dewatering process while rotating inside the tub. A plurality of passing holes is formed on a cylindrical wall of the drum so that water stored in the tub may flow into or out of the drum.

[0033] A washing machine may include a driver configured to rotate the drum. The driver may include a driving motor and a rotating shaft for transmitting a driving force generated by the driving motor to the drum. The rotating shaft may penetrate the tub to be connected to the drum.

[0034] The driver may rotate the drum forward or backward to perform each operation according to the washing, rinsing, and/or dewatering, or drying process.

[0035] A washing machine may include a water supply configured to supply water to the tub. The water supply may include a water supply pipe and a water supply valve provided in the water supply pipe. The water supply pipe may be connected to an external water supply source. The water supply pipe may extend from the external water source to a detergent supply and/or the tub. Water may be supplied to the tub through the detergent supply. Water may be supplied to the tub without passing through the detergent supply.

[0036] The water supply valve may open or close the water supply pipe in response to an electrical signal from a controller. The water supply valve may allow or block water to be or from being supplied to the tub from the external water source. The water supply valve may include, for example, a solenoid valve that is opened and closed in response to an electrical signal.

[0037] A washing machine may include a detergent supply configured to supply a detergent to the tub. The detergent supply may include a manual detergent supply configured such that a user supplies the detergent to be used each time washing, and an automatic detergent supply configured to store a large amount of detergent and automatically supply a predetermined amount of

detergent each time washing. The detergent supply may include a detergent box for storing the detergent. The detergent supply may be configured to supply the detergent into the tub in a water supply process. Water supplied through the water supply pipe may be mixed with the detergent by passing through the detergent supply. The water mixed with the detergent may be supplied into the inside of the tub. The detergent may be used as a term encompassing a detergent for pre-washing, a detergent for main washing, a fabric softener, a bleaching agent, etc., and the detergent box may be divided into a detergent storage region for pre-washing, a detergent storage region for main washing, a fabric softener storage region, and a bleaching agent storage region.

[0038] A washing machine may include a drain configured to discharge water accommodated in the tub to the outside. The drain may include a drain pipe extending from a lower end of the tub to the outside of the housing, a drain valve provided on the drain pipe to open and close the drain pipe, and a pump provided on the drain pipe. The pump may pump water in the drain pipe to the outside of the housing.

[0039] A washing machine may include a control panel disposed on one surface of the housing. The control panel may provide a user interface for interaction between the user and the washing machine. The user interface may include at least one input interface and at least one output interface.

[0040] The at least one input interface may convert sensory information received from the user into an electrical signal.

[0041] The at least one input interface may include a power button, an operation button, a course selection dial (or course selection button), and washing/rinsing/dewatering setting buttons. The at least one input interface may include, for example, a tact switch, a push switch, a slide switch, a toggle switch, a micro switch, a touch switch, a touch pad, a touch screen, a jog dial, and/or a microphone, etc.

[0042] The at least one output interface may visually or audibly deliver information related to operations of the washing machine to the user.

[0043] For example, the at least one output interface may deliver information related to a washing course, operating time of the washing machine, and washing setting/rinsing setting/dewatering setting to the user. The information about the operations of the washing machine may be output through a screen, an indicator, a voice, etc. The at least one output interface may include, for example, a liquid crystal display (LCD) panel, a light emitting diode (LED) panel, a speaker, etc.

[0044] A washing machine may include a communication module for wired and/or wireless communication with an external device.

[0045] The communication module may include at least one of a short-range communication module and a long-distance communication module.

[0046] The communication module may transmit data to or receive data from an external device (e.g., server, user device, and/or home appliance). For example, the communication module may establish communication with a server and/or a user device and/or a home appliance, and transmit and receive various data.

[0047] To this end, the communication module may support establishment of a direct (e.g., wired) communication channel or wireless communication channel between external devices, and performance of communication through the established communication channel. According to an embodiment, the communication module may include a wireless communication module (e.g., a cellular communication module, a short-range wireless communication module, or a global navigation satellite system (GNSS) communication module), or a wired communication module (e.g., a local area network (LAN) communication module, or a power line communication module). Among these communication modules, the corresponding communication module may communicate with an external device through the first network (e.g., a local area network such as Bluetooth, wireless fidelity (Wi-Fi) direct, or infrared data association (IrDA)) or the second network (e.g., a legacy cellular network, a 5G network, a next-generation communications network, the Internet, or a telecommunications network such as a computer network (e.g., LAN or WAN)). These various types of communication modules may be integrated into one component (e.g., a single chip) or may be implemented as a plurality of separate components (e.g., multiple chips).

[0048] The short-range wireless communication module may include, but is not limited thereto, a Bluetooth communication module, a Bluetooth low energy (BLE) communication module, a near field communication module, a WLAN (Wi-Fi) communication module, a Zig-Bee communication module, an infrared data association (IrDA) communication module, a Wi-Fi direct (WFD) communication module, an ultra-wideband (UWB) communication module, an Ant+ communication module, microwave (U-wave) communication module, etc.

[0049] The long-distance communication module may include a communication module performing various types of long-distance communication and may include a mobile communication device. The mobile communication device transmits and receives wireless signals to and from at least one of a base station, an external terminal, and a server on a mobile communication network.

[0050] In an embodiment, the communication module may communicate with external devices such as a server, a user device, and another home appliance through a nearby access point (AP). The access point (AP) may connect the local area network (LAN) to which a washing machine or a user device is connected to a wide area network (WAN) to which a server is connected. The washing machine or the user device may be connected to the server via the wide area network (WAN). The

controller may control various components of the washing machine (e.g., driving motor, water supply valve). The controller may control various components of the washing machine to perform at least one process including water supply, washing, rinsing, and/or dewatering according to user input. For example, the controller may control the driving motor to regulate a rotational speed of the drum or control the water supply valve of the water supply to supply water to the tub.

[0051] The controller may include hardware such as a CPU or memory, and software such as a control program. For example, the controller may include an algorithm for controlling operations of components in a washing machine, at least one memory storing data in the form of a program, and at least one processor performing the operations using data stored in the at least one memory. The memory and processor may each be implemented as a separate chip. The processor may include one or two or more processor chips or one or two or more processing cores. The memory may include one or two or more memory chips or one or two or more memory blocks. The memory and processor may be implemented as a single chip.

[0052] Hereinafter, a clothes treating apparatus according to various embodiments will be described in detail with reference to the accompanying drawings.

[0053] The terms "front," "rear," "left," and "right" used in the following description are defined based on the drawings, and the shape and location of each component are not limited by these terms.

[0054] For example, an X-axis direction may be defined as a front-rear direction, a Y-axis direction may be defined as a left-right direction, and a Z-axis direction may be defined as an up-down direction.

[0055] FIG. 1 is a perspective view of a clothes treating apparatus according to an embodiment of the present disclosure. FIG. 2 is a side sectional view of the clothes treating apparatus according to an embodiment of the present disclosure. FIG. 3 is an exploded perspective view of the clothes treating apparatus according to an embodiment of the present disclosure. FIG. 4 is an exploded perspective view illustrating the clothes treating apparatus illustrated in FIG. 3 from a different angle. FIG. 5 is an exploded perspective view of a partial configuration of a drying device in the clothes treating apparatus according to an embodiment of the present disclosure.

[0056] Referring to FIGS. 1 to 5, a clothes treating apparatus 1 according to an embodiment may include a housing 10 accommodating various components therein. The housing 10 may be provided in the form of a box with a laundry inlet 11a formed on one side thereof. The laundry inlet 11a may be provided to face substantially the front.

[0057] The housing 10 may include a plurality of frames 100, 12, and 13. The plurality of frames 100, 12, and 13 may include the front frame 100, the side frame 12, and the rear frame 13.

[0058] The front frame 100 may form a front side and a

portion of an upper side of the housing 10. The front frame 100 may cover the front of components of the clothes treating apparatus accommodated in the housing 10, such as a tub 20 and a drum 30. The front frame 100 may include a front cover.

[0059] The side frame 12 may form a side surface of the housing 10. The side frame 12 may cover a side of the components of the clothes treating apparatus accommodated in the housing 10, such as the tub 20 and the drum 30. The side frame 12 may include a side cover.

[0060] The rear frame 13 may form a rear side of the housing 10. The rear frame 13 may cover the rear of the components of the clothes treating apparatus accommodated in the housing 10, such as the tub 20 and the drum 30. The rear frame 13 may include a rear cover.

[0061] The side frame 12 and the rear frame 13 may be provided integrally. However, the side frame 12 and the rear frame 13 are not limited to the above example and may be formed separately and coupled to each other.

[0062] The front frame 100 may be separated from the side frame 12 and the rear frame 13. A control panel 300 may be mounted on the front frame 100. A user may replace the control panel 300 by separating the front frame 100 from the side frame 12 and rear frame 13. Therefore, when separation of the control panel 300 is required, the control panel 300 may be replaced by separating only the front frame 100 from the other components of the housing 10 without additionally separating the other components.

[0063] The housing 10 may include a reinforcing bracket 14. The reinforcing bracket 14 may be coupled to the front frame 100 to reinforce the strength of the front frame 100. The reinforcing bracket 14 may be disposed between openings 110a and 110b and the laundry inlet 11a. For example, the reinforcing bracket 14 may be disposed between a guide panel 200 and the inlet 11a. The reinforcing bracket 14 may be coupled and fastened to the front frame 100 by screws so that the guide panel 200 is coupled to the front frame 100. The reinforcing bracket 14 may extend along a horizontal direction. The reinforcing bracket 14 may not be included in the housing 10.

[0064] The housing 10 may include a top cover 15. The top cover 15 may be disposed above the tub 20, the drum 30, the plurality of frames 100, 12, and 13, and the like constituting the clothes treating apparatus to cover upper portions of the tub 20, the drum 30, the plurality of frames 100, 12, and 13, and the like. The top cover 15 may include a first cover part 15a and a second cover part 15b. The first cover part 15a may cover an upper portion of the front frame 100. For example, the first cover part 15a may cover an upper panel 120 of the front frame 100 (see FIG. 6). The second cover part 15b may be disposed at the rear of the first cover part 15a to cover the tub 20, the drum 30, etc. The first cover part 15a and the second cover part 15b may be formed separately or may be formed integrally. In addition, the first cover part 15a may also cover an upper portion of the upper panel 120 as a configuration included in the front frame 100.

[0065] The clothes treating apparatus 1 may include a door 40 for opening and closing the laundry inlet 11a. The door 40 may be rotatably mounted on the housing 10 by hinges. At least a portion of the door 40 may be provided to be transparent or translucent so that the inside of the housing 10 is visible. As an example, the door 40 may include tempered glass.

[0066] The clothes treating apparatus 1 may include a tub 20 provided inside the housing 10 to store water. The tub 20 may be provided in a substantially cylindrical shape with a tub opening 21 formed on one side thereof and may be disposed inside the housing 10 so that the tub opening 21 is disposed to correspond to the laundry inlet 11a. The tub opening 21 may be provided to face substantially the front.

[0067] The tub 20 may be connected to the housing 10 by a damper 25. The damper 25 may absorb vibration occurring when the drum 30 rotates to attenuate the vibration transmitted to the housing 10.

[0068] The clothes treating apparatus 1 may include the drum 30 provided to accommodate laundry. At least one lifter 33 may be provided inside the drum 30 to perform washing by lifting and dropping laundry.

[0069] The drum 30 may be disposed inside the tub 20 such that a drum opening 31 provided on one side thereof corresponds to the laundry inlet 11a and the tub opening 21. Laundry may sequentially pass through the laundry inlet 11a, the tub opening 21, and the drum opening 31 to be put into the drum 30 or taken out from the drum 30. The drum opening 31 may be provided to face substantially the front.

[0070] The drum 30 may perform each operation according to a washing, rinsing, and/or dewatering process while rotating inside the tub 20. A plurality of passing holes 32 is formed on a cylindrical wall of the drum 30 so that water stored in the tub 20 may flow into or out of the drum 30.

[0071] The clothes treating apparatus 1 may include a driver 50 configured to rotate the drum 30. The driver 50 may include a driving motor and a rotating shaft for transmitting a driving force generated by the driving motor to the drum 30. The rotating shaft may penetrate the tub 20 to be connected to the drum 30.

[0072] The driver 50 may rotate the drum 30 forward or backward to perform each operation according to the washing, rinsing, and/or dewatering, or drying process.

[0073] The clothes treating apparatus 1 may include a water supply 60 configured to supply water to the tub 20. The water supply 60 may include a water supply pipe 61 and a water supply valve 62. The water supply valve 62 may be connected to an external water supply source. The water supply pipe 61 may guide water from the water supply valve 62 to the tub 20. The water supply pipe 61 may extend from the water supply valve 62 to the tub 20. As an example, the water supply pipe 61 may be provided as a hose or a pipe made of a flexible material. Water may be supplied to a lower detergent supply 86 through the tub 20. Water may also be supplied to the lower detergent

supply 86 without passing through the tub 20.

[0074] The water supply valve 62 may open or close the water supply pipe 61 in response to an electrical signal from a controller. The water supply valve 62 may allow or block the supply of water from the external water supply source to the tub 20. The water supply valve 62 may include, for example, a solenoid valve provided to be opened and closed in response to an electrical signal.

[0075] The clothes treating apparatus 1 may include the detergent supplies 80 and 86 configured to supply a detergent to the tub 20. The detergent supplies 80 and 86 may include the upper detergent supply device 80 and the lower detergent supplies 86. The detergent may be used as a term encompassing a detergent for pre-washing, a detergent for main washing, a fabric softener, a bleaching agent, etc.

[0076] The upper detergent supplies 80 may be located above the tub 20. The upper detergent supplies 80 may be located above the tub 20 in the direction of gravity. The upper detergent supplies 80 may include a manual detergent supplies configured such that the user supplies the detergent to be used each time washing, and an automatic detergent supplies configured to store a large amount of detergent and automatically supply a predetermined amount of detergent each time washing. The upper detergent supplies 80 may be connected to the tub 20 through a connection pipe 81. As an example, the upper detergent supplies 80 may be provided to supply a solid washing detergent and/or softener to the tub 20. However, the type of detergent is not limited to the above example.

[0077] The upper detergent supplies 80 may include a detergent box 82. The detergent box 82 may store the solid washing detergent and/or fabric softener. The detergent box 82 may be withdrawn from the inside of the housing 10 or inserted into the inside of the housing 10 along a front-rear direction. The detergent box 82 may be disposed on one side of a drying device 90. For example, the detergent box 82 may be disposed in the horizontal direction with a condenser 92 and an evaporator 93.

[0078] The clothes treating apparatus 1 may include a guide assembly 400. The guide assembly 400 may guide the detergent box 82 of the upper detergent supply 80 to move through detergent box openings 110b and 200b (see FIG. 8). For example, the guide assembly 400 may guide the detergent box 82 of the upper detergent supply 80 to be inserted and/or withdrawn through the detergent box openings 110b and 200b (see FIG. 8). The guide assembly 400 may also guide a movement of a filter 98. The guide assembly 400 may also guide the detergent box 82 and the filter 98 to be seated within the housing 10.

[0079] The lower detergent supply 86 may be located below the tub 20. The lower detergent supply 86 may be located below the tub 20 in the direction of gravity. The lower detergent supply 86 may include a manual detergent supply configured such that the user supplies the detergent to be used each time washing, and an automatic detergent supply configured to store a large

amount of detergent and automatically supply a predetermined amount of detergent each time washing. As an example, the lower detergent supply 86 may be provided to supply a solid washing detergent and/or softener to the tub 20. However, the type of detergent is not limited to the above example.

[0080] The clothes treating apparatus 1 may include a drain 70 configured to discharge water accommodated in the tub 20 to the outside. The drain 70 may include a drain pump 71 provided to discharge water in the tub 20 to the outside of the housing 10. The drain 70 may include a circulation pump 76 provided to circulate water in the tub 20 back to the tub 20 through the lower detergent supply 86.

[0081] The drain 70 may be connected to the tub 20 through a tub connection pipe 72. The drain 70 may discharge water in the tub 20 to the outside of the housing 10 through a drain pipe 73.

