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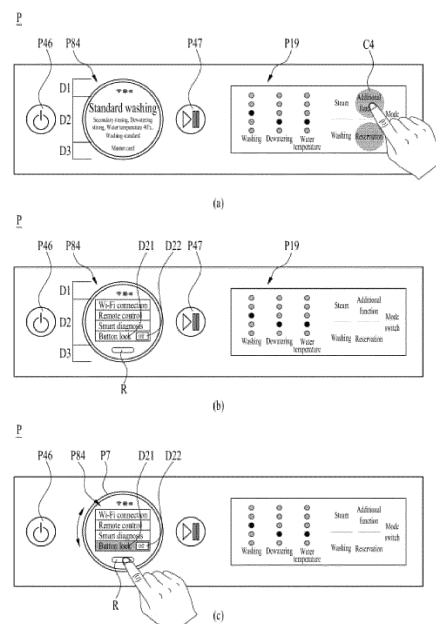
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(54) **INTERFACE AND LAUNDRY TREATMENT APPARATUS HAVING INTERFACE**

(57) The present disclosure relates to a laundry treatment apparatus comprising a setting unit provided to be able to receive an input of a locking command for deactivating inputs to a manipulation unit, wherein the manipulation unit is provided such that the locking command can only be cancelled through the setting unit, and the display unit can display a guide for cancelling the locking command when an input to the manipulation unit is made in a state where inputs to the manipulation unit are deactivated.

【Figure 13】



Description

TECHNICAL FIELD

[0001] The present application relates to an interface and laundry treating apparatus having the same.

BACKGROUND ART

[0002] Electronic equipments such as a laundry treatment device capable of washing, drying, washing, and drying laundry (e.g., an object to be washed or an object to be dried) should be necessarily provided with an input/output device (e.g., an interface) for inputting a control command to the corresponding electronic equipment by a user.

[0003] Among interfaces of the related art, a display unit displaying a control command selectable by a user, a search unit searching for a control command displayed on the display unit, a selection unit enabling a user to select a control command displayed on the display unit, and an input unit for requesting execution of the control command selected by the user are designed to be positioned in spaces separated from each other (Publication No. 10-2014-0023986).

[0004] That is, in the related art interface, a display (e.g., LCD, LED panel, etc.) on which a control command is displayed, a knob or button for searching for a control command by displaying a control command executable by a corresponding electronic equipment on the display, a button for inputting a control command for selecting a control command displayed on the display, and a button for inputting a control command for requesting execution of the selected control command are positioned in the spaces separated from each other, and such disposition was an element for determining a design of an interface (e.g., a design of a control panel) located on a front surface of an electronic equipment such as a laundry treatment device.

[0005] In the related art interface having the above-described structure, since the respective devices including a display are dispersedly disposed along a width direction of electronic equipment (the width direction of the electronic equipment) or a height direction of the electronic equipment, a lot of space is required for installation of the interface.

[0006] On the other hand, in the case of the related art laundry treatment device having the knob or the like, the knob is rotated to select a course and option. When the knob is rotated, the course and option corresponding to the knob may be sequentially selected. When the knob is placed in the course and option desired by a user, the user may press the execution button to operate the laundry treatment device.

[0007] Therefore, in the related art laundry treatment device equipped with a control panel such as the related art knob, when a course and option desired by a user are arranged with a next priority, the it is cumbersome that

the user has to repeatedly rotate the knob at all times in order to select the corresponding course and option.

[0008] In addition, in the related art laundry treatment device, it is tedious for a user to repeatedly manipulate the control panel in order to set up a specific option.

DISCLOSURE

TECHNICAL TASKS

[0009] One technical task of the present disclosure is to provide a laundry treating apparatus having a control panel capable of setting a shortcut of a specific course and option desired by a user.

[0010] Another technical task of the present disclosure is to provide a laundry treating apparatus including a control panel of the same type as a rotary knob, thereby selecting a course or option desired by a user by rotating the knob in a specific direction.

[0011] Further technical task of the present disclosure is to provide a laundry treating apparatus having a control panel of the same type as a rotary knob, by which a user is able to set the number of revolutions of the knob capable of selecting a specific course and option.

TECHNICAL SOLUTIONS

[0012] To solve the above-described tasks, in one technical aspect of the present disclosure, provided is a laundry treating apparatus, including a cabinet, a drum rotatably provided in the cabinet to accommodate laundry therein, a handle rotatably coupled to the cabinet to receive an input of a command for selecting or changing a course or an option for rotating the drum, a display unit provided inside the handle and displaying state information including a state of selecting the course or the option, a selection unit receiving an input of a determination command for determining the state information and configured to vary the determination command according to the state information, and a setting unit provided outside the handle to receive an input of a locking command for deactivating an input of the handle by being spaced apart.

[0013] An input of the selection unit may be deactivated based on inputting the locking command to the setting unit.

[0014] The selection unit may be configured to be selectively displayed within the display unit to receive the determination command and the selection unit may be blocked from being displayed based on inputting the locking command.

[0015] The handle and the selection unit may be configured to release the locking command through the setting unit only.

[0016] The display unit may display a guide for releasing the locking command based on rotating the handle in a state that the input of the handle is deactivated.

[0017] The display unit may display a link or QR code indicating an image or phrase for releasing the locking

command based on inputting the handle repeatedly while the guide is displayed,.

[0018] The setting unit may be configured to receive an option command for changing the option as well as the locking command and an input of the option command may be deactivated based on inputting the locking command.

[0019] The display unit may display a guide for releasing the locking command based on inputting the option command repeatedly while the input of the option command is deactivated.

[0020] The display unit may display a link or QR code indicating an image or phrase for releasing the locking command based on inputting the option command repeatedly while the guide is displayed.

[0021] To solve the above technical tasks, in the laundry treating apparatus of the present disclosure, the display unit may display approval information of the locking command based on inputting the locking command and the input of the manipulation unit may be deactivated based on approving the locking command through the manipulation unit.

[0022] The locking command may be cancelled based on absence of an approval input of the locking command through the manipulation unit for a reference time despite inputting the locking command to the setting unit.

[0023] The manipulation unit may include a handle rotatably provided to the cabinet to accommodate the display unit therein and receiving an input of a command for selecting the course or the option and a selection unit provided within the handle to receive an input of a command for determining the selected course or the selected option.

[0024] Based on displaying approval information of the locking command on the display unit by inputting the locking command to the setting unit, an input of the handle or the selection unit may be deactivated only when the selection unit is inputted.

[0025] The display unit may be disposed within the handle and the selection unit may be provided to the display unit.

[0026] The display unit may be configured to externally display a deactivated state of the input of the manipulation unit based on deactivating the input of the manipulation unit.

ADVANTAGEOUS EFFECTS

[0027] The present disclosure has an effect of setting a shortcut of a specific course and option desired by a user.

[0028] In a laundry treating apparatus having a control panel of the same type as a rotary knob, when the knob is rotated in a specific direction, the present disclosure has an effect of selecting a course or option desired by a user.

[0029] In the laundry treating apparatus having a control panel of the same type as a rotary knob, the present

disclosure has an effect that a user may set the number of revolutions for selecting a specific course and option.

DESCRIPTION OF DRAWINGS

[0030]

FIG. 1 is a diagram illustrating a home appliance system and an online system in which a laundry treating apparatus of the present disclosure is disposed. FIG. 2 is a diagram illustrating an embodiment of internal structures of a washing device 10 and a mini device 20.

FIG. 3 is a diagram illustrating a structure of a drying device in a laundry treating apparatus according to the present disclosure.

FIG. 4 is a diagram illustrating detailed structures of a water collection unit 37, a heat exchange unit 4, a cleaning unit 6, etc.

FIG. 5 is a diagram illustrating an internal structure of a drying device 20 according to an embodiment of the present disclosure.

FIG. 6 is a diagram illustrating a structure in which a washing device 10, a drying device 20, and an auxiliary apparatus 60 included in a laundry treating apparatus may communicate with each other.

FIG. 7 is a diagram illustrating an embodiment of a control panel P applicable to a laundry treating apparatus of the present disclosure.

FIG. 8 is a diagram illustrating a structure in which a control panel is coupled to a front panel.

FIG. 9 is a diagram illustrating an internal structure of a control panel.

FIG. 10 is a diagram illustrating a structure of an encoder.

FIG. 11 is a diagram illustrating structures of a manipulation unit and a display unit.

FIG. 12 is a diagram illustrating a utilization embodiment of the control panel.

FIG. 13 is a diagram illustrating a process of locking the control panel.

FIG. 14 is a diagram illustrating a state when the control panel is locked.

FIG. 15 is a diagram illustrating a state on a manipulation input when the control panel is locked.

FIG. 16 is a diagram illustrating a state on repetitive manipulation inputs when the control panel is locked.

FIG. 17 is a diagram illustrating a method of unlocking the control panel.

FIG. 18 is a diagram illustrating a control method of a laundry treating apparatus according to the present disclosure.

FIG. 19 is a diagram illustrating another control method of a laundry treating apparatus according to the present disclosure.

BEST MODE

[0031] Hereinafter, embodiments disclosed herein will be described in detail with reference to the accompanying drawings. In the present specification, even in different embodiments, the same or similar reference numerals are given to the same or similar configuration, and the description thereof will be replaced by the first description. Singular expression used herein includes plural expression, unless the context clearly indicates otherwise. In the following description of embodiments disclosed herein, when it is determined that the detailed description of the relevant known art may obscure the gist of the embodiments disclosed herein, the detailed description thereof will be omitted. In addition, it should be noted that the accompanying drawings are used to easily understand the embodiments disclosed in the present specification, and the technical ideas disclosed in the present specification should not be construed as being limited by the accompanying drawings.

[0032] FIG. 1 is a diagram illustrating a home appliance system and an online system in which a laundry treating apparatus of the present disclosure is disposed.

[0033] A laundry treating apparatus of the present disclosure may include a washing device 10 for performing a random washing course or option for performing a washing cycle for removing foreign substances from laundry by using water and detergent and a mini device 60 provided near or under the washing machine to perform a random washing course or option for performing a washing cycle of removing foreign substances from the laundry by using water and detergent.

[0034] The washing device 10 may be provided as a front load type in which laundry is put through a front side thereof, and the mini device 60 may be provided as a top load type in which laundry is put through a top side thereof.

[0035] As illustrated, the mini device 60 may be disposed under the washing device 10 to increase the height of an entrance of the washing device 10. In this case, the mini device 60 may be provided as a drawer type that is withdrawn forward such that the entrance through which laundry is put is exposed.

[0036] In addition, the mini device 60 may be disposed above the washing device 10. Accordingly, a user may easily access the mini device 60.

[0037] Meanwhile, the laundry treating apparatus of the present disclosure may include a drying device 20 that performs a random drying course or option for drying laundry containing moisture or water after completion of washing in the washing device 10 or the mini device 60.

[0038] A user may arrange the washing device 10 and the drying device 20 of the laundry treating apparatus of the present disclosure together in an indoor space, and the laundry treating apparatus of the present disclosure may additionally include mini device 60 as well.

[0039] As a result, the mini device 60 may perform washing on frequently washed laundry with a relatively

small volume, such as underwear, baby laundry, etc. In addition, non-frequently washed laundry with a large volume, such as a pair of blue jeans, a blanket, etc., may be washed by the washing device 10.

[0040] One or more of the washing device 10, the drying device 20, and the mini device 60 may be connected to an Internet network through a router (AP) 30. At least one of the washing device 10, the drying device 20, and the mini device 60 may include a communication module to access the router, and a server 50 provided by a manufacturer that has manufactured the laundry treating apparatus may recognize to register and control the washing device 10, the drying device 20, and the mini device 60.

[0041] When a user carries an external terminal 40 including a communication module such as a smartphone, the user may access the server 10 through the Internet network using the external terminal 40 to control one or more of the washing device 10, the drying device 20, and the mini device 60.

[0042] In addition, the user may register one or more of the washing device 10, the drying device 20, and the mini device 60 to the server 50 through the external terminal 40.

[0043] In addition, the server 50 may send notification to the external terminal 40 when there is notification information on at least one of the washing device 10, the drying device 20, and the mini device 60 for the user or an update item of course, option, etc.

[0044] Meanwhile, the washing device 10, the drying device 20, and the mini device 60 may be provided to communicate with each other.

[0045] One of the washing device 10, the drying device 20, and the mini device 60 may be provided to communicate with the other two of the washing device 10, the drying device 20, and the mini device 60 through the router 30 and the server 50. To this end, the washing device 10, the drying device 20, and the mini device 60 may include communication modules of Wi-Fi and the like.

[0046] In addition, the washing device 10, the drying device 20, and the mini device 60 may be provided to communicate with each other without the server 50. For example, the washing device 10, the drying device 20, and the mini device 60 may be provided to communicate with each other through Bluetooth communication modules.

[0047] The washing device 10, the drying device 20, and the mini device 60 may be provided to communicate with each other so as to share and/or display each other's states.

[0048] For example, a user may recognize the states of the drying device 20 and the mini device 60 through the washing device 10. Accordingly, although the drying device 20 and the mini device 60 are spaced apart from the washing device 10 or placed at locations where they disappear from user's view when the user looks at the washing device 10, the user may enable the washing device 10 to display the states of the drying device 20

and the mini device 60.

[0049] The washing device 10, the drying device 20, and the mini device 60 may be provided to share or display each other's course or option names, each other's course or option selected states, each other's course or option executed states, each other's course or option completed states, and each other's error or notification states.

[0050] In addition, one of the washing device 10, the drying device 20, and the mini device 60 may be provided to manipulate the other two of the washing device 10, the drying device 20, and the mini device 60 using a respective manipulation unit that receives an input of a command.

[0051] The washing device 10, the drying device 20, and the mini device 60 may be provided to transmit or receive control commands mutually through their respective communication modules or the server 10, or may be provided to receive a control command.

[0052] Accordingly, even if the washing device 10, the drying device 20, and the mini device 60 are spaced apart from each other, the user may use one device to control other devices, thereby improving convenience.

[0053] FIG. 2 is a diagram illustrating an embodiment of internal structures of the washing device 10 and the mini device 20.

[0054] Unlike the illustrated embodiment, the washing device 10 and the mini device 20 may be provided separately and independently.

[0055] The washing device 10 may include a cabinet 1 forming an appearance, a tub 2 accommodated in the cabinet 1 to store water, a drum 3 rotatably provided in the tub 2 to store water, a drive unit 32 coupled to the tub 2 to rotate the drum 3, a water supply unit 23 provided to supply water to the tub 2, and a drainage unit 25 provided to drain water in the tub 2.

[0056] Each of the tub 2 and the drum 3 may be provided with an entrance provided in a front side thereof to put laundry therethrough, and the cabinet 1 may further include a door 132 for opening and closing the entrance.

[0057] The drive unit 32 may include a stator 321 coupled to a rear side of the tub 2, a rotor 322 rotated by the stator 321, and a rotating shaft 323 coupled to the rotor 322 to rotate the drum 3.

[0058] The water supply unit 23 may include a water supply pipe 231 connecting an external water supply source and the tub 2 to communicate with each other and a water supply valve 232 opening and closing the water supply pipe 231.

[0059] Of course, the water supply unit 23 may further include a detergent box provided to be withdrawn forward of the cabinet 1 so as to supply detergent to the tub 2, and the water supply pipe 231 may be provided to communicate with the detergent box.

[0060] The drainage unit 25 may include a drain pipe 251 provided below the tub 2 and a drain pump 252 coupled to the drain pipe 252 to provide power for discharging water.

[0061] The washing device 10 may further include a support 22 configured to support the tub 2 to the cabinet 1, and may include a heater H1 to heat water in the tub 2.

[0062] In addition, the washing device 10 may further include a hot air supply unit Ha provided to supply hot air to the tub 2.

[0063] Meanwhile, the washing device 10 may include a control panel P or a washing controller that receives an input of a command for displaying or controlling a state of the washing device 10. The control panel P may be coupled to the cabinet 1.

[0064] In addition, the control panel P may be configured to perform a random washing course and option for removing foreign substances from laundry by operating at least one of the drive unit 32, the water supply valve 232, the drain pump 252, the heater H1, and the hot air supply unit Ha. The washing course and option may be configured by a series of control methods capable of performing all of a washing cycle, a rinsing cycle, and a de-watering cycle.

[0065] The mini device 60 includes a mini cabinet 1C forming an appearance, a mini tub 2C accommodated in the mini cabinet 1C to store water, a mini drum 3C rotatably provided in the mini tub 2C to store water, a mini drive unit 32C coupled to the mini tub 2C to rotate the mini drum 3C, a mini water supply unit provided to supply water to the mini tub 2C, and a mini drainage unit 25C provided to drain water in the mini tub 2C.

[0066] The mini cabinet 1C may be provided under the cabinet 1 to support the cabinet 1. Of course, it is not excluded that the mini cabinet is disposed over the cabinet 1.

[0067] The mini cabinet may be integrally provided with the cabinet 1.

[0068] Each of the mini tub 2C and the mini drum 3C may be provided with an entrance through which laundry is put, and the mini cabinet 1C may further include a mini door 132C configured to open/close the entrance.

[0069] The mini drive unit 32C may include a mini stator 321C coupled to a lower portion of the mini tub 2C, a mini rotor 322C rotated by the mini stator 321C, and a mini rotating shaft 323C coupled to the mini rotor 322C to rotate the mini drum 3C.

[0070] The mini water supply unit 23C may include a mini water supply pipe 231C connecting an external water supply source and the mini tub 2C to communicate with each other and a mini water supply valve 232C configured to open/close the mini water supply pipe 231C.

[0071] Of course, the mini water supply unit 23C may further include a mini detergent box provided to be withdrawn forward of the cabinet 1 and provided to put detergent into the mini tub 2C, and the mini water supply pipe 231C may be provided to communicate with the detergent box.

[0072] The mini drainage unit 25C may include a mini drain pipe 251C provided under the mini tub 2C and a mini drain pump 252C coupled to the mini drain pipe 252C to provide power for discharging water.

[0073] The mini washing device 60C may further include a mini support 22C to support the mini tub 2C to the mini cabinet 1C, and may include a mini heater H2 to heat water in the mini tub 2C.

[0074] In addition, the mini washing device 60 may further include a hot air supply unit provided to supply hot air to the mini tub 2C.

[0075] Meanwhile, the mini washing device 60 may include a mini control panel PC or a mini controller for receiving an input of a command for displaying or controlling a state of the mini washing device 60. The mini control panel PC may be provided in a manner of being coupled to the mini cabinet 1C.

[0076] In addition, the mini control panel PC may be provided to perform a random washing course and option for removing foreign substances from laundry by operating at least one of the mini drive unit 32C, the mini water supply valve 232C, the mini drain pump 252C, the mini heater H2, and a mini hot air supplier HaC. The washing course and option may be configured with a series of control methods capable of performing all of a washing cycle, a rinsing cycle, and a dewatering cycle.

[0077] The mini device 60 may further include a drawer D provided to be withdrawn forward from the mini cabinet 1C and accommodating the mini tub 2C therein. The drawer D may include a front cover DC on a front side thereof to open/close an entrance through which the drawer D is withdrawn from the mini cabinet 1C.

[0078] The mini control panel PC may be disposed on the front cover DC.

[0079] FIG. 3 is a diagram illustrating a structure of the drying device 30 in the laundry treating apparatus according to the present disclosure.

[0080] The drying device 20 may include a drying cabinet 1A, a drying drum 2A rotatably provided in the drying cabinet to provide a space for storing laundry, a circulation flow path 3A forming a flow path for resupplying air discharged from the drying drum 2A to the drying drum 2A, and a heat exchange unit 4 for dehumidifying and heating the air having flown into the circulation flow path 3A and resupplying it to the drying drum 2A.

[0081] When the drying drum 2A is provided as a cylindrical drum body 21 having an open front side and an open rear side, a first support portion 17A for rotatably supporting a front surface of the drum 2, and a second support portion 19A for rotatably supporting a rear surface of the drum 2.

[0082] The first support portion 17A may include a first fixing body 171 fixed to an inside of the drying cabinet 1A, a drum entrance 173 provided to pass through the first fixing body to enable the entrance 111 and an inside of the drum body 21A to communicate with each other, and a first support body 175 provided to the first fixing body 171 and inserted into the front surface (i.e., a first open surface) of the drum body 21.

[0083] The first fixing body 171 may be provided in any shape as long as the drum entrance 173 and the first support body 175 may be provided. The first support body

175 may have a pipe shape protruding from the first fixing body 171 toward the drying drum body 21A, and a diameter of the first support body 175 may be set larger than that of the drum entrance 173 and smaller than a diameter of the front surface of the drying drum body 21A. In this case, the drum entrance 173 may be located in a space defined by the first support body 175.

[0084] The first support portion 17 may further include a connection body 177 connecting the entrance 111 and the drum entrance 173. The connection body 177 may have a pipe shape extending from the drum entrance 173 toward the entrance 111. An air outlet 178 communicating with the circulation flow path 3A may be provided in the connection body 177.

[0085] The air outlet 178 is a passage through which air inside the drying drum body 21A is enabled to move to the circulation flow path 3, and may be provided as a through-hole provided to pass through the connection body 177.

[0086] The second support portion 19A may include a second fixing body 191 fixed to the inside of the cabinet 1A and a second support body 195 provided to the second fixing body 191 and inserted into a rear surface (i.e., a second open surface) of the drum body 21. The second support portion 19 is provided with an air inlet 198 provided to pass through the second fixing body 191 so as to enable the inside of the drum body 21 to communicate with the inside of the cabinet 1A. In this case, a duct 3A may be provided to connect the air outlet 178 and the air inlet 198.

[0087] The drum body 21 in the hollow cylindrical shape may be rotated through various types of drying drive units. Shown in the drawing is a case that the drying drive unit includes a motor 82 fixed to the inside of the drying cabinet 1A, a pulley 85 rotated by the motor, and a belt 83 connecting a circumferential surface of the pulley 85 and a circumferential surface of the drum body 21.

