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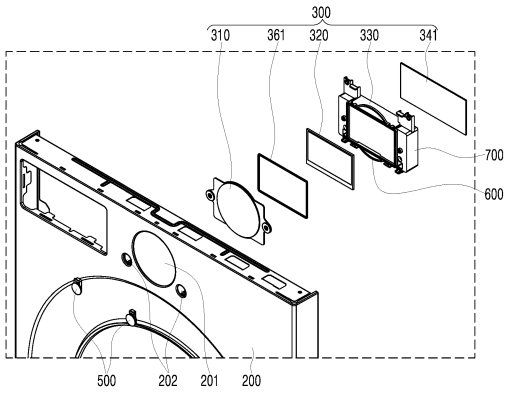
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(54) LAUNDRY PROCESSING APPARATUS

(57) Provided is a laundry treating apparatus in which control signals for a processing operation is capable of being input through a control panel. The laundry treating apparatus according to an aspect of the present disclosure includes: a main body configured to accommodate laundry and perform a processing operation for the laundry; a cabinet cover configured to cover the main body to define an exterior and having a first through hole in the front upper end portion thereof; and a control panel installed inside the cabinet cover and partially exposed outside through the first through hole such that a control signal for the processing operation can be input by a user. The control panel includes: a window that is in close contact with the inner surface of the cabinet cover on the front surface thereof other than an area corresponding to the first through hole; a touch screen coupled to the rear surface of the window; and a coating guide fastened to the inner surface of the cabinet cover in a state of being coupled to the window and the touch screen on a rear surface of the touch screen

FIG. 4



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Description

TECHNICAL FIELD

[0001] The present disclosure relates to a laundry treating apparatus and, more specifically, to a laundry treating apparatus in which a control signal for a processing cycle can be input through a control panel.

BACKGROUND

[0002] In general, a laundry treating apparatus is an apparatus that processes laundry by applying physical and chemical actions to the laundry. The term "laundry treating apparatus" is used to collectively refer to a washing apparatus that removes contaminants from laundry, a spin-drying apparatus that spin-dries laundry by rotating a washing tub containing laundry at high speed, a drying apparatus that dries wet laundry by applying hot air into the washing tub, and the like.

[0003] In this regard, laundry treating apparatuses that have recently appeared do not just perform washing, drywashing, and drying functions individually in respective apparatuses, but are configured to perform all of the above-mentioned functions together in one laundry treating apparatus.

[0004] Accordingly, when processing laundry, a series of operations such as a washing course, a rinsing course, a spin-drying course, a drying course, and the like can be appropriately controlled through a user's manipulation or automatic control.

[0005] A typical laundry treating apparatus includes a control panel configured to be capable of displaying visual information related to a processing operation to a user and capable of receiving user input. That is, the control panel is provided for a user interface (UI).

[0006] Accordingly, the control panel may include input units or selection units, such as various buttons for user operation, and various display units to provide information to a user. All of these various input units, selection units, and display units may be referred to as user interfaces.

[0007] Meanwhile, in accordance with the recent trend of placing importance on the exterior design of laundry treating apparatuses, a cabinet cover that defines the exterior of the laundry treating apparatus may be designed as an integrated sheet metal product to achieve a seamless structure. In this case, the control panel provided on the front surface of the laundry treating apparatus to facilitate user access and operation also needs to match the exterior design of the laundry treating apparatus, which is designed to have the seamless structure.

[0008] Regarding a laundry treating apparatus including a control panel as described above, Korean Patent No. 10-2257622 (hereinafter, referred to as "Prior Document 1") discloses a washing apparatus.

[0009] Specifically, a control panel provided on the front upper portion of a cabinet cover to face the front of the product, an operation unit installed on the control panel to select a specific wash course and accompanying options by rotating a knob, a display configured to selectively display the wash course and options based on the operation of the operation unit, and the like are disclosed.

[0010] In the case of the laundry treating apparatus in Prior Document 1, in view of the fact that the control panel is installed to be separated from the front surface of the cabinet cover by a parting line, there are inevitably limitations in designing the laundry treating apparatus with a seamless structure.

[0011] In addition, since the structure of the control panel is relatively complex in that a rotary knob for user operation is applied, there is a problem in that a structure for coupling the control panel to a cabinet cover designed as an integrated sheet metal product also becomes complicated.

[0012] In addition, Korean Patent Laid-open Publication No. 10-2013-0109356 (hereinafter, referred to as "Prior Document 2") discloses a washing machine.

[0013] Specifically, a cabinet, a control panel disposed on the front surface of the cabinet, a display unit mounted on the control panel such that the front surface thereof is exposed in front of the control panel, and the like are disclosed.

[0014] In the laundry treating apparatus of Prior Document 2, since the control panel is also installed separated by a parting line at the front top of the cabinet, there are inevitably limitations in designing the laundry treating apparatus in a seamless structure.

[0015] In addition, the display unit is provided in a touch screen type and performs both input and display functions. However, there is a problem in that the display unit is not directly coupled to the cabinet, but has a complex structure in which the display unit is assembled to the cabinet in the state of being installed to a control panel assembly.

[0016] As described above, in the case of a laundry treating apparatus that includes a control panel, there is also a problem in that the control panel should be easily installed on the cabinet cover while also ensuring that the control panel also matches the exterior design of the cabinet cover.

[0017] However, the conventional laundry treating apparatuses have limitations in that the above-mentioned problems cannot be adequately solved.

DISCLOSURE

TECHNICAL PROBLEM

[0018] The present disclosure is to solve the above-mentioned problems of a laundry treating apparatus including a control panel.

[0019] Specifically, the present disclosure is to provide a laundry treating apparatus in which a parting line between a cabinet cover and a control panel is minimized,

so that that the control panel can match the exterior design with a seamless structure.

[0020] In addition, the present disclosure is to provide a laundry treating apparatus in which only the portions of a control panel that are essential to be exposed to a user are exposed outside, so that the control panel can match the exterior design with a seamless structure.

[0021] In addition, the present disclosure is to provide a laundry treating apparatus in which the structure of a control panel coupled to a cabinet cover is optimized so that the control panel can be more easily and stably coupled to the cabinet cover.

[0022] The technical problems to be addressed by the present disclosure are not limited to those described above, and other technical problems, which are not described above, will be clearly understood by a person ordinarily skilled in the related art to which the present disclosure belongs.

TECHNICAL SOLUTION

[0023] In order to achieve the above or other objects, the laundry treating apparatus according to an aspect of the present disclosure is configured such that no parting line is formed between a cabinet cover and a control panel on exterior. Specifically, the control panel is installed inside the cabinet cover that forms the exterior so that the control panel is not separated from the cabinet cover on the exterior.

[0024] In addition, the laundry treating apparatus according to an aspect of the present disclosure is configured such that the portions of the control panel that are not directly necessary for user operation is not exposed outside. Specifically, the control panel is installed inside the cabinet cover, and only a portion of the control panel is configured to be exposed outside through the first through hole provided in the cabinet cover.

[0025] In addition, the laundry treating apparatus according to an aspect of the present disclosure is configured such that the structure of the control panel installed inside the cabinet cover is suitable for coupling with the cabinet cover. Specifically, the coating guide is configured to be fastened to the inner surface of the cabinet cover in a pre-assembled state with the window and touch screen.

[0026] In addition, in the laundry treating apparatus according to an aspect of the present disclosure, a printed circuit board may be coupled to the rear surface of the coating guide.

[0027] In addition, in the laundry treating apparatus according to an aspect of the present disclosure, a panel rib protruding from the lower end portion of the coating guide may support the printed circuit board.

[0028] In addition, in the laundry treating apparatus according to an aspect of the present disclosure, the coating guide may be fastened to the inner surface of the cabinet cover in a pre-assembled state with the printed circuit board.

[0029] In addition, the laundry treating apparatus according to an aspect of the present disclosure may include a first sealing member interposed between the window and the coating guide.

[0030] In addition, in the laundry treating apparatus according to an aspect of the present disclosure, the control panel may be fastened to a hook protrusion protruding from the second through hole in the cabinet cover.

[0031] In addition, in the laundry treating apparatus according to an aspect of the present disclosure, a hook at the bottom of the coating guide is inserted into and fastened to a hook hole penetrating the hook protrusion in the longitudinal direction.

[0032] In addition, in the laundry treating apparatus according to an aspect of the present disclosure, the upper end portion of the coating guide may be screwed to the inner surface of the cabinet cover.

[0033] In addition, in the laundry treating apparatus according to an aspect of the present disclosure, a control button is installed inside the cabinet cover, and a portion of the control button may be exposed outside through the second through hole in the cabinet cover.

[0034] In addition, in the laundry treating apparatus according to an aspect of the present disclosure, a pair of second through holes and control buttons may each be arranged symmetrically on opposite sides of the control panel.

[0035] In addition, in the laundry treating apparatus according to an aspect of the present disclosure, the control panel may be fastened to both the respective hook protrusions which are provided at the pair of second through holes, respectively.

[0036] In addition, in the laundry treating apparatus according to an aspect of the present disclosure, a wireless communication part may be installed on the inner surface of the cabinet cover in the state of being coupled to the bottom of the control panel.

[0037] In addition, in the laundry treating apparatus according to an aspect of the present disclosure, UIs may be arranged in a fixed UI section and a variable UI section, respectively, which are provided on the control panel, depending on the characteristics thereof.

[0038] In addition, in the laundry treating apparatus according to an aspect of the present disclosure, the touch screen is displayed through a transmissive area provided in a portion of the window, and the remaining portion of the window may be provided as a non-transmissive area.

[0039] Solutions to the technical problems to be achieved in the present disclosure are not limited to the solutions described above, and other solutions not described above will be clearly understood by a person ordinarily skilled in the art to which the present disclosure belongs from the description below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0040]

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

FIG. 2 is a view schematically illustrating the main configuration of a laundry treating apparatus according to an embodiment of the present disclosure.

FIG. 3 is a view illustrating a control panel installed on a cabinet cover in the laundry treating apparatus according to an embodiment of the present disclosure.

FIG. 4 is an exploded perspective view illustrating the control panel installed on the cabinet cover in the laundry treating apparatus according to an embodiment of the present disclosure.

FIG. 5 is a view illustrating a state in which a window of the control panel is coupled to the inner surface of the cabinet cover in the laundry treating apparatus according to an embodiment of the present disclosure.

FIG. 6 is a view illustrating a state in which a coating guide of the control panel is fastened to the inner surface of the cabinet cover in the laundry treating apparatus according to an embodiment of the present disclosure.

FIG. 7 is a view illustrating in more detail a hook protrusion provided on the cabinet cover in the laundry treating apparatus according to an embodiment of the present disclosure.

FIG. 8 is a view illustrating a fixed UI section and a variable UI section of the control panel in the laundry treating apparatus according to an embodiment of the present disclosure.

FIG. 9 is a view illustrating, by way of an example, a transmissive area and a non-transmissive area of the control panel in the laundry treating apparatus according to an embodiment of the present disclosure.

FIGS. 10 to 12 are views illustrating a structure that provides a transmissive area and a non-transmissive area of the control panel in the laundry treating apparatus according to an embodiment of the present disclosure.