[0082] The clothes treating apparatus 1 may include a control panel 300 disposed on one surface of the housing 10. The control panel 300 may provide a user interface for interaction between the user and the clothes treating apparatus 1. The control panel 300 may include a display 310. The user interface may include at least one input interface and at least one output interface.

[0083] The at least one input interface may convert sensory information received from the user into an electrical signal.

[0084] The at least one input interface may include a power button, an operation button, a course selection dial (or course selection button), and washing/rinsing/dewatering setting buttons. The at least one input interface may include, for example, a tact switch, a push switch, a slide switch, a toggle switch, a micro switch, a touch switch, a touch pad, a touch screen, a jog dial, and/or a microphone, etc.

[0085] The at least one output interface may visually or audibly deliver information related to operations of the clothes treating apparatus 1 to the user.

[0086] For example, the at least one output interface may deliver information related to a washing course, operating time of the clothes treating apparatus 1, and washing setting/rinsing setting/dewatering setting to the user. The information about the operations of the clothes treating apparatus 1 may be output through a screen, an indicator, a voice, etc. The at least one output interface may include, for example, a liquid crystal display (LCD) panel, a light emitting diode (LED) panel, a speaker, etc.

[0087] The clothes treating apparatus 1 may include a drying device 90 configured to dry laundry accommodated inside the drum 30. The drying device 90 may be configured to heat air and supply the heated air to the inside of the tub 20. The drying device 90 may be configured to dry and heat air discharged from the tub 20 and circulate the dried and heated air inside the tub 20 to dry clothes inside the drum 30. The drying device 90 according to an embodiment may be disposed above the tub 20.

[0088] The drying device 90 may include a drying

device case 90a in which a heat pump for drying air may be installed. The drying device 90 may include a drying device cover 90b coupled to the drying device case 90a to form a flow path through which air may move. The drying device cover 90b may cover an open upper side of the drying device case 90a.

[0089] Referring to FIG. 5, as an example, the drying device 90 may include a rear cover 90c capable of being coupled to a rear side of the drying device case 90a. The rear cover 90c may form at least a portion of a rear surface of the drying device 90. The water supply valve 62 may be mounted on the rear cover 90c.

[0090] The drying device 90 according to an embodiment may be configured as a heat pump type. The drying device 90 may include a compressor 91, the condenser 92, the evaporator 93, an expansion valve, and a refrigerant pipe 94 through which a refrigerant circulates. The compressor 91, condenser 92, evaporator 93, and the like constituting the heat pump may be disposed in the drying device case 90a. For example, the drying device 90 may include a cooling fan 91a provided to cool the compressor 91. As an example, the drying device 90 may be mounted as a single module.

[0091] The compressor 91 may compress the refrigerant, and the compressed high-temperature and pressure refrigerant may move to the condenser 92. The condenser 92 may cool the refrigerant to heat the surrounding air. The heated air may be introduced into the drum 30 to dry clothes.

[0092] The refrigerant expanded through the expansion valve may absorb heat from the evaporator 93 to cool the surrounding air. That is, the evaporator 93 may remove moisture by cooling high-temperature and humid air passed through the inside of the drum 30. The air from which moisture has been removed passes through the condenser 92 and exchanges heat with the refrigerant passing through the condenser 92, thereby being heated again. That is, the condenser 92 may heat the air passed through the evaporator 93.

[0093] As an example, the drying device 90 may further include a drying heater 99. The drying heater 99 may increase a drying efficiency of the drying device 90. As an example, the drying device 90 may replace the components of the heat pump with the drying heater 99.

[0094] The drying heater 99 may heat the air introduced into the drying device 90. The drying heater 99 may be disposed on a heating flow path 96. The drying heater 99 may be disposed downstream of the condenser 92. The drying heater 99 may be provided in a relatively small size to minimize a flow path resistance. For example, the drying heater 99 may be a sheath heater.

[0095] The drying device 90 according to an embodiment may be disposed above the tub 20. Above the tub 20, an inlet flow path 95 through which air is introduced into the drying device 90, a heating flow path 96 in which the condenser 92 and the evaporator 93 are disposed, and a supply flow path 97 through which air heated in the

drying device 90 is supplied to the inside of the drum 30 may be provided.

[0096] The inlet flow path 95 may be provided to allow air passed through the inside of the tub 20 to be introduced into the drying device 90. The inlet flow path 95 may be located above the tub 20. The inlet flow path 95 may communicate with an exhaust flow path P formed at the rear of the tub 20. The inlet flow path 95 may communicate with the exhaust flow path P through an inlet guide 95a. The air passed through the exhaust flow path P may be introduced into the drying device 90 through the inlet guide 95a.

[0097] The filter 98 may be provided in the inlet flow path 95 to filter out foreign substances such as lint contained in the air introduced from the tub 20 through the exhaust flow path P. The air introduced into the inlet flow path 95 may pass through the filter 98 and then move to the heating flow path 96.

[0098] Because the air introduced into the heating flow path 96 has passed through the inside of the tub 20, the air may be high-temperature and humid. The high-temperature and humid air may be cooled in the evaporator 93 disposed in the heating flow path 96 to remove moisture. The air from which moisture has been removed in the evaporator 93 may be heated again while passing through the condenser 92.

[0099] The supply flow path 97 may be provided to supply the air heated while passing through the condenser 92 back into the inside of the tub 20. The supply flow path 97 may be in communication with the heating flow path 96 and extend downward to discharge the heated air toward the opening of the tub 20.

[0100] A fan 97a may be provided in the supply flow path 97 to flow air into the inside of the tub 20. That is, the fan 97a may flow air to supply the air to the laundry inside the drum 30. For example, the fan 97a may include a sirocco fan.

[0101] According to this configuration, the inlet flow path 95 and the supply flow path 97 may allow air to circulate into the tub 20 and the drying device 90.

[0102] The clothes treating apparatus 1 according to an embodiment of the present disclosure may be configured such that air is introduced into the drying device 90 through the inlet flow path 95 provided above the tub 20. The air heated in the drying device 90 may be supplied to the inside of the drum 30 through the supply flow path 97 provided above the tub 20.

[0103] A position of the water supply valve 62 of the clothes treating apparatus 1 according to an embodiment of the present disclosure may be determined by utilizing a space vacated by this mounting structure. In an embodiment of the present disclosure, the water supply valve 62 may be mounted between the inlet guide 95a and the cooling fan 91a. The water supply valve 62 may be located in a central portion of the rear surface of the drying device 90. The water supply valve 62 may be located at the rear of the condenser 92. The water supply valve 62 may be located in a region separated from a flow

path through which dry air flows. However, the position of the water supply valve 62 is not limited thereto.

[0104] The clothes treating apparatus 1 according to an embodiment may further include the exhaust flow path P through which the air discharged from the inside of the tub 20 flows to the drying device 90. The exhaust flow path P may communicate with the inlet flow path 95 of the drying device 90.

[0105] The exhaust flow path P may be provided to discharge the humid air passed through the tub 20. As an example, the exhaust flow path P may be provided at the rear of the tub 20.

[0106] The clothes treating apparatus 1 according to an embodiment may include a tub duct 28 forming at least a portion of the exhaust flow path P. As an example, the tub duct 28 may be formed integrally with the tub 20. As an example, the tub 20 may include the tub duct 28.

[0107] The clothes treating apparatus 1 according to an embodiment may include a duct cover 29 forming at least a portion of the exhaust flow path P. The duct cover 29 may be provided to cover an open rear side of the tub duct 28. As an example, the tub 20 may include the duct cover 29. The duct cover 29 may form at least a portion of the exhaust flow path P through which the air discharged through an air outlet 27 flows to the drying device 90.

[0108] In the clothes treating apparatus 1 according to an embodiment, the exhaust flow path P may be formed as the duct cover 29 is coupled to the tub duct 28.

[0109] The tub duct 28 according to an embodiment may include a recess portion 28a forming a portion of the exhaust flow path P through which the air discharged from the inside of the tub 20 flows. The air outlet 27 may be formed on the recess portion 28a to exhaust air from the inside of the tub 20.

[0110] The tub duct 28 according to an embodiment may include a discharge guide 28b forming another portion of the exhaust flow path P through which the air passed through the recess portion 28a flows. The discharge guide 28b may protrude outward from an outer circumferential surface of the tub 20. The discharge guide 28b may protrude substantially upward from the outer circumferential surface of the tub 20.

[0111] The discharge guide 28b may communicate the drying device 90 and the recess portion 28a. The discharge guide 28b may form one passage forming the exhaust flow path P together with the recess portion 28a and the duct cover 29.

[0112] The discharge guide 28b may be covered by the duct cover 29. The discharge guide 28b may have one open side. The duct cover 29 may cover the one open side of the discharge guide 28b.

[0113] The duct cover 29 may cover both the recess portion 28a and the discharge guide 28b. For example, the duct cover 29 may cover both an open side of the recess portion 28a and the open side of the discharge guide 28b. The exhaust flow path P may be formed by the duct cover 29 covering the recess portion 28a and the discharge guide 28b. As an example, the duct cover 29

may cover only the recess portion 28a.

[0114] The duct cover 29 may be provided to cover an open rear side of the recess portion 28a and/or an open rear side of the discharge guide 28b. The exhaust flow path P may be one passage formed together with the tub duct 28 and the duct cover 29.

[0115] The air inside the tub 20 may be discharged into the tub duct 28 through the air outlet 27 formed on the tub 20. The air discharged through the tub duct 28 may flow along the exhaust flow path P to be supplied to the drying device 90.

[0116] The tub 20 of the clothes treating apparatus 1 according to an embodiment may include a step portion 28c formed to change a cross-sectional area of the exhaust flow path P. The step portion 28c may be provided on the tub duct 28.

[0117] The step portion 28c may be formed such that a cross-sectional area substantially perpendicular to a direction of air flow expands as it flows in the direction of air flow in the exhaust flow path P. For example, the step portion 28c may be provided such that a cross-sectional area of a portion of the exhaust flow path P formed by the discharge guide 28b is larger than a cross-sectional area of a portion of the exhaust flow path P formed by the recess portion 28a.

[0118] In the clothes treating apparatus 1 according to an embodiment, a loss of an internal space of the tub 20 may be prevented by the step portion 28c, a size of the exhaust flow path P may be secured, and an internal space of the housing 10 may be used efficiently.

[0119] The air heated in the drying device 90 may be supplied to the inside of the drum 30. In order to ensure a region in which the heated air supplied into the inside of the drum 30 comes into contact with laundry, the air outlet 27 may be provided at a position opposite to an air inlet 26 (see FIG. 5) through which the air heated in the drying device 90 is supplied to the tub 20. The air outlet 27 may be provided at the position opposite to the air inlet 26 through which the air heated in the drying device 90 is supplied to the tub 20 to allow the heated air to more come into contact with the laundry by increasing a distance and/or time that the heated air flows inside the drum 30. The air outlet 27 may be provided to be spaced apart from the supply flow path 97 allowing the heated air to be supplied to the inside of the drum 30. By increasing an area of contact between the heated air and the laundry, the drying efficiency may be improved.

[0120] The clothes treating apparatus 1 according to an embodiment may include the control panel 300. The control panel 300 may include the at least one input interface and the at least one output interface as described above. The control panel 300 may be positioned at, mounted on and/or coupled to the front frame 100. For example, the control panel 300 may be positioned at, mounted on and/or coupled to the rear of the front frame 100. The control panel 300 may be mounted on the front frame 100 through the guide panel 200.

[0121] The control panel 300 may be arranged in the

horizontal direction with the detergent box 82 while being disposed in the housing 10. For example, the control panel 300 and the detergent box 82 may be separated by the guide assembly 400 so as not to interfere with each other. Therefore, even though the detergent inside the detergent box 82 leaks out, the detergent may not flow toward the control panel 300.

[0122] The control panel 300 may be located in front of the drying device 90 while being disposed in the housing 10. The control panel 300 may be disposed in the housing 10 without interference with the components of the drying device 90.

[0123] The control panel 300 may be provided between the fan 97a and the filter 98. For example, while the front frame 100 is coupled to the rear frame 13 and the side frame 12, and the fan 97a and filter 98 are accommodated inside the housing 10, the control panel 300 may be disposed between the fan 97a and the filter 98 in a left-right direction. For example, in the housing 10, the fan 97a, the control panel 300 and the filter 98 may be disposed in sequence along the left-right direction.

[0124] The fan 97a may be disposed in front of the drying device case 90a. For example, the fan 97a may be mounted on one side of a front side of the drying device case 90a in the left-right direction. The fan 97a may protrude from the drying device case 90a. Additionally, for example, a filter 98 may be mounted on the drying device case 90a, and a portion of the filter 98 may protrude from the other side of the front side of the drying device case 90a in the left-right direction.

[0125] The control panel 300 may be disposed between the fan 97a at the front of the drying device case 90a and the protruding portion of the filter 98. Therefore, without forming an additional space for the control panel 300, the control panel 300 may be disposed in a space between the protruding fan 97a and the protruding filter 98 to utilize the space.

[0126] The clothes treating apparatus 1 according to an embodiment may include the guide panel 200. The guide panel 200 may guide the control panel 300 to be coupled to the front frame 100. The guide panel 200 may guide the coupling of the control panel 300. The guide panel 200 may be the coupling panel 200. The guide panel 200 may be disposed between the front frame 100 and the control panel 300 in the front-rear direction. The guide panel 200 may be disposed between the reinforcing bracket 14 and the upper panel 120 of the front frame 100 in an upper-lower direction. The guide panel 200 may also guide the guide assembly 400 to be mounted on the front frame 100. The guide panel 200 and the guide assembly 400 may be hook-coupled. Accordingly, as the guide panel 200 extends along the horizontal direction, the guide assembly 400 and the control panel 300 may be coupled to the front frame 100 with the single guide panel 200 without the need for other components.

[0127] However, the present disclosure is not limited thereto. For example, the guide assembly 400 may be coupled to the drying device case 90a or formed integrally

with the drying device case 90a.

[0128] FIG. 6 is an enlarged view of a partial configuration of the clothes treating apparatus according to an embodiment of the present disclosure. FIG. 7 is an enlarged view of a partial configuration of the clothes treating apparatus according to an embodiment of the present disclosure. FIG. 8 is an exploded perspective view of a partial configuration of the clothes treating apparatus according to an embodiment of the present disclosure. FIG. 9 is an exploded perspective view of a partial configuration of the clothes treating apparatus according to an embodiment of the present disclosure.

[0129] FIG. 6 is an enlarged front perspective view of a partial configuration of the clothes treating apparatus, FIG. 7 is an enlarged rear perspective view of a partial configuration of the clothes treating apparatus, FIG. 8 is an exploded front perspective view of a partial configuration of the clothes treating apparatus, and FIG. 9 is an exploded rear perspective view of a partial configuration of the clothes treating apparatus.

[0130] Referring to FIGS. 6 to 9, the front frame 100 may include a front panel 110. The front panel 110 may form the front of the front frame 100. The openings 110a and 110b may be formed on the front panel 110. The openings 110a and 110b may be formed at an upper portion of the front panel 110. For example, the openings 110a and 110b may be formed above the laundry inlet 11a and the reinforcing bracket 14. The openings 110a and 110b may include a plurality of the openings 110a and 110b. The plurality of openings 110a and 110b may include the display opening 110a and the detergent box opening 110b.

[0131] A display 310 may be disposed in the display opening 110a. The display 310 may be exposed to the outside of the housing 10 through the display opening 110a. The display opening 110a formed on the front panel 110 may be a first opening. The detergent box opening 110b may be opened and closed by the guide assembly 400. The user may put the detergent to the detergent box 82 through the detergent box opening 110b.

[0132] The front frame 100 may include the upper panel 120. The upper panel 120 may form the upper portion of the front frame 100. A fastening hole 120a may be formed on the upper panel 120. The fastening hole 120a may be formed such that the guide panel 200 is coupled to the front frame 100. The upper panel 120 of the front frame 100 and an upper portion 220 of the guide panel 200 may be coupled through the fastening hole 120a formed on the upper panel 120 and a fastener 200c formed at the upper portion 220 of the guide panel 200.

[0133] The upper panel 120 may be covered by the top cover 15. For example, the fastening hole 120a of the upper panel 120 may be covered by the first cover part 15a of the top cover 15.