[0088] Meanwhile, the drying drive unit may be provided on a backside of the drying drum 2A to directly rotate the drum 2A. A rotating shaft of the drying drive unit 28 may be directly coupled to the drum 2A to rotate the drying drum 2A.

[0089] In this case, the second support portion 19A may support the drying drive unit to be located at the backside of center of the drying drum 2A.

[0090] Meanwhile, a separate decelerator 28a may be provided between the drying drive unit 28A and the drying drum 2. In this case, a rotating shaft coming out of the decelerator 28a may be directly coupled to the center of the backside of the drum 2, and the decelerator 28a may be supported by being coupled to the second support portion 19.

[0091] In this case, the drying drive unit 28A may freely change the rotation speed and direction of the drum 2A.

[0092] A first roller 179 rotatably supporting the circumferential surface of the drum body 21A may be provided to the first support portion 17A, and a second roller 199 rotatably supporting the circumferential surface of the

drum body may be provided to the second support portion 19.

[0093] The circulation flow path 3A may include a duct provided to communicate with the drum 2. The duct 3A may be provided to communicate with the drying drum 2A to form a circulation flow path in which the air discharged from the drying drum passes through the heat exchange unit 4 and then re-flows into the drum 2A.

[0094] The duct 3A may include an exhaust duct 31A connected to the air outlet 178, a supply duct 33A connected to the air inlet 198, and a connection duct 35A connecting the exhaust duct and the supply duct.

[0095] The heat exchange unit 4 may be provided as various devices capable of sequentially performing dehumidification and heating of the air introduced into the duct 3A. For example, the heat exchange unit 4 may be provided as a heat pump system.

[0096] The heat exchange unit 4 may include a fan 49 for moving air along the duct 3A, a first heat exchanger (i.e., a heat absorbing part) 41 for removing moisture from the air introduced into the duct 3A, and a second heat exchanger (i.e., a heating part) 43 provided inside the duct 3A to heat the air having passed through the first heat exchanger 41.

[0097] The heat absorbing part 41 may be provided as an evaporator for absorbing heat, and the heating part 43 may be provided as a condenser that emits heat.

[0098] The fan 49 may include an impeller 491 provided in the duct 3A and an impeller motor 493 rotating the impeller 491. The impeller 491 may be provided anywhere in the exhaust duct 31A, the connection duct 35A, and the supply duct 33A [see FIG. 4]. The impeller 491 may be provided in the supply duct 33A.

[0099] The heat absorbing part 41 may be provided as a multitude of metal plates disposed in the width direction (i.e., Y-axis direction) of the connection duct 35A or the height direction (i.e., Z-axis direction) of the connection duct, and the heating part 43 may be provided as a multitude of metal plates arranged in the width direction of the connection duct or the height direction of the connection duct. The heat absorbing part 41 and the heating part 43 are sequentially disposed in the connection duct 35A along a direction from the exhaust duct 31A to the supply duct 33A, and are connected to each other through a refrigerant pipe 48 forming a circulation flow path of the refrigerant.

[0100] The refrigerant moves along the refrigerant pipe 48 by a compressor 45 located outside the duct 3A, and the refrigerant pipe 48 is provided with a pressure regulator 47 for adjusting a pressure of the refrigerant having passed through the heating part 43.

[0101] The heat absorbing part 41 is a means for cooling air and evaporating the refrigerant by transferring the heat of the air introduced into the exhaust duct 31A to the refrigerant. The heating part 43 is a means for heating air and condensing the refrigerant by transferring heat of the refrigerant having passed through the compressor 45 to the air. In this case, the moisture contained in the

air may be collected on the bottom surface of the connection duct 35A along the surface of the heat absorbing part 41 when passing through the heat absorbing part 41.

[0102] In order to collect water removed from the air passing through the heat absorbing part 41, a water collection unit is provided in the drying device 20.

[0103] The water collected in the water collection unit may be collected in the water storage unit 7 and then discharged collectively. The water storage unit 7 may include a water storage tank 72 detachably provided to the cabinet 1 to provide a space in which water is stored and an inlet 722 provided to pass through the water storage tank 72 to introduce water discharged from a water storage unit supply pipe 633 into the water storage tank 72.

[0104] The water storage tank 72 may be provided as a drawer type tank that can be withdrawn from the cabinet 1, and in this case, a water storage unit mounting hole or a tank hole 115 into which the water storage tank 72 is inserted should be provided in the front panel 11 of the cabinet. A water storage panel 71 may be fixed to a front surface of the water storage tank 72, and the water storage panel 71 may be detachably coupled to the water storage unit mounting hole or the tank hole 115 to form a portion of the front panel 11A.

[0105] A recess 711 into which a user's hand is inserted may be further provided to the water storage panel 71. In this case, the water storage panel 71 functions as a handle for withdrawing the water storage tank 72 from the cabinet or inserting the water storage tank 72 into the cabinet.

[0106] The inlet 722 may be provided to be supplied with the water discharged from a nozzle 722a fixed to the cabinet 1A. The nozzle 722a may be fixed to an upper panel 13 of the cabinet to be positioned above the inlet 722 when the storage body 72 is inserted into the cabinet 1.

[0107] The water storage unit 7 having the above-described structure may discard water in the water storage tank 72 by allowing a user to withdraw the water storage tank 72 from the cabinet 1 and then invert or tilt the water storage tank 72 toward a direction in which the inlet 722 is located. A communication hole 721 configured to pass through an upper surface of the storage body 72 may be further provided such that water in the water storage tank 72 is easily discharged through the inlet 722.

[0108] Meanwhile, the heat exchange unit 4 is provided to condense the moisture or water of the air circulating in the heat absorbing part 41. Accordingly, although the air circulates through the drum 2A, moisture is removed in the heat absorbing part 41, thereby continuously drying the laundry inside the drum 2A.

[0109] The moisture condensed in the heat absorbing part 41 may be primarily collected in a water collection unit 37 and then secondarily collected into the water storage unit 7. The water collection unit 37 may be disposed inside the connection duct 35, and may be separately provided in a space spaced apart from the connection

duct 35.

[0110] FIG. 4 shows the detailed structures of the water collection unit 37, the heat exchange unit 4, and a cleaning unit 6.

[0111] The water collection unit 37A may be provided as a water collection body 371A which is fixed to a bottom surface of the connection duct 35A and communicates with the inside of the connection duct. A heat exchanger support portion 372A may be further provided to the water collection body 371A so that the heat absorbing part 41 and the heating part 43 do not contact the water (i.e., condensed water) stored in the water collection body 371A. The heat exchanger support portion 372A may include a support plate 373A in contact with the heat absorbing part 41 and the heating part 43, a spacer 375A configured to maintain a gap between the support plate 373A and the bottom surface of the water collection body 371A, and a support plate through-hole 376A provided to pass through the support plate 373A.

[0112] The support plate through-hole 376A may be provided only in a space in which the heat absorbing part 41 is supported only in the space provided by the support plate 373A or may be provided in each of a space in which the heat absorbing part is supported and a space in which the heating part is supported. When the support plate through-hole 376A is provided below the heating part 43, the water having moved to the heating part 43 along the support plate 373A may be discharged to the water collection body 371A (to prevent degradation of heat transfer efficiency generated when the heating part contacts the water).

[0113] In order to minimize that the foreign substances (e.g., lint, etc.) discharged from the drying drum body 21A are stacked on the heat absorbing part 41 and the heating part 43, a filtering part for filtering air may be further provided to the drying device 20.

[0114] A second filtering part 8 may be provided as a means for filtering the air introduced into the exhaust duct 31A from the drying drum body 21A, and a first filtering part 5 may be provided as a means for filtering the air having passed through the second filtering part by being disposed between the second filtering part 8 and the heat absorbing part 41. A diameter of a filtering hole provided in the first filtering part 5 may be set to be smaller than that of a filtering hole provided in the second filtering part 8.

[0115] The second filtering part 8 may include a frame 81 detachably inserted into the exhaust duct 31A through the air outlet 178 and a filter (i.e., a fourth filter) 83 provided in the frame to filter air.

[0116] The first filtering part 5 may be detachably provided in the connection duct 35. In this case, the front panel 11 of the cabinet may be provided with a filter mounting hole 113 through which the first filtering part 5 is withdrawn and a mounting hole door 114 for opening and closing the filter mounting hole, and a duct through-hole 34 (see FIG. 3) into which the first filtering part 5 is inserted may be provided in the duct 3A. Accordingly, a

user may separate the first filtering part 5 from the laundry treating apparatus as needed, and then remove foreign substances remaining in the first filtering part 5 and wash the first filtering part.

[0117] The first filtering part 5 may include a filtering part body 51, 53, 57, and 58 inserted into the filter mounting hole 113 and the duct through-hole 34 and positioned between the second filtering part 8 and the heat absorbing part 41 and a filter 531, 551, and 571 provided in the filtering part body to filter the fluid (e.g., air and water) moving to the heat absorbing part 41 and the water collection body 371.

[0118] The filtering part body may be provided in various shapes according to the shape of cross-sections (e.g., Y-Z plane and X-Z plane of the connection duct 35) of the connection duct 35, and FIG. 1 illustrates an example of a case that the filtering part body is provided in a shape similar to hexahedron.

[0119] In this case, the filtering part body may be provided to include a front surface 51 in a shape capable of closing the duct through-hole 34, a rear surface 53 positioned between the front surface and the heat absorbing part 41, a bottom surface 55 provided to connect the front surface and the rear surface, a first side surface 57 forming a left side surface of the filtering part body, and a second side surface 58 forming a right side surface of the filtering part body.

[0120] The front surface 51 may be provided with a lock 513 detachably coupled to a lock fastening portion 16 provided to the cabinet. The lock 513 may be provided as a bar rotatably coupled to the front surface 51 of the filtering part body, and the lock fastening portion 16 may be provided to form a recess in which a free end of the bar is accommodated. Preferably, the lock 513 may be provided at both confronting sides of the front surface 51 facing each other and the lock fastening portion 16 may be provided at both confronting sides of the filter mounting hole 113.

[0121] A handle 511 may be further provided on the front surface 51 to facilitate the filtering part body to be inserted into or separated from the connection duct 35.

[0122] The rear surface 53 and the bottom surface 55 may be provided with a first filter 531 and a second filter 551 that filter the fluid (e.g., air and water) introduced into the filtering part body, respectively. The rear surface 53 is provided with a rear surface through-hole allowing the inside of the filtering part body to communicate with the inner space of the duct 3A, and the first filter 531 is provided in the rear surface through-hole. The bottom surface 55 is provided with a bottom surface through-hole through which the inside of the filtering part body communicates with the inner space of the duct 3A, and the second filter 551 is provided in the bottom surface through-hole. Accordingly, the first filter 531 becomes a means for filtering the fluid (e.g., air and water) supplied to the heat absorbing part 41, and the second filter 551 becomes a means for filtering the fluid supplied to the water collection body 371.

[0123] The first side surface 57 and the second side surface 58 may be provided to connect the front surface 51, the rear surface 53, and the bottom surface 55.

[0124] The first filtering part 5 having the above-described structure may be provided to communicate with the exhaust duct 31 through the upper surface or the second side surface 58 of the filtering part body. FIG. 1 illustrates an example of a case that the first filtering part 5 is connected to the exhaust duct 31 through an upper surface through-hole provided to perforate the upper surface of the filtering part body and a side through-hole provided to perforate the second side surface 58.

[0125] The first filter 531 may be inclined from 90 degrees to 100 degrees toward the front surface of the heat absorbing part 41 with respect to the bottom surface 55 of the filtering part body. That is, when water is sprayed to the first filter 531 through the cleaning unit 6 to be described later, foreign substances remaining in the first filter may be easily moved to the bottom surface 55.

[0126] The second filter 551 may be inclined downward from the front surface 51 toward the first filter 531 by an angle of 10 degrees to 20 degrees (e.g., the second filter may be inclined upward by an angle of 10 to 20 degrees from a lower end of the first filter toward a direction in which the filter mounting hole is located). When the second filter 551 is inclined downward toward the first filter 531, a connection point between the first filter 531 and the second filter 551 is the lowest point in the space provided by the first filtering part, and thus the foreign substance I of the first filtering part 5 may be concentrated on a connection point between the first filter 531 and the second filter 551. When the foreign substances are concentrated on the connection point between the first filter 531 and the second filter 551, a user may more easily remove foreign substances in the first filtering part 5.

[0127] Yet, when foreign substances are concentrated at the connection point between the first filter 531 and the second filter 551, it may happen that it takes a long time for the water sprayed through the cleaning unit 6 to be discharged to the water collection body 371. To solve this problem, the first side surface 57 may further include a bypass hole allowing the inside of the first filtering part 5 to communicate with the collecting body 371 and a third filter 571 provided in the bypass hole.

[0128] The bypass hole and the third filter 571 may be provided at a position higher than the uppermost end of the second filter 551 and lower than the uppermost end of the first filter 531. Therefore, the laundry treating apparatus may minimize a phenomenon in which water sprayed to the first filtering part 5 cannot be recovered to the water collection body 371 by the foreign substances remaining in the first filtering part 5.

[0129] Meanwhile, the drying device 20 may further include a cleaning unit 6 for cleaning the first filtering part 5 using water stored in the water collection body 371. That is, the water stored in the water collection body 371 may be separately collected to the water storage unit 7 or may be selectively moved to the cleaning unit 6.

[0130] The cleaning unit 6 may be provided as a means for cleaning at least one of the first filter 531, the second filter 551, the third filter 571, and the heat absorbing part 41 by spraying the water stored in the water collection body 371 to the first filtering part 5. The cleaning unit 6 may include a spray unit 65 provided in the duct 3A to supply water to the first filtering part 5 and a cleaning pump 61 to move the water stored in the water collection body 371 to the spray unit 65.

[0131] The cleaning pump 61 may be connected to the water collection body 371 through a first connection pipe 611, and may be connected to the spray unit 65 through a second connection pipe 613. If the laundry treating apparatus is provided with only one cleaning pump 61 to move the water of the water collection body 371 to the spray unit 65 and the water storing unit 7, the drying device 20 may further include a flow path switching unit 63. In this case, the flow path switching unit 63 may be connected to the cleaning pump 61 through the second connection pipe 613, the spray unit 65 may be connected to the flow path switching unit 63 through the spray supply pipe 631, and the water storage unit 7 may be connected to the flow path switching unit 63 through the water storage unit supply pipe 633.

[0132] In this case, the water storage unit supply pipe 633 should be provided to connect the nozzle 722a and the flow path switching unit 63.

[0133] The flow path switching unit 63 is provided with a valve that controls the opening and closing of the spray supply pipe 631 and the opening and closing of the water storage unit supply pipe 633. Accordingly, the drying device 20 may supply the water stored in the water collection body 371 to the spray unit 65 by controlling the valve provided in the flow path switching unit 63, or may supply the water to the water storage unit 7.

[0134] According to the example shown in the drawing, the spray unit 65 includes a duct through-hole 651 passing through the connection duct 35 and having the spray supply pipe 631 connected thereto, a first guide 653 for guiding the water supplied from the duct through-hole to the first filter 531, and a second guide 655 for guiding at least a portion of the water supplied through the first guide 653 to the front surface of the heat absorbing part 41. In this case, the second guide 655 may be provided as a means for allowing water to be supplied to the front surface of the heat absorbing part 41 through the first filter 531. That is, when the first filtering part 5 is fixed to the connection duct 35, the first filter 531 may be disposed between the first guide 653 and the second guide 655, and the second guide 655 may be provided as an inclined surface inclined downward from the upper surface of the connection duct 35 toward the first filter 531.

[0135] The first guide 653 may further include a guide through-hole 654. The guide through-hole 654 may be a hole provided to perforate the first guide 653, and the water introduced into the duct through-hole 651 may be supplied to a front area of the heat absorbing part 41 through the guide through-hole 654. The front area of the

heat absorbing part refers to an area located in a direction toward the first filter 531 with respect to a vertical line passing through the center of the heat absorbing part 41.

[0136] Meanwhile, the laundry treating apparatus of the present disclosure preferably includes a water collection unit water level sensing unit 91 that measures a water level of the water collection body 371 and transmits the measured water level to the controller. When the water collection unit water level sensing unit 91 is provided, the laundry treating apparatus may determine a time point at which the water stored in the water collection body 371 is moved to the storage body 72, thereby preventing the water of the water collection body 371 from flowing back to the connection duct 35.

[0137] The water collection unit water level sensing unit 91 may be provided as any device capable of sensing a water level inside the water collection body 371, and FIG. 3 illustrates an example of a sensor provided with a multitude of electrodes having different lengths (provided as a multitude of electrodes electrically connected according to a water level).

[0138] A dryness sensing unit may be provided to the drying device 20 so that an operation stop timing point of the heat exchange unit 4 may be determined by determining a dryness of laundry. The dryness sensing unit may include at least one of an electrode sensor 95 provided to be in contact with laundry to measure an amount of moisture contained in the laundry and a humidity sensor for measuring a humidity of air introduced into the duct 3A from the drum 2.

[0139] The electrode sensor may include a first electrode 951 and a second electrode 953 that may come in contact with the laundry inside the drum body 21 by being fixed to the first fixing body 171. As the degree of dryness increases, the amount of moisture contained in the laundry may be reduced (the electrical resistance of the laundry increases). Hence, the drying device 20 may determine the dryness of the laundry by observing the electrical resistance measured when the two electrodes 951 and 953 are connected through the laundry. Meanwhile, as the drying degree of the laundry increases, the amount of moisture contained in the air introduced into the duct 3A is reduced, and thus the drying device 20 may determine the dryness of the laundry by observing the humidity of the air introduced into the duct 3A through the humidity sensor.

[0140] In addition, the drying device 20 may further include a temperature sensing unit 96 for measuring a temperature of the air introduced into the duct 3A. The temperature sensing unit 96 may be fixed to an upper surface of the connection duct 35 to be positioned between the first filter 531 and the second filter 551.

[0141] FIG. 5 is a diagram illustrating an internal structure of the drying device 20 according to an embodiment of the present disclosure.

[0142] The drive unit 28 may be directly fastened to a backside of the drying drum 2A. The drying drive unit 28 may be disposed on the second support portion 19 to

directly rotate the drying drum 2A.

[0143] The drying drive unit 28 may include a stator supported by the second support portion 19, a rotor rotated by the stator, and a rotating shaft.

[0144] The drying drive unit 28 may be separately coupled to a decelerator 28A, and the decelerator 28A may be coupled to the center of the backside of the drying drum 2A to rotate the drying drum 2A.

[0145] Accordingly, the decelerator 28A may increase torque while reducing the RPM of the rotating shaft.

[0146] A steam unit 200 may be fixed to the first support portion supporting the front panel 11 or the drum 2 for space utilization. In addition, the steam unit 200 may be provided adjacent to a corner of the cabinet 1.

[0147] An internal supply unit 400 may include a water tank 420 for storing water, a water pump 430 providing power for supplying the water stored in the water tank 420 to the steam unit 200, and a tank housing 410 providing a space in which the water pump 430 and the water tank 420 are installed.

[0148] The tank housing 410 may be provided in a box shape with an open top surface, the water pump 430 is disposed on a front side of the cabinet 1, and the tank housing 410 may extend along front and rear sides of the cabinet 1 so that the water pump 430 may be disposed on the rear side of the cabinet 1.

[0149] The tank housing 410 may include a tank mounting portion 411 on which the water tank 420 is detachably seated and a pump mounting portion 412 on which the water pump 430 may be mounted. The tank mounting portion 411 and the pump mounting portion 412 may be provided in recess shapes to prevent water leaking from the water tank 420 or the water pump 430 from leaking to the drying drum 2A and the like.

[0150] In addition, the tank housing 410 may further include a partition wall 413 partitioning the tank mounting portion 411 and the pump mounting portion 412. Accordingly, the water tank 420 may be easily mounted on and separated from the tank housing 410. The partition wall 413 may play a role as a collector to prevent the remaining water in the tank mounting portion 411 or the remaining water on the pump mounting portion 412 from moving to other places.

[0151] An extension pipe 416 that allows the water tank 420 and the water pump 430 to communicate with each other may be installed on the partition wall 413. A valve system may be installed at the extension pipe 416 to prevent water leakage even when the water tank 420 is separated from the tank mounting portion 411.

[0152] The extension pipe 416 may extend from the partition wall 413 toward the water pump 430 or the water tank 420.

[0153] Meanwhile, the tank housing 410 may be formed such that the pump mounting portion 412 is disposed closer to the steam unit 200 than the tank mounting portion 411. Accordingly, a flow path for a supply from the water tank 420 to the steam unit 200 may be simplified.

[0154] The tank housing 410 may be formed such that the tank mounting portion 411 and the pump mounting portion 412 are disposed along the front-rear direction of the cabinet.

[0155] A water supply unit 300 may include a coupling part capable of fixing the tank housing 410 to at least one of a support bar 440 and one side surface of the cabinet.

[0156] Meanwhile, a drying drum 2A rotating inside the drying cabinet 1 is provided. Therefore, the configuration disposed inside the cabinet 1 needs to be spaced apart from the drying drum 2A. Therefore, it is necessary to prevent the water supply unit 300 and the steam unit 200 from being in contact with the drum 2. For example, a steam guide pipe 230 supplying steam from the steam unit 200 to the drum 2, a direct water pipe 510 supplying water to the steam unit 200, and the like need to be blocked from coming in contact with the drying drum 2A.

[0157] Meanwhile, it is necessary to support not only the water tank 420 and the water pump 430 but also the weight of the water accommodated in the water tank 420.

[0158] Therefore, the laundry treating apparatus according to the present disclosure may include a support bar 440 supporting the steam unit 200 and the water supply unit 300 to prevent the steam unit 200 and the water supply unit 300 from being in contact with the drum, the support bar 440 supporting the steam unit 200 and the water supply unit 300 within the drying cabinet.