DETAILED DESCRIPTION

[0041] Hereinafter, exemplary embodiments disclosed herein will be described in detail with reference to the accompanying drawings, and like reference numerals designate like elements, and redundant descriptions thereof will be omitted. The suffixes "module" and "unit" for components used in the following description are given or used interchangeably only for the ease of preparing the specification, and do not have distinct meanings or roles in themselves. In addition, in describing the embodiments disclosed herein, when it is determined that detailed descriptions of related known technologies may obscure the gist of the embodiments disclosed herein, the detailed descriptions will be omitted. In addition, it should be understood that the accompanying drawings are only for easy understanding of the embodiments disclosed herein, and that the technical idea disclosed herein is not limited by the accompanying drawings, and includes all changes, equivalents, and substitutes included in the spirit and technical scope of the present disclosure.

[0042] Terms containing ordinal numbers, such as first and second, may be used to describe various components, but the components are not limited by the terms. These terms are used only for the purpose of distinguishing one component from another.

[0043] When a component is referred to as being "connected" or "joined" to another component, it is to be understood that the component may be directly connected to or joint to the other component, but that other components may be present therebetween. In contrast, when a component is referred to as being "directly connected" or "directly joined" to another component, it is to be understood that no other components are present therebetween.

[0044] Singular expressions include plural expressions unless the context clearly dictates otherwise.

[0045] Herein, it is to be understood that the terms such as "include" and "have" are intended to indicate the presence of features, numbers, steps, operations, components, parts described in the description, or combinations thereof, but are not intended to preclude the possibility of presence or addition of one or more other features, numbers, steps, operations, components, parts, or combinations thereof.

[0046] FIG. 1 is a perspective view illustrating a laundry treating apparatus 1000 according to an embodiment of the present disclosure. FIG. 2 is a view schematically illustrating the main configuration of the laundry treating apparatus 1000 according to an embodiment of the present disclosure.

[0047] As illustrated in FIGS. 1 and 2, the laundry treating apparatus 1000 according to an embodiment of the present disclosure includes a main body 100, a cabinet cover 200, and a control panel 300.

[0048] The main body 100 is a part that accommodates laundry to perform processing operations for the laundry, and is capable of performing at least one of washing, rinsing, spin-drying, and drying.

[0049] In this case, the main body 100 may include a washing tub 110 in which laundry is put into an internal space so that at least one of washing, rinsing, dehydration, and drying can be performed. A laundry inlet for putting laundry into the washing tub 110 may be provided on one surface of the washing tub 110.

[0050] In addition, the laundry inlet may be configured to be opened/closed by a door 10 so that the laundry inlet can be closed by the door 10 during at least one of washing, rinsing, spin-drying, and drying.

[0051] Meanwhile, the washing tub 110 may include a tub configured to contain washing water. This tub may be placed on a damper installed on a base forming the bottom surface of the cabinet cover 200, is connected to

a spring, which is installed inside the cabinet cover 200, in a suspended manner, and may be cushioned and supported by the damper and the spring.

[0052] This tub has a cylindrical structure laid on its side, and a drum may be disposed inside the tub, and a motor, which is a driving mechanism configured to rotate the drum, may be installed on the rear surface of the tub.

[0053] The drum is a part configured to accommodate laundry, may be configured as a cylindrical structure in which the lower portion is laid on its side like the tub to be submerged in the washing water in the tub, and may be rotatably disposed inside the tub.

[0054] The drum has a plurality of holes provided in its peripheral portion to allow washing water or air to enter and exit therethrough, and a lifter configured to lift and drop laundry may be mounted on the inner circumferential surface of the peripheral portion.

[0055] The cabinet cover 200 is a part that covers the main body 100 to form the exterior, and the main components of the main body 100 may be placed in the internal space of the cabinet cover. In addition, the above-mentioned door 10 may be installed on a portion of the cabinet cover 200. In addition, a controller 800 is installed inside the cabinet cover 200 to control the main components related to the processing operations of the laundry treating apparatus 1000 described above.

[0056] In addition, a control panel 300 may be installed on the cabinet cover 200, and via the control panel 300, the laundry treating apparatus 1000 may display visual information related to the processing operations to a user and receive user input. That is, the control panel 300 may be provided for a user interface (UI).

[0057] In this case, the control panel 300 may be installed in the front upper portion of the cabinet cover 200 to facilitate user access and operation. To this end, the cabinet cover 200 may have a first through hole 201 in the front upper end portion, and the control panel 300 may be disposed in this first through hole 201.

[0058] Meanwhile, in accordance with the recent trend of placing importance on the exterior design of laundry treating apparatuses 1000, a cabinet cover 200 that defines the exterior of the laundry treating apparatus 1000 may be designed as an integrated sheet metal product to achieve a seamless structure.

[0059] In this case, the control panel 300 disposed in the front upper end portion of the cabinet cover 200 to facilitate user access and operation also needs to match the exterior design of the laundry treating apparatus 1000, which is designed in a seamless structure.

[0060] For this purpose, the control panel 300 is installed inside the cabinet cover 200, and may be partially exposed outside through the first through hole 201 so that control signals for processing operations can be input by a user

[0061] That is, the control panel 300 may be installed inside the cabinet cover 200, rather than being installed to be separated from the front surface of the cabinet cover 200 by a parting line.

[0062] In this way, in the laundry treating apparatus 1000 according to the present embodiment, the control panel 300 is installed inside the cabinet cover 200 that forms the exterior so that the control panel 300 is not separated from the cabinet cover 200 on the exterior. Therefore, the aesthetics and productivity of the laundry treating apparatus 1000 can be improved by designing the cabinet cover 200 as an integrated sheet metal product.

[0063] In addition, in the laundry treating apparatus 1000 according to the present embodiment, the control panel 300 is installed inside the cabinet cover 200, and only a portion of the control panel 300 is exposed outside through the first through hole 201 in the cabinet cover 200. Therefore, by minimizing the exposure of portions of the control panel 300 that do not need to be exposed to a user, the exterior design of the laundry treating apparatus 1000 can be implemented in a seamless structure.

[0064] FIG. 3 is a view illustrating the control panel 300 installed on the cabinet cover 200 in the laundry treating apparatus 1000 according to an embodiment of the present disclosure. FIG. 4 is an exploded perspective view illustrating the control panel 300 to be installed on the cabinet cover 200 in the laundry treating apparatus 1000 according to an embodiment of the present disclosure. FIG. 5 is a view illustrating a state in which a window 310 of the control panel 300 is coupled to the inner surface of the cabinet cover 200 in the laundry treating apparatus 1000 according to an embodiment of the present disclosure. FIG. 6 is a view illustrating a state in which a coating guide 330 of the control panel 300 is fastened to the inner surface of the cabinet cover 200 in the laundry treating apparatus 1000 according to an embodiment of the present disclosure.

[0065] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, the control panel 300 includes a window 310, a touch screen 320, and a coating guide 330.

[0066] The window 310 may have a structure in which a portion of the front surface thereof other than the area corresponding to the first through hole 201 is in close contact with the inner surface of the cabinet cover 200, and a portion of the front surface of the control panel 300 is in close contact with the inner surface of the cabinet cover 200.

[0067] That is, the window 310 has a relatively larger area than the first through hole 201, so that the central portion of the window 310 is placed in the first through hole 201, and the remaining outer portion may be in close contact with the inner surface of the cabinet cover 200.

[0068] Meanwhile, the window 310 may have a step formed between the area corresponding to the first through hole 201 and the remaining portion. That is, the central portion of the window 310 may have a shape that protrudes forward from the remaining outer portion, so that the central portion of the window 310 can be inserted into the first through hole 201.

[0069] In this case, there is no step between the front surface of the central portion of the window 310 and the outer surface of the cabinet cover 200, so that aesthetic appearance can be ensured.

[0070] The touch screen 320 is a part coupled to the rear surface of the window 310, and may be a screen configured to allow, when a touch object such as a human hand or an object (e.g., a stylus pen) touches the text displayed on the screen or a specific location of the screen, input data to be received directly from the screen so that the location can be identified and specific processing can be performed by stored software.

[0071] In this case, the touch screen 320 may be provided with touch sensors. The touch sensors may detect a touch input applied to the touch screen 320 using at least one of various touch types such as a resistive type, a capacitive type, an infrared type, an ultrasonic type, and a magnetic field type.

[0072] In this way, when there is a touch input to the touch sensors, corresponding signals may be sent to the control box. The control box may process the signals and then transmit corresponding data to a controller 800. As a result, the controller 800 may identify which areas of the touch screen 320 are touched, or the like. Here, the control box may be a separate component from the controller 800 or may be the controller 800 itself.

[0073] Meanwhile, the controller 800 may perform different controls or the same control depending on the type of a touch object that touches the touch screen 320. Whether to perform different controls or the same controls depending on the type of the touch object may be determined depending on the operating state of the laundry treating apparatus 1000 or the running application.

[0074] Accordingly, the touch screen 320 is capable of not only displaying visual information related to the processing operations of the laundry treating apparatus 1000 to the user, but also receiving user input for the processing operations of the laundry treating apparatus 1000.

[0075] That is, the touch screen 320 of the control panel 300 may simultaneously perform the functions of various display units for providing information to a user, as well as the functions of an input unit or a selection unit for user operation.

[0076] In this case, the touch screen 320 may include at least one of a liquid crystal display (LCD), a thin film transistor-liquid crystal display (TFT LCD), an organic light-emitting Diode (OLED), a flexible display, a 3D Display, and an electronic ink (E-ink) display.

[0077] The coating guide 330 is a part that is fastened to the inner surface of the cabinet cover 200 in the state of being coupled to the window 310 and the touch screen 320 on the rear side of the touch screen 320. The main components of the control panel 300 may have structures to be fastened to and supported on the inner surface of the cabinet cover 200 in a pre-assembled state before being installed to the cabinet cover 200.

[0078] That is, the coating guide 330 may be fastened to the inner surface of the cabinet cover 200 while pressing the rear surfaces of the window 310 and the touch screen 320 in the state in which the window 310 and the touch screen 320 are coupled to the front surface thereof.

[0079] Accordingly, the control panel 300 may be configured in a structure in which parts other than the coating guide 330 of the overall structure are firmly coupled to the coating guide 330, and then the coating guide 330 is fastened to the inner surface of the cabinet cover 200.

[0080] In this case, the coating guide 330 on which the touch screen 320 is supported may be coated to prevent external moisture or the like from penetrating into the touch screen 320.

[0081] In this way, in the laundry processing device 1000 according to the present embodiment, the coating guide 330 is fastened to the inner surface of the cabinet cover 200 in the pre-assembled with the window 310 and the touch screen 320. Therefore, the control panel 300 directly coupled inside the cabinet cover 200 can be installed more easily and stably.

[0082] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, the control panel 300 may further include a printed circuit board (PCB) 341 connected to the touch screen 320 and coupled to the rear surface of the coating guide 330.

[0083] That is, the printed circuit board 341 may have various circuit components mounted thereon and be connected to the touch screen 320. Accordingly, input and output signals for the touch screen 320 may be connected to the controller 800 via the printed circuit board 341. In this case, the printed circuit board 341 may be the above-described controller or the controller 800 itself.