[0134] The front frame 100 may include a side panel 130. The side panel 130 may form a side of the front frame 100. The reinforcing bracket 14 may be coupled to the side panel 130. The reinforcing bracket 14 may be screw-

coupled to the front panel 110 and the side panel 130. For example, a first reinforcing part 14a of the reinforcing bracket 14 may be screw-coupled to the front panel 110, and a second reinforcing part 14b of the reinforcing bracket 14 may be screw-coupled to the side panel 130.

[0135] The reinforcing bracket 14 may include the first reinforcing part 14a and the second reinforcing part 14b. The first reinforcing part 14a may be disposed at the rear of the front panel 110 to reinforce the strength of the front panel 110. The first reinforcing part 14a may be coupled to the front panel 110 at the rear of the front panel 110. The first reinforcing part 14a may extend in the horizontal direction. The first reinforcing part 14a may be disposed between the openings 110a and 110b and the laundry inlet 11a. The second reinforcing part 14b may extend from an end of the first reinforcing part 14a. The second reinforcing part 14b may be coupled to the side panel 130 to reinforce the strength of the side panel 130. The second reinforcing part 14b may be coupled to the side panel 130 on an inner side of the front frame 100. The second reinforcing part 14b may extend in the front-rear direction.

[0136] The reinforcing bracket 14 may include a third reinforcing part 14c. The third reinforcing part 14c may extend upward from the first reinforcing part 14a. The third reinforcing part 14c may extend from both sides of the first reinforcing part 14a in the horizontal direction. The third reinforcing part 14c may be coupled to the guide panel 200. The fastening hole 120a may be formed on the third reinforcing part 14c. The fastening hole 120a of the third reinforcing part 14c may be coupled with a fastener 200e formed at a lower portion 280 of the guide panel 200 through a screw. The third reinforcing part 14c may be disposed at the rear of the guide panel 200.

[0137] The guide panel 200 may be disposed between the front frame 100 and the control panel 300 in the front-rear direction to enable the control panel 300 to be coupled to the front frame 100. The guide panel 200 may also be coupled to the guide assembly 400 such that the guide assembly 400 is fixed to the front frame 100. Accordingly, through the guide panel 200 as a single component, the control panel 300 and the guide assembly 400 may be coupled and/or fixed to the front frame 100.

[0138] The guide panel 200 may include the openings 200a and 200b. The openings 200a and 200b of the guide panel 200 may include a plurality of the openings 200a and 200b. The plurality of openings 200a and 200b may include the display opening 200a and the detergent box opening 200b.

[0139] The display opening 200a of the guide panel 200 may correspond to the display opening 110a of the front frame 100. The display 310 may be disposed in the display opening 200a of the guide panel 200. The display 310 may be exposed to the outside of the housing 10 through the display opening 200a. The display opening 200a formed on the guide panel 200 may be a second opening. The display opening 200a may be formed at the

upper portion 220 of the guide panel 200. However, the formation location of the display opening 200a is not limited to the above example.

[0140] The detergent box opening 200b of the guide panel 200 may correspond to the detergent box opening 110b of the front frame 100. The user may put the detergent into the detergent box 82 through the detergent box opening 200b. The detergent box opening 110b of the front frame 100 may be a third opening, and the detergent box opening 200b of the guide panel 200 may be a fourth opening.

[0141] The guide panel 200 may include the fasteners 200c, 200d, and 200e. The fasteners 200c, 200d, and 200e may include a plurality of the fasteners 200c, 200d, and 200e. The plurality of fasteners 200c, 200d, and 200e may include the upper fastener 200c, the middle fastener 200d, and the lower fastener 200e. The upper fastener 200c may be formed at the upper portion 220 of the guide panel 200 so that the upper panel 120 of the front frame 100 and the upper portion 220 of the guide panel 200 are screw-coupled. The middle fastener 200d may be formed at a middle portion of a front side 210 of the guide panel 200, so that first and second display cases 321 and 322 and the guide panel 200 may be coupled to each other. A portion of the middle fastener 200d may be provided to be adjacent to the upper portion 220 of the guide panel 200. The lower fastener 200e may be formed at a lower portion of the front side 210 of the guide panel 200 so that the reinforcing bracket 14 and the lower portion 280 of the guide panel 200 are screw-coupled. The upper fastener 200c, the middle fastener 200d, and the lower fastener 200e may each be provided as a plurality of fasteners.

[0142] The guide panel 200 may include hooks 200f and 200g. The hook 200f and 200g may include a plurality of the hooks 200f and 200g. The plurality of hooks 200f and 200g may protrude rearward from the front side 210 of the guide panel 200. The plurality of hooks 200f and 200g may include the first hook 200f and the second hook 200g. The first hook 200f may be inserted into a mounting groove 430a formed on a guide member 430 to connect the guide member 430 and the guide panel 200. The first hook 200f may be formed in a region adjacent to the detergent box opening 200b. The second hook 200g may be provided such that the first and second display cases 321 and 322 and the guide panel 200 are coupled to each other. For example, the second hook 200g may be provided such that the first display case 321 and the guide panel 200 are hook-connected. The second hook 200g may be formed in a region adjacent to the display opening 200a. For example, the second hook 200g may be in contact with a hook protrusion 321d of the first display case 321. The first hook 200f and the second hook 200g may each be provided as a plurality of hooks. However, the first hook and the second hook are not limited to the names of the examples described above. For example, the first hook may be a hook formed in the region adjacent to the display opening 200a, or the second hook may be a hook formed in the region adjacent to the detergent box

opening 200b.

[0143] The control panel 300 may include the display 310. The display 310 may include at least one input interface and/or at least one output interface. The display 310 may be accommodated in the first and second display cases 321 and 322.

[0144] The display 310 may include a glass 310a, a touch panel 310b, and a display panel 310c.

[0145] The glass 310a may be disposed in front of the touch panel 310b and the display panel 310c to protect the touch panel 310b and the display panel 310c. Buttons may be printed on the glass 310a to provide physical buttons to the user.

[0146] The touch panel 310b may receive a signal according to user input. The touch panel 310b may be disposed between the glass 310a and the display panel 310c. The touch panel 310b may have a thickness thinner than the glass 310a and the display panel 310c.

[0147] The display panel 310c may be disposed at the rear of the glass 310a and the touch panel 310b. The display panel 310c may display operation information of the clothes treating apparatus.

[0148] The glass 310a, the touch panel 310b, and the display panel 310c may be adhered to each other through an adhesive film. However, the method of coupling and/or adhering the glass 310a, the touch panel 310b, and the display panel 310c is not limited to the above example.

[0149] Also, the display 310 may not include at least one of the glass 310a, the touch panel 310b and the display panel 310c, or the glass 310a, the touch panel 310b and the display panel 310c may be formed integrally.

[0150] The display 310 may be disposed adjacent to the first and second display cases 321 and 322. For example, the display 310 may be disposed between the front panel 110 and the first and second display cases 321 and 322. For example, the display 310 may be attached to a front surface of the first display case 321 through tape.

[0151] The control panel 300 may include the first and second display cases 321 and 322. The first and second display cases 321 and 322 may accommodate various components such as the display 310, a speaker, a microphone 360, and/or a communication module 340. The first and second display cases 321 and 322 may include the first display case 321 and the second display case 322. For example, the speaker (not shown), printed circuit board 330 and 350, the microphone 360, and/or the communication module 340 may be disposed between the first display case 321 and the second display case 322.

[0152] The first display case 321 may be disposed in front of the second display case 322. The first display case 321 may be disposed at the rear of the guide panel 200. The first display case 321 may cover the front of the speaker (not shown), the printed circuit boards 330 and 350, the microphone 360, and/or the communication module 340.

[0153] The first display case 321 may include a coupling portion 321a. The coupling portion 321a may be provided such that the first display case 321 and the guide panel 200 are coupled to each other. For example, the coupling portion 321a of the first display case 321 and the middle fastener portion 200d of the guide panel 200 are screw-coupled, so that the first and second display cases 321 and 322 may be coupled to the guide panel 200. The coupling portion 321a may be provided as a plurality of the coupling portions 321a. The plurality of coupling portions 321a may be provided at an upper left, upper right, lower left and/or lower right of the first display case part.

[0154] An opening 321b may be formed on the first display case 321. A cable (not shown) electrically connecting the display 310 and the printed circuit board 330 may pass through the opening 321b of the first display case 321.

[0155] The first display case 321 may include a mounting protrusion 321c. The mounting protrusion 321c may be mounted in a mounting portion 322a provided on the second display case 322. The mounting portion 322a may be provided as a hole, and as the mounting protrusion 321c is inserted into the mounting portion 322a, the first display case 321 and the second display case 322 may be coupled to each other.

[0156] The first display case 321 may include the hook protrusion 321d. The hook protrusion 321d may correspond to the first hook 200f of the guide panel 200. The first hook 200f and the hook protrusion 321d are in contact with each other, so that the first display case 321 and the guide panel 200 may be stably coupled and supported.

[0157] The second display case 322 may be disposed at the rear of the first display case 321. The second display case 322 may be disposed at the rear of the guide panel 200. The second display case 322 may cover the rear of the speaker (not shown), the printed circuit boards 330 and 350, the microphone 360, and/or the communication module 340.

[0158] The second display case 322 may include the mounting portion 322a. The mounting portion 322a may be provided such that the second display case 322 and the first display case 321 are coupled to each other. For example, the mounting protrusion 321c of the first display case 321 may be mounted in the mounting portion 322a of the second display case 322. For example, the mounting portion 322a may be a mounting hole, and the mounting protrusion 321c may be inserted into and fixed to the mounting hole. The mounting portion 322a may be provided as a plurality of the mounting portions 322a. The plurality of mounting portions 322a may be provided along a circumference of the second display case 322.

[0159] The second display case 322 may include a vent portion 322b. The vent portion 322b protrudes rearward to form a vent hole so that heat generated in the first and second display cases 321 and 322 may be released to the outside through the vent hole. Therefore, over-

heating of components inside the first and second display cases 321 and 322 may be prevented through the vent portion 322b.

[0160] The control panel 300 may include the printed circuit board 330. The printed circuit board 330 is disposed in the first and second display cases 321 and 322 and may control the display 310. A control circuit may be provided on the printed circuit board 330. The printed circuit board 330 may be electrically connected to the display 310.

[0161] The control panel 300 may include the communication module 340. The communication module 340 is disposed in the first and second display cases 321 and 322 and may transmit and receive control information of the display 310.

[0162] The display 310 and the control panel 300 may transmit and receive information to and from other home appliances and/or electronic devices through the communication module 340. For example, the clothes treating apparatus may be communicatively connected to a refrigerator to display status information of the refrigerator on the display 310. Or, a work being performed in the refrigerator may be transferred to the clothes treating apparatus and the work may be continuously performed in the clothes treating apparatus. Or, based on completion of a washing process and/or drying process, the electronic device and/or home appliance may notify the user of information related to the washing process and/or drying process. The clothes treating apparatus may integratively provide information on the interconnected home appliances and/or electronic devices to the user through the display 310 and the control panel 300.

[0163] The control panel 300 may include the touch printed circuit board 350. The touch printed circuit board 350 is disposed in the first and second display cases 321 and 322, and may transmit, receive, and/or control touch information of the display 310. The touch printed circuit board 350 may be fixed to the first display case 321 at the rear of the first display case 321. The touch printed circuit board 350 may be electrically connected to the display 310.

[0164] The control panel 300 may include the microphone 360. The microphone 360 may be disposed in the first and second display cases 321 and 322. For example, the microphone 360 may be mounted on the first display case 321 at a lower portion of the first display case 321. The microphone 360 may recognize a voice of the user and transmit information about the voice to the printed circuit board 330.

[0165] The clothes treating apparatus may further include the guide assembly 400. The guide assembly 400 may guide movements of the detergent box 82 and the filter 98. For example, the guide assembly 400 may guide the detergent box 82 and the filter 98 to be inserted and withdrawn through the openings 110b and 200b. Also, the guide assembly 400 may guide the detergent box 82 and the filter 98 to be seated within the housing 10.

[0166] The guide assembly 400 may be disposed on one side of the control panel 300. For example, the guide assembly 400 may be disposed along the horizontal direction with the control panel 300. The guide assembly 400 may be coupled to, mounted on, and/or fixed to the front frame 100 through the guide panel 200. The guide assembly 400 may be coupled to, mounted on, and/or fixed to the guide panel 200. For example, the guide assembly 400 may be hook-coupled with the guide panel 200. The guide assembly 400 may be a seating guide, a mounting guide, and/or a movement guide.

[0167] The guide assembly 400 may include guide doors 410 and 420. The guide doors 410 and 420 may open and close the detergent box openings 110b and 200b through which the detergent box 82 may be inserted and withdrawn. The guide doors 410 and 420 may be rotatably coupled to the guide panel 200.

[0168] The guide doors 410 and 420 may also be referred to as the detergent box doors 410 and 420 and/or the filter doors 410 and 420. The guide doors 410 and 420 may be provided to cover the front of the filter 98 and the front of the detergent box 82 mounted in the housing 10 through the detergent box openings 110b and 200b. In this case, the guide doors 410 and 420 may be arranged parallel to the front of the housing 10, thereby improving aesthetics. For example, the guide doors 410 and 420 may be arranged parallel to the front panel 110 of the front frame 100, thereby improving the aesthetics of the clothes treating apparatus.

[0169] The guide doors 410 and 420 may include the door cover 410 and the door opening/closing part 420. The door cover 410 may be disposed in front of the door opening/closing part 420 to cover the door opening/closing part 420. For example, the door cover 410 may be attached to the front of the door opening/closing part 420. The door opening/closing part 420 may be rotatably coupled to the guide panel 200 through a rotating portion 420a provided on one side thereof. The door opening/closing part 420 may be disposed at the rear of the door cover 410. The door opening/closing part 420 may be disposed in front of the guide member 430 to open and close openings 433a and 433b of the guide member 430.

[0170] However, the clothes treating apparatus is not limited to the door cover 410 and the door opening/closing part 420 being formed separately and coupled to each other. For example, the door cover 410 and the door opening/closing part 420 may be formed integrally. Also, only the door opening/closing part 420 may be provided.

[0171] In addition, the door cover 410 and the door opening/closing part 420 may be formed to cover only portions of the openings 433a and 433b of the guide member 430. For example, the door cover 410 and the door opening/closing part 420 may have a cross-sectional area corresponding to a cross-sectional area of the filter guide opening 433a to open and close only the filter guide opening 433a, or may have a cross-sectional area corresponding to a cross-sectional area of the detergent box guide opening 433b to open and close only the

detergent box guide opening 433b.

[0172] The guide assembly 400 may include the guide member 430. The guide member 430 may be disposed at the rear of the guide doors 410 and 420. The guide assembly 400 may guide a mounting position of the filter 98 and guide a mounting position of the detergent box 82. Also, the guide assembly 400 may guide the insertion and/or withdrawal of the filter 98 and guide the insertion and/or withdrawal of the detergent box 82.

[0173] The guide member 430 may include a detergent box guide part 431 and a filter guide part 432. The detergent box guide part 431 and the filter guide part 432 may protrude rearward. The detergent box guide part 431 may form the opening 433b, and the detergent box 82 may be mounted in the opening 433b of the detergent box guide part 431, or the mounting of the detergent box 82 may be guided through the opening 433b of the detergent box guide part 431. the filter guide part 432 may form the opening 433a, and the filter 98 may be mounted in the opening 433b of the filter guide part 432, or the mounting of the filter 98 may be guided through the opening 433b of the filter guide part 432.

[0174] The mounting groove 430a may be formed on the guide member 430. The mounting groove 430a may be provided as a plurality of grooves. For example, the mounting groove 430a may be formed on each of the detergent box guide part 431 and the filter guide part 432. The first hook 200f of the guide panel 200 may be mounted in the mounting groove 430a. The guide assembly 400 may be mounted on, fixed to, and/or coupled to the guide panel 200 through the mounting groove 430a and the first hook 200f. The mounting groove 430a may be formed along a circumference of each of the detergent box guide part 431 and the filter guide part 432.

[0175] Processes of coupling and/or assembling the control panel 300 to the front frame 100 according to an embodiment will be described below.