[0159] The support bar 440 may be provided to support at least one portion of the steam unit 200 or at least one portion of the water supply unit 300. In addition, the support bar 440 may fix the tank housing 410 to the drying cabinet or support the same.

[0160] Both ends of the support bar 440 may be provided in a bar shape coupled to a drying front panel 11 and a drying rear panel 12. Accordingly, the support bar 440 may not only support the weight of the tank housing 410, but also fix the drying front panel 11 and the drying rear panel 12. The support bar 440 may be coupled to the drying front panel 11 and the drying rear panel 12 in a manner of being spaced apart from a drying side panel 14 by a predetermined distance. Meanwhile, both ends of the support bar 440 may be coupled to the cabinet 1, and the rest of the support bar 440 may be disposed at a position lower than an upper portion of a side surface of the cabinet 1. Accordingly, the support bar 440 may be prevented from interfering with the upper panel 13 by being spaced apart from the upper panel 13. In addition, a space capable of supporting some configurations of the water supply unit 300 and the steam unit 200 may be formed between the support bar 440 and the upper panel 13.

[0161] Owing to the support bar 440, the width of the tank housing 410 may be prevented from being excessively extended.

[0162] Although not shown, the tank housing 410 may further include a mounting sensor capable of sensing whether the water tank 420 is mounted on an inner surface of the tank housing 410. The mounting sensor may

include a weight sensor and be provided to distinguish heaviness/lightness of the weight.

[0163] The mounting sensor may be connected to the drying control panel PA to transfer information indicating whether the water tank 420 is mounted as well as information on the quantity of water accommodated in the water tank 420.

[0164] The internal supply unit 400 may include a pump discharge pipe 433 that discharges water from the pump housing 430 to the steam unit 200.

[0165] The external supply unit 500 may include a direct water valve 520 seated on the second support portion 19A or the drying rear panel 12 and a direct water pipe 510 provided to supply water from the direct water valve 520 to the steam unit 200.

[0166] The direct water pipe 510 may extend from the drying rear panel 12 to the steam unit 200, and the direct water valve 520 may be provided to open/close the direct water pipe 510. The direct water pipe 510 may extend from the direct water valve 520 to the steam generator 210 across the support bar 440. In this case, at least one portion of the direct water pipe 510 may be supported by the support bar 440 to be prevented from coming into contact with the drying drum 2A.

[0167] The support bar 440 may be disposed between the direct water valve 520 and the water tank 430.

[0168] In addition, the direct water valve 520 may be seated on the drying rear panel 12 or the second support portion 19A to be exposed externally, and the direct water pipe 510 may be provided to extend from the direct water valve 520 toward the steam unit 200. Accordingly, the external supply unit 500 may supply water to the steam unit 200 in a direct water manner from an external water supply source.

[0169] The steam unit 200 may be provided to receive water from the external supply unit 500 and the internal supply unit 400, respectively. Yet, when the steam unit 200 is provided to receive water through each pipe, a steam unit 200 having a different shape should be manufactured, and thus a flow path and a control method may be complicated.

[0170] To this end, the laundry treating apparatus of the present disclosure may further include a combining junction unit 600 coupling the direct water pipe 510 and the pump discharge pipe 433 so that the direct water pipe 510 and the pump discharge pipe 433 are combined to form a junction. The combining junction unit 600 may be provided to collect both water stored in the internal supply unit 400 and water supplied from the external supply unit 500 in a direct water manner.

[0171] In addition, the combining junction unit 600 may be provided to transfer the supplied water to the steam unit 200. The combining junction unit 600 may be provided as a three-way valve, or may be provided in the shape of a combined junction pipe in which three pipes are coupled.

[0172] When the combining junction unit 600 is provided in a tubular shape, the external supply unit 500 and

the internal supply part 400 may be provided with check valves to prevent backflow. Specifically, the direct water pipe 510 may be provided with a direct water check valve 511 provided to open the direct water pipe 510 in one direction, and the pump discharge pipe 433 may be provided with a discharge check valve 434 provided to open the pump discharge pipe 433 in one direction.

[0173] In addition, a check valve may be provided to each of the pump discharge pipe 433 and the direct water pipe 510. The external supply unit 500 may include an external check valve, and the internal supply unit 400 may include an internal check valve.

[0174] Accordingly, the water supplied to the direct water pipe 510 may be prevented from flowing back to the water pump 430, and the water supplied to the pump discharge pipe 433 may be prevented from flowing backward to the direct water valve 510.

[0175] Meanwhile, when the combining junction unit 600 is provided as a valve or a combining junction pipe, the combining junction unit 600 has a significant weight of its own. In addition, when water passes through the combining junction unit 600, a significant weight may be applied to the combining junction unit 600.

[0176] Therefore, the combining junction unit 600 may be provided in a manner of being mounted on the support bar 440.

[0177] The combining junction unit 600 and the support bar 400 may be coupled to each other by a separate fixing member to prevent the combining junction unit 600 from being separated from the support bar 400. Since the combining junction unit 600 is seated on the support bar 400, the positions of the direct water pipe 510 and the pump discharge pipe 433 may be stably fixed.

[0178] Meanwhile, the steam unit 200 may include a water guide pipe 220 connected to the combining junction unit 600 to be supplied with water of the water supply unit 300, a steam generator 210 generating steam by being supplied with water from the water guide pipe 220, and a steam guide pipe 230 guiding the steam generated from the steam generator 210 to the drying drum 2A or the duct 3A.

[0179] The steam generator 210 may be provided below the drying drum 2A to be stably supplied with water from the water supply unit 300 by gravity, and the generated steam may be stably moved to the drying drum 2A owing to a density difference.

[0180] The steam guide pipe 230 may be provided to communicate with a gasket provided in front of the drying drum 2A or the first support portion. Accordingly, the steam guide pipe 230 may stably supply steam into the drying drum 2A without coming in contact with the drying drum 2A.

[0181] Meanwhile, the tank housing 410 may be provided with a mounting sensor capable of sensing whether the water tank 420 is mounted. For example, the mounting sensor may be provided as a pressure sensor or the like.

[0182] In addition, a water level sensor capable of

sensing the water level of the water tank 420 may be further provided. For example, the water level sensor may be provided as a weight sensor. The mounting sensor or the water level sensor may also be controlled by the control panel 820, and may be provided to transmit a signal to the control panel 820.

[0183] Meanwhile, the control panel P may indirectly recognize the water level of the water tank 420 by temporarily driving the water pump 430 and sensing a load added to the water pump 430.

[0184] The water storage tank 72 may have a significantly larger volume than the water tank 430, and may be disposed in a manner of being spaced apart from the water tank 430 to prevent user's confusion as to the water tank 430.

[0185] The water tank 430 and the steam unit 200 may be disposed between the support bar 440 and one side surface of the cabinet, and the water storage tank 72 may be disposed between the support bar 440 and the other side surface of the cabinet.

[0186] Since the water tank 430 is coupled to the tank mounting portion 411, it can be seen that the tank mounting portion 411 is also disposed between the support bar 440 and the one side surface of the cabinet.

[0187] As a result, the support bar 440 may be disposed between the water storage tank 72 and the steam generator 210, and may be disposed between the water storage tank 72 and the water tank 430.

[0188] FIG. 6 illustrates a structure in which the washing device 10, the drying device 20, and the auxiliary apparatus 60 may communicate with each other when they are included in the laundry treating apparatus.

[0189] The washing device 10 may include a washing control panel P configured to display a user and information and to receive an input of a command from the user.

[0190] The washing control panel P may include a display unit P8 capable of displaying a state of the washing device 10, an input unit P9 capable of inputting a command to the washing device 10, and a washing speaker K1 capable of externally representing a notification generated from the washing device 10, include a controller M1 capable of performing washing courses and options including a drive unit, a water supply unit, a drainage unit, and the like of the washing device 10, and include a storage unit S1 storing a program for transferring information to the controller M1 or a program to be used by the controller M1.

[0191] The input unit P9 may include all components provided to receive a user command to the washing device 10, such as a manipulation unit P4, a power unit P46, an execution unit P47, a setting unit P2, and the like, which will be described later.

[0192] In addition, the washing device 10 may include a communication module T1. The communication module T1 may include a communication modem T11 including a communication means such as Wi-Fi, Bluetooth, and the like, a communication controller T12 configured to control the communication modem, and a communi-

cation storage unit T13 capable of storing a program for transferring received information to the controller M1 or controlling the communication controller T12 when the power is cut off to the controller M1.

[0193] The communication module T1 may be configured to be continuously supplied with power even when the power supply to the control panel P of the washing device 10 is cut off, and may be provided to maintain communication states with the external terminal 40 and the server 50.

[0194] In addition, the communication module T1 may be configured to maintain a communication state by being directly paired with a drying communication module T2 and a mini communication module T31, which will be described later.

[0195] In addition, when the communication module T1 is supplied with a power command for supplying power of the control panel P, the communication module T1 may control the power of the control panel P to be supplied.

[0196] The drying device 20 may include a drying control panel PA configured to display a user and information and to receive an input of a command from the user.

[0197] The drying control panel P may include a drying display unit P8A capable of displaying a state of the drying device 20, a drying input unit P9A capable of inputting a command to the drying device 20, and a drying speaker K2 capable of externally representing a notification generated from the drying device 20, include a drying controller M2 capable of performing a drying course and option for operating the drive unit and the like of the drying device 20, and include a drying storage unit S2 storing a program for transferring information to the drying controller M2 or a program to be used by the drying controller M2.

[0198] The drying input unit P9A may include all components provided to receive a user command to the washing device 10, such as a manipulation unit P4, a power unit P46, an execution unit P47, a setting unit P2, and the like, which will be described later.

[0199] In addition, the drying device 20 may include a drying communication module T2. The drying communication module T2 may include a drying communication modem T21 including a communication means such as Wi-Fi, Bluetooth, etc., a drying communication controller T22 configured to control the drying communication modem, and a drying communication storage unit T23 capable of storing a program for transferring received information to the drying controller M2 or storing a program for controlling the drying communication controller T22 when the power is cut off to the drying controller M2.

[0200] The drying communication module T2 may be configured to be continuously supplied with power even when the power supply to the control panel PA of the drying device 20 is cut off, and may be configured to maintain a communication state with the external terminal 40 and the server 50.

[0201] In addition, the drying communication module

T2 may be configured to maintain a communication state by being directly paired with the communication module T1 and the mini communication module T3, which will be described later.

5 **[0202]** In addition, when the drying communication module T2 is supplied with a power command for supplying power of the drying control panel PA, it may control the power of the drying control panel PA to be supplied.

10 **[0203]** The mini device 60 may include a mini control panel PC configured to display a user and information and to receive an input of a command from a user.

[0204] The mini control panel PC may include a mini display unit P8C capable of displaying a state of the mini device 60, a mini input unit P9C capable of inputting a command to the mini device 60, and a mini speaker K3 capable of externally representing a notification generated from the mini device 60, include a mini controller M3 capable of performing a washing course and option for operating a drive unit, a water supply unit, a drainage unit, and the like of the mini device 60, and includes a mini storage unit S3 storing a program for transferring information to the mini controller M3 or a program to be used by the mini controller M3.

25 **[0205]** The mini input unit P9C may include all components provided to receive an input of a user command to the washing device 10, such as a manipulation unit P4, a power unit P46, an execution unit P47, a setting unit P2, and the like, which will be described later.

30 **[0206]** In addition, the mini device 60 may include a mini communication module T3. The mini communication module T3 may include a mini communication modem T31 including a communication means such as Wi-Fi, Bluetooth, etc., a mini communication controller T32 configured to control the mini communication modem, and a mini communication storage T33 capable of storing a program for transferring received information to the mini controller M3 or controlling the mini communication controller T32 when power is cut off to the mini controller M3.

35 **[0207]** The mini communication module T3 may be configured to be continuously supplied with power even when the power supply to the control panel PC of the mini device 60 is cut off, and may be configured to maintain a communication state with the external terminal 40 and the server 50.

40 **[0208]** In addition, the mini communication module T3 may be configured to maintain a communication state by being directly paired with the communication module T1 and the drying communication module T2, which will be described later.

45 **[0209]** In addition, when the mini communication module T3 is supplied with a power command for supplying power of the mini control panel PC, it may control the power of the mini control panel PC to be supplied.

50 **[0210]** Meanwhile, the external terminal 40 may include a short-range communication module 40b provided to directly communicate with the washing device 10, the drying device 20, and the mini device 60 and a long-range communication module 40a configured to communicate

with the server 50.

[0211] In addition, the external terminal 40 may further include a terminal display unit 42 for displaying information received from the communication module, a terminal input unit 44 for transmitting a command to home appliances such as the washing device 10 or the server 50, and a terminal controller 46 controlling the terminal display unit 42, the terminal input unit 44, and the communication module. The external terminal 40 may further include a terminal storage unit 48 to store information received from the communication module or a program for controlling the terminal controller 46.

[0212] The server 50 includes a communication device 5 capable of communicating with the external terminal 40, the washing device 10, the drying device 20, and the mini device 60, an operation processing device 52 for computing information received from the external terminal 40, the washing device 10, the drying device 20, and the mini device 60 or information to transmit to the external terminal 40, the washing device 10, the drying device 20, and the mini device 60, and a storage device 54 for storing information received from the external terminal 40, the washing device 10, the drying device 20, and the mini device 60 or random courses or options capable of operating the washing device 10, the drying device 20, and the mini device 60.

[0213] FIG. 7 is a diagram illustrating an embodiment of a control panel P applicable to the laundry treating apparatus of the present disclosure.

[0214] Hereinafter, although described with reference to the control panel P of the washing device 10, the control panel P may be applied to the washing device 10 and the drying device 20 in the same structure, and may also be applicable to the mini device 60.

[0215] In other words, the control panel P, the drying control panel PA, and the mini control panel PC may have the same structure.

[0216] The washing device 10 includes a cabinet 1 and a control panel P provided to the cabinet 1.

[0217] The control panel P refers to a device that enables communication between a user and a laundry treating apparatus (including other electronic equipments as well as the same). The communication between the user and the laundry treating apparatus refers to a process in which a user inputs a control command to the laundry treating apparatus and a process in which the laundry treating apparatus transmits information to the user.

[0218] Through the control panel P, the user may input at least one of a power command for supplying or blocking power of the laundry treating apparatus, a selection command for selecting a random course or option for processing laundry, an execution command for performing the selected course or option, and a stop command for stopping the course or option being performed.

[0219] The treating of laundry may include a washing cycle for removing foreign substances from the laundry through water and detergent or a drying cycle for drying the water contained in the laundry.

[0220] The control panel P may display an operating state of the laundry treating apparatus or information of the course or option to a user.

[0221] For example, the control panel P may display a state in which at least one of the power command, the selection command, the execution command, the performance command, and the stop command is input. In addition, the control panel P may display error information indicating a problem situation occurring in the laundry treating apparatus or guide information guiding an action to be taken by the user.

[0222] The cabinet 1 may include a front panel 11 forming a front side and an upper panel 13 coupled to an upper portion of the front panel 11. The front panel 11 and the upper panel 13 may be formed of a metal material and may be provided in the shape of a steel sheet.

[0223] The control panel P of the laundry treating apparatus according to the present disclosure may be coupled to the front panel 11.

[0224] The control panel P may be coupled to a rear surface of the front panel 11 and partially exposed to a front surface of the front panel 11. The front panel 11 may be made of a simple metal plate, and the control panel P may be simply coupled and fixed to the rear surface of the front panel 11.

[0225] Accordingly, the front panel 11 may form most of the front surface of the cabinet 1. As a result, the appearance of the front panel 11 may be reinforced to maximize aesthetics. In addition, a process of manufacturing the front panel 11 may be simplified, and a process of assembling or installing the front panel 11 and the control panel P may be simplified. In addition, a configuration such as a separate frame for seating the control panel P on the front panel 11 may be omitted.

[0226] The control panel P of the laundry treating apparatus according to the present disclosure may include a manipulation unit P7 rotatably coupled to the cabinet and a display unit P8 provided inside the manipulation unit P7 to display a state of the laundry treating apparatus.

[0227] The manipulation unit P7 may be provided in the form of a rotary knob, and the display unit P8 may be provided as a display D including liquid crystal or the like. The display unit P8 and a selection unit R to be described later may be included inside the manipulation unit P7.

[0228] In addition, the selection unit R receives a determination command according to user's manipulation or touch, and may be regarded as being functionally included in the manipulation unit P7.

[0229] In addition, since the selection unit R is provided to the display unit P8, it may be seen that the selection unit R is included in the display unit P8 from the perspective of location.

[0230] The display unit P8 may be entirely provided as a touch panel, or at least a portion of the display unit P8 may be provided as a touch panel.

[0231] The manipulation unit P7 may be configured to select a random course or option capable of treating laun-

dry while rotating, and the display unit P8 may be configured to display a corresponding course or option each time the manipulation unit P7 rotates.

[0232] Accordingly, the control panel P of the laundry treating apparatus according to the present disclosure may prevent a random course or option capable of rotating the drum, which will be described later, from being displayed as text, guide phrases, and the like in a certain area.

[0233] Accordingly, an area occupied by the control panel P on the front panel 11 or an area ratio thereof may be greatly reduced. Since separate text and the like or guide phrase is not attached to the front panel 11, aesthetic sense may be maximized.

[0234] A display P84 of the display unit P8 may include a state display area D1 configured to display a state of the laundry treating apparatus and a content display area D2 configured to display a state in which at least one of the power command, the selection command, the execution command, the performance command, and the stop command of the laundry treating apparatus is inputted, error information, and guide information for guiding a user to take a necessary action.

[0235] The state display area D1 may display a lock state D11 of indicating whether the door 113 is locked to the cabinet, an activation state D12 of the communication module T, an execution state D13 of the course or option, and a notification state D14 indicating a presence of notification information to the user.

[0236] The content display area D2 is the largest area in the display unit P8, and may be configured to display a selection state, an execution state, a stop state, and a completion state of a course or option as well as a state of another home appliance, which will be described later.

[0237] In addition, the control panel P may further include a selection unit R for inputting a determination command for the user to determine information displayed on the display unit P8. The selection unit R may be provided inside the manipulation unit to further reduce the area occupied by the control panel P.

[0238] The selection unit R may be provided inside the display unit P8 and may be disposed in a manner of being spaced apart from the content display area D2. The selection unit R may be provided as a physical button or a touch panel for sensing a contact of a user's body.

[0239] The display P84 of the display unit may include an input area D3 that may require an input of the selection unit R at a point corresponding to the selection unit R.

[0240] The input area D3 may be provided to emit light when the selection unit R is activated to receive an input of a command from the user.

[0241] Meanwhile, the manipulation unit P7 and the display unit P8 may be configured to operate when power is supplied.

[0242] To this end, the control panel P of the laundry treating apparatus of the present disclosure may further include a power unit P46 for inputting a power command to the laundry treating apparatus as well as the manipu-

lation unit P7 and the display unit.

[0243] The user may activate the manipulation unit P7 by inputting the power unit P46.

[0244] The front panel 11 may include a power mounting part 116 provided to install the power unit P46.

[0245] In addition, the control panel P may further include an execution unit P47 to which an execution command for executing or stopping the selected course or option is inputted. The execution unit P47 may be provided separately from the manipulation unit P7 and the display unit P8 to reflect user's certain intention for execution or stop. In addition, the functions of the manipulation unit P7 and the display unit P8 may be prevented from expanding excessively.

[0246] The front panel 11 may include a power mounting part 117 provided to install the execution unit P47.

[0247] The power unit P46, the execution unit P47, the manipulation unit P7, and the display unit P8 may be provided in a single control box P1.

[0248] Meanwhile, the front panel 11 may further include a setting unit P2 capable of adding or changing an option to the course. The user may set options for changing the strength, duration time, and the like for performing the course through the setting unit P2.

[0249] The setting unit P2 may be provided separately from the case P1 to be coupled to the front panel 11. The setting unit P2 may include a separate liquid crystal display or may include a touch panel or a physical button capable of writing or entering the option.

[0250] The power unit P46, the execution unit P47, the manipulation unit P7, and the setting unit P2 may be collectively defined as an input unit P8.

[0251] Meanwhile, the front panel 11 may include a door 112 for opening and closing an entrance through which laundry is put. The control panel P may be positioned above the door 112 to enhance the accessibility of the user.

[0252] Meanwhile, the front panel 11 may further include a locking portion L for fixing the door 112 to the front panel 11. When the laundry treating apparatus is activated like the drum of the laundry treating apparatus is rotated, the locking portion L may be provided to lock the door 112 to the front panel 11. As a result, a safety accident may be prevented. The locking portion L may be provided to unlock the door 112 when the operation of the laundry treating apparatus is finished.

[0253] The locking portion L may be provided in any configuration capable of fixing the door 112 to the cabinet 1. The locking portion L may be provided as a fastening portion for fastening a hook projected from the door or a solenoid valve for gripping the hook.

[0254] The laundry treating apparatus of the present disclosure may include a detergent box 132 for accommodating detergent for washing laundry, and the front panel 11 may include a detergent hole P24 through which the detergent box 45 is withdrawn.

[0255] The cabinet 1 may include a front panel 11 forming a front surface of the laundry treating apparatus, and

the front panel 11 may include an entrance 111 provided to communicate with the drum 2 and a door 112 rotatably coupled to the cabinet to open and close the entrance 111.

[0256] The cabinet 1 may include an opening disposed in a manner of opening the door 112 and preventing the door 112 from being locked to the cabinet 1.

[0257] The opening may include a restricting portion 10b coupled to the door 112 to be exposed to an outer circumferential surface of the door 112. The restricting portion 10b may be provided to prevent the door from being coupled to a locking portion 10c provided to the cabinet. Accordingly, a user may dry or ventilate the inside of the drum 2 by using the restricting portion 10b of the door when the laundry treating apparatus is not used.

[0258] The front panel 11 is provided with a control panel P, and the control panel 117 may include an input unit P9 for receiving an input of a control command from a user, a display unit P8 for outputting information such as a control command selectable by the user and the like, and a main controller M1 for controlling a command for performing a drying cycle of the laundry treating apparatus.