[0084] Meanwhile, a hole is provided in a portion of the coating guide 330 to make the front surface and the rear surface communicate with each other, so that the touch screen 320 and the printed circuit board 341 can be electrically connected to each other.

[0085] In this way, in the laundry treating apparatus 1000 according to the present embodiment, since the printed circuit board 341 is coupled to the rear surface of the coating guide 330, the printed circuit board 341 can be easily connected to the touch screen 320.

[0086] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, the control panel 300 may further include a panel rib 340 protruding rearward from the lower end portion of the coating guide 330 to support the printed circuit board 341.

[0087] Even when the printed circuit board 341 is installed on the rear surface of the coating guide 330 with the above-described structure, the coating guide 330 may be detached due to shock, vibration, or the like.

[0088] In particular, since a user should operate the control panel 300 installed inside the cabinet cover 200 in the manner of applying force inward from the outside of the cabinet cover 200, there is a risk that the printed circuit board 341 may be detached when the control panel 300 is used continuously.

[0089] Therefore, it may be desirable to prevent the

printed circuit board 341 from being removed by providing the panel rib 340 to protrude rearward from the lower end portion of the coating guide 330 such that the panel rib 340 supports the printed circuit board 341.

[0090] In this way, in the laundry treating apparatus 1000 according to the present embodiment, since the panel rib 340 protruding from the lower end portion of the coating guide 330 supports the printed circuit board 341, it may be possible to prevent the printed circuit board 341 from being removed by shock, vibration, and the like.

[0091] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, the coating guide 330 may be fastened to the inner surface of the cabinet cover 200 in the state of being coupled to the printed circuit board 341.

[0092] As described above, it may be desirable for the control panel 300 to be configured in a structure in which parts other than the coating guide 330 of the overall structure of the control panel 300 are firmly coupled to the coating guide 330, and then the coating guide 330 is fastened to the inner surface of the cabinet cover 200.

[0093] Therefore, it may be desirable for the printed circuit board 341 to also be pre-assembled with the coating guide 330.

[0094] In this way, in the laundry treating apparatus 1000 according to the present embodiment, since the coating guide 330 is fastened to the inner surface of the cabinet cover 200 in the pre-assembled state with the printed circuit board 341, the control panel 300 can be modularized so that installation work on the cabinet cover 200 can be performed more efficiently.

[0095] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, the control panel 300 may further include a first sealing member 361 interposed between the window 310 and the coating guide 330.

[0096] Since the touch screen 320 is disposed between the window 310 and the coating guide 330, there is a risk that the touch screen 320 may be damaged when the space between the window 310 and the coating guide 330 is excessively narrow.

[0097] Therefore, it may be desirable to minimize the pressure applied to the touch screen 320 by interposing the first sealing member 361 between the window 310 and the coating guide 330.

[0098] In addition, when external moisture or the like penetrates into the space between the window 310 and the coating guide 330, there is a risk that the function of the touch screen 320 may be deteriorated.

[0099] Therefore, it may be desirable to interpose the first sealing member 361 between the window 310 and the coating guide 330 to prevent moisture from penetrating into the portions that the coating guide 330 does not cover.

[0100] In this way, in the laundry treating apparatus 1000 according to the present embodiment, since the first sealing member 361 is interposed between the window 310 and the coating guide 330, waterproofing and shock resistance performance can be secured at the coupling portion between the window 310 and the coating guide 330.

[0101] FIG. 7 is a view illustrating in more detail the hook protrusion 210 on the cabinet cover 200 in the laundry treating apparatus 1000 according to an embodiment of the present disclosure.

[0102] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, the cabinet cover 200 may have a hook protrusion 210 that protrudes rearward from the circumference of a second through hole 202 provided lower than the center of the first through hole 201. In this case, the control panel 300 may be fastened to the hook protrusion 210 and coupled to the inner surface of the cabinet cover 200.

[0103] That is, in the laundry treating apparatus 1000 according to the present embodiment, since the control panel 300 is fastened to the hook protrusion 210 protruding from the second through hole 202 provided in the cabinet cover 200, manufacturing efficiency can be improved by forming the hook protrusion 210 for fastening the control panel 300 at the time of forming the second through hole 202.

[0104] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, the hook protrusion 210 may have a hook hole 211 penetrating the hook protrusion in the longitudinal direction thereof. In this case, the coating guide 330 may be fastened when the hook 370 provided at the lower end thereof is inserted into the hook hole 211.

[0105] That is, in the laundry treating apparatus 1000 according to the present embodiment, since the hook 370 at the lower end portion of the coating guide 330 is inserted into and fastened to the hook hole 211 penetrating the hook protrusion 210 in the longitudinal direction, the control panel 300 can be easily and stably fastened to the hook protrusion 210.

[0106] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, the upper end portion of the coating guide 330 may be screwed to the inner surface of the cabinet cover 200.

[0107] That is, in the laundry treating apparatus 1000 according to the present embodiment, since the upper end portion of the coating guide 330 is screwed to the inner surface of the cabinet cover 200, the coupled state between the cabinet cover 200 and the control panel 300 can be stably maintained.

[0108] The laundry treating apparatus 1000 according to an embodiment of the present disclosure may further include a control button 500 installed inside the cabinet cover 200 and partially exposed outside through the second through hole 202 to be brought into contact with the control panel 300 when pressed by a user

[0109] That is, in the laundry treating apparatus 1000 according to the present embodiment, since the control button 500 is installed inside the cabinet cover 200 and the control button 500 is partially exposed outside through the second through hole 202 in the cabinet cover

200, input of control signals for which an intuitive operation, such as a power on/off signal and a start/stop operation signal, is desirable can be performed smoothly.

[0110] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, a pair of second through holes 202 and control buttons 500 may each be arranged symmetrically on opposite sides of the control panel 300.

[0111] That is, in the laundry treating apparatus 1000 according to the present embodiment, since the second through holes 202 and the control buttons 500 are each arranged symmetrically on the opposite sides of the control panel 300, a plurality of control signals can be input through the control buttons 500 and a balance in the exterior design can be achieved.

[0112] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, the hook protrusions 210 may be provided at the second through holes 202, respectively. In this case, the control panel 300 may be fastened to both the respective hook protrusions 210.

[0113] That is, in the laundry treating apparatus 1000 according to the present embodiment, since the control panel 300 is fastened to both the respective hook protrusions 210 provided at the pair of second through holes 202, respectively, the control panel 300 can be fastened to the hook protrusions 210 while maintaining balance.

[0114] The laundry treating apparatus 1000 according to an embodiment of the present disclosure may further include a wireless communication part 600 installed inside the cabinet cover 200 to be capable of transmitting and receiving wireless signals to and from the outside. In this case, the wireless communication part 600 may be installed on the inner surface of the cabinet cover 200 while being coupled to the bottom of the control panel 300.

[0115] That is, in the laundry treating apparatus 1000 according to the present embodiment, since the wireless communication part 600 is installed on the inner surface of the cabinet cover 200 in the state of being coupled to the bottom of the control panel 300, main components can be efficiently arranged in the internal space of the cabinet cover 200, and the control panel 300 can be disposed higher in the front upper end portion of the cabinet cover 200.

[0116] FIG. 8 is a view illustrating, by way of an example, a fixed UI section 301 and a variable UI section 302 of the control panel 300 in the laundry treating apparatus 1000 according to an embodiment of the present disclosure. FIG. 9 is a view illustrating, by way of an example, a transmissive area 311 and a non-transmissive area 312 of the control panel 300 in the laundry treating apparatus 1000 according to an embodiment of the present disclosure. FIGS. 10 to 12 are views illustrating the structure of providing the transmissive area 311 and the non-transmissive area 312 of the control panel 300 in the laundry treating apparatus 1000 according to an embodiment of the present disclosure.

[0117] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, the control panel 300 may include a fixed UI section 301 in which a first control UI 301a, of which the display is fixed, is disposed, and a variable UI section 302 in which a second control UI 302a, of which the display-on/off and type are variable, is disposed.

[0118] That is, in the laundry treating apparatus 1000 according to the present embodiment, since the fixed UI section 301 and the variable UI section 302 provided in the control panel 300 are arranged according to UI characteristics, a user may more conveniently input control signals for processing operations.

[0119] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, a portion of an area of the window 310 corresponding to the first through hole 201 may be provided as a transmissive area 311, and the remaining portion is provided as a non-transmissive area 312. In this case, the touch screen 320 may be coupled to the rear surface of the window 310 and perform display through the transmissive area 311.

[0120] That is, in the laundry treating apparatus 1000 according to the present embodiment, since the touch screen 320 is displayed through the transmissive area 311 provided in a portion of the window 310, and the remaining portion of the window 310 is provided as a non-transmissive area 312, various exterior designs may be implemented regardless of the shape of the touch screen 320.

[0121] The laundry treating apparatus 1000 according to an embodiment of the present disclosure may include a main body 100, a cabinet cover 200, a control panel 300, and a control button 500.

[0122] The main body 100 is a part that accommodates laundry to perform processing operations for the laundry, and is capable of performing at least one of washing, rinsing, spin-drying, and drying.

[0123] The cabinet cover 200 is a part that covers the main body 100 to form an exterior and has a first through hole 201 provided in the front upper portion thereof, and a second through hole 202 provided lower than the center of the first through hole 201.

[0124] That is, as described above, the first through hole 201 may be provided in the cabinet cover 200 to allow a portion of the control panel 300 to be exposed outside. In addition, the second through hole 202 may be provided lower than the center of the first through hole 201, so that a control button 500 can be disposed therein.

[0125] The control panel 300 is a part that is installed inside the cabinet cover 200 and partially exposed outside through the first through hole 201 so that control signals for processing operations can be input by a user

[0126] The control button 500 is a part that is installed inside the cabinet cover 200 and partially exposed outside through the second through hole 202 to be capable of coming into contact with the control panel 300 when pressed by a user

[0127] That is, when the control button 500 is installed

inside the cabinet cover 200, only the portion for a user to operate may be exposed outside through the second through hole 202. Accordingly, the user may input specific control signals associated with the control button 500 to the laundry treating apparatus 1000 by pressing the portion of the control button 500 exposed outside the cabinet cover 200.

[0128] In this case, the specific control signals associated with the control button 500 are essentially used due to the characteristics thereof, such as a power on/off signal and an operation start/stop signal, but the types thereof do not need to be changed. It may be desirable to arrange the control signals such that the user can intuitively operate the control signals.

[0129] That is, it may be desirable to arrange the signals such as a power on/off signal and an operation start/stop signal such that a user can operate the signals through the control button 500, which is fixedly installed separately from the control panel 300.

[0130] Therefore, when the user presses the control button 500, the portions of the control buttons 500 disposed inside the cabinet cover 200 come into contact with the control panel 300 so that signals such as a power on/off signal and an operation start/stop signal can be input to the controller 800.

[0131] Meanwhile, when the user presses the control button 500, the portion of the control button 500 disposed inside the cabinet cover 200 may not come into contact with the control panel 300, but signals such as turn on/off and operation start/stop may be input to the controller 800 through a separate signal transmission path.