[0176] The guide panel 200 may be coupled to the front frame 100. For example, at the rear of the front frame 100, the upper portion 220 of the guide panel 200 may be coupled and fixed to an upper panel 120 of the front frame 100, and the lower portion 280 of the guide panel 200 may be coupled and fixed to the reinforcing bracket 14 disposed below the guide panel 200. Thereafter, the first and second display cases 321 and 322, on which the printed circuit board 330 is accommodated and the display 310 is adhered, may be coupled to the guide panel 200. For example, the coupling portion 321a of the first display case 321 and the middle fastener 200d of the guide panel 200 are screw-coupled, and the second hook 200g of the guide panel 200 and the hook protrusion 321d of the first display case 321 are hook-coupled, so that the first and second display cases 321 and 322 may be coupled to the guide panel 200.

[0177] Processes of separating the control panel 300 from the front frame 100 according to an embodiment are executed in the reverse order of the above processes. For example, the user may replace the control panel 300

by separating the front frame 100 from the side frame 12 and the rear frame 13. Therefore, when the separation of the control panel 300 is required, the control panel 300 may be replaced by separating only the front frame 100 from the other components of the housing 10 without additionally separating the other components.

[0178] FIG. 10 is a perspective view of a guide panel in the clothes treating apparatus according to an embodiment of the present disclosure. FIG. 11 is an enlarged view of the guide panel in the clothes treating apparatus according to an embodiment of the present disclosure. FIG. 12 is an enlarged side sectional view of the clothes treating apparatus according to an embodiment of the present disclosure. FIG. 13 is an enlarged side sectional view of the clothes treating apparatus according to an embodiment of the present disclosure.

[0179] FIG. 11 is an enlarged cross-sectional view of a C region in the guide panel illustrated in FIG. 10. FIG. 12 is an enlarged side cross-sectional view cut along line A-A' in the clothes treating apparatus illustrated in FIG. 6. FIG. 13 is an enlarged cross-sectional view of a D region in the clothes treating apparatus illustrated in FIG. 12.

[0180] Referring to FIGS. 10 to 13, the upper panel 120, the control panel 300, the lower portion 280 of the guide panel 200, and the reinforcing bracket 14 may be arranged along an up-down direction. For example, the upper portion 220 of the guide panel 200 is coupled to the upper panel 120, and the lower portion 280 of the guide panel 200 is coupled to the reinforcing bracket 14, so that the guide panel 200 may be fixed and coupled to the front frame 100.

[0181] A size of the lower portion 280 of the guide panel 200 may become smaller. For example, in a case in which a size of the clothes treating apparatus is smaller than the size in the embodiment illustrated in the drawings, the guide panel 200 provided between the control panel 300 and the reinforcing bracket 14 may become smaller. Conversely, in a case in which the size of the clothes treating apparatus is bigger than the size in the embodiment illustrated in the drawings, the guide panel 200 provided between the control panel 300 and the reinforcing bracket 14 may become bigger. In other words, the guide panel 200 may be commonly applied regardless of the size of the clothes treating apparatus. Therefore, according to an embodiment, the control panel 300 may be coupled to the front frame 100 regardless of the size of the clothes treating apparatus.

[0182] The display 310, the first display case 321, the printed circuit board 330, and the second display case 322 may be arranged along the front-rear direction.

[0183] The front frame 100 may include an opening rib 111. For example, the front panel 110 may include the opening rib 111. The opening rib 111 may be extended rearward by bending a portion of the front panel 110. For example, the opening rib 111 may be extended rearward by bending a portion of the front panel 110 at the upper portion of the front panel 110. Also, for example, the opening rib 111 may be provided above the laundry inlet

11a and the reinforcing bracket 14. The opening ribs 111 may be provided at a circumference of each of the openings 110a and 110b. For example, the opening rib 111 may be provided at an upper edge, a lower edge, a left edge, and/or a right edge of the display opening 110a. The opening rib 111 formed at a circumference of the display opening 110a may be the first opening rib 111a.

[0184] The opening rib 111 may be accommodated in the guide panel 200. For example, the opening rib 111 may be disposed in an accommodation groove 230 of the guide panel 200. Therefore, a rear end of the opening rib 111 may be prevented from being exposed to the outside, and the end (or cut surface) of the opening rib 111 may be prevented from rusting due to exposure of the opening rib 111.

[0185] For example, the display 310 may have a step with the front panel 110. The display 310 may be disposed further at the rear than the front panel 110. However, the position of the display 310 is not limited thereto. For example, the display 310 and the front panel 110 may be disposed on the same plane, or the display 310 may be disposed further in the front than the front panel 110, so that a step may be formed between the display 310 and the front panel 110.

[0186] The guide panel 200 may include the accommodation groove 230 and an extension rib 240. The accommodation groove 230 may be formed along a circumference of the display opening 200a of the guide panel 200. The accommodation groove 230 may prevent rust from occurring on an end (or cut surface) of the opening rib 111a by accommodating the opening rib 111a. The accommodation groove 230 may be recessed from the front side 210 of the guide panel 200.

[0187] The extension rib 240 may protrude by being bent from the front side 210 of the guide panel 200 forming the display opening 200a. The extension rib 240 may protrude forward to form the accommodation groove 230. The extension rib 240 may be formed along the circumference of the display opening 200a of the guide panel 200. For example, the extension rib 240 may be provided at an upper edge, a lower edge, a left edge, and/or a right edge of the display opening 200a. The extension rib 240 may be disposed between the opening rib 111 and the display 310 while the control panel 300 is coupled to the front frame 100.

[0188] The clothes treating apparatus may further include a sealing member provided to seal the opening rib 111a. For example, the sealing member may seal an end of the opening rib 111a. The sealing member may be in contact with the end of the opening rib 111a. For example, the sealing member may be disposed in the accommodation groove 230. The sealing member sealing the opening rib 111a may be a first sealing member.

[0189] The clothes treating apparatus may further include a second sealing member provided to seal the extension rib 240. For example, the second sealing member may seal an end of the extension rib 240. The second sealing member may be in contact with the end of

the extension rib 240.

[0190] Alternatively, for example, the first sealing member and/or the second sealing member may be configured to seal a space between the extension rib 240 and the opening rib 111a. The display 310 may be disposed within the display openings 110a and 200a. For example, the glass 310a may be disposed within the display openings 110a and 200a. The glass 310a may correspond to sizes of the display openings 110a and 200a. For example, the glass 310a may be formed to have substantially the same size as the display openings 110a and 200a. Therefore, because the display 310 is not formed with a size smaller than the display openings 110a and 200a, the display may have a wide display region.

[0191] The opening rib 111 may be extended rearward by bending a portion of the front panel 110 at the upper portion of the front panel 110. The opening rib 111b may be formed at a circumference of the detergent box opening 110b. For example, the opening rib 111b may be provided at an upper edge, a lower edge, a left edge, and/or a right edge of the detergent box opening 110b. The opening rib 111 formed at the circumference of the detergent box opening 110b may be the second opening rib 111b.

[0192] The guide panel 200 may include accommodation portions 250 and 260. The accommodation portions 250 and 260 may extend rearward from the front side 210. An accommodation space 270 in which the opening rib 111b is disposed may be formed between the accommodation portions 250 and 260 and the guide member 430. For example, the accommodation space 270 may be formed between the accommodation portions 250 and 260 and extension portions 434 and 435 of the guide member 430 (see FIG. 15).

[0193] The accommodation space 270 may be formed between the accommodation portions 250 and 260 of the guide panel 200 and the extension portions 434 and 435 of the guide member 430 while the guide panel 200 is coupled to the front frame 100 and the guide assembly 400 is coupled to the guide panel 200. The accommodation space 270 may be formed along a circumference of the detergent box opening 200b. For example, the accommodation space 270 may be provided between the accommodation portions 250 and 260, which are provided at an upper edge, a left edge and a lower edge of the detergent box opening 200b, and the extension portions 434 and 435. Also, the accommodation space 270 may be formed along circumferences of the openings 433a and 433b of the guide member 430. However, the formation location of the accommodation space 270 is not limited to the above example. For example, the accommodation space 270, in which the opening rib 111b is accommodated, may be formed only by the guide panel 200 at the right edge of the detergent box opening 200b, or may be formed between the guide panel 200 and the door opening/closing part 420.

[0194] The accommodation portions 250 and 260 may include the first accommodation portion 250 and the

second accommodation portion 260. The first accommodation portion 250 may extend by being bent rearward from the front side 210. The second accommodation portion 260 may extend from a rear end of the first accommodation portion 250 toward the inside of the detergent box opening 200b. For example, the second accommodation portion 260 may be extended by being bent upward from the first accommodation portion 250. The second accommodation portion 260 may have a step with the front side 210. For example, the second accommodation portion 260 may be stepped rearward from the front side 210. The filter guide part 432 may be seated in the second accommodation portion 260 (see FIG. 15).

[0195] The first accommodation portion 250 and the second accommodation portion 260 may be formed along the circumference of the detergent box opening 200b. For example, the first accommodation portion 250 and the second accommodation portion 260 may be provided at the upper edge, the lower edge, the left edge and/or the right edge of the detergent box opening 200b. The second accommodation portion 260 may extend in a direction toward a center of the detergent box opening 200b from the first accommodation portion 250 which is provided at the upper edge, the lower edge, the left edge and/or the right edge of the detergent box opening 200b.

[0196] FIG. 14 is an enlarged side sectional view of the clothes treating apparatus according to an embodiment of the present disclosure. FIG. 15 is an enlarged side sectional view of the clothes treating apparatus according to an embodiment of the present disclosure.

[0197] FIG. 14 is an enlarged side cross-sectional view cut along line B-B' in the clothes treating apparatus illustrated in FIG. 6. FIG. 15 is an enlarged cross-sectional view of a E region in the clothes treating apparatus illustrated in FIG. 14.

[0198] Referring to FIGS. 14 and 15, the guide assembly 400 may be coupled and fixed to the front frame 100 by the guide panel 200. For example, the guide panel 200 is screw-coupled to the front frame 100 and the reinforcing bracket 14, and the guide assembly 400 is hook-and-groove coupled to the guide panel 200, so that the guide assembly 400 may be fixed to the front frame 100.

[0199] The guide doors 410 and 420 and the guide member 430 may be arranged along the front-rear direction.

[0200] The opening rib 111 may be formed by bending a portion of the front panel 110. For example, the opening rib 111b may be extended rearward by bending a portion of the front panel 110 forming the detergent box opening 110b. The opening rib 111b may be formed along the circumference of the detergent box opening 110b. For example, the opening rib 111b may be provided at the upper edge, the lower edge, the left edge and/or the right edge of the detergent box opening 110b.

[0201] The opening rib 111b may be accommodated in the guide panel 200 and the guide assembly 400. For example, the opening rib 111b may be disposed in the accommodation space 270 formed between the guide

panel 200 and the guide assembly 400. Therefore, a rear end of the opening rib 111b may be prevented from being exposed to the outside, and the end (or cut surface) of the opening rib 111b may be prevented from rusting due to exposure of the opening rib 111b.

[0202] For example, the guide assembly 400 may have a step with the front panel 110. For example, the door cover 410 may be disposed further in the front than the front panel 110. However, the position of the guide assembly 400 is not limited thereto. For example, the door cover 410 and the front panel 110 may be disposed on the same plane, or the door cover 410 may be disposed further at the rear than the front panel 110, so that a step may be formed between the door cover 410 and the front panel 110.

[0203] The first accommodation portion 250 may be extended by being bent rearward from the front side 210. The second accommodation portion 260 may be extended by being bent downward from the rear end of the first accommodation portion 250 toward the inside of the detergent box opening 200b.

[0204] The guide member 430 may include the extension portions 434 and 435. The extension portions 434 and 435 may be provided as a plurality of extension portions. The plurality of extension portions 434 and 435 may include the first extension portion 434 and the second extension portion 435. However, the extension portions 434 and 435 may be formed as one portion rather than a plurality of portions.

[0205] The first extension portion 434 may extend from a front end of the filter guide part 432. For example, the first extension portion 434 may extend outwardly of the opening 433a of the filter guide part 432. Also, the first extension portion 434 may extend from a front end of the detergent box guide part 431. For example, the first extension portion 434 may extend outwardly of the opening 433b of the detergent box guide part 431. The second extension portion 435 may extend forward from a front end of the first extension portion 434.

[0206] The first extension portion 434 and the second extension portion 435 may be provided at the circumferences of the openings 433a and 433b. For example, the first extension portion 434 and the second extension portion 435 may be formed at an upper edge and/or a lower edge of the filter guide opening 433a, or at an upper edge and/or a left edge of the detergent box guide opening 433b. Accordingly, the accommodation space 270 may also be formed between the extension portions 434 and 435 and the accommodation portions 250 and 260 at the upper edge and/or the lower edge of the filter guide opening 433a. Also, the accommodation space 270 may be formed between the extension portions 434 and 435 and the accommodation portions 250 and 260 at the upper edge and/or the left edge of the detergent box guide opening 433b. However, the formation location of accommodation space 270 is not limited to the above example.

[0207] The extension portions 434 and 435 and the

guide parts 431 and 432 may be formed to be stepped. For example, the second extension portion 435 and the filter guide part 432 may have a step. Also, the second extension portion 435 and the detergent box guide part 431 may also have a step.

[0208] The first extension portion 434 may be in contact with the second accommodation portion 260. The accommodation space 270 in which the opening rib 111b is accommodated may be formed between the second extension portion 435 and the accommodation portion 250 and 260. A portion of the second extension portion 435 may also be disposed between the opening rib 111b and circumferences of the guide doors 410 and 420. For example, a front end of the second extension portion 435 may also be disposed between the opening rib 111b and the guide doors 410 and 420.

[0209] The clothes treating apparatus may further include a sealing member provided to seal the opening rib 111b. For example, the sealing member may be disposed in the accommodation space 270. The sealing member sealing the opening rib 111 may be a third sealing member.

[0210] The clothes treating apparatus may further include a fourth sealing member provided to seal the second extension portion 435. For example, the fourth sealing member may seal an end of the second extension portion 435. The fourth sealing member may be in contact with the end of the second extension portion 435.

[0211] Alternatively, for example, the third sealing member and/or the fourth sealing member may be configured to seal a space between the second extension portion 435 and the opening rib 111b.

[0212] An embodiment in which the display opening 200a and the detergent box opening 200b are formed on the single guide panel 200 has been described above. However, the embodiments of the present disclosure are not limited to the above description. For example, the opening of the guide panel 200 may be formed as only the one display opening 200a or the one detergent box opening 200b. In this case, the guide panel 200 may have a shape and size corresponding to the one display opening 200a or the one detergent box opening 200b.

[0213] Alternatively, for example, the clothes treating apparatus may each include a first guide panel having the display opening 200a and a second guide panel having the detergent box opening 200b. In this case, the second guide panel may be formed integrally with the guide assembly 400.

[0214] An embodiment of the present disclosure has been described with reference to a drying combined washing machine as an example, but is not limited thereto. For example, the present disclosure may be applied to various home appliances equipped with displays, as well as clothes treating apparatuses including dryers, washing machines, and clothes care machines. According to an aspect of the present disclosure, a clothes treating apparatus to which a control panel can be coupled at the rear of a front frame may be provided.

[0215] According to another aspect of the present disclosure, a clothes treating apparatus with improved aesthetics can be provided by coupling a control panel to a front frame without a dividing line.

5 **[0216]** According to another aspect of the present disclosure, a clothes treating apparatus capable of preventing rust from occurring can be provided by covering a cut surface of the front frame forming an opening.

10 **[0217]** Effects according to one aspect of the present disclosure are not limited to the effects mentioned above, and other effects not mentioned will be clearly understood by those skilled in the art from the description above.

15 **[0218]** A clothes treating apparatus according to an embodiment may include a tub 20, a front frame 100 disposed in front of the tub and having a laundry inlet 11a and openings 110a and 110b formed above the laundry inlet, a reinforcing bracket 14 coupled to the front frame between the laundry inlet and the openings to reinforce the strength of the front frame, a control panel provided at a position corresponding to the openings of the front frame, and a guide panel 200 configured to fix the control panel and coupled to the front frame and the reinforcing bracket.