[0259] The input unit P9 may include a power supply requesting unit P46 for requesting power supply to the laundry treating apparatus, a manipulation unit P7 for enabling a user to select a desired course from a multitude of courses, and an execution unit P47 for requesting initiation of the course selected by the user.

[0260] The display unit P8 may include at least one of a display panel capable of outputting text and figures and a speaker capable of outputting an audio signal and sound.

[0261] FIG. 8 is a diagram illustrating a structure in which a control panel is coupled to a front panel.

[0262] As shown in the drawing, the washing device 10 may further include a detergent supply unit P24. The detergent supply unit P24 may include a detergent box housing 241 provided in the cabinet 1, a connection pipe 242 connecting the detergent box housing to the tub body 21, and a detergent box 243 withdrawn from the detergent box housing 241 through a detergent box entrance 133 provided in the front panel 11.

[0263] The detergent box 243 may include a chamber 245 for providing a space for storing detergent, and a discharge flow path 247 for discharging the detergent in the chamber to the detergent box housing 241. The discharge flow path 247 may be provided as a water trap (e.g., a siphon flow path for moving the liquid to the detergent box housing 241 when a water level of liquid stored in the chamber 245 exceeds a preset water level).

[0264] When the detergent supply unit 24 is provided in the washing device 10, the water supply unit 23 may further include a nozzle 232 for supplying water to the chamber 245. The nozzle 232 may be fixed to the cabinet 1 to form an upper surface of the detergent box housing 241, and the water supply pipe 231 may be provided to connect the nozzle 232 to a water supply source.

[0265] A detergent box panel 248 may be provided on a front surface of the detergent box 243. The detergent box panel 248 may be provided in a shape of closing the detergent box entrance 133, and a detergent box handle may be provided to the detergent box panel 248.

[0266] The front panel 11 may be fixed to the cabinet body 11 through a panel support 12. That is, the panel support 12 may be fixed to the cabinet body 11, and the front panel 11 may be fixed to the panel support 12. The panel support 12 may be provided with a detergent box through-hole 121 through which the detergent box 243 passes.

[0267] The control panel P may be fixed to the cabinet 1 through the panel support 12. The panel support 12 may be provided with an interface mounting slot to which the control panel P is fixed.

[0268] The front panel 11 may include a first button mounting portion 136 and a second button mounting portion 137, a first button 461 may be exposed to the outside of the cabinet 1 through the first button mounting portion 136, and a second button 471 may be exposed to the outside of the cabinet 1 through the second button mounting portion 137.

[0269] A first input unit 46 and a second input unit 47 may be provided in a left space and a right space of the display unit 8, respectively, may be provided in an upper space and a lower space of the display unit, respectively, or may be vertically or horizontally disposed in either a left space or a right space of the display unit.

[0270] The cabinet 1 may include a panel through-hole 134 provided to pass through the front panel 11, and a shaft 71 may be inserted into the panel through-hole 134.

[0271] When the laundry treating apparatus is provided as the drying device 20, the rest of the laundry treating apparatus may be the same except that the configuration related to the detergent box is changed to a water storage tub 7.

[0272] FIG. 9 is a diagram illustrating an internal structure of a control panel.

[0273] The control panel P may include a circuit board (i.e., a first circuit board) P4 located within the cabinet 1 by being fixed to the panel support 12, an encoder P5 located within the cabinet 1 by being fixed to the circuit board, a manipulation unit P7 connected to the encoder P5 through the front panel 11, and a display unit P8 fixed to the encoder 5 or the first circuit board P4 through the front panel 11.

[0274] The first circuit board P4 is a board provided with a control circuit required for control (e.g., power control, operation control) of at least one of the drive units 23, 27, and 25, the steam unit 200, and the water supply unit 300, and may be fixed to the panel support 12 through a case P41.

[0275] The case P41 may have any shape capable of fixing the first circuit board 4 to the panel support 12.

[0276] The case P41 may have a hexahedral shape with one surface (e.g., a surface facing the panel support) open.

[0277] A boss for setting a position of the first circuit board P4 may be provided to the case P41. The boss may include a first boss 411 and a second boss 412.

[0278] In this case, the first circuit board P4 may include a board through-hole P42 through which the first boss 411 passes and a boss insertion hole P43 through which the second boss 412 passes. The second boss 412 may be disposed in each of left and right spaces next to the first boss 411, or may be disposed in each of upper and lower spaces next to the first boss 411.

[0279] A wire 822 is connected to the display unit P. The wire 822 may be provided as a power line for supplying power to the display unit, and the display unit P8 may be provided as a communication line that enables communication with devices inside the cabinet including the first circuit board P4.

[0280] A first boss through-hole 413 may be provided in the first boss 411, and a wire through-hole 123 (see FIG. 4) may be provided in the panel support 12. In this case, the wire 822 may extend into the cabinet 1 by being inserted into the first boss through-hole 413 and the wire through-hole 123.

[0281] The first circuit board P4 may further include a power unit P46 and an execution unit P47. The power unit P46 may be provided as a means for inputting a control command for requesting power supply to the laundry treating apparatus 100, and the execution unit P47 may be provided as a means for inputting a command for requesting execution of a control command displayed on the display unit P8 or a command for requesting temporary interruption of a control command being executed by the laundry treating apparatus 10.

[0282] The power unit P46 and the execution unit P47 may be configured to generate control signals by sensing the static electricity of a user's body.

[0283] The power unit P46 may include a first button 461 exposed to the outside of the cabinet 1, a first detection sensor 464 fixed to the first circuit board P4, and a conductor (i.e., a first touch spring) 463 connecting the first button and the first detection sensor. Likewise, the execution unit P47 may include a second button 471 exposed to the outside of the cabinet 1, a second detection sensor 474 fixed to the first circuit board P4 and a conductor (i.e., a second touch spring, not shown) connecting the second button and the second detection sensor.

[0284] The front panel 11 may include a first button mounting portion 116 and a second button mounting portion 117, the first button 461 may be exposed to the outside of the cabinet 1 through the first button mounting portion 116, and the second button 471 may be exposed to the outside of the cabinet 1 through the second button mounting portion 117.

[0285] The power unit P46 and the execution unit P47 may be provided in a left space and a right space next to the display unit P8, respectively, may be provided in an upper space and a lower space next to the display unit, respectively, or may be vertically or horizontally disposed in any one of a left space and a right space next

to the display unit.

[0286] A first touch spring 463 and a second touch spring may be provided in coil shapes to provide restoring forces to the first button 461 and the second button 471, respectively. Further, in order to prevent the first button 461 and the second button 471 from being separated from the button mounting portions 116 and 117, respectively, a first stopper 462 for limiting the range of motion of the first button is provided to the power supply 46 and a second stopper (not shown) for limiting the range of motion of the second button may be provided to the execution unit 47.

[0287] The encoder P5 is a means for rotatably fixing the manipulation unit P7 to the first circuit board P4 as well as a means for generating an electrical signal when the manipulation unit P7 rotates (or generating an electrical signal set differently depending on a rotation angle of an actuator).

[0288] The drying control panel PA may have the same structure of the control panel P.

[0289] In addition, the mini control panel PC may also have the same structure of the control panel P.

[0290] FIG. 10 illustrates a structure of an encoder.

[0291] The encoder P5 may include a fixing part P51 fixed to the first circuit board P4 to have the display unit P8 fixed thereto, a rotating part P52 rotatably provided to the fixing part P51 to have the manipulation unit P7 fixed thereto, and a signal generating part P54 for generating an electrical signal when the rotating part P52 rotates.

[0292] The fixing part P51 may include a fixing body P512 fixed to the first circuit board P4, a support body 511 extending from the fixing body 512 and rotatably fixed to the rotating part P52, and a body through-hole 514 connected to the board through-hole P42 (i.e., connected to the first boss through-hole) by passing through the fixing body and the support body.

[0293] The fixing body 512 may have a cylindrical shape. A board fastening portion 513 may be provided on a circumferential surface of the fixing body 512 or one surface (e.g., a surface facing the first circuit board) of the fixing body 512. In this case, the first circuit board P4 may be provided with an encoder fixing hole P44 into which the board fastening portion 513 is inserted.

[0294] A multitude of the board fastening portions 513 and the encoder fixing holes P44 may be provided, and the encoder fixing holes P44 may be disposed to surround the board through-holes P42.

[0295] A fastening body fixing portion 531 for fastening the display unit P8 to the fixing part 51 and a position setting recess 532 for preventing the display unit 8 from rotating on inserting the display unit P8 into the body through-hole 514 may be provided in the body through-hole 514.

[0296] The fastening body fixing portion 531 may be provided as a protrusion protruding from at least one of the support body 511 and the fixing body 512 toward the center of the body through-hole 514. The drawing illus-

trates an example in which the fastening body fixing portion 531 is provided in the support body 511.

[0297] The position setting recess 532 may be provided as a recess in which one surface of the fixing part P51 forming the body through-hole 514 is concavely bent. In this case, the position setting recess 532 may be provided along a length direction of the body through-hole 514.

[0298] The rotating part P52 may be provided as a rotating body 521 rotatably coupled to the support body 511. A rotating body through-hole through which the support body 511 passes may be provided in the rotating body 521.

[0299] The rotating body 521 may be provided with a shaft fastening portion 522 to which the manipulation unit P7 is fastened. The shaft fastening portion 522 may be provided as a fastening hole that passes through a circumferential surface of the rotating body 521, or may be provided as a fastening recess in which the circumferential surface of the rotating body 521 is concavely bent.

[0300] The signal generating part P54 may include a magnet fixed to the rotating body 521, a sensor provided to the fixing body 512 or the support body 511 to sense magnetic force, and a terminal for connecting the sensor and the first circuit board 4. The magnets may be arranged such that a multitude of permanent magnets are spaced apart from each other along the circumferential surface of the rotating body 521.

[0301] The first circuit board P4 assembled with the encoder P5 may be coated with an insulating material. This is to minimize the possibility that the circuit is short-circuited when water is supplied to the first circuit board P4. In order to prevent the rotating body 521 from being fixed to the support body 511 by the insulating material when the insulating material is coated on one surface (e.g., a surface facing the front panel) of the first circuit board P4, an encoder cover P6 may be further provided to the control panel P.

[0302] The encoder cover P6 may be fixed to the first circuit board P4 to have a pipe shape that surrounds the encoder P5. That is, as shown in the drawing, the encoder cover P6 may include a fixing body cover P61 fixed to the first circuit board P4 and surrounding the fixing body 512, and a cover through-hole P62 provided to pass through the fixing body cover P61 to have the encoder 5 inserted therein.

[0303] A board fastening portion 611 may be provided to the fixing body cover P61, and an encoder cover fixing hole P45 to which the board fastening portion 611 is fixed may be provided in the first circuit board P4. A multitude of the board fastening portions 611 and a multitude of the encoder cover fixing holes P45 may be provided, and the encoder cover fixing holes P45 may be disposed to surround the board fastening portion 513.

[0304] A cover outlet 612 may be further provided to a circumferential surface of the fixing body cover P61 to discharge water introduced into the fixing body cover P61. The cover outlet 612 is preferably disposed at the lowermost end of the circumferential surface of the fixing

body cover 61.

[0305] Meanwhile, the above-described insulating material is coated on the first circuit board P4 after both the encoder P5 and the encoder cover P6 are coupled to the first circuit board P4. The insulating material sprayed to a partial area of the first circuit board P4 (e.g., an outer space of the encoder cover) is introduced into the encoder cover P6 through the cover outlet 612. In this process, a distance L1 from the first circuit board to the uppermost end of the fixing body 512 is preferably set equal to or greater than a distance L2 from the first circuit board to the uppermost end of the cover outlet 612 so that the insulating material may be blocked from being supplied to the rotating body 521.

[0306] The encoder cover P6 may further include a support body cover P63 extending from the fixing body cover P61 and surrounding the rotating body 521 (surrounding the support body). Since the support body cover P63 may restrict the manipulation unit P7 from moving in a diameter direction of the cover through-hole 62, the support body cover 63 may prevent the manipulation unit P7 from being separated from the rotating body 521.

[0307] FIG. 11 is a diagram illustrating a structure of a manipulation unit and a display unit.

[0308] The manipulation unit P7 may include a shaft 71 passing through the front panel 11 and fixed to the rotating body 521 and a circular handle 73 fixed to the shaft 71 and positioned outside the cabinet 1.

[0309] The cabinet 1 may include a panel through-hole 134 provided to pass through the front panel 11, and the shaft 71 may be inserted into the panel through-hole 134.

[0310] The shaft P71 may be provided as a pipe having a shaft through-hole 711 inside. The rotating body 521 provided to the encoder is inserted into the shaft through-hole 711, and a rotating body fastening portion 712 provided on a circumferential surface of the shaft P71 and positioned inside the shaft through-hole 711 is coupled to the shaft fastening portion 522 provided to the rotating body. Accordingly, the shaft P71 is fixed to the rotating body 521 through the rotating body fastening portion 712 and the shaft fastening portion 522.

[0311] The handle P73 may be fixed to the shaft P71 to be positioned outside the cabinet 1, and a user may supply a force required for rotation of the rotating body 521 to the shaft P71 through the handle P73.

[0312] The handle P73 may include an accommodation space 731 formed in the handle to communicate with the shaft through-hole 711 and a handle through-hole 732 perforating one surface of the handle P73 to communicate the accommodation space 731 with the outside.

[0313] When a diameter of the handle P73 is set to be longer than that of the shaft P71, the shaft P71 may further include a base 713 to which the handle P73 is fixed. The base 713 may be provided as a disk fixed to the circumferential surface of the shaft P71.

[0314] The handle P73 and the base 713 may be coupled to each other through a base fastening portion 734

provided to the circular handle 73 and a handle fastening portion 714 provided to the base 713.

[0315] The base fastening portion 734 may be provided as a multitude of protrusions fixed to the handle to be positioned inside the accommodation space 731, and the handle fastening portion 714 may be provided in the base 713 and may be provided as an indent in which the protrusion is accommodated.

[0316] To facilitate the coupling between the handle P73 and the base 713, the handle P73 may be provided with a fastening guide 735 positioned between one base fastening portion 734 and another base fastening portion 734, and the base 713 may be provided with a guide indent 715 into which the fastening guide 735 is inserted. The guide indent 715 may be provided as an indent in which a circumferential surface of the base 713 is bent toward the shaft through-hole 711.

[0317] The display unit P8 may include a housing P81 fixed to the fixing body 512 of the encoder and positioned inside the accommodation space 731 of the actuator, a display P84 fixed to the housing and displaying information (e.g., information related to control, operation, and the like of the laundry treating apparatus), and a circuit board (i.e., a second circuit board or a display unit circuit board) P82 provided to the housing and having a circuit for controlling the display P84.

[0318] The housing P81 may include a fastening body 81*b* fixed to the fixing body 512 by being inserted into the body through-hole 514 through the shaft through-hole 711 and an accommodation body 81*a* fixed to the fastening body 81*b* and positioned inside the accommodation space 731.

[0319] The accommodation body 81*a* may be provided in any shape capable of being inserted into the accommodation space 731, and the accommodation body 81*a* is provided in a cylindrical shape as an example shown in the drawing.

[0320] A mounting space 811 is formed within the accommodation body 81*a*, and the mounting space 811 communicates with the accommodation space 731 provided in the handle through an accommodation body through-hole 812 (e.g., the accommodation body through-hole is provided to communicate with the handle through-hole). That is, the accommodation body through-hole 812 is provided on a surface facing a direction in which the handle through-hole 732 is located in the space provided by the accommodation body 81*a*.

[0321] The fastening body 81*b* may be provided in any shape capable of being inserted into the shaft through-hole 711 and the body through-hole 514 of the encoder, and the fastening body 81*b* is provided in a cylindrical shape as an example shown in the drawing. The fastening body 81*b* is provided with a fastening body through-hole 815 connected to the mounting space 811.

[0322] A fixing body fastening portion 816 may be provided on a circumferential surface of the fastening body 81*b*. The fixing body fastening portion 816 is a means for fixing the housing P81 to the fastening body fixing

portion 531 provided in the encoder.

[0323] Furthermore, a multitude of position setting protrusions 817 may be further provided on the circumferential surface of the fastening body 81*b*.

[0324] The position setting protrusion 817 has a shape that can be inserted into the position setting recess 532 provided in the encoder, and the position of the position setting protrusion 817 is provided at a position corresponding to the position of the position setting recess 532. The position setting protrusion 817 and the position setting recess 532 are a means for minimizing a risk that the fixing body fastening portion 816 cannot be coupled to the fastening body fixing portion 531 (i.e., a means for securing the coupling between the fixing body fastening portion and the fastening body fixing portion) when the fastening body 81*b* is inserted into the body through-hole 514.

[0325] The second circuit board P82 may be inserted into the mounting space 811, and the wire 822 connected to the second circuit board P82 may be drawn out of the housing P81 through the fastening body through-hole 815. A multitude of lamps 821 may be provided on the second circuit board P82.

[0326] The second circuit board P82 may control the display P84 to display preset information according to an electrical signal generated by the signal generating part 54 when the handle P73 rotates.

[0327] In order to maintain a gap between the second circuit board P82 and the display P84 and to prevent damage to the lamp 821, the mounting space 811 may be provided with a mounting part P83 positioned between the display P84 and the second circuit board P82.

[0328] The mounting part P83 may be provided as a mounting body 831 fixed to the accommodation body 81*a* and positioned inside the mounting space 811. The mounting body 831 may be provided in any shape capable of being inserted into the mounting space 811.

[0329] A seating recess 832 to which the display P84 is fixed is provided on one surface of the mounting body 831. A connector through-hole 836 may be provided in the seating recess 832, and a connector (e.g., a flexible PCB hinge, or the like) 841 provided to the display P84 may be inserted into the connector through-hole 836 to be connected to the second circuit board P82.

[0330] A lamp through-hole 835 into which the lamp 821 is inserted may be provided in the mounting body 831. The number of the lamp through-holes 835 is preferably set equal to that of the lamps 821, and the position of the lamp through-hole 835 should be set as a space of the mounting body located above the seating recess 832 or a space of the mounting body located below the seating recess 832. This is to enable the light emitted from the lamp 821 to be transmitted to the outside of the housing P81 through the lamp through-hole 835.

[0331] The mounting part P83 is fixed to the housing P81 through the mounting body fastening portion 813 provided to the accommodation body 81*a* and the accommodation body fastening portion 833 provided to the

mounting body 831. The mounting body fastening portion 813 is provided as a multitude of protrusions located inside the mounting space 811. The accommodation body fastening portion 833 may be provided on a circumferential surface of the mounting body 831 (i.e., one surface of the mounting body coming in contact with the accommodation body) and may be provided as a recess to which the mounting body fastening portion 813 is fixed.

[0332] The number of the mounting body fastening portions 813 may be set equal to that of the accommodation body fastening portions 833, and the positions of the mounting body fastening portion 813 and the accommodation body fastening portion 833 should be set to correspond to each other.

[0333] In order to increase the fastening force of the mounting body 831, the accommodation body fastening portion 833 may be provided with an upper fastening portion positioned at a higher point than the seating surface 832 and a lower fastening portion positioned at a lower point than the seating surface 832. Unlike the drawings, the accommodation body fastening portion 833 may be provided on each of the left and right sides of the seating surface.

[0334] A window P85 may be further provided to the accommodation body 81a to prevent water and foreign substances from being introduced into the display P84 and the second circuit board P82.

[0335] Preferably, the window P85 is fixed to at least one of the accommodation body 81a and the mounting body 831 to close the accommodation body through-hole 812. The window P85 may be formed of a material having a transparency such that the information displayed on the display P84 and the light emitted from the lamp 821 can be checked externally.

[0336] When the window P85 is fixed to the mounting body 831, a cover fixing protrusion 851 protruding toward the mounting body 831 may be provided to the window P85, and a fixing protrusion fastening portion 834 to which the cover fixing protrusion 851 is coupled may be provided to the mounting body 831.

[0337] The second circuit board P82 may also be fixed to the mounting body 831. That is, the mounting part P83 may include a protrusion 838 protruding from the mounting body 831 toward the second circuit board 82, and the second circuit board 82 may be provided with a protrusion through-hole 823 into which the protrusion 838 is inserted.

[0338] In addition, a cover sheet 853 for lowering the transparency of the cover may be further provided to the window P85. The transparency of the cover sheet is preferably set to an extent that the inside of the mounting space 811 is difficult to be checked from the outside (e.g., the transparency of the cover sheet is set to be lower than the transparency of the cover). The cover sheet 853 may be fixed to the surface of the window P85, and a text or symbol H may be provided to an area onto which the lamp through-hole 835 is projected in the cover sheet.

[0339] Meanwhile, in the mounting part P83, the lamp

through-hole 835 corresponding to the input area D3 of the lamp through-hole 835 may provide a user with a signal for pressing the input area D3.

[0340] The selection unit R may be provided inside the display unit P8. Specifically, the selection unit R may be provided as a configuration of the display unit P8, and may be provided to the display unit P8 to be disposed inside the manipulation unit P7.

[0341] Accordingly, it can be seen that the display unit P8 includes the selection unit R for receiving a determination command for determining the state information displayed on the display P84. Since the determination command determined by the selection unit R varies according to the state information, the selection unit R may correspond to a variable input unit.

[0342] For example, when selection information of a course and option is displayed on the display P84, the selection unit R may be configured to input a determination command for selecting or determining the course and option. In addition, when a guide text is displayed on the display P84, the selection unit R may be configured to input a determination command for checking the guide text.

[0343] As a result, the selection unit R may be configured to receive an input of a determination command for confirming or determining a corresponding control command according to a type of a control command displayed on the display 84.

[0344] The selection unit R may be configured to determine whether the control command displayed on the display P84 is selected by detecting whether a user's body is in contact with the window P85.

[0345] That is, the selection unit R may include a sensor R3 provided to the second circuit board 82 to sense static electricity of a user's body and a conductor R2 or a physical button R1 connecting the sensor R3 and the window P85.