[0132] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, the cabinet cover 200 may have a hook protrusion 210 protruding rearward from the circumference of the second through hole 202, and the control panel 300 may be coupled to the inner surface of the cabinet cover 200 while being fastened to the hook protrusion 210.

[0133] That is, the circumference of the second through hole 202 provided through the cabinet cover 200 may be partially bent toward the rear side to provide the hook protrusion 210. In particular, the hook protrusion 210 is not a separate member coupled to the second through hole 202 of the cabinet cover 200, but may be formed by bending integrally with the second through hole 202 which is formed when the cabinet cover 200 is manufactured as a sheet metal product.

[0134] In addition, the control panel 300 may be configured in a structure that is supported by being fastened to the hook protrusion 210 provided integrally with the circumference of the second through hole 202.

[0135] In this way, in the laundry treating apparatus 1000 according to the present embodiment, since the control panel 300 is fastened to the hook protrusion 210 protruding from the second through hole 202 provided in the cabinet cover 200, manufacturing efficiency can be improved by forming the hook protrusion 210 for fastening the control panel 300 at the time of forming the second through hole 202.

[0136] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, the hook hole 211 may penetrate the hook protrusion 210 in the longitudinal direction thereof, and the control panel 300 may be fastened when the hook 370 is inserted into the hook hole 211.

[0137] That is, as described above, the hook protrusion 210 may have a shape protruding rearward from the circumference of the second through hole 202, and the hook hole 211 may be provided in a shape penetrating the hook protrusion 210 in the longitudinal direction.

[0138] In addition, the hook 370 may protrude at the lower end portion of the control panels 300, and the hook 370 may be inserted into and fastened to the hook hole 211 having the shape penetrating the hook protrusion in the longitudinal direction.

[0139] In this case, since the second through hole 202 is provided lower than the center of the first through hole 201, the hook 370 at the lower end portion of the control panel 300 may be easily fastened to the hook protrusion 210 protruding rearward from the circumference of the second through hole 202.

[0140] Accordingly, when the hook 370 is inserted into and fastened to the hook holes 211, the forward and rearward displacement of the control panel 300 can be limited by the hook protrusion 210. In addition, a portion of the control panel 300 may be seated on the upper surface of the hook protrusion 210 so that the upward and downward displacement of the control panel 300 can also be limited to a certain extent.

[0141] In this way, in the laundry treating apparatus 1000 according to the present embodiment, since the hook 370 at the lower end portion of the control panel 300 is inserted into and fastened to the hook hole 211 penetrating the hook protrusions 210 in the longitudinal direction, the control panel 300 can be easily and stably fastened to the hook protrusion 210.

[0142] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, the upper end portion of the control panel 300 may be screwed to the inner surface of the cabinet cover 200.

[0143] As described above, even when the hook 370 at the lower end portion of the control panel 300 is fastened to the hook protrusion 210 to be limited in the displacement, a relatively large displacement may occur at the upper end portion of the control panel 300.

[0144] Therefore, in addition to fastening the lower end portion of the control panel 300, it may be desirable to fasten the upper end portion of the control panel 300 to the cabinet cover 200 so that the overall displacement of the control panel 300 is limited. To this end, the upper end portion of the control panel 300 may be fastened to the cabinet cover 200 through at least one screw 380.

[0145] In this way, in the laundry treating apparatus 1000 according to the present embodiment, since the upper end portion of the control panel 300 is screwed to the inner surface of the cabinet cover 200, the coupled

state between the cabinet cover 200 and the control panel 300 can be stably maintained.

[0146] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, a pair of second through holes 202 and control buttons 500 may be arranged symmetrically on opposite sides of the control panel 300.

[0147] That is, on the front exterior of the laundry treating apparatus 1000, second through holes 202 may be provided symmetrically on the left and right sides of the control panel 300, respectively. In addition, a control button 500 may be disposed in each of the second through holes 202.

[0148] In this case, one control button 500 may be associated with a power on/off signal, and another control button 500 may be associated with an operation start/stop signal.

[0149] In this way, in the laundry treating apparatus 1000 according to the present embodiment, since the second through holes 202 and the control buttons 500 are each arranged as a symmetrical pair on the opposite sides of the control panel 300, a plurality of control signals can be input through the control buttons 500 and a balance in the exterior design can be achieved.

[0150] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, the hook protrusions 210 may be provided at the second through holes 202, respectively, and the control panel 300 may be fastened to both the respective hook protrusions 210.

[0151] That is, on the front exterior of the laundry treating apparatus 1000, second through holes 202 may be provided symmetrically on the left and right of the control panel 300, and hook protrusions 210 may be provided for the second through holes 202, respectively. In addition, a pair of hooks 370 may be provided at the lower end portion of the control panel 300 so that the hooks 370 can be fastened to the hook protrusions 210, respectively.

[0152] When only one hook 370 is fastened to the hook protrusion 210, displacement in the forward and rearward directions and upward and downward directions may be limited to a certain extent, but when the control panel 300 is not balanced on the left and right with respect to the hook 370, there is a risk that rotational displacement may occur

[0153] Therefore, it may be desirable to provide a pair of hooks 370 at the lower end portion of the control panel 300 so that the hooks are fastened together to the hook protrusions 210 provided at the pair of second through holes 202, respectively.

[0154] In this way, in the laundry treating apparatus 1000 according to the present embodiment, since the control panel 300 is fastened to both the respective hook protrusions 210 provided at the pair of second through holes 202, respectively, the control panel 300 can be fastened to the hook protrusions 210 while maintaining balance.

[0155] The laundry treating apparatus 1000 according to an embodiment of the present disclosure may include a main body 100, a cabinet cover 200, a control panel 300, and a wireless communication part 600. In this case, the wireless communication part 600 may be installed on the inner surface of the cabinet cover 200 while being coupled to the bottom of the control panel 300.

[0156] The wireless communication part 600 is a part that is installed inside the cabinet cover 200 and configured to transmit and receive wireless signals to the outside. The wireless communication part may be configured to receive signals, which are wirelessly input from outside the laundry treating apparatus 1000, and to transmit the signals to the controller 800, or may be configured to wirelessly transmit signals, which are output from the controller 800, to outside the laundry treating apparatus 1000.

[0157] In this case, the wireless communication part 600 may include at least one of Wi-Fi, Bluetooth, and RF communication modules. For example, the laundry treating apparatus 1000 may be configured to perform wireless communication with a user's mobile terminal via a Wi-Fi communication module or a Bluetooth communication module. As another example, the laundry treating apparatus 1000 may be configured to perform wireless communication with another home appliance (e.g., another separate laundry treating apparatus 1000) via an RF communication module.

[0158] The wireless communication part 600 may be disposed in the internal space of the cabinet cover 200. However, it may be desirable for the wireless communication part to be disposed as close to the external portion of the cabinet cover 200 as possible in the internal space of the cabinet cover 200 in order to minimize a decrease in wireless communication efficiency.

[0159] In particular, when the cabinet cover 200 is made of a metal material, in order ensure that the wireless communication part 600 performs wireless communication smoothly, it may be desirable for the wireless communication part 600 to be disposed adjacent to the first through hole 201 or the second through hole 202 in the cabinet cover 200.

[0160] In addition, since it is more efficient for the wireless communication part 600 to be disposed adjacent to the control panel 300 and the printed circuit board 341, it may be more desirable for the wireless communication part 600 to be installed together with the control panel 300.

[0161] Therefore, the wireless communication part 600 may be installed on the inner surface of the cabinet cover 200 in the state of being coupled to the control panel 300, rather than being installed separately from the control panel 300.

[0162] Meanwhile, since the overall height of the laundry treating apparatus 1000 is generally less than the height of the user's eyes, in order for the user to more easily check and operate the control panel 300, it may be desirable for the control panel 300 to be disposed as high as possible in the front upper end portion of the

cabinet cover 200.

[0163] Accordingly, the first through hole 201 configured to expose a portion of the control panel 300 outside the cabinet cover 200 also needs to be disposed as high as possible in the front upper end portion of the cabinet cover 200.

[0164] In this case, when a separate main component is disposed on top of the control panel 300, it may be difficult to dispose the control panel 300 and the first through hole 201 as high as possible in the front upper end portion of the cabinet cover 200.

[0165] Accordingly, when the wireless communication part 600 coupled and installed on the control panel 300 is coupled to the bottom of the control panel 300, efficient arrangement of the wireless communication part 600 and optimal arrangement of the control panel 300 may be achieved.

[0166] In this way, in the laundry treating apparatus 1000 according to the present embodiment, since the wireless communication part 600 is installed on the inner surface of the cabinet cover 200 in the state of being coupled to the bottom of the control panel 300, main components can be efficiently arranged in the internal space of the cabinet cover 200, and the control panel 300 can be disposed higher in the front upper end portion of the cabinet cover 200.

[0167] The laundry treating apparatus 1000 according to an embodiment of the present disclosure may further include a sound output unit 700 that is installed inside the cabinet cover 200 and configured to output sound signals for processing operations. In this case, the sound output unit 700 may be installed on the inner surface of the cabinet cover 200 while being coupled to a side surface of the control panel 300.

[0168] The sound output unit 700 is a component that guides the user to specific matters or draws the user's attention to the specific matters by an auditory sound signal, such as a buzzer or speaker, and may be configured in various ways according to need.

[0169] The sound output unit 700 may be disposed in the internal space of the cabinet cover 200. However, it may be desirable for the sound output unit to be disposed as close to the external portion of the cabinet cover 200 as possible in the internal space of the cabinet cover 200 in order to insure that sound signals are smoothly transmitted to the user

[0170] In addition, since it is also more efficient for the sound output unit 700 to be disposed adjacent to the control panel 300 and the printed circuit board 341, it may be more desirable for the sound output unit 700 to be installed together with the control panel 300.

[0171] Therefore, the sound output unit 700 may also be installed on the inner surface of the cabinet cover 200 in the state of being coupled to the control panel 300, rather than being installed separately from the control panel 300.

[0172] However, as described above, it is not desirable for the sound output unit 700 to be coupled to the top of the control panel 300. In addition, in order to minimize interference with the wireless communication part 600 coupled to the bottom of the control panel 300, it may be desirable for the sound output unit 700 to be coupled to a side surface of the control panel 300.

[0173] As described above, in the laundry treating apparatus 1000 according to the present embodiment, since the sound output unit 700 is installed on the inner surface of the cabinet cover 200 in the state of being coupled to the side surface of the control panel 300, the sound output unit 700 may also be arranged to match the most efficient arrangement of the control panel 300.

[0174] Meanwhile, regarding the laundry treating apparatus 1000 according to the present embodiment, the configuration in which the wireless communication part 600 and the sound output unit 700 are disposed at the bottom of the control panel 300 and on the side surface of the control panel 300, respectively, has been described, but the laundry treating apparatus is not necessarily limited thereto. If necessary, the wireless communication part 600 and the sound output unit 700 may be disposed on the side surface of the control panel 300 and at the bottom of the control panel 300, respectively.