25 **[0219]** The front frame 100 may include a front panel 110 on which the openings 110a and 110b are formed, and an upper panel 120 provided at an upper portion of the front panel and to which an upper portion of the guide panel is fastened.

30 **[0220]** The reinforcing bracket 14 may be fastened to a lower portion 280 of the guide panel and disposed below the guide panel at the rear of the front panel to support the guide panel.

35 **[0221]** The control panel 300 may include a display 310 disposed in the opening of the front panel, a printed circuit board 330 configured to control the display, and the first and second display cases 321 and 322 provided to accommodate the printed circuit board and mounted on the guide panel.

40 **[0222]** The display case may include the first display case 321 fastened to the guide panel, and the second display case 322 mounted on the first display case and disposed at the rear of the first display case to accommodate the printed circuit board.

45 **[0223]** The display may further include a glass 310a disposed in the opening, a touch panel 310b disposed at the rear of the glass, and a display panel 310c disposed at the rear of the touch panel and in front of the first display case and adhered to the first display case .

50 **[0224]** The front frame may include the front panel 110, the first opening 110a formed on the front panel such that the display 310 is disposed therein, and an opening rib 111a extending rearward by being bent from the front panel, and the opening rib 111a may be accommodated in the guide panel 200.

55 **[0225]** The guide panel 200 may include a front side 210 on which a second opening 200a corresponding to the first opening is formed, and an accommodation

groove 230 recessed from the front side to accommodate the opening rib.

[0226] The guide panel may further include an extension rib 240 protruding forward from the front side.

[0227] The clothes treating apparatus may further include a detergent supply 80 positioned above the tub and including a detergent box 82, and the control panel may be disposed above the tub along a horizontal direction with the detergent supply 80.

[0228] The guide panel may include a display opening 200a provided to correspond to the opening of the front panel and in which a display is disposed, and a detergent box opening 200b formed to allow the detergent box to be inserted and withdrawn.

[0229] The clothes treating apparatus may further include guide doors 410 and 420 configured to open and close the detergent box opening, and a guide member 430 disposed at the rear of the guide doors and configured to guide the insertion and withdrawal of the detergent box.

[0230] The reinforcing bracket may extend along the horizontal direction from below the guide panel, and the reinforcing bracket may include a first fastener 14d fastened to the guide panel below the detergent box door, and a second fastener 14d disposed on an opposite side to the first fastener with respect to the control panel.

[0231] The clothes treating apparatus may further include a housing configured to accommodate the tub and a drying device 90 disposed in the housing and configured to dry air flowing into the tub, the drying device may include a drying device case 90a disposed above the tub, and a compressor 91, a condenser 92, and an evaporator 93 disposed on one side of the detergent box in the drying device case, and the control panel may be spaced apart from the front of the drying device in the housing.

[0232] The clothes treating apparatus may further include a rear frame 13 and a side frame 12 disposed between the front frame and the rear frame to be coupled to the front frame, and the control panel 300 may be detachable from the front frame 100 in a state in which the front frame 100 is separated from the side frame 12.

[0233] A clothes treating apparatus according to an embodiment may include a tub 20, a front panel 110 disposed in front of the tub, having openings 110a and 110b, and including opening ribs 111 formed at circumferences of the openings 110a and 110b, a control panel 300 including a display 310 disposed in the opening, and a guide panel 200 configured to fix the control panel to the front panel and including an accommodation groove 230 recessed to accommodate the opening rib.

[0234] The guide panel may further include a front side 210 on which an opening corresponding to the opening rib is formed, and an extension rib 240 extending from the front side to form the accommodation groove.

[0235] The clothes treating apparatus may further include a reinforcing bracket 14 coupled from the rear of the front panel and coupled with the guide panel to couple the control panel to the front panel.

[0236] The clothes treating apparatus may further include a front frame 100 including a front panel 110 and an upper panel 120 extending perpendicularly to the front panel from an upper portion of the front panel, and an upper portion 220 of the guide panel is fastened to the upper panel and a lower portion 280 of the guide panel is fastened to the reinforcing bracket, so that the guide panel may be coupled to the front frame.

[0237] The control panel may include a display 310 disposed in the opening of the front panel, a printed circuit board 330 configured to control the display, and the first and second display cases 321 and 322 provided to accommodate the printed circuit board and mounted on the guide panel.

[0238] A clothes treating apparatus according to an embodiment may include a tub 20, a drying device 90 configured to supply dry air to the tub and including an evaporator 93, a front frame 100 configured to accommodate the tub and the drying device and having an opening 110a, a housing 10 including a reinforcing bracket 14 coupled to the rear of the front frame to reinforce the strength of the front frame, a control panel 300 including a display 310 disposed in the opening, and a guide panel 200 configured to fix the control panel to the front frame, wherein an upper portion 220 of the guide panel is coupled to the front frame, and a lower portion 280 of the guide panel is coupled to the reinforcing bracket.

[0239] The foregoing has illustrated and described specific embodiments. However, it should be understood by those of skilled in the art that the present disclosure is not limited to the above-described embodiments, and various changes and modifications may be made without departing from the technical idea of the present disclosure described in the following claims.

Claims

1. A clothes treating apparatus comprising:

a tub;
a front frame disposed in front of the tub and having a laundry inlet and an opening formed above the laundry inlet;
a reinforcing bracket coupled to the front frame between the laundry inlet and the opening to reinforce a strength of the front frame;
a control panel provided at a position corresponding to the opening of the front frame; and
a guide panel configured to fix the control panel and coupled to the front frame and the reinforcing bracket.

2. The clothes treating apparatus according to claim 1, wherein the front frame comprises:

a front panel on which the opening is formed;
and

an upper panel provided at an upper portion of the front panel and to which an upper portion of the guide panel is fastened.

3. The clothes treating apparatus according to claim 2, wherein the reinforcing bracket is fastened to a lower portion of the guide panel and disposed below the guide panel at a rear of the front panel to support the guide panel.

4. The clothes treating apparatus according to claim 3, wherein the control panel comprises:

a display disposed in the opening of the front panel;
a printed circuit board configured to control the display; and
a display case provided to accommodate the printed circuit board and mounted on the guide panel.

5. The clothes treating apparatus according to claim 4, wherein the display case comprise:

a first display case fastened to the guide panel; and
a second display case mounted on the first display case and disposed at a rear of the first display case to accommodate the printed circuit board.

6. The clothes treating apparatus according to claim 5, wherein the display further comprises:

a glass disposed in the opening;
a touch panel disposed at a rear of the glass; and
a display panel disposed at a rear of the touch panel and in front of the first display case and adhered to the first display case .

7. The clothes treating apparatus according to claim 1, wherein

the front frame comprises:

a front panel;
a first opening formed on the front panel such that a display is disposed therein; and
an opening rib extending rearward by being bent from the front panel, and

the opening rib is accommodated in the guide panel.

8. The clothes treating apparatus according to claim 7, wherein the guide panel comprises:

a front side on which a second opening corre-

sponding to the first opening is formed; and
an accommodation groove recessed from the front side to accommodate the opening rib.

9. The clothes treating apparatus according to claim 8, wherein the guide panel further comprises an extension rib protruding forward from the front side.

10. The clothes treating apparatus according to claim 1, further comprising

a detergent supply positioned above the tub and comprising a detergent box,
wherein the control panel is disposed above the tub along a horizontal direction with the detergent supply.

11. The clothes treating apparatus according to claim 10, wherein the guide panel comprises:

a display opening provided to correspond to the opening of a front panel and in which a display is disposed; and
a detergent box opening formed to allow the detergent box to be inserted and withdrawn.

12. The clothes treating apparatus according to claim 11, further comprising:

a detergent box door configured to open and close the detergent box opening; and
a guide member disposed at a rear of the detergent box door and configured to guide the insertion and withdrawal of the detergent box.

13. The clothes treating apparatus according to claim 12, wherein

the reinforcing bracket extends along a horizontal direction from below the guide panel, and
the reinforcing bracket comprises:

a first fastener fastened to the guide panel below the detergent box door; and
a second fastener disposed on an opposite side to the first fastener with respect to the control panel.

14. The clothes treating apparatus according to claim 1, further comprising:

a housing configured to accommodate the tub; and
a drying device disposed in the housing and configured to dry air flowing into the tub,
wherein the drying device comprises:

a drying device case disposed above the

tub; and
a compressor, a condenser, and an evaporator disposed on one side of a detergent box in the drying device case, and

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wherein the control panel is spaced apart from a front of the drying device in the housing.

15. The clothes treating apparatus according to claim 1, further comprising:

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a rear frame; and
a side frame disposed between the front frame and the rear frame to be coupled to the front frame,
wherein the control panel is detachable from the front frame in a state in which the front frame is separated from the side frame.