[0346] The selection unit R may include a receiving portion R1 attached to or coupled to the window P85 and a transmitting portion R2 having one end connected to the receiving portion R1 and the other end connected to the sensor R3. In this case, a conductor through-hole 837 into which the transmitting portion R2 is inserted should be provided in the mounting body 831.

[0347] The receiving portion R1 is a means for facilitating an input of a control command by expanding an area in which a user can contact. In the control panel P having the above-described structure, the display area D1 is formed in the upper space of the window P85 and the input area D3 is formed in the lower space of the window P85. Therefore, when the width of the receiving portion R1 is set to be wide, the width of the input area D3 is expanded, and thus a user may more easily input a control command. It is preferable that the width of the receiving portion R1 is 1/4 to 1/2 or less of the width of the window P85.

[0348] The transmitting portion R2 and the receiving portion R1 may be formed of a conductor. Accordingly,

when the user's body is in contact, a body current of the user may be charged or transferred to transfer the current to the sensor R3.

[0349] In addition, the transmitting portion R2 and the receiving portion R1 may be provided as physical buttons. Accordingly, when a body of the user presses the receiving portion R1, a pressure of the body may be transferred to the sensor R3.

[0350] The receiving portion R1 may be provided as a film printed or attached to a rear surface of the window P85, or may be formed of a carbon-based material.

[0351] Meanwhile, the display unit P may include an inducing portion 839 for inducing the user to press the selection unit R.

[0352] The inducing portion 839 may guide the user to a position of the selection unit R to induce the user to input the selection unit R.

[0353] The inducing portion 839 may include a lamp 821 corresponding to the position of the receiving portion R1 and the lamp through-hole 835. Specifically, the inducing portion 839 may include the lamp through-hole 835 disposed under the display P84 and the lamp 821 installed in the lamp through-hole 835.

[0354] The lamp through-hole 835 and the lamp 821 constituting the inducing portion 839 may be disposed at the center under the display 84 with respect to the mounting part 83.

[0355] Accordingly, when the lamp 821 emits light in the inducing portion 839, the selection unit R or an area adjacent to the selection unit R may become bright.

[0356] In addition, the lamp 821 of the inducing portion 839 may be provided as an LED element or the like to display a separate text or phrase.

[0357] The control panel P having the above-described structure enables the display of the control command, the search of the displayed control command, and the selection of the displayed control command, and can minimize the space required for installation. Yet, the control panel P having the above-described structure needs a means for blocking water or foreign substances from being introduced into the display unit P8 and the manipulation unit P7 or a means for discharging the introduced water or foreign substances externally.

[0358] The control panel P having the above-described structure may display a preset control command on the display P84 whenever a user turns the handle P73 (e.g., whenever the encoder generates an electrical signal) (search and change of a control command).

[0359] When a desired control command is displayed on the display P84, the user may select the displayed control command through the selection unit R. The control command selected through the selection unit R may be initiated when the user inputs an execution command through the execution unit P47.

[0360] Meanwhile, although the handle P73 is coupled to the first circuit board P4 so as to be rotatable, since the housing P81 of the display unit is fixed to the first circuit board P4, it is necessary to constantly maintain a

gap between the handle P73 and the housing P81. This is because the rotation of the handle P73 may be restricted when the gap between the handle P73 and the housing P81 is not maintained.

[0361] FIG. 12 is a diagram illustrating utilization of the control panel.

[0362] In a state display area D1 of the display unit P8, whether the door is locked, whether a communication module is activated, whether a course or option is operated, whether a guide phrase is generated, and the like may appear in the form of icons.

[0363] In addition, the number of display contents that may appear while rotating the manipulation unit P7 may be displayed in the state display area D1. For example, a plurality of points may be disposed in a manner of being spaced apart from each other, and one of a plurality of the points may emit light to provide the number of contents displayed in a content display area D2.

[0364] The contents of a course and option, an execution state of the course or option, and a guide phrase necessary for a user may be displayed in the content display area D2.

[0365] The content display area D2 may be provided larger than the state display area D1.

[0366] An input area D3 may emit light to request a user's input, and a guide phrase indicating what kind of content the user should input may be displayed in the input area D3.

[0367] A power unit P46 may be provided on the left side of the display unit P8, and an execution unit P47 may be provided on the right side of the display unit P8.

[0368] The manipulation unit P7 may be rotatably provided on an outer circumferential surface of the display unit P8 and may be provided to rotate the drum 2.

[0369] The random course may be a series of control methods for performing a washing cycle of washing laundry.

[0370] When the manipulation unit P7 is rotated, a name of the corresponding course and a simple option name may be displayed in the content display area D2 of the display unit P8 according to a configured order, and a description of the course or option may be displayed.

[0371] The option may be selected by the setting unit P2. The setting unit P2 may be configured to receive an input of a selection command for selecting one or more of random options.

[0372] The random option may include setting an additional condition of the course.

[0373] For example, the random option may include a configured algorithm or control method for adjusting at least one of the number of iterations for performing the course, the strength on performing each cycle, RPM of a drum on performing each cycle, a temperature of water, an amount of water, and a duration time of each cycle.

[0374] The setting unit P2 may be provided as a touch display capable of selecting the random option or may include a plurality of lamps and a plurality of conductor

switches capable of sensing a user's body.

[0375] For example, the setting unit P2 may include an option selection unit B for receiving an input of a setting command for setting a condition for the course and an option display unit B4 for displaying option information corresponding to the option selection unit B.

[0376] For example, the option selection unit B may include a rinsing unit B1 for adjusting an RPM and duration time of the drum, an amount of water, and a rinsing power related to the number of rinsing times on performing a rinsing cycle in the course, a dewatering unit B2 for adjusting a dewatering force related to an RPM and duration time of a drum on performing a dewatering cycle in the course, and a temperature unit B3 for adjusting the temperature of the water on performing a washing cycle in the course.

[0377] The option display unit B4 may be configured to display the rinsing power, the dewatering force, and the temperature by objectifying and unitizing them.

[0378] Meanwhile, the setting unit P2 may be provided with a utilization unit C for receiving an input of a utilization command for utilizing the function of the laundry treating apparatus.

[0379] For example, the utilization unit C may include a washing unit C1 capable of inputting a special washing cycle for functional laundry, soft laundry, and tub cleaning, and the like, a reservation unit C2 for inputting a reservation command for performing a washing course at a specific time, a sterilization unit C capable of adding steam to laundry during the course cycle to promote sterilization, and an additional function unit C4 for utilizing additional functions such as pairing with other devices, etc.

[0380] In addition, the setting unit P2 may include a switching unit E for receiving an input of a connection command for communicating with the drying device 20 or the mini device 60.

[0381] Meanwhile, the setting unit P2 may turn on a light of a function that can be utilized at the present time or a function selected by a user, or turn off a light of a function that cannot be executed or a function that is not selected by the user.

[0382] The setting unit P2 may display all of the contents through an auxiliary display P19.

[0383] Hereinafter, an embodiment and control method of displaying and controlling the drying device 20 or the mini device 60 with the control panel P of the washing device 10 will be described. Yet, this is only to remove the repetitive description, and may be equally applied when the washing device 10 or the mini device 60 is controlled with the drying control panel PA.

[0384] In addition, the above embodiment and control method are equally applicable when the washing device 10 or the drying device 20 is controlled with the mini control panel PC.

[0385] FIG. 13 is a diagram showing a process for locking the control.

[0386] The locking or unlocking of the control panel P

described below may be applied to all of the washing device 10, the drying device 20, and the mini device 60.

[0387] The control panel P may perform a locking function that does not react to a user's command. In other words, the control panel P may perform a locking function in which a user's command input is deactivated.

[0388] The control panel P may omit an input unit capable of immediately performing a locking function. Accordingly, the control panel P may be locked only when a locking function intention of a user is reliably received.

[0389] To this end, when another separate input is performed on the control panel P, the control panel P may enter a step of setting a locking.

[0390] For example, referring to FIG. 13 (a), a locking function may be set by inputting the additional function unit C4 of the setting unit P2 on the control panel P.

[0391] Referring to FIG. 13 (b), when the additional function unit C4 of the setting unit P2 is inputted, the display unit P may display additional function lists on the display P84. The additional function list may include approval information D21 capable of performing a locking command.

[0392] Only when a user selects and determines the approval information D21, the control panel P may be locked.

[0393] Referring to FIG. 13 (c), after the user selects the approval information D21 by manipulating the manipulation unit P7, the user inputs setting information D22 for approving the locking command by inputting the selection unit R, and thus the locking of the control panel may be performed.

[0394] The locking command may be approved by the input of the setting information D22.

[0395] The setting information D 22 may include receiving a user's selection by turning on/off a button locking.

[0396] As a result, in order for the user to perform a locking of the control panel P, the setting unit P2, the manipulation unit P7, and the selection unit R should be inputted. Therefore, the control panel P may be set to be locked only when there is a certain locking intention by inducing several configurations to be inputted instead of one configuration.

[0397] As a result, the control panel P may be prevented from being randomly locked.

[0398] FIG. 14 is a diagram illustrating a state when the control panel is locked.

[0399] Referring to FIG. 14 (a), when the locking of the control panel P is approved or set, the display unit P8 may display locking information a, which indicates that locking of the control panel is approved or set, on the display P84. The locking information a may represent a notice indicating that an input of the control panel P has been deactivated. The guide message may be an explanatory phrase "button locking is set".

[0400] The locking information a may be displayed in a pop-up form on the display unit P8, and then removed after being displayed for a predetermined time only. Ac-

cordingly, a user may recognize that the control panel P is set to be locked, and immediately obtain state information of the laundry treating apparatus.

[0401] Referring to FIG. 14 (b), the display unit P may display an execution state of the laundry treating apparatus. In this case, the display unit P may display a locked state D11 indicating that the control panel P is locked.

[0402] That is, the locking information a disappears from the display unit P, but the locked state D11 is continuously displayed for other users to recognize that the control panel P is in a locked state.

[0403] In other words, the display unit P8 may externally display a state that an input of at least one of the manipulation unit P7, the execution unit P47, the power unit P46, and the setting unit P2 has been deactivated by using the locked state D11.

[0404] In this case, the light of the deactivated input unit P8 may be turned off to inform the user that the input is deactivated.

[0405] For example, all portions of the setting unit P2 except for the additional function unit C4 may be turned off and may not be displayed to the user. The additional function unit C4 may be set to enable an input for unlocking of the control panel P.

[0406] In addition, the display unit P8 may display a state that the input of the manipulation unit P7 is deactivated as the input of the selection unit R is deactivated.

[0407] FIG. 15 illustrates a state on a manipulation input when the control panel is locked.

[0408] Referring to FIG. 15 (a), the control panel P may be configured to be in a locked state to deactivate an input.

[0409] When the control panel P is set to be locked, the manipulation unit P7 may be configured to be deactivated not to receive an input. In addition, the execution unit P47 may also be configured to be deactivated not to receive an input. In addition, an input to the setting unit P2 may be also deactivated.

[0410] Accordingly, when the locking of the control panel P is performed, a progress of a course or option of the laundry treating apparatus may not be disturbed. As a result, confusion between one user controlling the laundry treating apparatus using the external terminal 40 and another user manipulating the laundry treating apparatus may be prevented.

[0411] Confusion between one user having performed the locking setting and another user may be prevented

[0412] Yet, an input to the power unit P46 may be available. Hence, the operation of the laundry treating apparatus may be allowed to be stopped in an emergency situation.

[0413] Meanwhile, the user attempt to operate the control panel P without knowing that the control panel P is set to be locked.

[0414] Referring to FIG. 15 (b), if an input to the control panel P is deactivated, it means that the control panel P does not respond to an input to the manipulation unit P7 or the like. Accordingly, it may be able to detect an input

to the remaining area except the manipulation unit P7, the execution unit P47, and the additional function unit C4 in the auxiliary display P19 of the setting unit P2.

[0415] When a user applies an input to the remaining area except the manipulation unit P7, the execution unit P47, and the additional function unit C4 in the auxiliary display P19 of the setting unit P2, the control panel P may determine that the user is not aware of the locked state.

[0416] The input may include at least two inputs.

[0417] When the input is performed, the display unit P8 may display a guide a1 for releasing the locking command to the user. The guide a1 may include a phrase indicating a method of releasing the locking command.

[0418] Accordingly, the user may recognize the method of releasing the locking command, and the control panel P may confirm the user's certain unlocking intention.

[0419] FIG. 16 is a diagram illustrating a state on repetitive manipulation inputs when the control panel is locked.

[0420] Referring to FIG. 16 (a), even though a guide a1 is displayed on the display P84 of the display unit, a user may repeatedly input the control panel P. In this case, the control panel P may determine that the user does not understand the guide a1.

[0421] Hence, when the manipulation unit P7, the execution unit P47, and a portion of the setting unit are repeatedly inputted while the guide is displayed, the control panel P may display link information or a QR code, on which an image or phrase capable of releasing the locking command is displayed, on the display unit P8.

[0422] Accordingly, the user may intuitively recognize that the control panel P is currently in an input-deactivated state and acquire information for unlocking by photographing the QR code through the external terminal 40.

[0423] Furthermore, the user certainly recognizes that the control panel P is in a locked state according to the appearance of the QR code itself, so that the user may directly release the locking by pressing the additional function unit C4.

[0424] FIG. 17 is a diagram illustrating a method of unlocking the control panel.

[0425] The control panel P may input an unlocking command in a manner similar to inputting a locking command.

[0426] In other words, the control panel P may be unlocked in the same manner as the locking is set.

[0427] Referring to FIG. 17 (a), the control panel P may be set to be locked.

[0428] Hence, the manipulation unit P7, the setting part P2, and the execution unit P47 may be in a state in which inputting is deactivated.

[0429] Yet, the additional function unit C4 in the auxiliary display P19 may remain in an input-activated state.

[0430] Referring to FIG. 17 (b), when the additional function unit C4 is inputted, an additional function list may be displayed on the display P84 of the display unit P8.

[0431] The display unit P may display additional function lists on the display P84. The additional function list may include approval information D21 capable of releasing the locking command.

[0432] Only when a user selects and determines the approval information D21, the control panel P may be unlocked.

[0433] Referring to FIG. 17 (c), the user selects the approval information D21 by manipulating the manipulation unit P7 and then inputs setting information D22 for releasing the locking command by inputting the selection unit R, thereby releasing the locking of the control panel.

[0434] The release of the locking command may be approved by the input of the setting information D22.

[0435] The setting information D22 may include receiving a user's selection through ON/OFF of a button lock.

[0436] As a result, in order to release the locking of the control panel P, the setting unit P2, the manipulation unit P7, and the selection unit R should be inputted. Accordingly, the locking of the control panel P may be released only when there is a certain unlocking intention by inducing the user to input several configurations instead of a single configuration.

[0437] When the locking of the control panel P is released, the display unit P8 may display unlocking information a2, which indicates that unlocking of the control panel is approved or set, on the display P84. The unlocking information a2 may display a guide message indicating that the input of the control panel P is activated. The guide message may include an explanatory phrase "button lock is released."

[0438] Referring to FIG. 17 (d), the setting information D 22 may be changed to OFF from ON, and lights of the auxiliary display P19 of the setting unit P2 may also be entirely turned on to display an activated state.

[0439] Furthermore, the input of the selection unit R may also be activated on the display unit P8 to display a state in which the input of the manipulation unit P7 is activated.

[0440] FIG. 18 illustrates a control method of performing locking of the control panel P of the laundry treating apparatus according to the present disclosure.

[0441] The laundry treating apparatus according to the present disclosure may perform a setting entry step S1 of inputting the additional function unit C4 to the control panel P.

[0442] In the setting entry step S 1, a locking selecting step S2 of selecting a locking command through the manipulation unit P7 may be performed.

[0443] In this case, an input checking step S3 of checking whether the locking command is finally determined with an input of the selection unit R or the execution unit P47 may be performed.

[0444] A time sensing step S4 of checking whether there is an input of the selection unit R or the execution unit P47 for a final determination for a reference time. If the reference time expires, the locking setting may be cancelled.

[0445] Hence, the display unit P8 may not be blocked from displaying the state of the laundry treating apparatus.

[0446] Meanwhile, when the locking command is finally determined by the input of the selection unit R or the execution unit P47, an excluding step S5 of excluding the additional function unit C4 from deactivation may be performed, and a locking setting step S6 of deactivating the input of the input unit P9 of the control panel P may be performed.

[0447] In doing so, the power unit P46 may be excluded from locking.

[0448] On the other hand, the display unit P8 may perform a locking displaying step S7 of displaying a guide phrase or a locked state D11 indicating that the locking is set.

[0449] FIG. 19 illustrates a control method of releasing a locking of the control panel P of the laundry treating apparatus according to the present disclosure.

[0450] A locking setting step N1 of setting a locking of the control panel P may be performed.

[0451] When the locked control panel P is inputted, a guide display step N8 of displaying a guide for unlocking may be displayed on the display unit P8.

[0452] Nevertheless, when the control panel P is repeatedly inputted, the display unit P8 may perform a link guide step N10 of displaying a link or QR code having an image for unlocking.

[0453] On the other hand, it may be able to perform a setting entry step N3 of inputting the additional display unit C4 for enabling a state of receiving an input of a command for performing an unlocking in the setting unit P2 rather than the locking area.

[0454] When the additional display unit C4 is inputted, an input checking step N5 of checking whether a locking command releasing command is finally determined with an input of the selection unit R or the execution unit P47 may be performed.

[0455] A time sensing step N6 of checking whether there is an input of a final determination to the selection unit R or the execution unit P47 is performed. When a reference time expires, the unlocking setting may be cancelled. Accordingly, it is possible to prevent the locking of the control panel P from being released randomly.

[0456] Meanwhile, when the unlocking command is finally determined by the input of the selection unit R or the execution unit P47, an unlocking step N7 of re-activating the input of the input unit P9 of the control panel P may be performed.

[0457] The present disclosure may be modified in various forms, and thus the scope of the present disclosure is not limited thereto. Therefore, if the modified embodiment includes the elements of the claims of the present disclosure, it should be construed as pertaining to the scope of the present disclosure.

Claims**1.** A laundry treating apparatus, comprising:

a cabinet; 5
 a drum rotatably provided in the cabinet to accommodate laundry therein;
 a handle rotatably coupled to the cabinet to receive an input of a command for selecting or changing a course or an option for rotating the drum; 10
 a display unit provided inside the handle and displaying state information including a state of selecting the course or the option;
 a selection unit receiving an input of a determination command for determining the state information and configured to vary the determination command according to the state information; 15
 and
 a setting unit provided outside the handle to receive an input of a locking command for deactivating an input of the handle by being spaced apart, 20
 wherein an input of the selection unit is deactivated based on inputting the locking command to the setting unit. 25

2. The laundry treating apparatus of claim 1, wherein the selection unit is configured to be selectively displayed within the display unit to receive the determination command and wherein the selection unit is blocked from being displayed based on inputting the locking command. 30

3. The laundry treating apparatus of claim 1, wherein the handle and the selection unit are configured to release the locking command through the setting unit only. 35

4. The laundry treating apparatus of claim 1, wherein the display unit displays a guide for releasing the locking command based on rotating the handle in a state that the input of the handle is deactivated. 40

5. The laundry treating apparatus of claim 4, wherein the display unit displays a link or QR code indicating an image or phrase for releasing the locking command based on inputting the handle repeatedly while the guide is displayed. 45

6. The laundry treating apparatus of claim 1, wherein the setting unit is configured to receive an option command for changing the option as well as the locking command and wherein an input of the option command is deactivated based on inputting the locking command. 50

7. The laundry treating apparatus of claim 6, wherein

the display unit displays a guide for releasing the locking command based on inputting the option command repeatedly while the input of the option command is deactivated.

8. The laundry treating apparatus of claim 7, wherein the display unit displays a link or QR code indicating an image or phrase for releasing the locking command based on inputting the option command repeatedly while the guide is displayed.

9. The laundry treating apparatus of claim 1, wherein the display unit displays approval information of the locking command based on inputting the locking command and wherein the input of the manipulation unit is deactivated based on approving the locking command through the manipulation unit.

10. The laundry treating apparatus of claim 9, wherein the locking command is cancelled based on absence of an approval input of the locking command through the manipulation unit for a reference time despite inputting the locking command to the setting unit.

11. The controller of claim 9, the manipulation unit comprising:

a handle rotatably provided to the cabinet to accommodate the display unit therein and receiving an input of a command for selecting the course or the option; and
 a selection unit provided within the handle to receive an input of a command for determining the selected course or the selected option, wherein based on displaying approval information of the locking command on the display unit by inputting the locking command to the setting unit, an input of the handle or the selection unit is deactivated only when the selection unit is inputted.

12. The laundry treating apparatus of claim 11, wherein the display unit is disposed within the handle and wherein the selection unit is provided to the display unit.

13. The laundry treating apparatus of claim 9, wherein the display unit is configured to externally display a deactivated state of the input of the manipulation unit based on deactivating the input of the manipulation unit.

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

a tub fixed inside the cabinet to accommodate the drum and to store water;

a water supply unit communicating with an external water supply source to supply water to the tub; and

a drainage unit provided to discharge the water of the tub to an outside of the cabinet, 5
wherein the course or the option is related to a washing course or a washing option for removing foreign substances from the laundry.

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

a circulation flow path unit circulating air in the drum; and
a heat exchange unit condensing or heating air 15
in the circulation flow path unit,
wherein the course or the option is related to a drying course or a drying option for removing moisture from the laundry.