[0175] In addition, within the limit of preventing the wireless communication part 600 and the sound output unit 700 from interfering with each other, both the wireless communication part 600 and the sound output unit 700 may be disposed at the bottom of the control panel 300, or disposed on the side surface of the control panel 300.

[0176] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, the control panel 300 may include a window 310, a touch screen 320, and a coating guide 330 so that the control panel 300 directly coupled inside the cabinet cover 200 can be easily and stably installed.

[0177] In this case, the wireless communication part 600 may be coupled to the bottom of the coating guide 330, and the sound output unit 700 may be coupled to the side surface of the coating guide 330.

[0178] As described above, the coating guide 330 is a part that supports the window 310 and the touch screen 320. In view of the fact that the coating guide 330 has a certain level of rigidity in the control panel 300 and does not have high functional sensitivity, the coating guide 330 may be most desirable for coupling with other components.

[0179] Therefore, it may be desirable to couple the wireless communication part 600 to the bottom of the coating guide 330 in the control panel 300 and to couple the sound output unit 700 to the side surface of the coating guide 330.

[0180] In this way, in the laundry treating apparatus 1000 according to the present embodiment, since the wireless communication part 600 and the sound output unit 700 are coupled to the bottom and the side surface of the coating guide 330, respectively, the communication part 600 and the sound output unit 700 can be coupled to the most desirable portions in the control panel

300.

[0181] The laundry treating apparatus 1000 according to an embodiment of the present disclosure may include a main body 100, a cabinet cover 200, and a control panel 300. In this case, the control panel 300 may include a fixed UI section 301 and a variable UI section 302.

[0182] The control panel 300 is a part that is exposed outside the cabinet cover 200 so that the user can input control signals for the laundry treating apparatus 1000. The user may input operating signals for each component of the laundry treating apparatus 1000 by operating the control panel 300.

[0183] In this case, UIs are disposed on the control panel 300, so that the user can may operate the UIs disposed on the control panel 300 to input operating signals for each component of the laundry treating apparatus 1000.

[0184] On the other hand, among the UIs, there may be a UI that is essentially used due to its characteristics, but whose display does not need to be changed. In addition, among the UIs, there may be a UI that needs to be used while varying to various types due to its characteristics.

[0185] In this way, since the UIs disposed on the control panel 300 are operated differently by the user depending on the characteristics thereof, it may be desirable to arrange respective UIs separately in consideration of the characteristics thereof so that the user can use the UIs more conveniently.

[0186] To this end, a first control UI 301a, of which the display is fixed, may be disposed in the fixed UI section 301. In this case, the first control UI 301a (e.g., a setting UI) is essentially used due to its characteristics, but its display does not need to be changed. Therefore, the user may recognize that the first control UI is always disposed at that on the control panel 300.

[0187] In addition, a second control UI 302a of which the status and type are variable may be disposed in the variable UI section 302. In this case, the second control UI 302a needs to be used while varying to various types due to its characteristics, and the user needs to operate the second control UI while checking the status and type of the currently implemented UI.

[0188] As described above, in the laundry treating apparatus 1000 according to the present embodiment, since the fixed UI section 301 and the variable UI section 302 provided in the control panel 300 are arranged according to UI characteristics, the user may more conveniently input control signals for processing operations.

[0189] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, operation signals for the first control UI 301a may be input to the fixed UI section 301 by a button rod contact type.

[0190] In this case, the button rod contact type may refer to a contact type with a structure in which, when a user operates the fixed UI section 301, a separate button rod 390 capable of connecting electrical signals moves and transmits the corresponding signals to the control box or controller 800.

[0191] That is, when the user touches the fixed UI section 301 by touching, pressing, or the like, the button rod 390 arranged to be brought into brought into a corresponding portion at one end is pressed and pushed rearward. In this case, as the other end of the button rod 390 is brought into contact with the control box or controller 800, an electrical signal may be connected, and as a result, the control signal that the user wishes to input may be transmitted to the controller 800.

[0192] As described above, the first control UI 301a disposed in the fixed UI section 301 may be controlled by a simple operation by the user without the need to change the display. Therefore, the button rod contact type that is relatively easy to operate may be desirable for the first control UI.

[0193] In this way, in the laundry treating apparatus 1000 according to the present embodiment, since the fixed UI section 301 is operated by the button rod contact type, the user may easily operate the fixed UI section 301, of which the display is fixed.

[0194] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, operation signals for the second control UI 302a may be input to the variable UI section 302 by a touch type.

[0195] In this case, the touch type may refer to a contact type with a structure in which, when a touch object such as a human hand or an object (e.g., a stylus pen) touches the second control UI 302a appearing in the variable UI section 302 through a separate touch sensor or the like, a corresponding signal can be transmitted to the control box or the controller 800.

[0196] As described above, in view of the fact that the second control UI 302a disposed in the variable UI section 302 needs to be used while varying to various types due to its characteristics, the touch type, which allows the user to operate the UI while checking the status and type of the UI that is being implemented by the user, may be desirable for the second control UI.

[0197] In particular, since the type of the second control UI 302a also varies in the variable UI section 302, it may be convenient to allow various types of UIs to vary through touching on a screen of a certain area.

[0198] In this way, in the laundry treating apparatus 1000 according to the present embodiment, since the variable UI section 302 is operated by a touch type, the user may effectively operate the variable UI section 302 of which the display-on/off and type vary.

[0199] Meanwhile, the first control UI 301a may include at least one of a power UI on which power-on/power-off of the laundry treating apparatus 1000 can be selected, and an operation UI on which turn-on/turn-off of the operation of the laundry treating apparatus 1000 can be selected, and a setting UI on which the settings of the laundry treating apparatus 1000 can be selected.

[0200] The second control UI 302a is an operation UI on which the operation type of the laundry treating apparatus 1000 can be selected, a laundry UI on which the

type of laundry accommodated in the laundry treating apparatus 1000 can be selected, and a time UI on which the operating time of the laundry treating apparatus 1000 can be selected.

[0201] The operation UI is used to set the process to be performed for laundry in the laundry treating apparatus 1000. It is necessary to operate the operation UI while checking the status and type of the UI that is currently being implemented.

[0202] Similarly, the laundry UI is used to select the type of laundry to be processed in the laundry treating apparatus 1000 so that optimal processing can be performed accordingly. It is necessary to operate the laundry UI while checking the status and type of a UI that is currently being implemented.

[0203] In addition, similarly, the time UI is used to set the time for processing laundry in the laundry treating apparatus 1000. It is also necessary to operate the time UI while checking the status and type of a UI that is currently being implemented.

[0204] Therefore, it may be desirable to dispose the operation UI, the laundry UI, and the time UI in the variable UI section 302 to be variable in terms of display-on/off and type.

[0205] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, the control panel 300 may include a window 310, a touch screen 320, and a coating guide 330 so that the control panel 300 directly coupled inside the cabinet cover 200 can be easily and stably installed.

[0206] In this case, the touch screen 320 may be disposed in the variable UI section 302.

[0207] When the touch screen 320 is a screen configured to: determine, when a touch object such as a human hand or an object (e.g., a stylus pen) touches a character displayed on the screen or a specific location on the screen, the location; and allow an input material to be received directly therefrom so specific processing can be executed by stored software. The controller 800 may change the display-on/off and type to correspond to the type of the touch object touching the touch screen 320.

[0208] As described above, in the laundry treating apparatus 1000 according to the present embodiment, since the touch screen 320 is disposed in the variable UI section 302, the variable UI section 302 in which display-on/off and type vary can be smoothly implemented on the touch screen 320.

[0209] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, the first through hole 201 may be provided as a circular open surface. In this case, the touch screen 320 may be fabricated in a quadrilateral shape with a height Hs that is relatively smaller than the diameter Dh of the first through hole 201.

[0210] That is, in the laundry treating apparatus 1000 according to the present embodiment, since the touch screen 320 has a height relatively smaller than the diameter of the first through hole 201 provided in a circular shape, it may be possible to implement a circular display on the exterior design even when the touch screen 320 is not fabricated in a relatively expensive circular structure.

[0211] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, a portion of an area of the window 310 corresponding to the first through hole 201 may be provided as a transmissive area 311, and the remaining portion is provided as a non-transmissive area 312. In this case, the touch screen 320 may be coupled to the rear surface of the window 310 and perform display through the transmissive area 311.

[0212] That is, in the laundry treating apparatus 1000 according to the present embodiment, since the touch screen 320 is displayed through the transmissive area 311 provided in a portion of the window 310, and the remaining portion of the window 310 is provided as a non-transmissive area 312, various exterior designs may be implemented regardless of the shape of the touch screen 320.

[0213] The laundry treating apparatus 1000 according to an embodiment of the present disclosure may include a main body 100, a cabinet cover 200, and a control panel 300. In this case, the control panel 300 may include a window 310 and a touch screen 320.

[0214] A portion of an area of the window 310 corresponding to the first through hole 201 may be provided as a transmissive area 311 and the remaining portion may be provided as a non-transmissive area 312. In this case, the touch screen 320 may be coupled to the rear surface of the window 310 and perform display through the transmissive area 311.

[0215] The transmissive area 311 refers to an area configured to transmit at least part of the light such that the opposite side or the inside is visible. Accordingly, the transmissive area 311 may be a concept that includes a semi-transmissive area.

[0216] Specifically, as illustrated in FIG. 10, the window 310 may be made of a transmissive material. That is, the window 310 may be made of a transmissive glass material or a synthetic resin material.

[0217] A shield layer 312a may be disposed on a portion of the window 310 to provide a non-transmissive area 312. In this case, the shield layer 312a may be disposed on the front or rear surface of the window 310.

[0218] In FIG. 10, ink is printed on the rear surface of the window 310 to form the shield layer 312a. The ink may contain pigments having a specific color group (e.g., black, white, and blue).

[0219] In this case, as a method of forming the shield layer 312a, various printing techniques such as screen printing (using a mesh formed of silk, nylon, tetron, stainless steel, or the like), offset printing, and transfer printing may be applied.

[0220] The shield layer 312a is not disposed in the transmissive area 311. That is, the transmissive area 311 may be a transparent portion that is not covered by the shield layer 312a and remains as a transmissive window

310.

[0221] A touch screen 320 may be coupled to the rear surface of the window 310 corresponding to the transmissive area 311. The touch screen 320 may be disposed to completely cover the transmissive area 311 to detect a touch input to the transmissive area 311.

[0222] The touch screen 320 may be fabricated to have a size larger than the transmissive area 311, and in this case, the touch screen 320 may be configured to cover a portion of the shield layer 312a that defines the transmissive area 311.

[0223] As illustrated in FIG. 11, the shield layer 312a defining the transmissive area 311 of the window 310 may be configured such that its transparency gradually changes toward the transmissive area 311.

[0224] For example, the non-transmissive area 312 around the transmissive area 311 may be configured to gradually become transparent toward the transmissive area 311. To this end, the shield layer 312a may include a plurality of shield dots 312a-1 provided around the transmissive area, and the plurality of shield dots 312a-1 may be provided to have a lower density toward the transmissive area 311.

[0225] By blurring the boundary of the transmissive area 311 through this halftone technique, a visual transition from the non-transmissive area 312 to the transmissive area 311 can be naturally achieved.