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FIG. 1

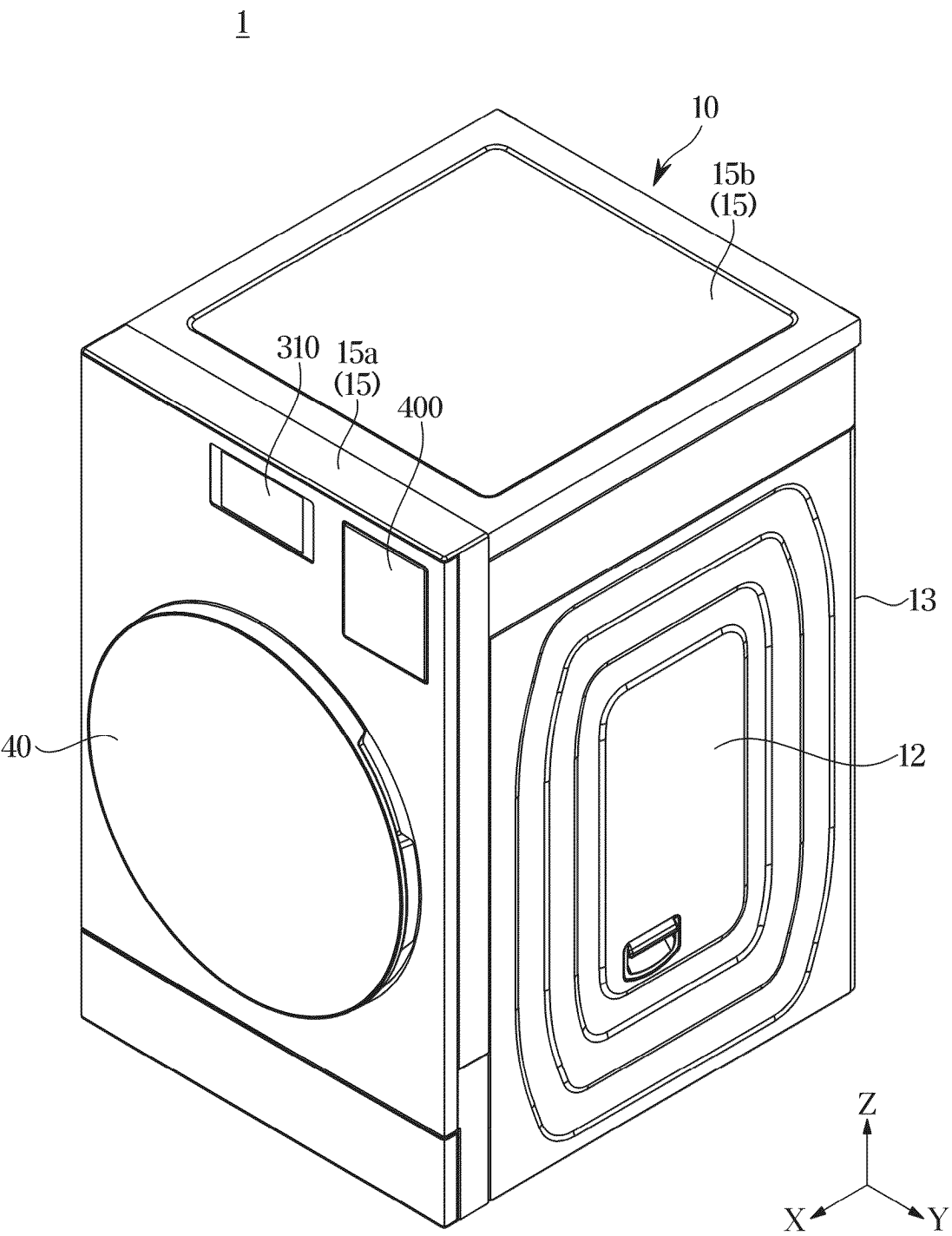


FIG. 2

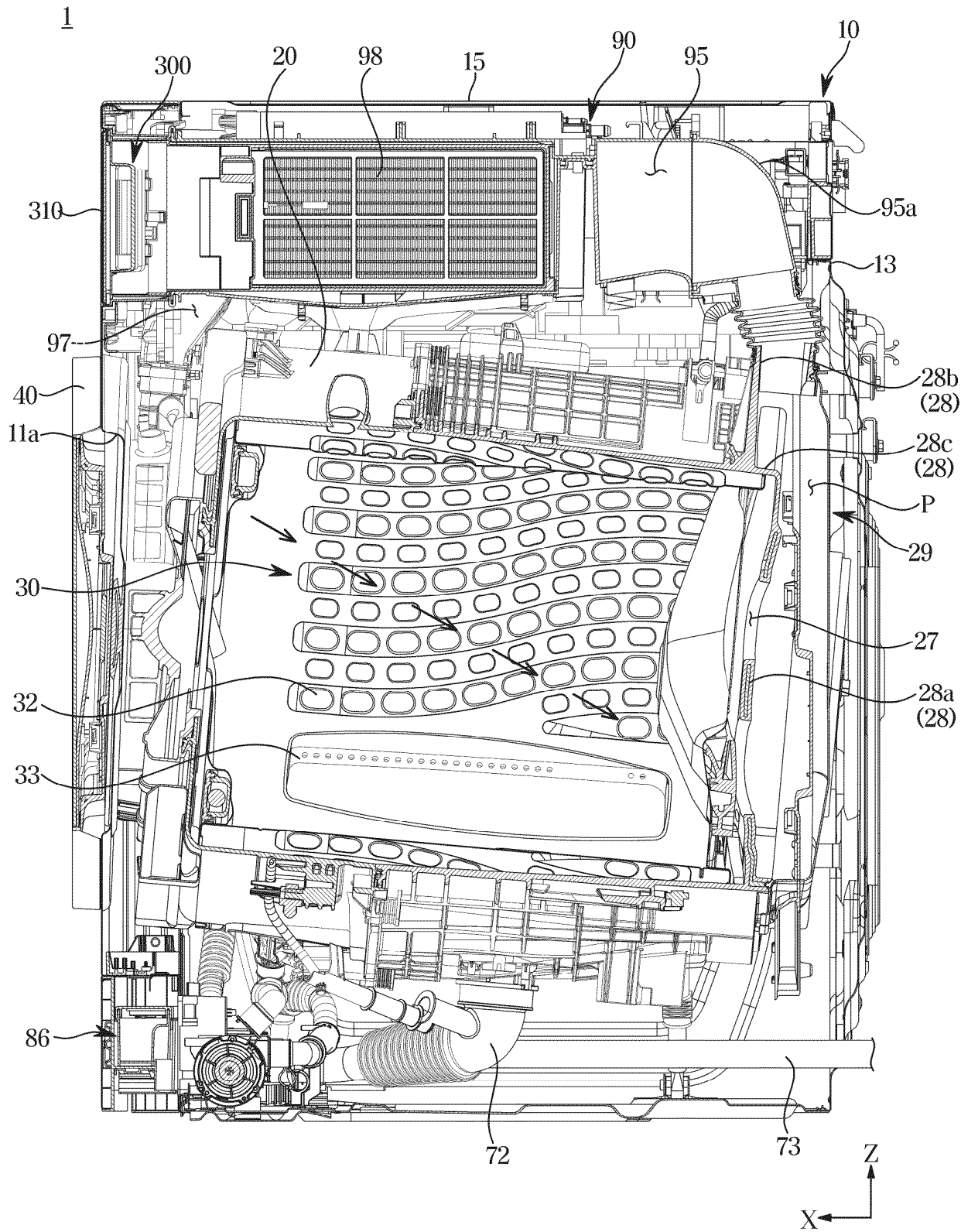


FIG. 3

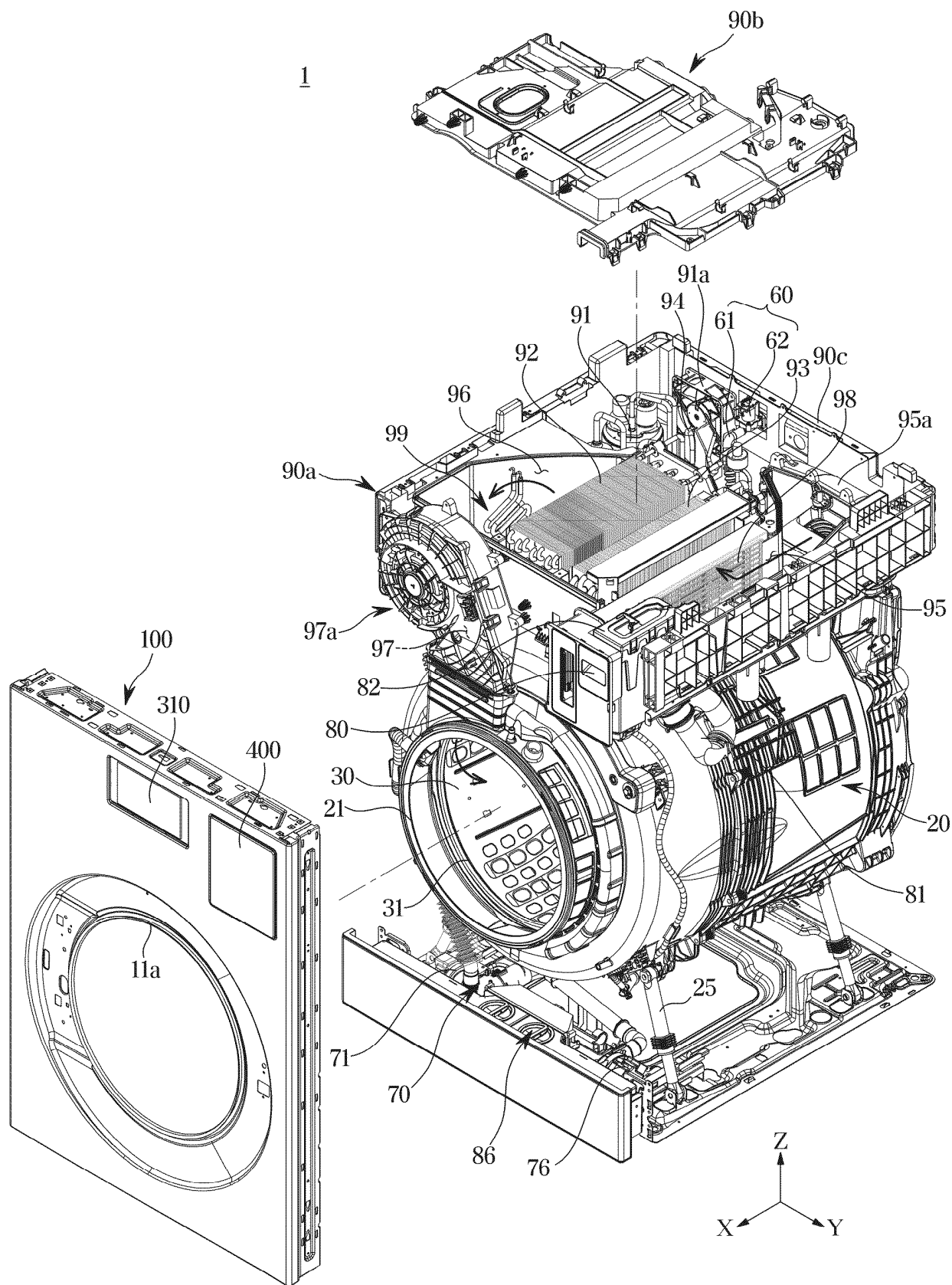


FIG. 4

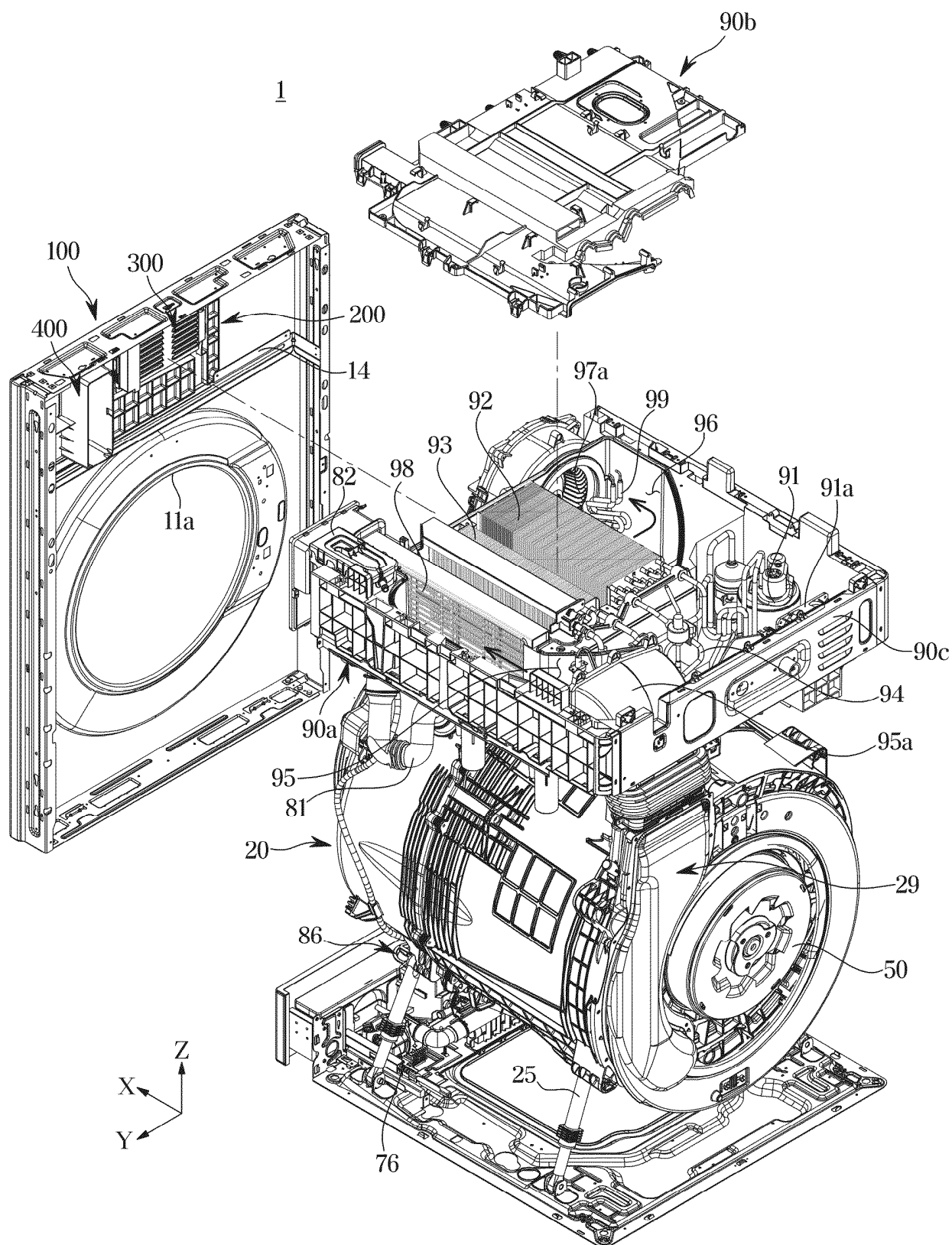


FIG. 5

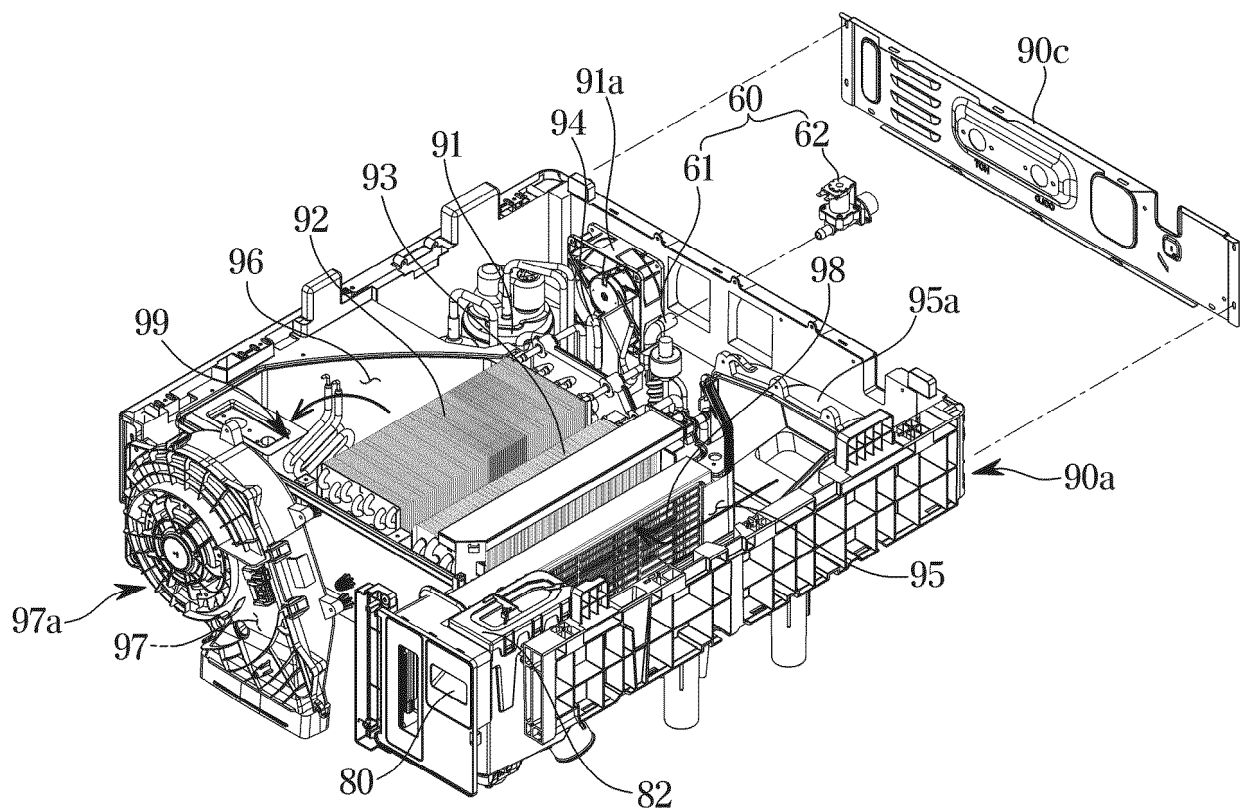


FIG. 6

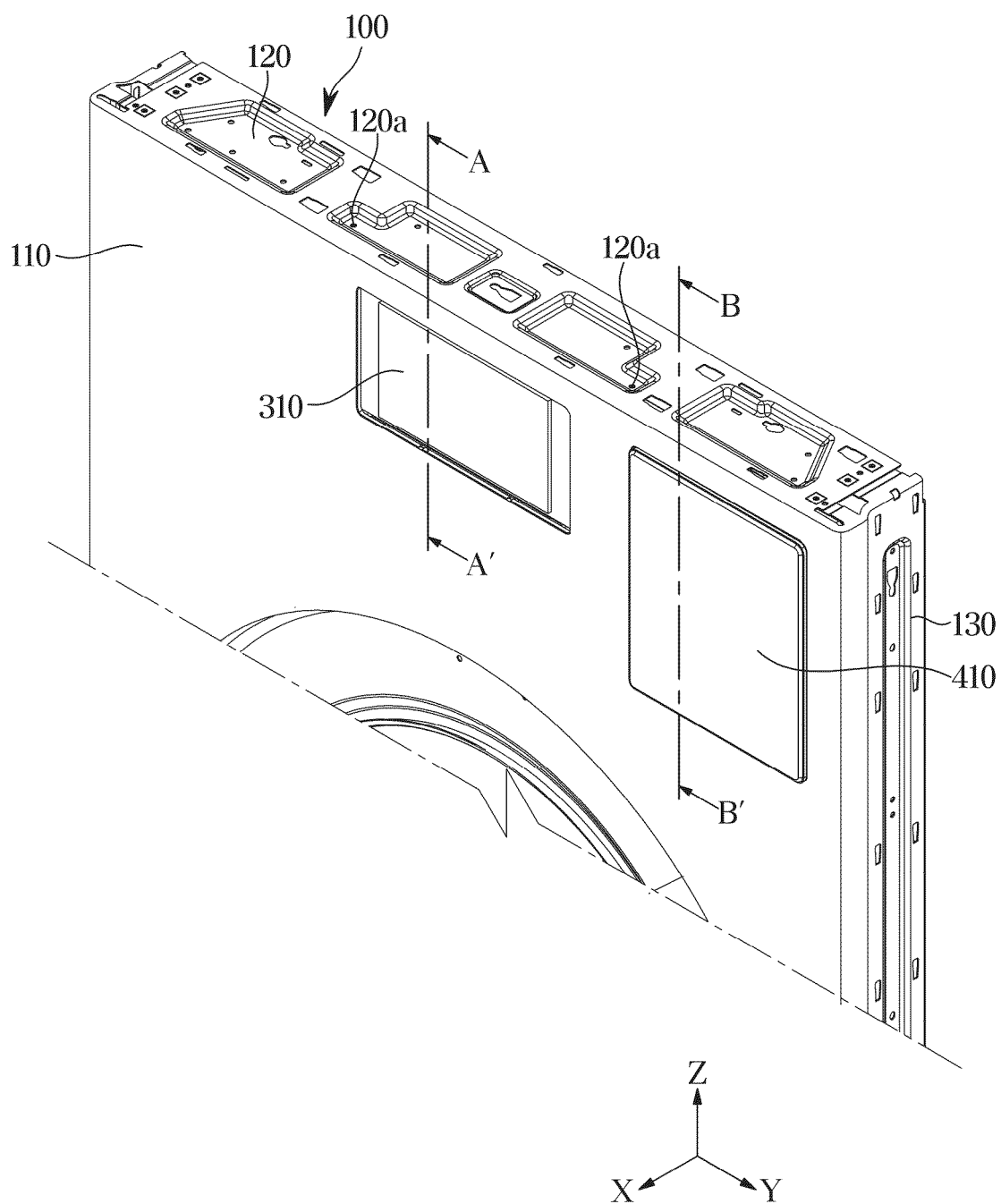
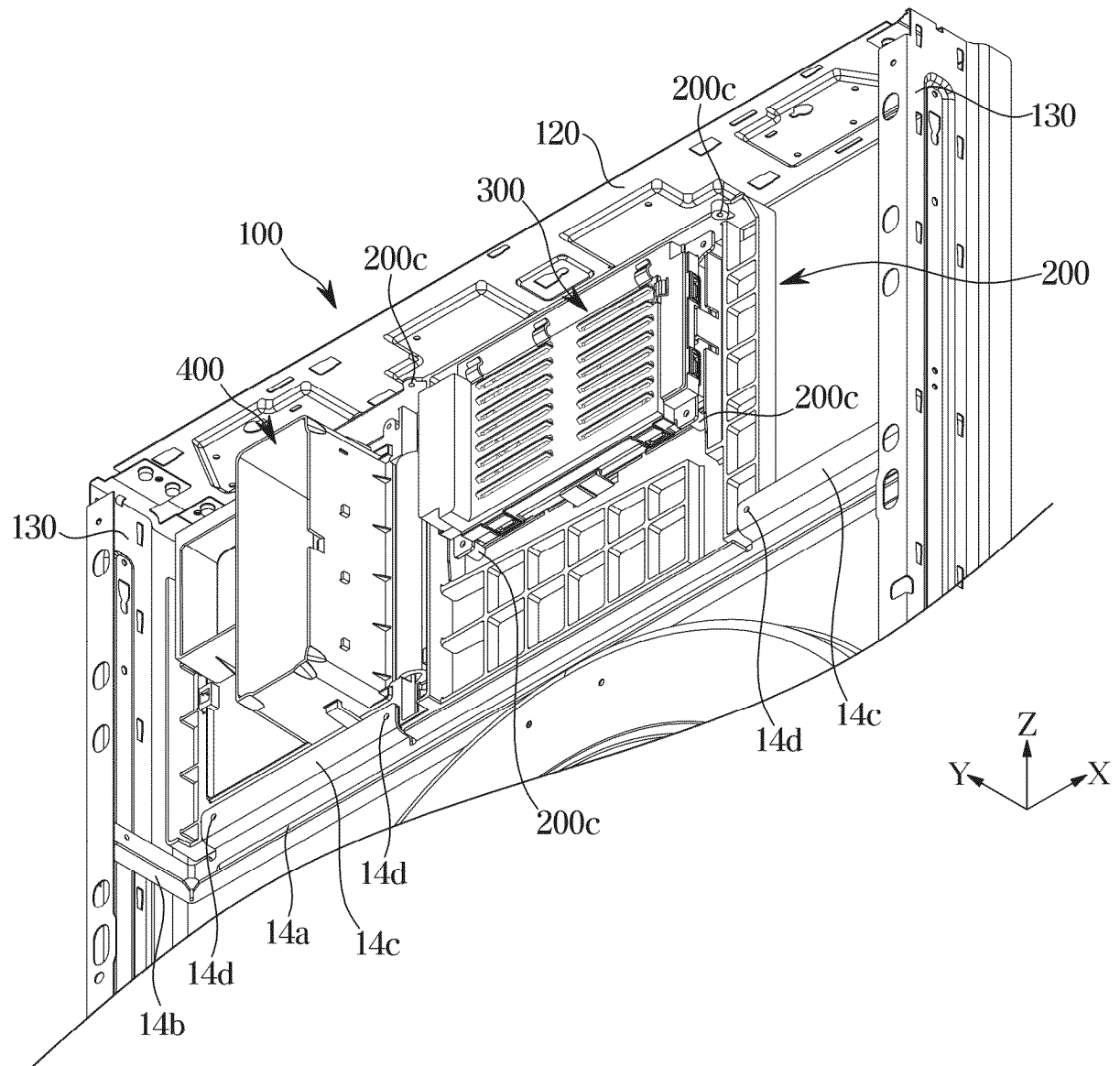