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16. The laundry treating apparatus of claim 9, further comprising:

a circulation flow path unit circulating air in the drum; and 25
a heat exchange unit condensing or heating air
in the circulation flow path unit,
wherein the course or the option is related to a drying course or a drying option for removing moisture from the laundry. 30

35

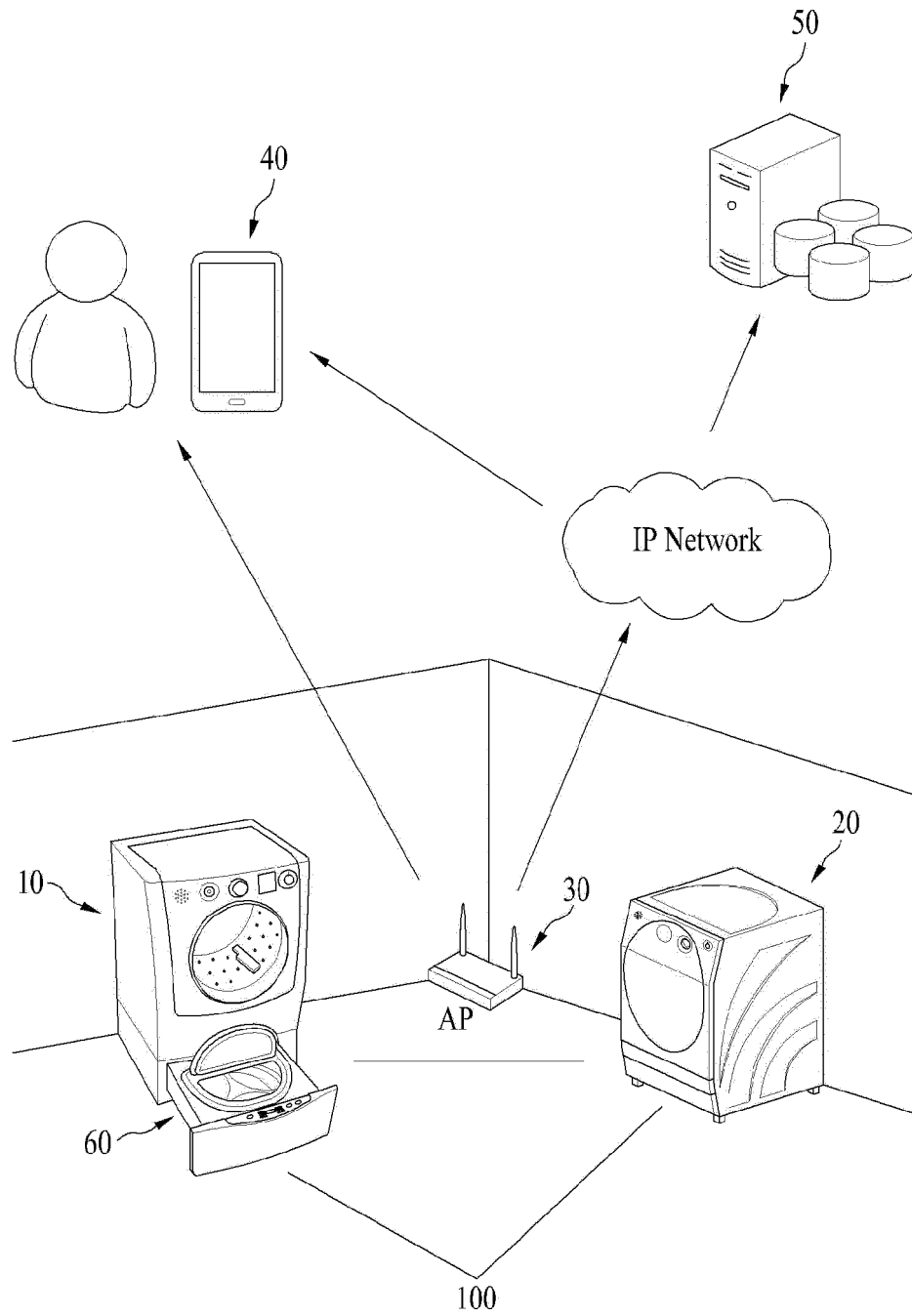
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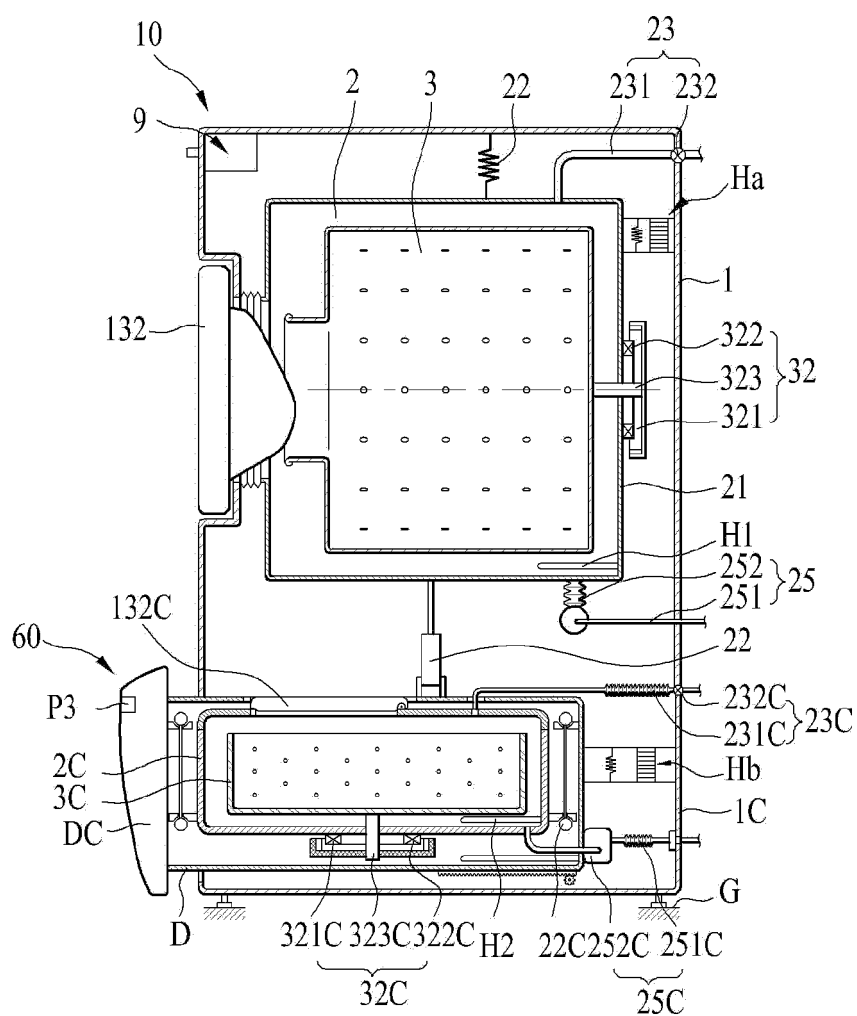
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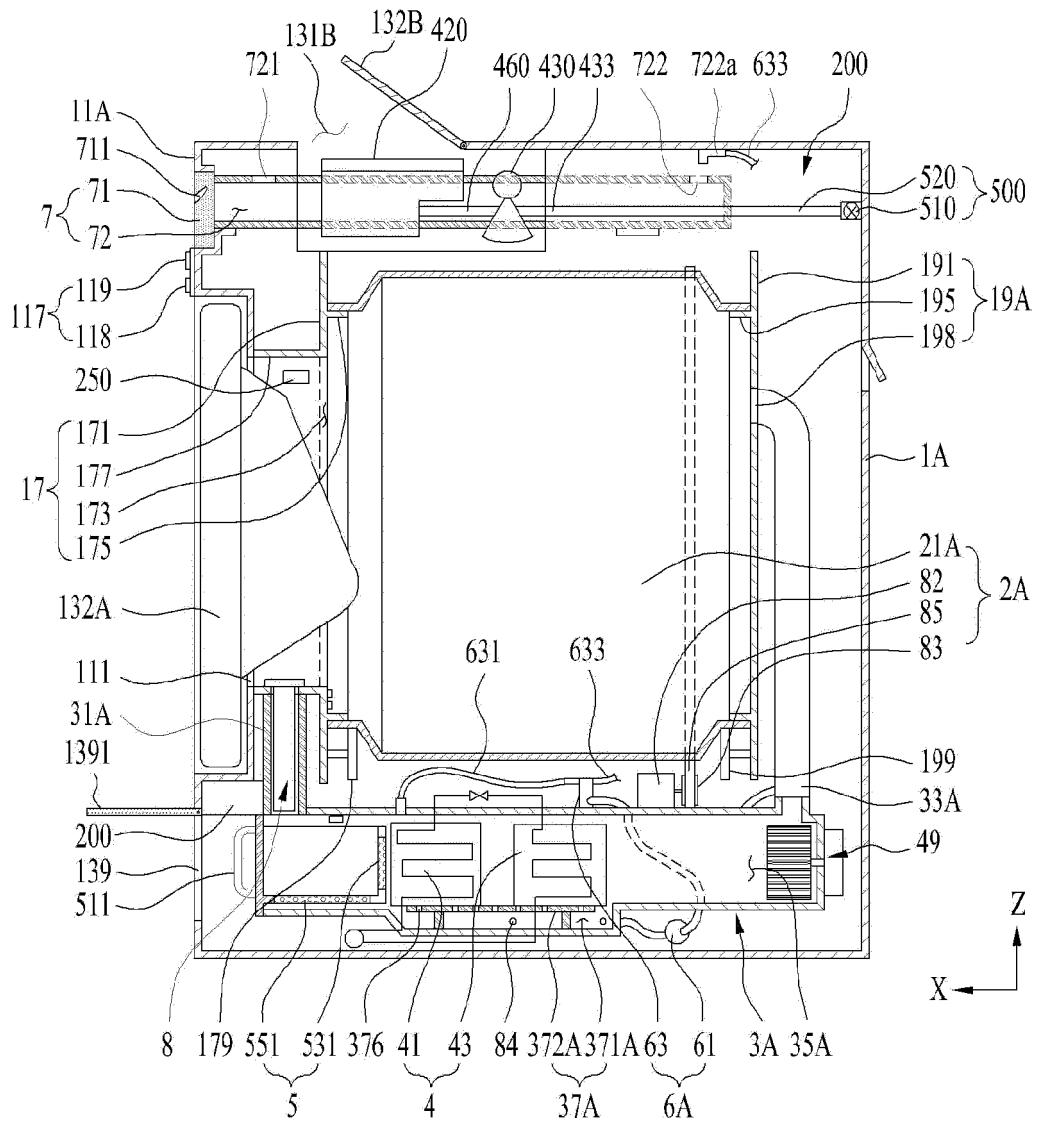
【Figure 1】