[0226] In addition, as illustrated in FIG. 12, unlike the above embodiment in which the shield layer 312a is printed on the rear surface of the window 310, a film 312b may be bonded to the rear surface of the window 310 to provide the non-transmissive area 312.

[0227] The film 312b may include a non-transmissive portion 312b-2 corresponding to the non-transmissive area and a transmissive portion 312b-1 corresponding to the transmissive area 311. The non-transmissive portion 312b-2 is provided to surround the transmissive portion 312b-1, and the transmissive portion 312b-1 may be partitioned by the non-transmissive portion 312b-2.

[0228] Here, the portion corresponding to the non-transmissive portion 312b-2 may function as a shield layer 312a that makes the window 310 opaque, thereby forming the non-transmissive area 312. The portion corresponding to the transmissive portion 312b-1 may form the transmissive area 311 together with the transmissive window 310.

[0229] A touch screen 320 may be coupled to the rear surface of the film 312b corresponding to the transmissive portion 312b-1. The touch screen 320 may be disposed to completely cover the transmissive area 311 to detect a touch input to the transmissive area 311.

[0230] The touch screen 320 may be provided in a size larger than the transmissive area 311, and in this case, the touch screen 320 may be configured to cover a portion of the non-transmissive portion 312b-2 that defines the transmissive portion 312b-1.

[0231] In this way, in the laundry treating apparatus 1000 according to the present embodiment, since the touch screen 320 is displayed through the transmissive area 311 provided in a portion of the window 310, and the remaining portion of the window 310 is provided as a non-transmissive area 312, various exterior designs may be implemented regardless of the shape of the touch screen 320.

[0232] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, the touch screen 320 may be fabricated in a shape having a flat surface relatively smaller than the open surface of the first through hole 201, and in the area corresponding to the first through hole 201 in the window 310, the portion in which the touch screen 320 does not perform display may be provided as a non-transmissive area 312.

[0233] Depending on the exterior design of the laundry treating apparatus 1000, the portion through which the control panel 300 is externally exposed (i.e., the first through hole 201) may have various shapes. However, even when the shape of the first through hole 201 is provided in various ways in terms of a design, if the planar shape of the touch screen 320 for display does not match the shape of the first through hole 201, there is a risk that aesthetics may be deteriorated.

[0234] Therefore, in order to implement various exterior designs without being limited by the planar shape of the touch screen 320, it may be desirable to cover the portion of the first through hole 201 where the touch screen 320 is not displayed by the non-transmissive area 312 of the window 310.

[0235] In this way, in the laundry treating apparatus 1000 according to the present embodiment, the first through hole 201 is opened relatively larger than the touch screen 320, and the portion of the through hole 201 where the touch screen 320 is not displayed is covered by the non-transmissive area 312 of the window 310. Therefore, it is possible to implement a design in which only the touch screen 320 is displayed even when the open shape of the first through hole 201 does not correspond to the planar shape of the touch screen 320.

[0236] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, the first through hole 201 may be provided as a circular open surface, and the touch screen 320 be fabricated in a quadrilateral shape with a height Hs that is relatively smaller than the diameter Dh of the first through hole 201.

[0237] Here, the circular shape may include a true circular shape, an oval shape, or a round shape which is at least partially rounded.

[0238] The circular touch screen 320 may be more expensive than the widely used quadrilateral touch screen 320, and since it is difficult to determine the exact installation location due to its shape, assembly defects may occur frequently.

[0239] However, according to the structure according to the present embodiment, it is possible to provide a control panel 300 that appears circular to the user while using the quadrilateral touch screen 320 that is inexpensive and can be assembled in the correct position.

[0240] Since the transmissive area 311 is surrounded by the non-transmissive area 312, visual information output from a portion of the touch screen 320 that does not correspond to the transmissive area 311 is invisible to the user. Considering this, visual information may not be output on a portion of the touch screen 320 that does not correspond to the transmissive area 311.

[0241] In this way, in the laundry treating apparatus 1000 according to the present embodiment, since the touch screen 320 has a height relatively smaller than the diameter of the first through hole 201 provided in a circular shape, it may be possible to implement a circular display on the exterior design even when the touch screen 320 is not fabricated in a relatively expensive circular structure.

[0242] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, the control panel 300 may include a fixed UI section 301 in which a first control UI 301a, of which the display is fixed, is disposed, and a variable UI section 302 in which a second control UI 302a, of which the display-on/off and type are variable, is disposed. Therefore, control signals for processing operations can be more conveniently input by the user.

[0243] In this case, the fixed UI section 301 may be provided as a non-transmissive area 312, and the variable UI section 302 may be provided as the transmissive area 311.

[0244] As described above, since the touch screen 320 is disposed in the variable UI section 302, the variable UI section 302 needs to be formed as a transmissive area 311. In contrast, it may be desirable to provide the fixed UI section 301 as a non-transmissive area 312 and to dispose only UIs that are relatively simple to operate in the fixed UI section.

[0245] In this way, in the laundry treating apparatus 1000 according to the present embodiment, since the fixed UI section 301 and the variable UI section 302 of the control panel 300 are provided as the non-transmissive area 312 and the transmissive area 311, respectively, the variable UI section 302, of which the display-on/off and type vary, may be implemented on the touch screen 320.

[0246] In the laundry treating apparatus 1000 according to an embodiment of the present disclosure, in the fixed UI section 301, an operation signal for the first control UI 301a is input by the button rod contact type, so that the user can easily operate the fixed UI section 301, of which the display is fixed.

[0247] In addition, in the laundry treating apparatus 1000 according to an embodiment of the present disclosure, since an operating signal for the second control UI 302a is input by the touch type in the variable UI section 302, the user may effectively operate the variable UI section 302, of which the display-on/off and type vary.

[0248] Although specific embodiments of the present disclosure have been described above and illustrated in the figures, it will be understood that the present disclosure is not limited to the described embodiments, and various modifications and changes can be made as other specific embodiments by a person ordinarily skilled in the art without departing from the spirit and scope of the present disclosure. Accordingly, the scope of the present disclosure should not be defined by the described embodiments, but should be defined by the technical idea described in the claims.

INDUSTRIAL APPLICABILITY

[0249] According to at least one of the embodiments of the present disclosure, the control panel is installed inside the cabinet cover that defines the exterior, and the control panel is not separated from the cabinet cover on the exterior. Therefore, the cabinet cover is designed as an integrated sheet metal product, so that the aesthetics and productivity of laundry treating apparatus can be improved.

[0250] In addition, according to at least one of the embodiments of the present disclosure, the control panel is installed inside the cabinet cover, and only a portion of the control panel is exposed outside through the first through hole provided in the cabinet cover. Therefore, the exterior design of the laundry treating apparatus can be implemented as a seamless structure by minimizing the exposure of the portions of the control panel that do not need to be exposed to the user.

[0251] In addition, according to at least one of the embodiments of the present disclosure, since the coating guide is fastened to the inner surface of the cabinet cover in the pre-assembled state with the window and the touch screen, the control panel directly coupled inside the cabinet cover can be installed more easily and stably.

[0252] In addition, according to at least one of the embodiments of the present disclosure, the printed circuit board is coupled to the rear surface of the coating guide. Therefore, the printed circuit board can be easily connected to the touch screen.

[0253] In addition, according to at least one of the embodiments of the present disclosure, the panel rib protruding from the lower end portion of the coating guide supports the printed circuit board. Therefore, it is possible to prevent the printed circuit board from being detached due to shock, vibration, or the like.

[0254] In addition, according to at least one of the embodiments of the present disclosure, the coating guide is fastened to the inner side of the cabinet cover in the pre-assembled state with the printed circuit board. Therefore, the control panel can be modularized so that installation work on the cabinet cover can be performed more efficiently.

[0255] In addition, according to at least one of the embodiments of the present disclosure, the first sealing member is interposed between the window and the coating guide. Therefore, waterproofing and impact resistance performance can be secured for the coupling portion between the window and the coating guide.

[0256] In addition, according to at least one of the embodiments of the present disclosure, the control panel is fastened to the hook protrusion protruding from the second through hole provided in the cabinet cover. Therefore, manufacturing efficiency can be improved by forming the hook protrusion for fastening the control panel when forming the second through hole.

[0257] In addition, according to at least one of the embodiments of the present disclosure, the hook at the lower end portion of the coating guide is inserted into and fastened to the hook hole formed by penetrating the hook protrusion in the longitudinal direction. Therefore, the control panel can be easily and stably fastened to the hook protrusion.

[0258] In addition, according to at least one of the embodiments of the present disclosure, the upper end portion of the coating guide is screwed to the inner surface of the cabinet cover. Therefore, the coupling state between the cabinet cover and the control panel can be stably maintained.

[0259] In addition, according to at least one of the embodiments of the present disclosure, the control buttons are installed inside the cabinet cover, and some of these control buttons are exposed outside through the second through holes in the cabinet cover. Therefore, input of control signals for which an intuitive operation, such as a power-on/off or start/stop operation, is desirable can be performed smoothly.

[0260] In addition, according to at least one of the embodiments of the present disclosure, a pair of second through holes and control buttons are arranged as a symmetrical pair on opposite sides of the control panel. Therefore, a plurality of control signals can be input through the control buttons, and a balance on exterior design can be achieved.

[0261] In addition, according to at least one of the embodiments of the present disclosure, the control panel is fastened both to the hook protrusions provided at the pair of second through holes, respectively. Therefore, the control panel can be fastened to the hook protrusions while maintaining balance.

[0262] In addition, according to at least one of the embodiments of the present disclosure, the wireless communication part is installed on the inner surface of the cabinet cover in a state of being coupled to the bottom of the control panel. Therefore, the main components can be efficiently disposed in the internal space of the cabinet cover, and the control panel can be disposed higher in the front upper end portion of the cabinet cover.

[0263] In addition, according to at least one of the embodiments of the present disclosure, UIs are arranged in the fixed UI section and the variable UI section, respectively, which are provided in the control panel, depending on the characteristics thereof. Therefore, control signals for processing operations can be more conveniently input by the user.

[0264] In addition, according to at least one of the embodiments of the present disclosure, the touch screen is displayed through the transmissive area provided in a portion of the window, and the remaining portion of the window is provided as the non-transmissive area. Therefore, various exterior designs can be implemented regardless of the shape of the touch screen.

Claims

1. A laundry treating apparatus comprising:

   a main body that accommodates laundry and performs a processing operation on the laundry;
   a cabinet cover configured to cover the main body to define an exterior and having a first through hole in a front upper end portion thereof; and
   a control panel installed inside the cabinet cover and partially exposed outside through the first through hole such that a control signal for the processing operation can be input by a user,
   wherein the control panel comprises:

      a window that is in close contact with an inner surface of the cabinet cover on a front surface thereof other than an area corresponding to the first through hole;
      a touch screen coupled to a rear surface of the window; and
      a coating guide fastened to the inner surface of the cabinet cover in a state of being coupled to the window and the touch screen on a rear surface of the touch screen.

2. The laundry treating apparatus of claim 1, wherein the control panel further comprises a printed circuit board (PCB) connected to the touch screen and coupled to a rear surface of the coating guide.