FIG. 7



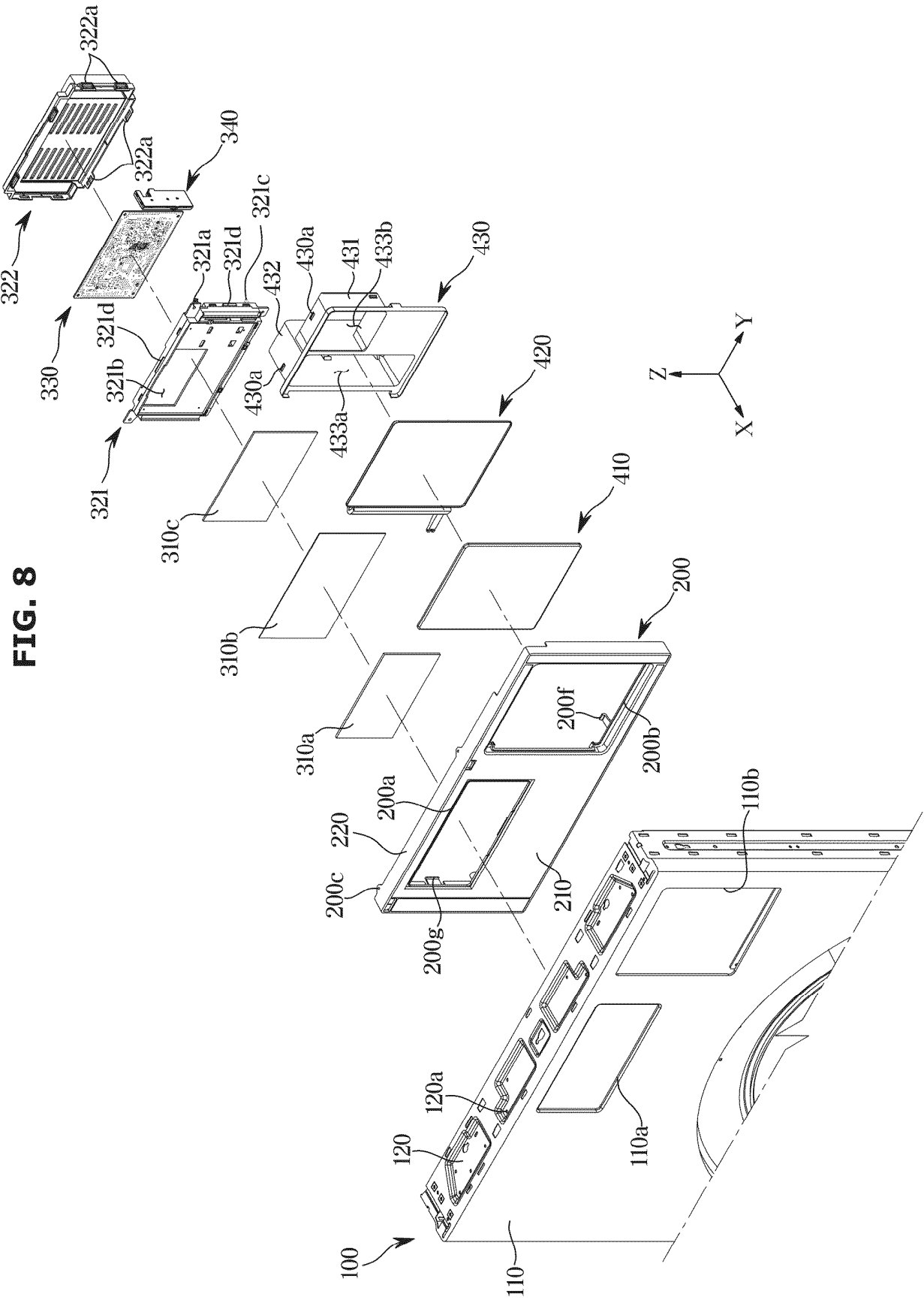


FIG. 9

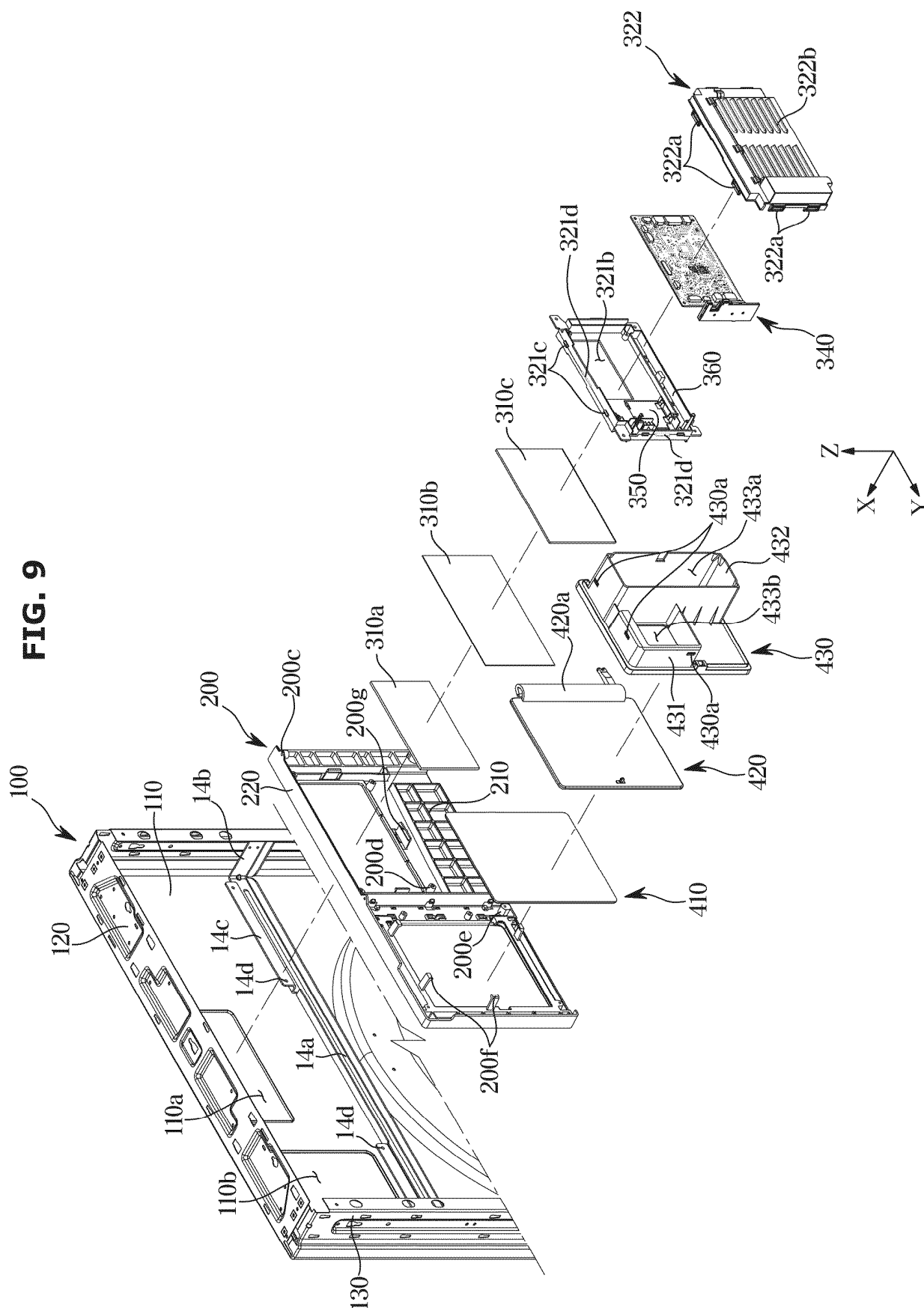


FIG. 10

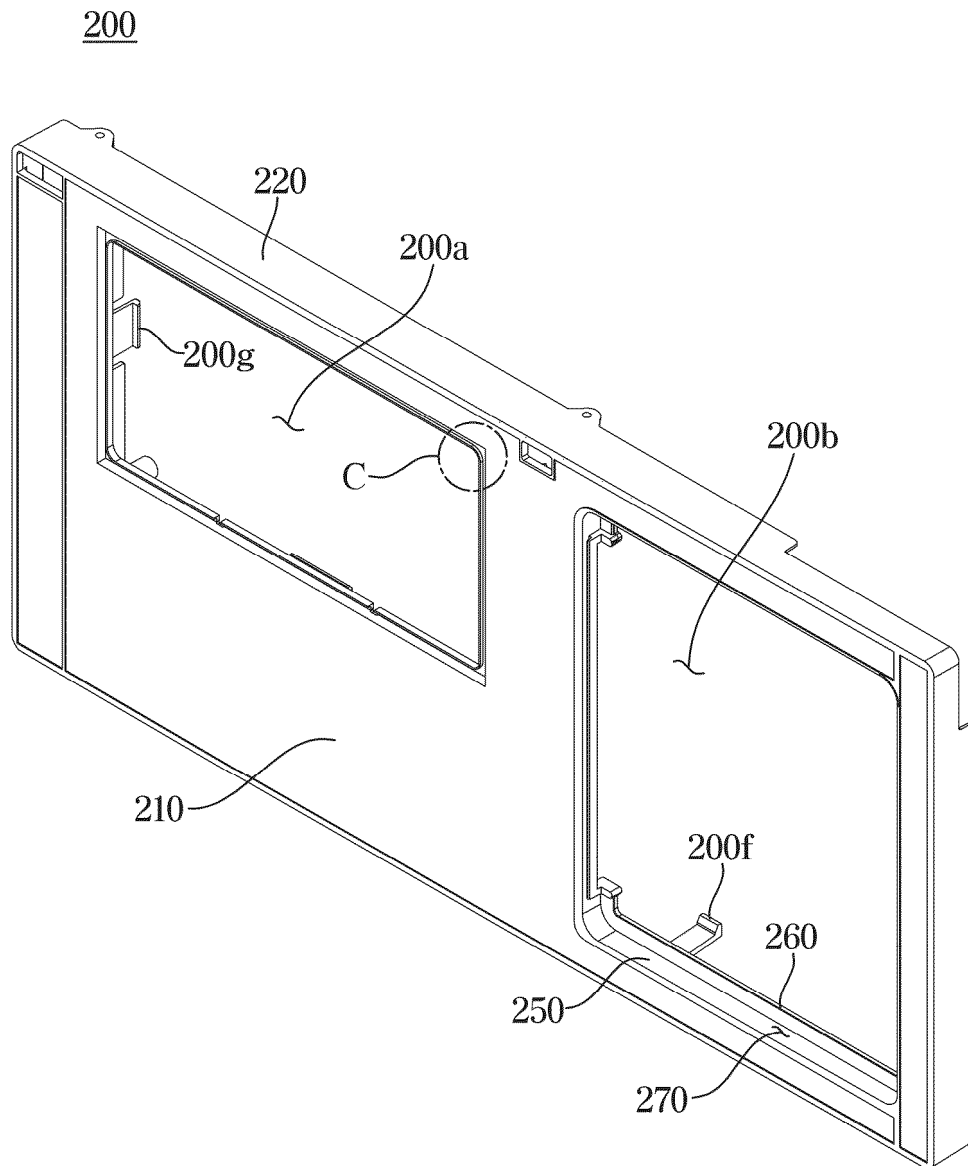


FIG. 11

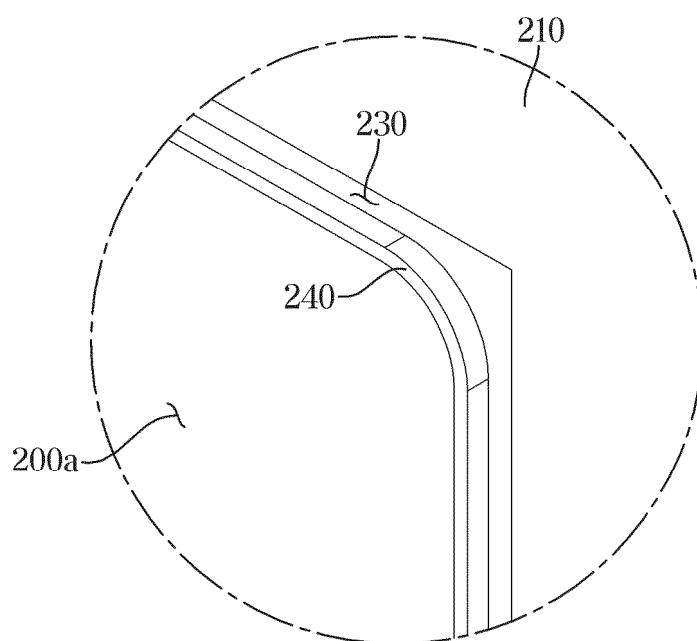


FIG. 12

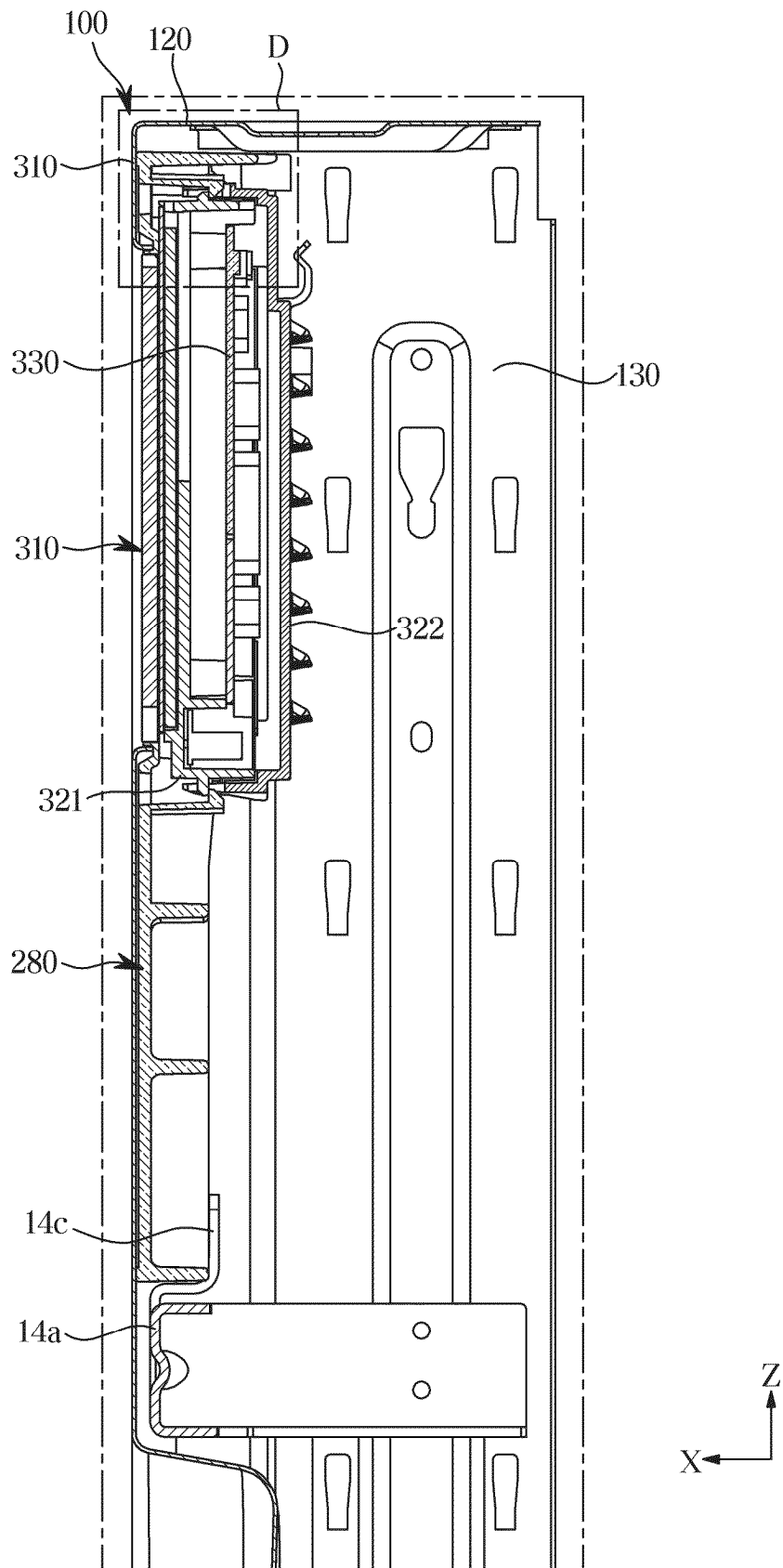


FIG. 13

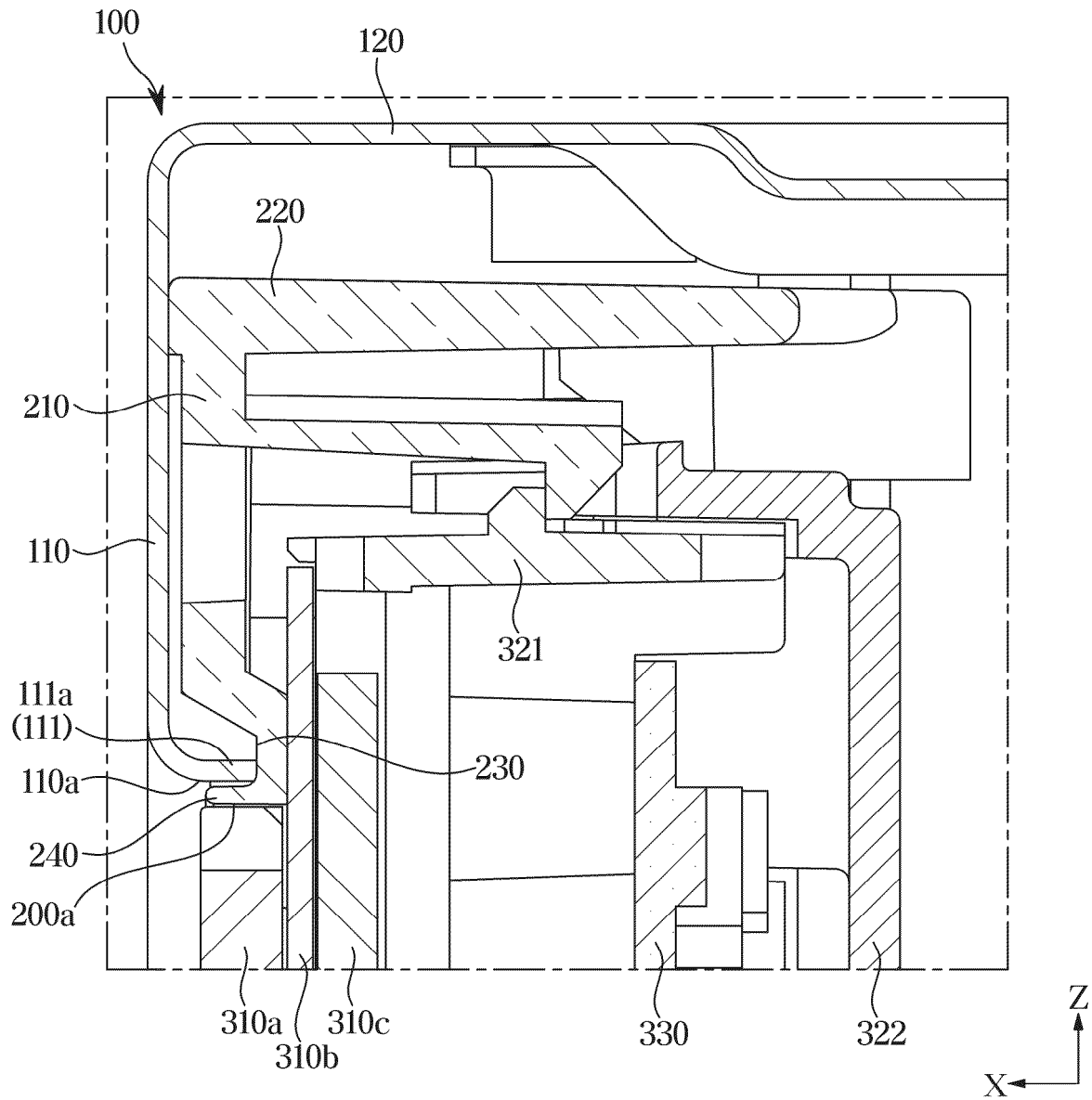


FIG. 14

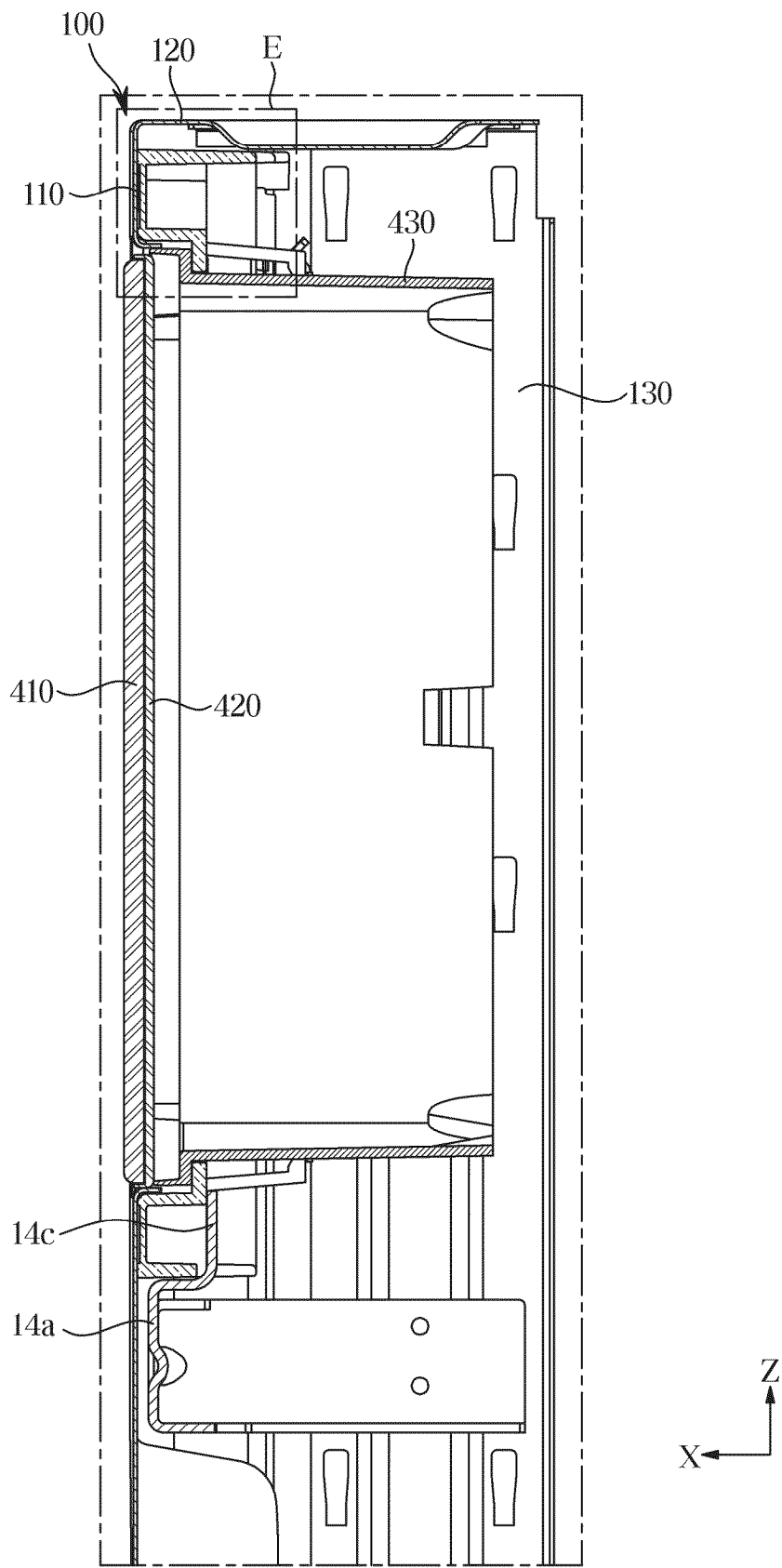
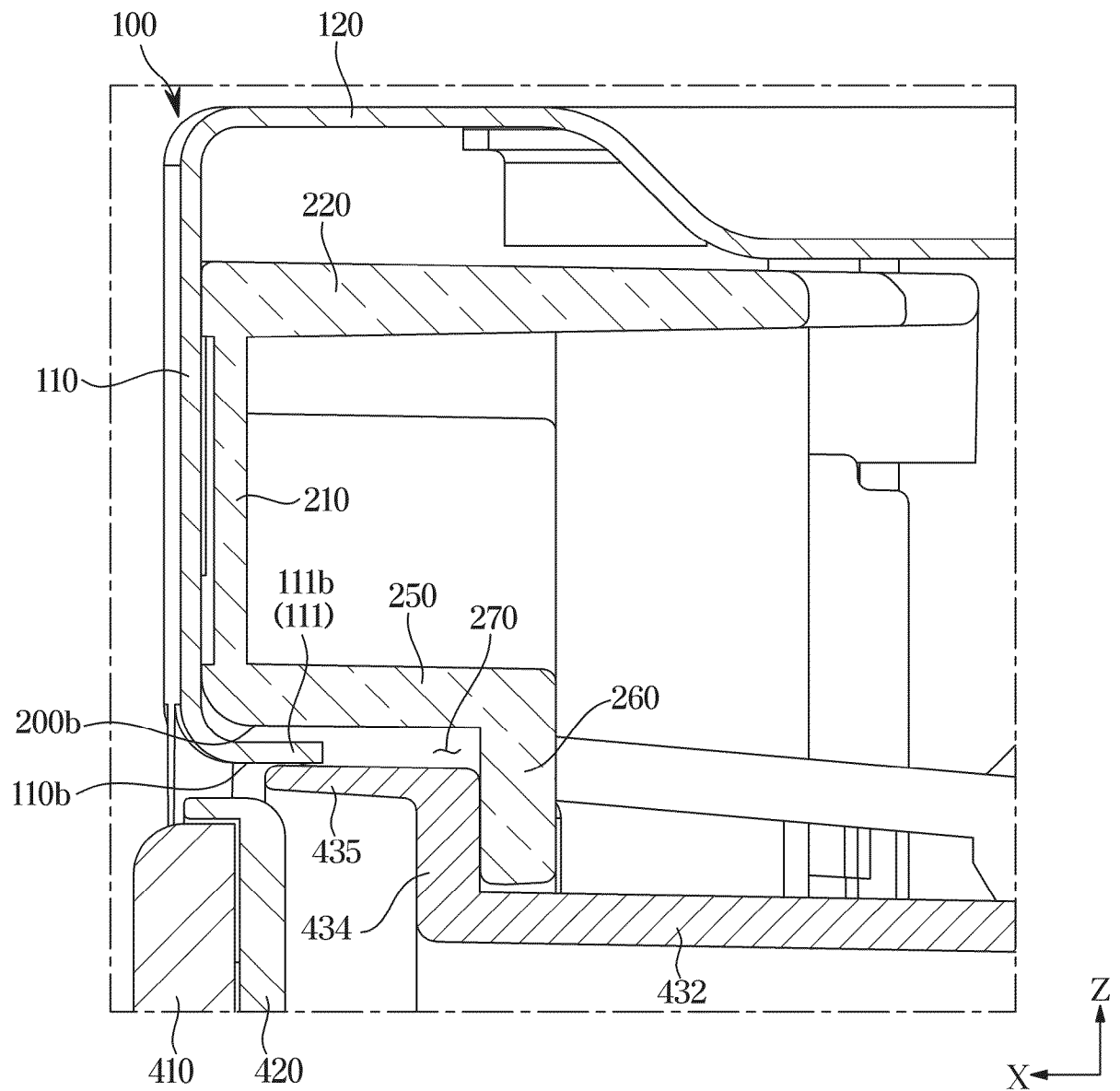


FIG. 15



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2024/018606

A. CLASSIFICATION OF SUBJECT MATTER**D06F 34/34**(2020.01)i; **D06F 25/00**(2006.01)i; **D06F 37/04**(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 34/34(2020.01); D06F 25/00(2006.01); D06F 33/30(2020.01); D06F 34/05(2020.01); D06F 37/26(2006.01);
D06F 39/12(2006.01); D06F 58/20(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: 튜브(tub), 개구(opening), 프론트 프레임(front frame), 보강 브라켓(reinforcement bracket), 컨트롤 패널(control panel), 가이드 패널(guide panel), 의류처리장치(laundry treating apparatus)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 10-2023-0001233 A (LG ELECTRONICS INC.) 04 January 2023 (2023-01-04) See paragraphs [0052]-[0064], [0083]-[0121], [0162]-[0165], [0252]-[0257], [0284] and [0299]; claim 1; and figures 1-14 and 17.	1-15
Y	KR 10-2022-0125131 A (SAMSUNG ELECTRONICS CO., LTD.) 14 September 2022 (2022-09-14) See paragraph [0059]; and figures 6-15.	1-15
Y	KR 10-2023-0063654 A (SAMSUNG ELECTRONICS CO., LTD.) 09 May 2023 (2023-05-09) See paragraphs [0036]-[0037] and [0059]; claims 3 and 6; and figures 1-5.	14
A	KR 10-1490238 B1 (LG ELECTRONICS INC.) 05 February 2015 (2015-02-05) See paragraphs [0031]-[0051]; and figures 3-4.	1-15
A	KR 10-2016-0084073 A (LG ELECTRONICS INC.) 13 July 2016 (2016-07-13) See paragraphs [0053]-[0057]; and figure 4.	1-15

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

* Special categories of cited documents:

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

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

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“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

14 March 2025

Date of mailing of the international search report

14 March 2025

Name and mailing address of the ISA/KR

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Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/KR2024/018606

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Form PCT/ISA/210 (patent family annex) (July 2022)

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Information on patent family members

International application No.

PCT/KR2024/018606

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			WO 2008-108589 A3	11 September 2009
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