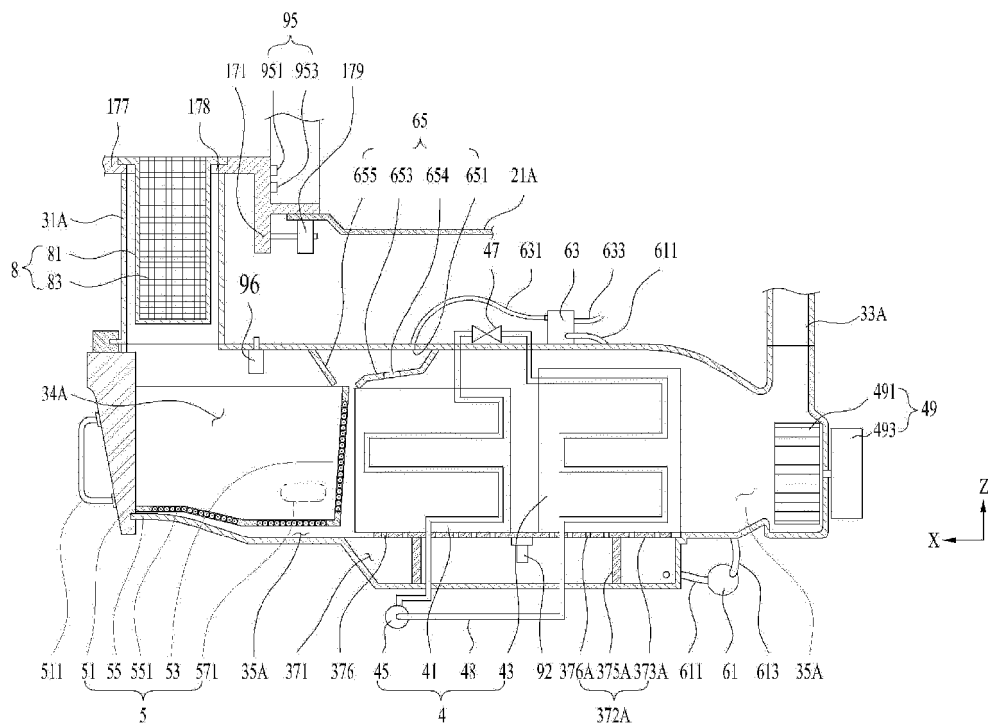
【Figure 2】



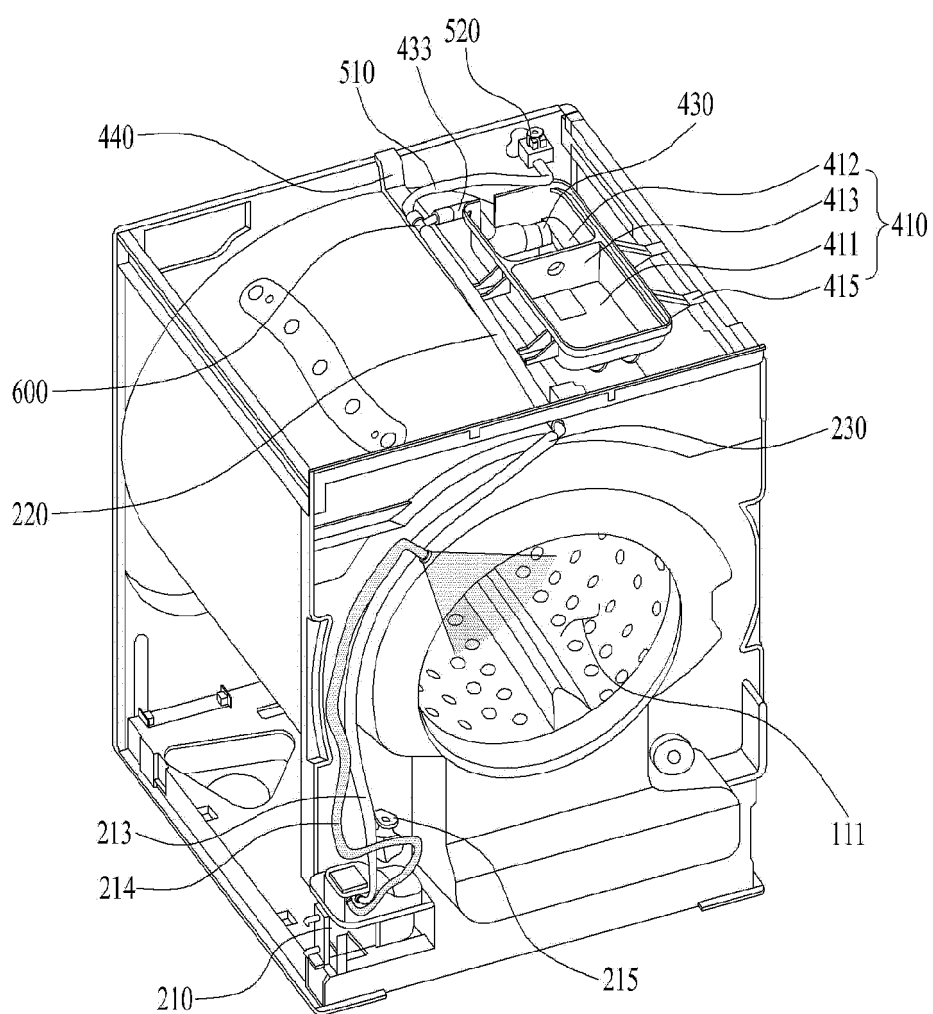
【Figure 3】



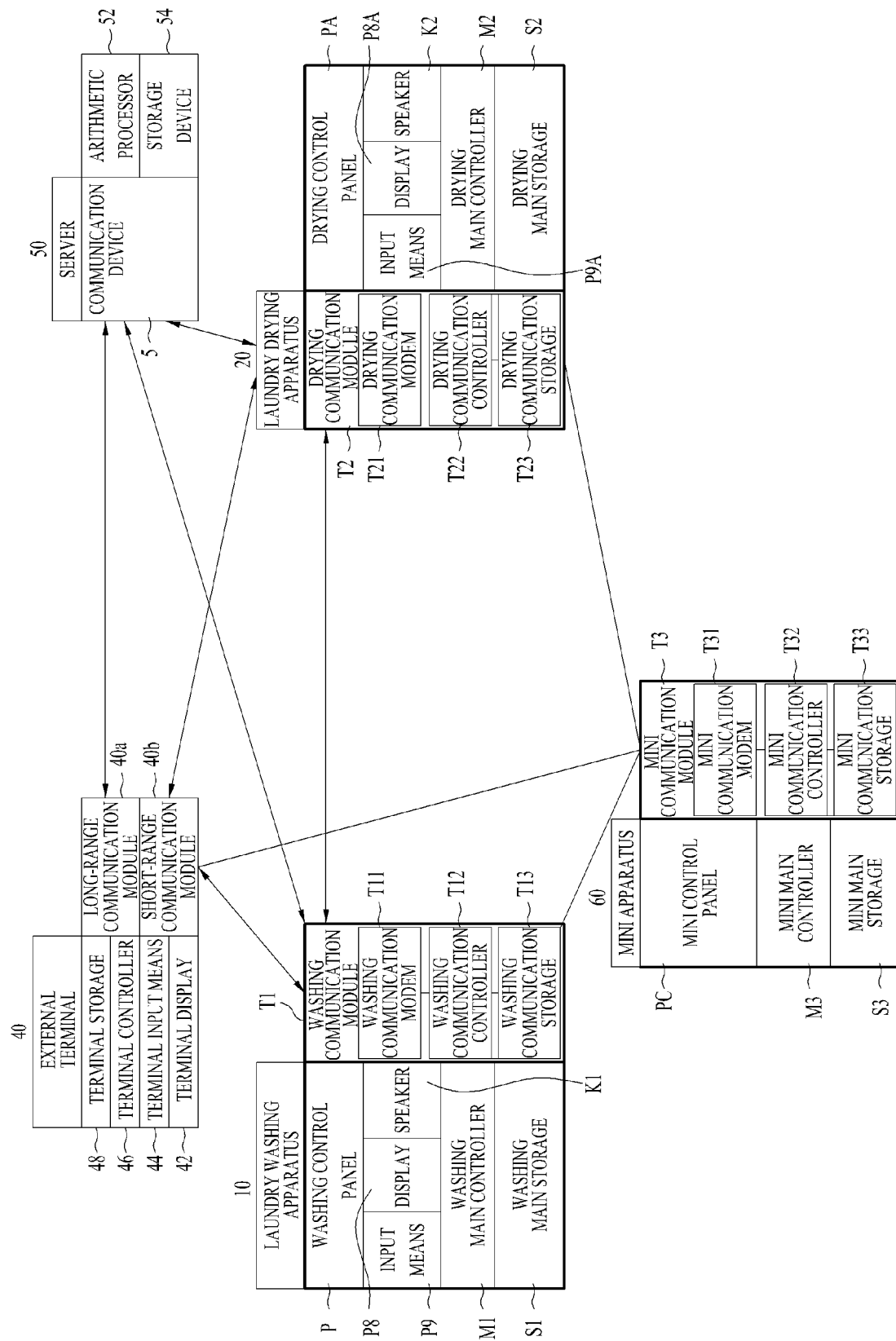
【Figure 4】



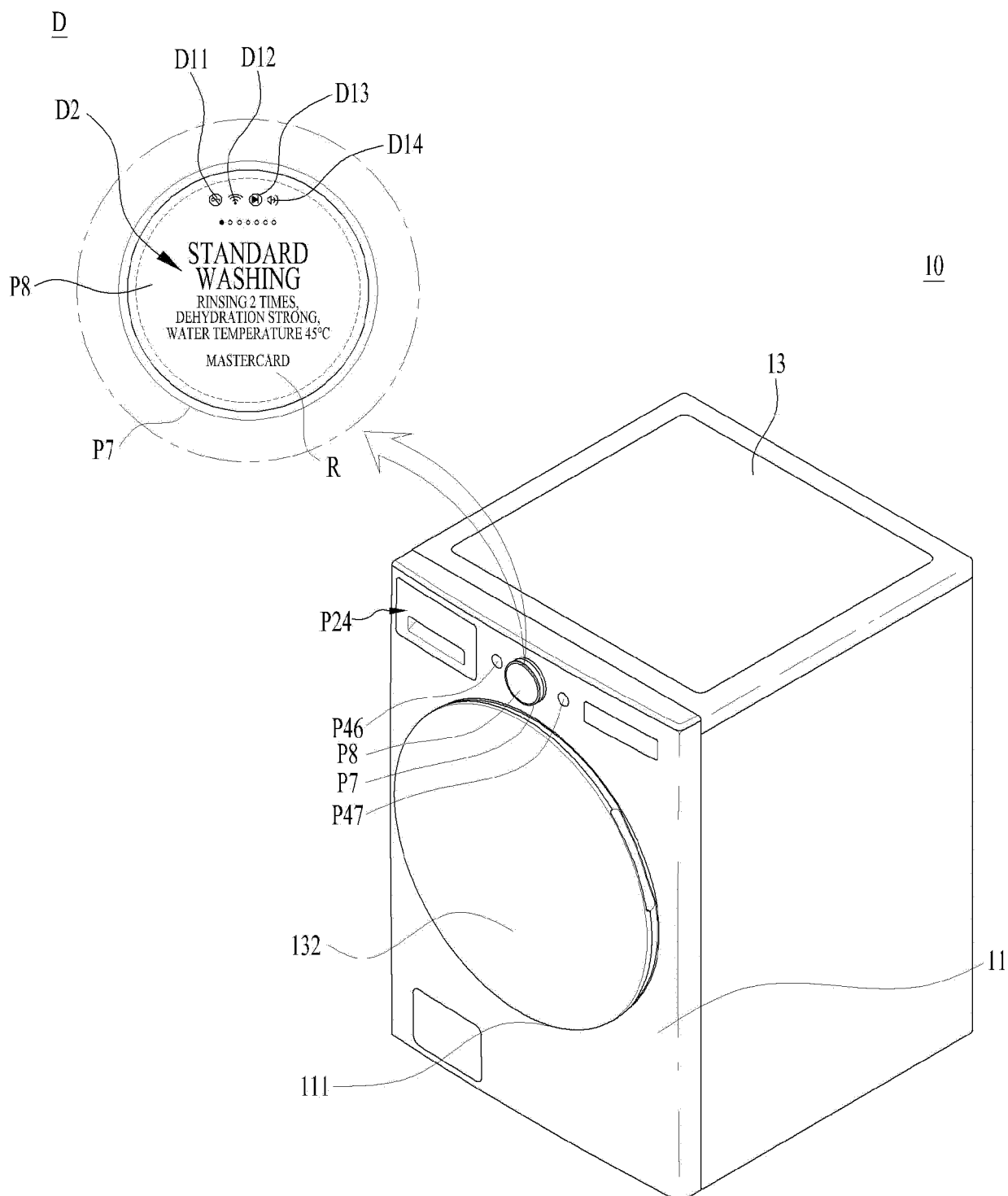
【Figure 5】



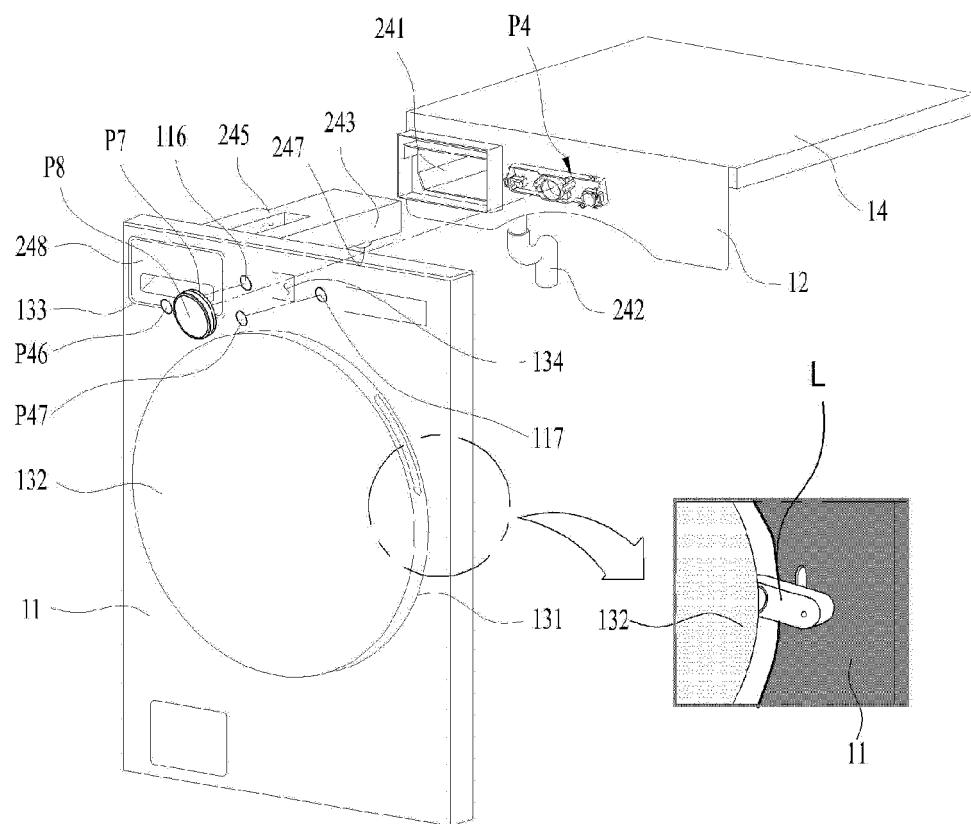
【Figure 6】



【Figure 7】

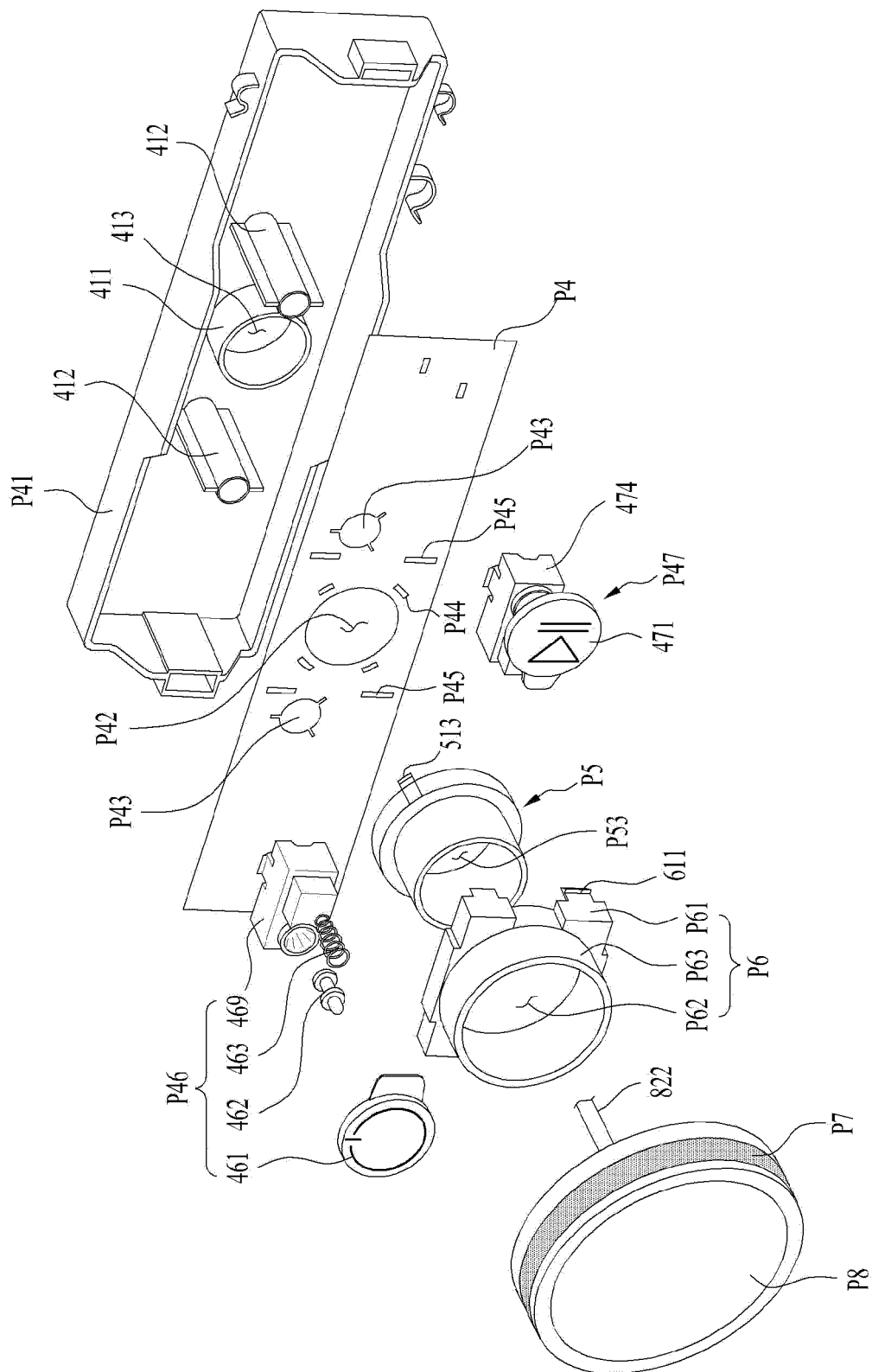


【Figure 8】

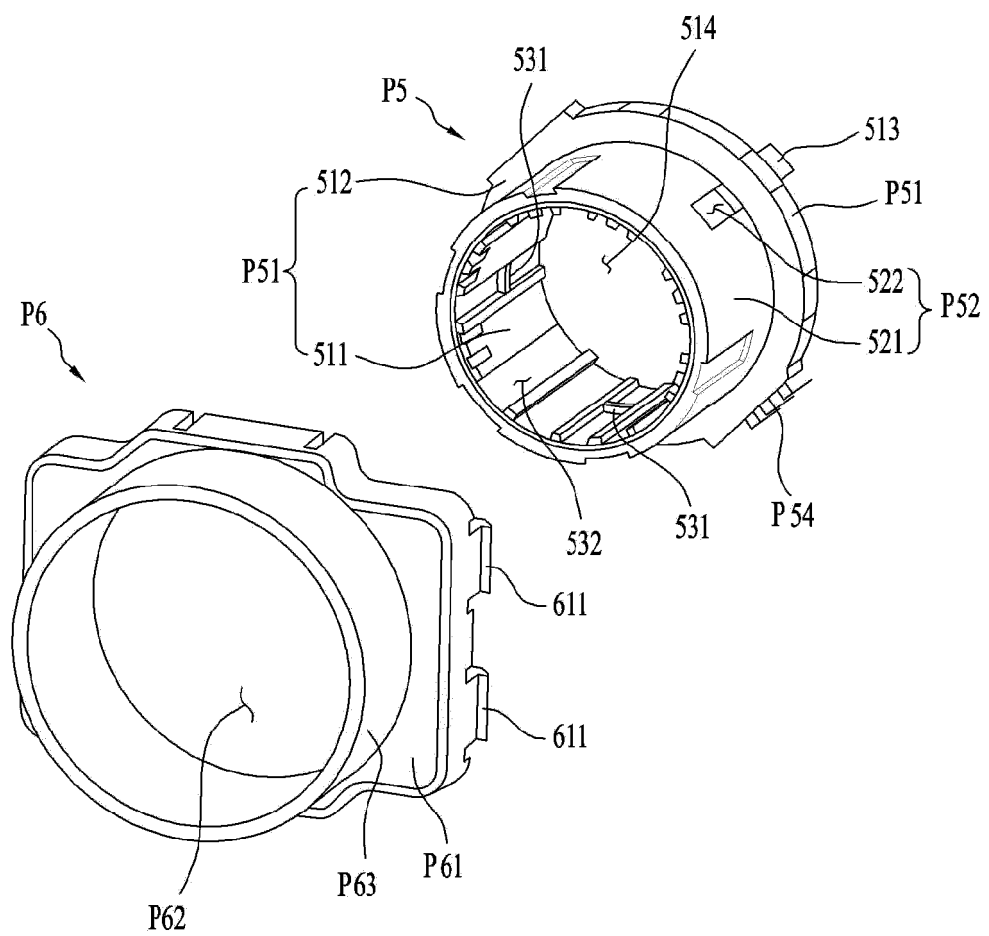


【Figure 9】

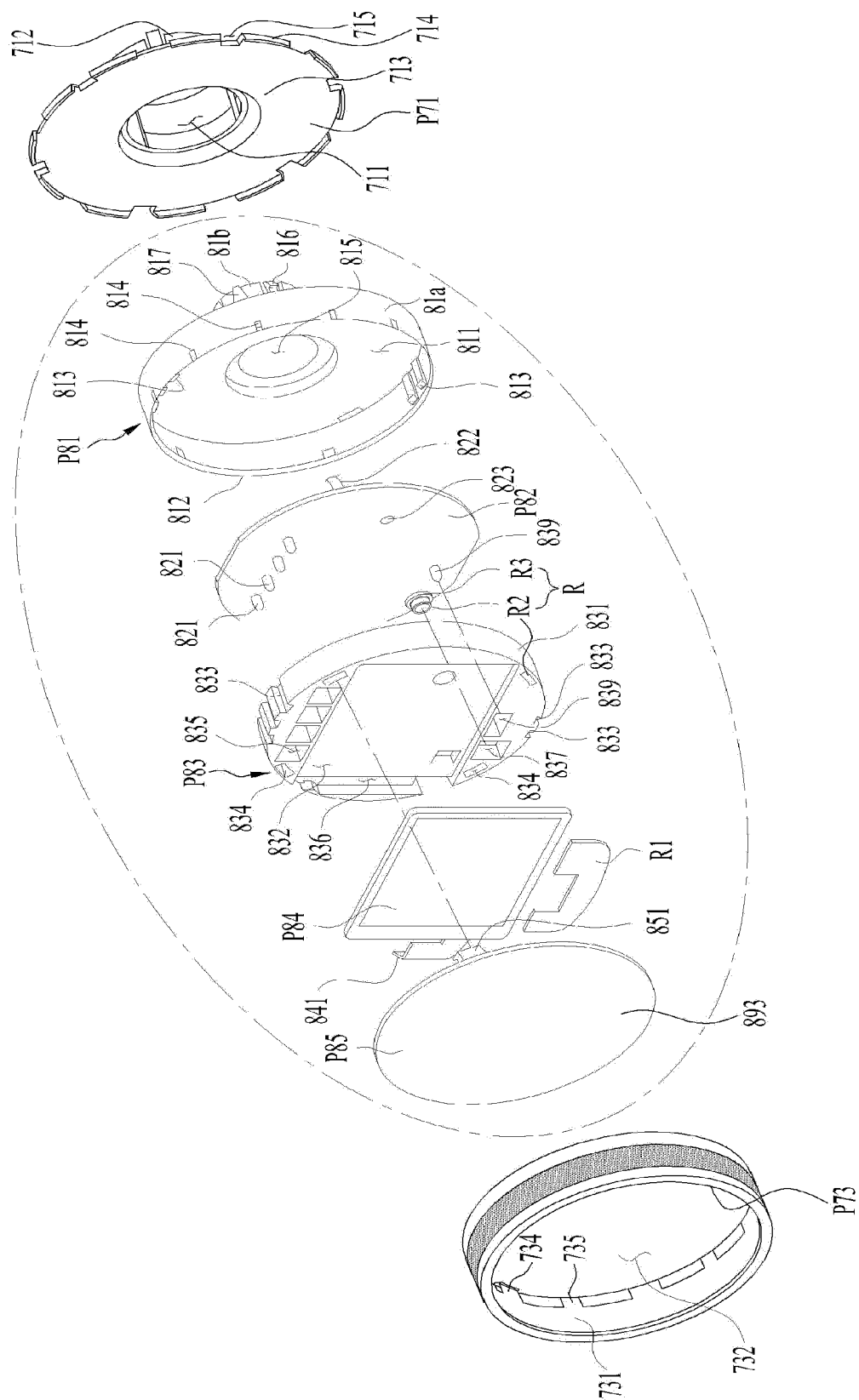
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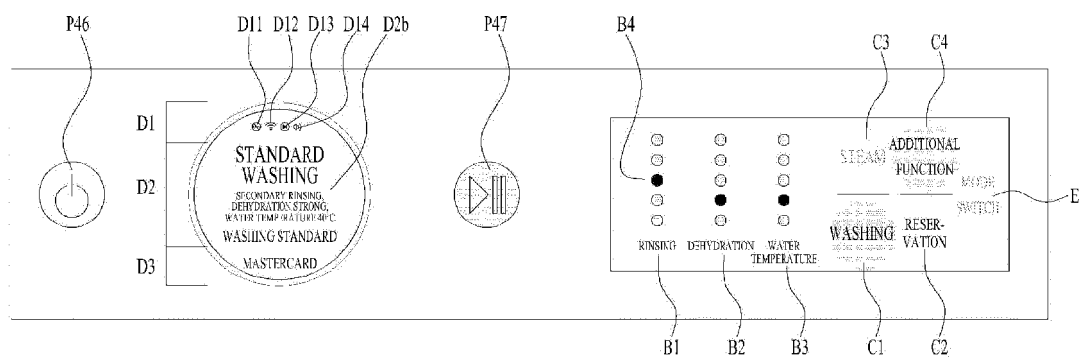
【Figure 10】



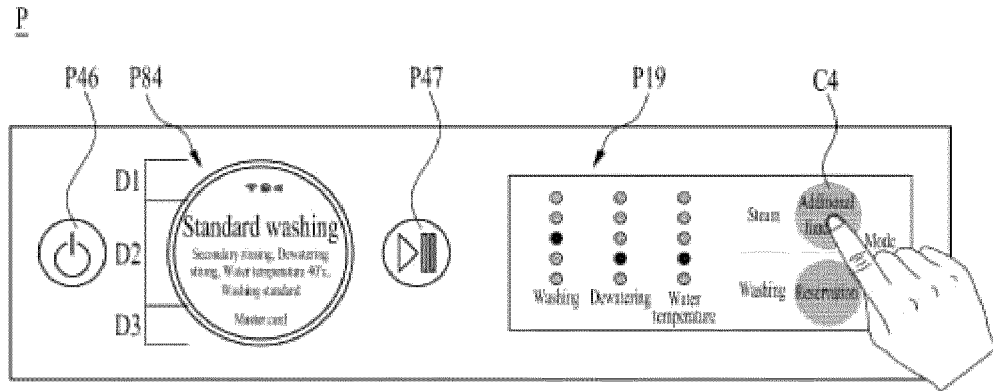
【Figure 11】



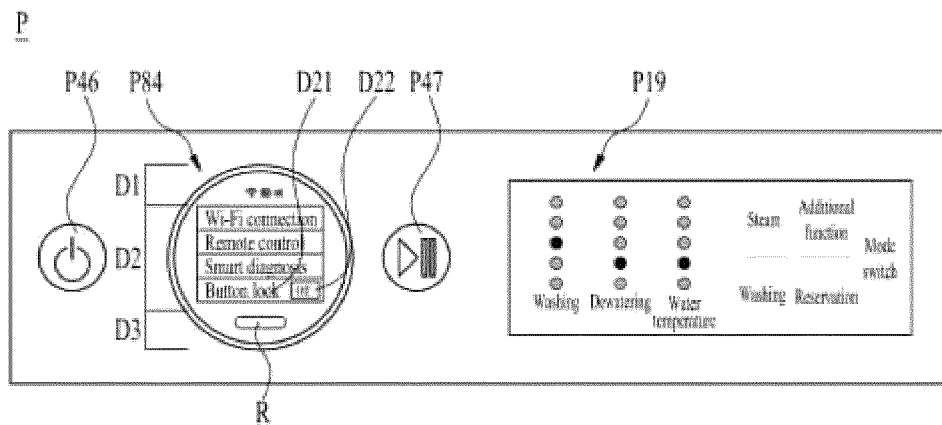
【Figure 12】



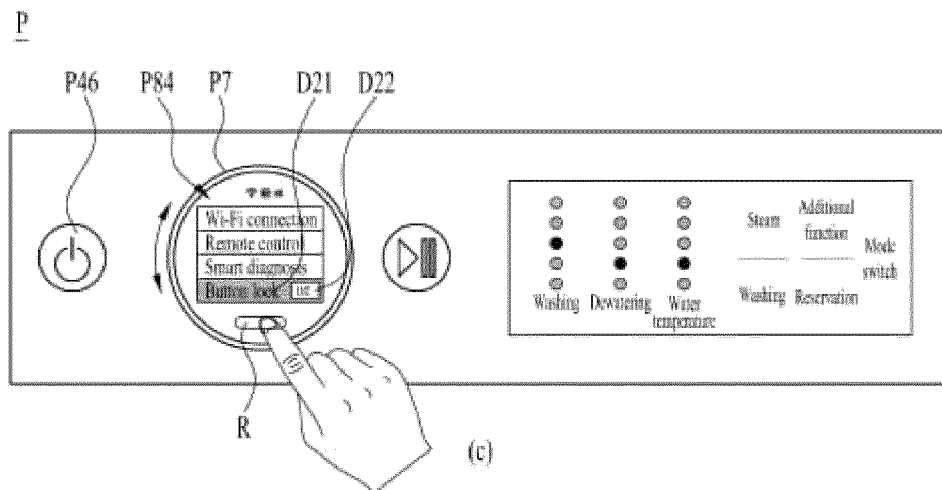
【Figure 13】



(a)

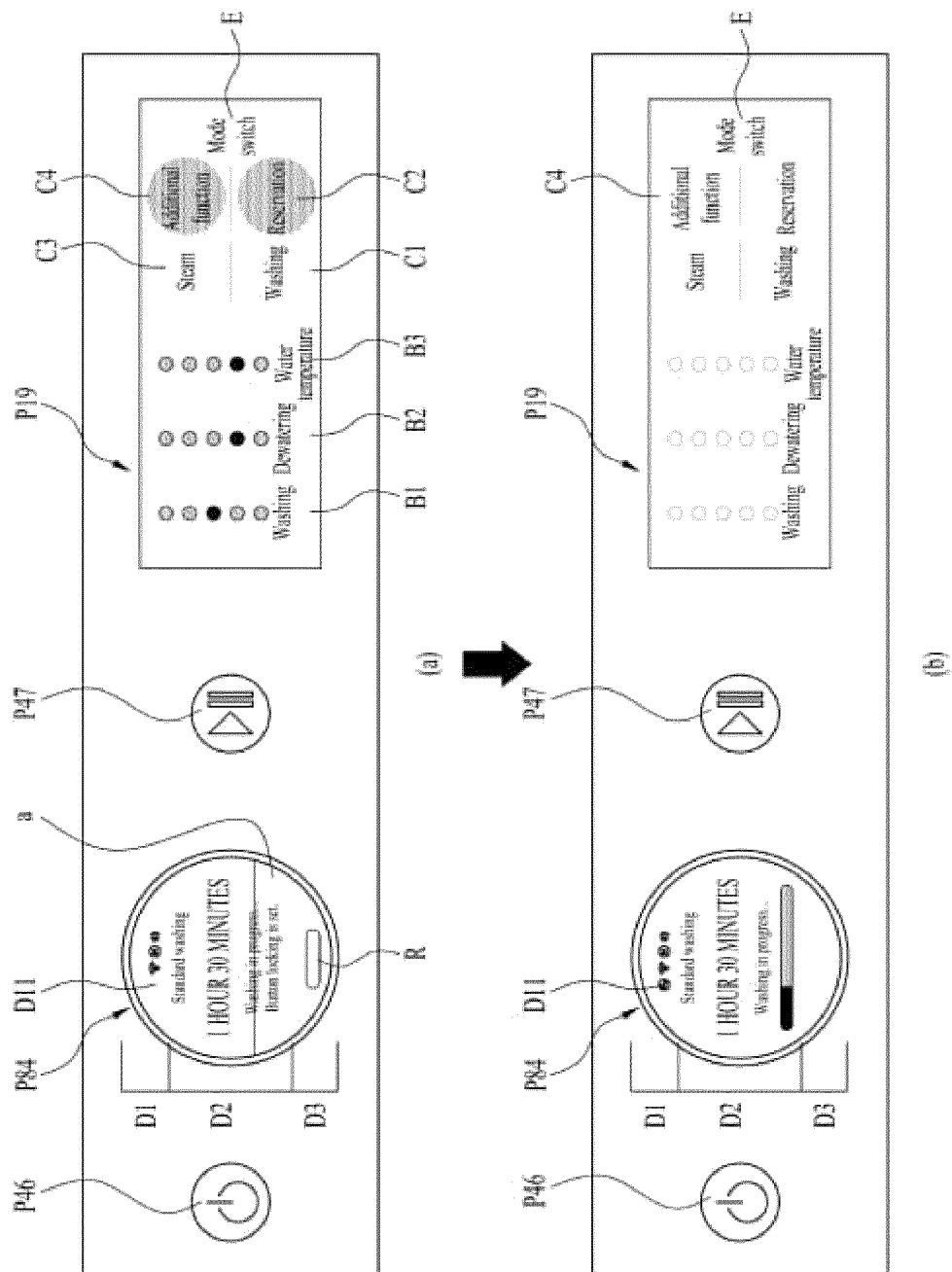


(b)