3. The laundry treating apparatus of claim 2, wherein the control panel further comprises a panel rib that protrudes rearward from a lower end portion of the coating guide to support the printed circuit board.

4. The laundry treating apparatus of claim 3, wherein the coating guide is fastened to the inner surface of the cabinet cover in a state of being coupled to the printed circuit board.

5. The laundry treating apparatus of claim 1, wherein the control panel further comprises a first sealing member interposed between the window and the coating guide.

6. The laundry treating apparatus of claim 1, wherein the cabinet cover has a hook protrusion protruding rearward from a circumference of the second through hole provided lower than a center of the first

through hole, and
wherein the control panel is fastened to the hook protrusion and coupled to the inner surface of the cabinet cover.

7. The laundry treating apparatus of claim 6, wherein the hook protrusion comprises a hook hole penetrating the hook protrusion in a longitudinal direction, and
wherein the coating guide is fastened when a hook provided in a lower end thereof is inserted into the hook hole.

8. The laundry treating apparatus of claim 7, wherein an upper end portion of the coating guide is screwed to the inner surface of the cabinet cover.

9. The laundry treating apparatus of claim 6, further comprising:
a control button installed inside the cabinet cover and partially exposed outside through the second through hole to be brought into contact with the control panel when pressed by a user.

10. The laundry treating apparatus of claim 9, wherein a pair of second through holes and control buttons are arranged symmetrically on opposite sides of the control panel.

11. The laundry treating apparatus of claim 10, wherein the hook protrusions are provided at the second through holes, respectively, and
wherein the control panel is fastened to both the respective hook protrusions.

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

a wireless communication part installed inside the cabinet cover and configured to transmit and receive a wireless signal to and from outside,
wherein the wireless communication part is installed on the inner surface of the cabinet cover while being coupled to bottom of the control panel.

13. The laundry treating apparatus of claim 1, wherein the control panel comprises:

a fixed UI section where a first control UI, of which display is fixed is placed; and
a variable UI section where a second control UI of which display-on/off and type is variable is disposed.

14. The laundry treating apparatus of claim 1, wherein a portion of the window corresponding to the first through hole is provided as a transmissive area, and a remaining portion is provided as a non-transmissive area, and
wherein the touch screen is coupled to a rear surface of the window and displayed through the transmissive area