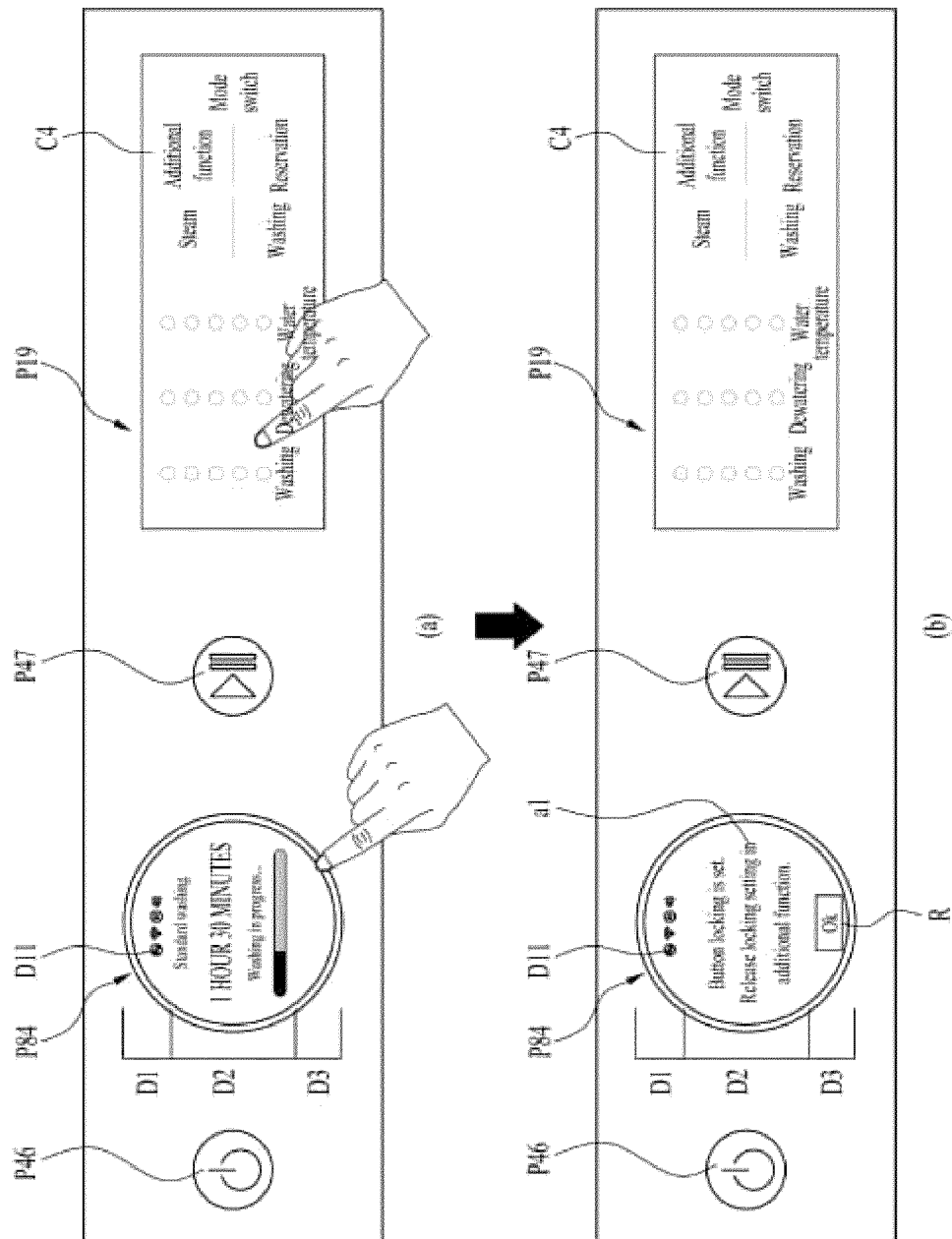


(c)

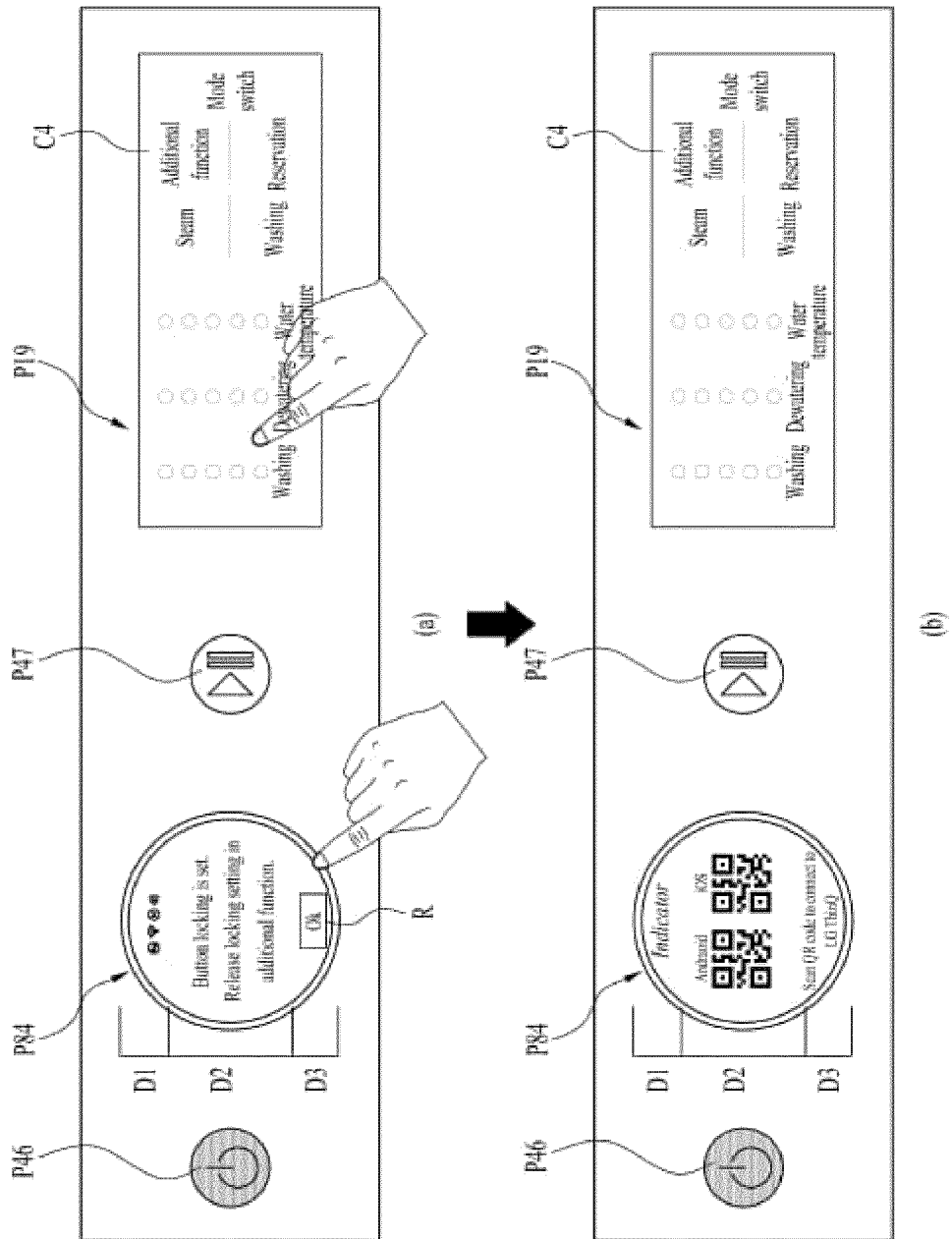
【Figure 14】



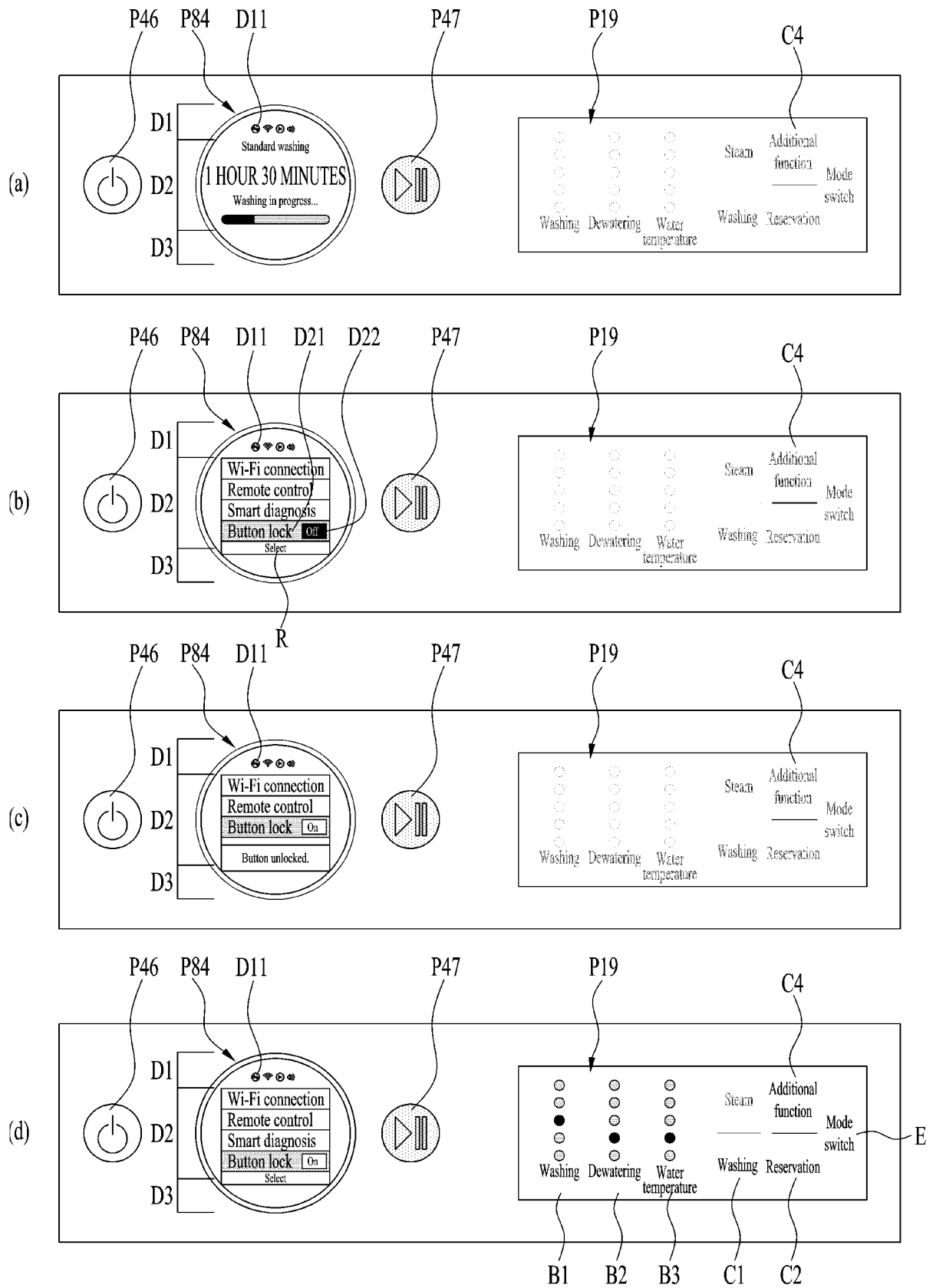
【Figure 15】



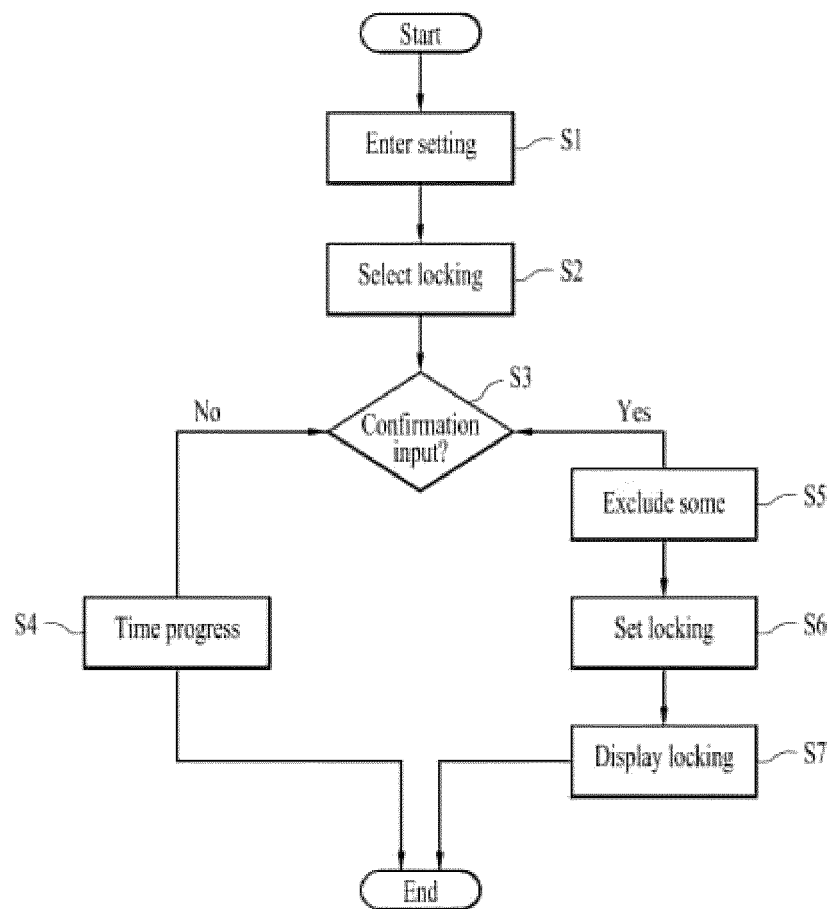
【Figure 16】



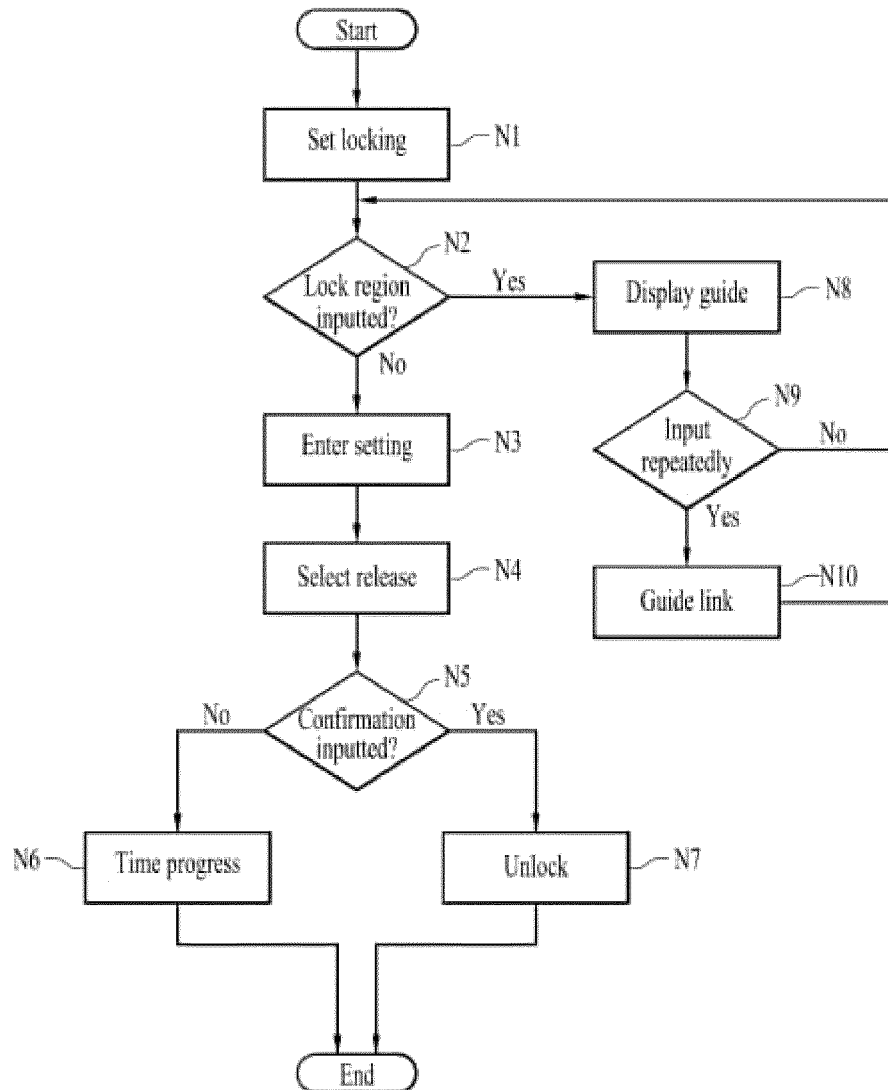
【Figure 17】



【Figure 18】



【Figure 19】



INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2022/009230

A. CLASSIFICATION OF SUBJECT MATTER D06F 34/28(2020.01)i; D06F 34/30(2020.01)i; D06F 34/32(2020.01)i; D06F 34/34(2020.01)i; D06F 39/08(2006.01)i; D06F 58/24(2006.01)i; D06F 58/26(2006.01)i; D06F 34/05(2020.01)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 34/28(2020.01); A47L 15/42(2006.01); D06F 33/02(2006.01); D06F 37/10(2006.01); D06F 39/00(2006.01); H04L 12/12(2006.01)																		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Korean utility models and applications for utility models: IPC as above Japanese utility models and applications for utility models: IPC as above																		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) eKOMPASS (KIPO internal) & keywords: 세탁기(washing machine), 인터페이스(interface), 잠금(locking), 버튼(button), 노브(knob), 디스플레이(display), 불활성(deactivation)																		
C. DOCUMENTS CONSIDERED TO BE RELEVANT																		
<table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>X</td> <td>CN 209958088 U (WUXI LITTLE SWAN CO., LTD.) 17 January 2020 (2020-01-17) See paragraphs [0039], [0041], [0044], [0046] and [0058] and figure 1.</td> <td>1-3,6,9-13</td> </tr> <tr> <td>Y</td> <td></td> <td>4-5,7-8,14-16</td> </tr> <tr> <td>Y</td> <td>KR 10-2010-0092764 A (LG ELECTRONICS INC.) 23 August 2010 (2010-08-23) See paragraphs [0002], [0016] and [0028] and figures 1-4.</td> <td>4-5,7-8,14-16</td> </tr> <tr> <td>A</td> <td>EP 3396045 A1 (ELECTROLUX APPLIANCES AKTIEBOLAG) 31 October 2018 (2018-10-31) See paragraph [0064] and figure 8.</td> <td>1-16</td> </tr> <tr> <td>A</td> <td>CN 109537242 A (SHANGHAI GILARDINO INTERNET TECHNOLOGY CO., LTD.) 29 March 2019 (2019-03-29) See paragraphs [0062]-[0065] and figure 3.</td> <td>1-16</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	CN 209958088 U (WUXI LITTLE SWAN CO., LTD.) 17 January 2020 (2020-01-17) See paragraphs [0039], [0041], [0044], [0046] and [0058] and figure 1.	1-3,6,9-13	Y		4-5,7-8,14-16	Y	KR 10-2010-0092764 A (LG ELECTRONICS INC.) 23 August 2010 (2010-08-23) See paragraphs [0002], [0016] and [0028] and figures 1-4.	4-5,7-8,14-16	A	EP 3396045 A1 (ELECTROLUX APPLIANCES AKTIEBOLAG) 31 October 2018 (2018-10-31) See paragraph [0064] and figure 8.	1-16	A	CN 109537242 A (SHANGHAI GILARDINO INTERNET TECHNOLOGY CO., LTD.) 29 March 2019 (2019-03-29) See paragraphs [0062]-[0065] and figure 3.	1-16
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INTERNATIONAL SEARCH REPORT

International application No.

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 10-2014-0032262 A (LG ELECTRONICS INC.) 14 March 2014 (2014-03-14) See claims 1-3 and figure 1.	1-16

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Information on patent family members

International application No.

PCT/KR2022/009230

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
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