FIG. 1

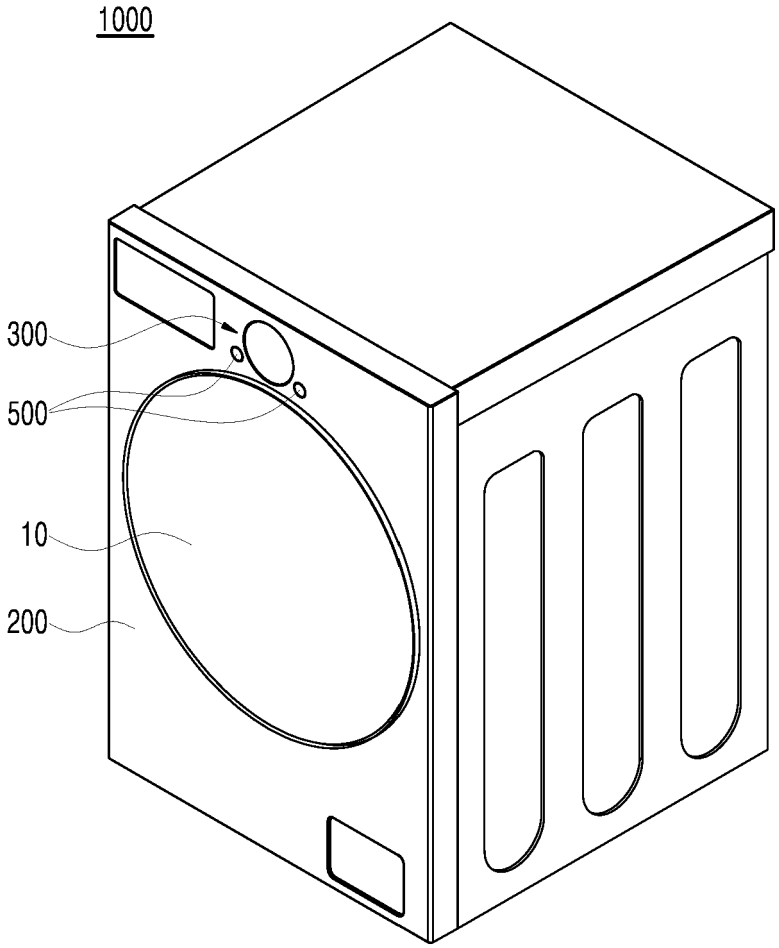


FIG. 2

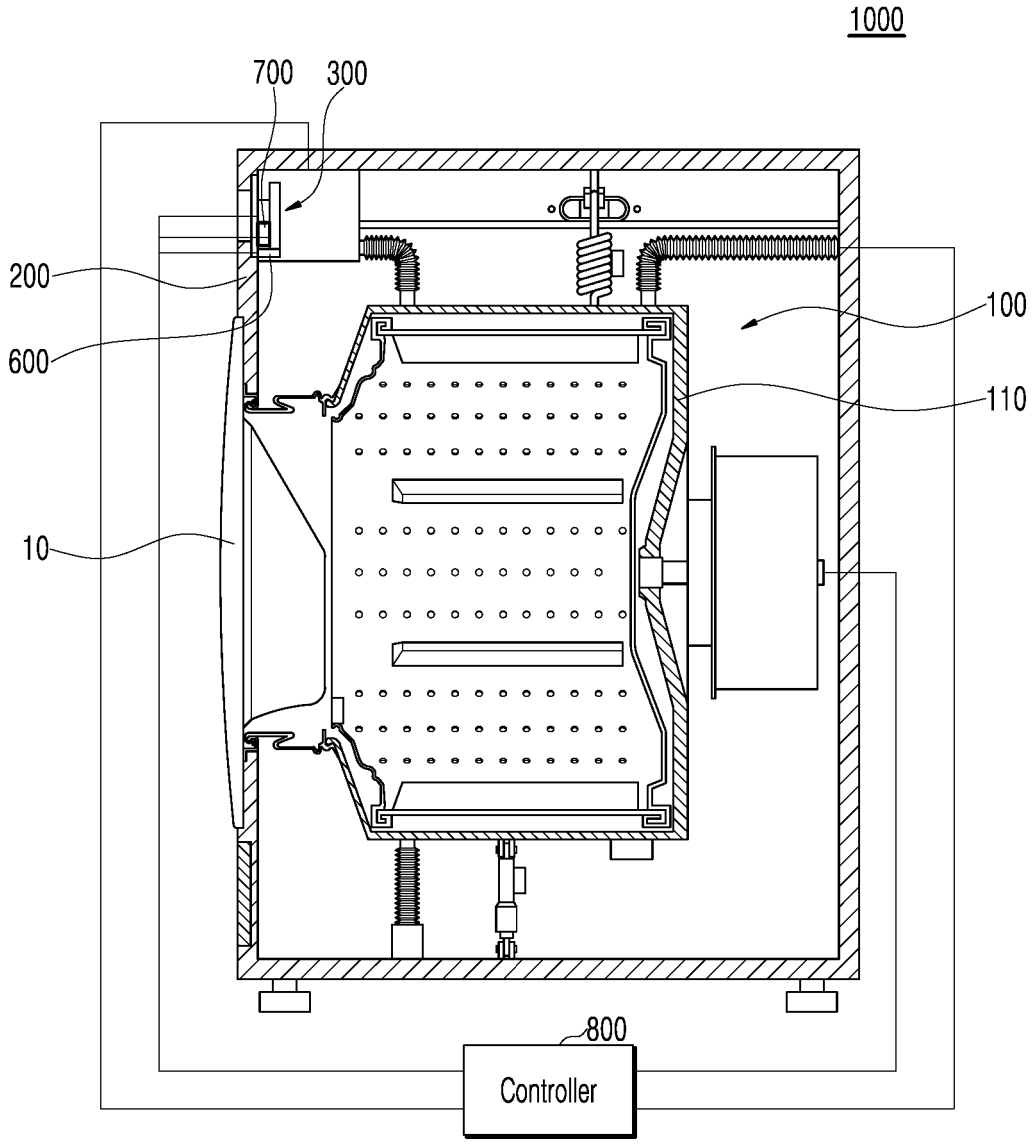


FIG. 3

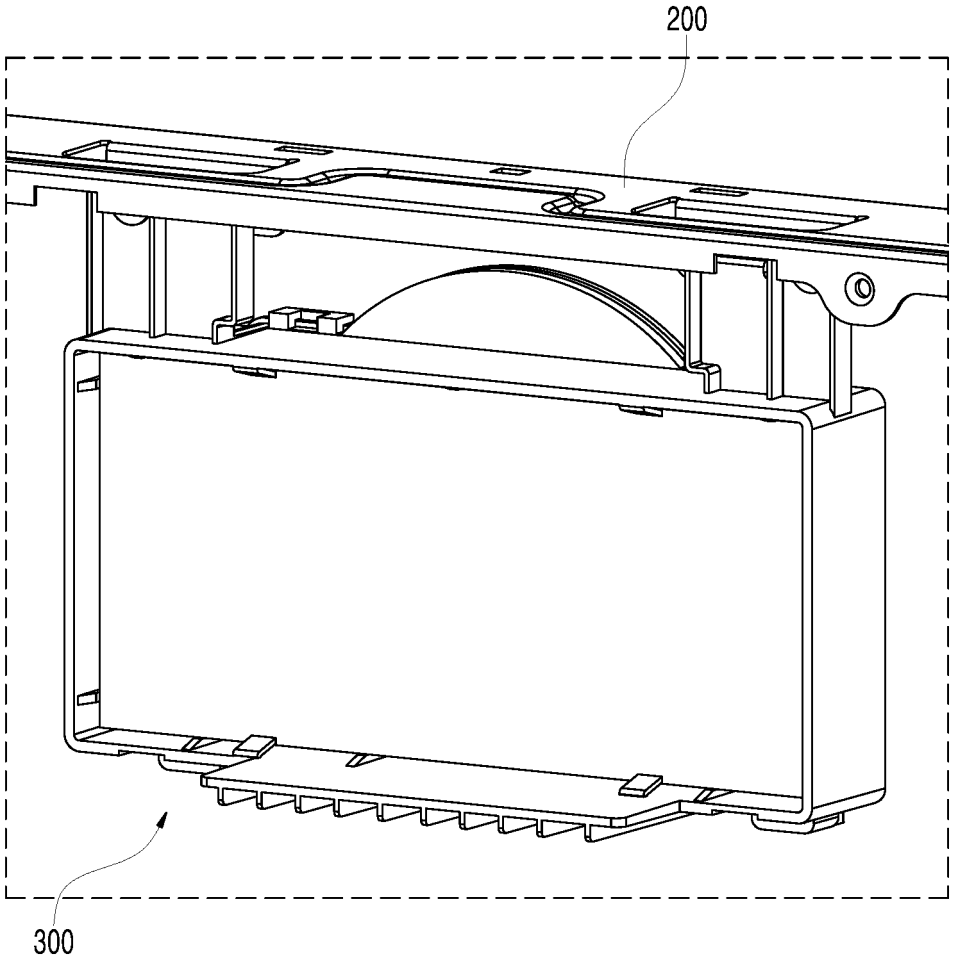


FIG. 4

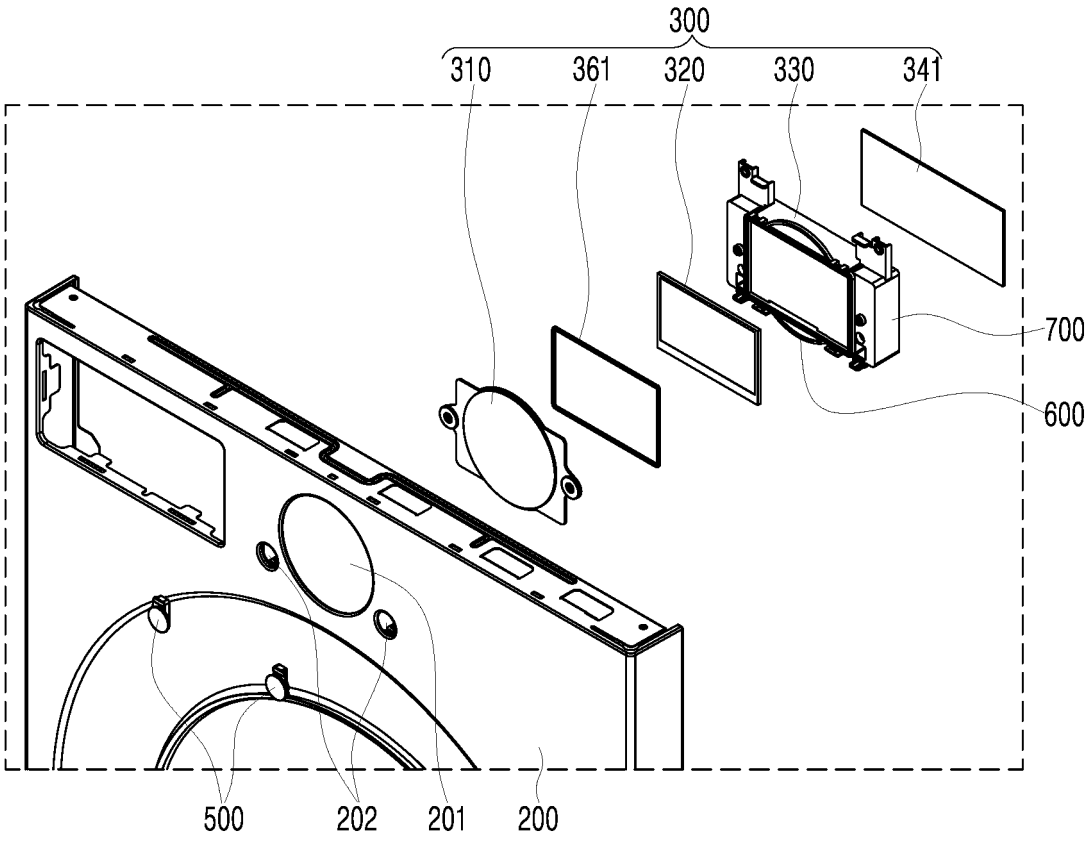


FIG. 5

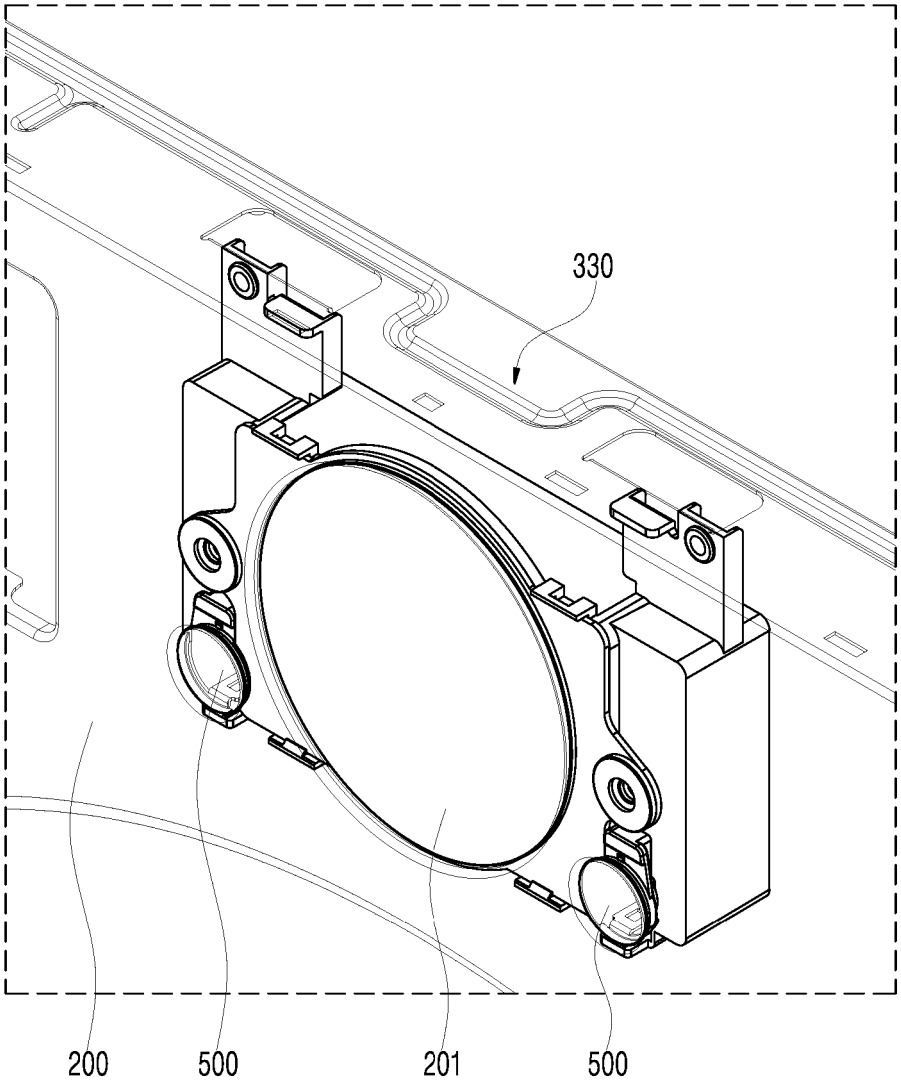


FIG. 6

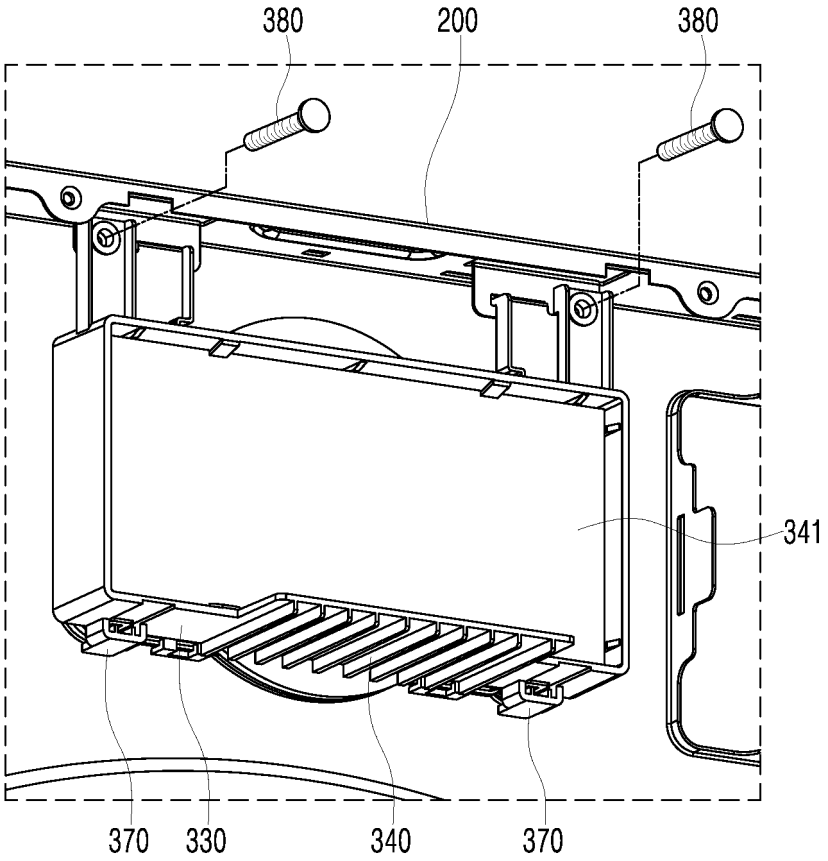


FIG. 7

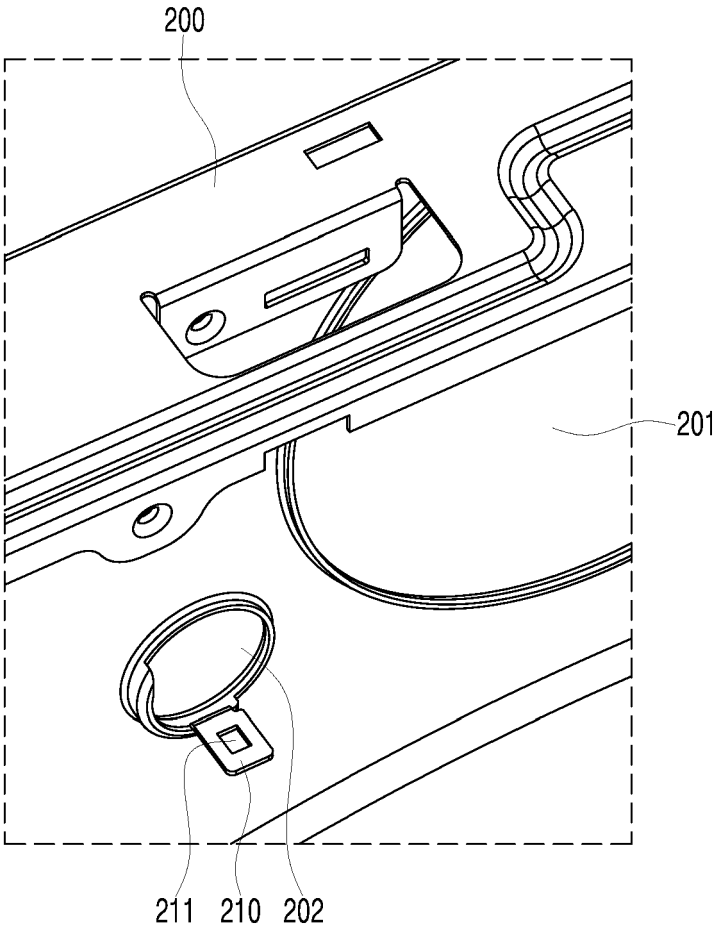


FIG. 8

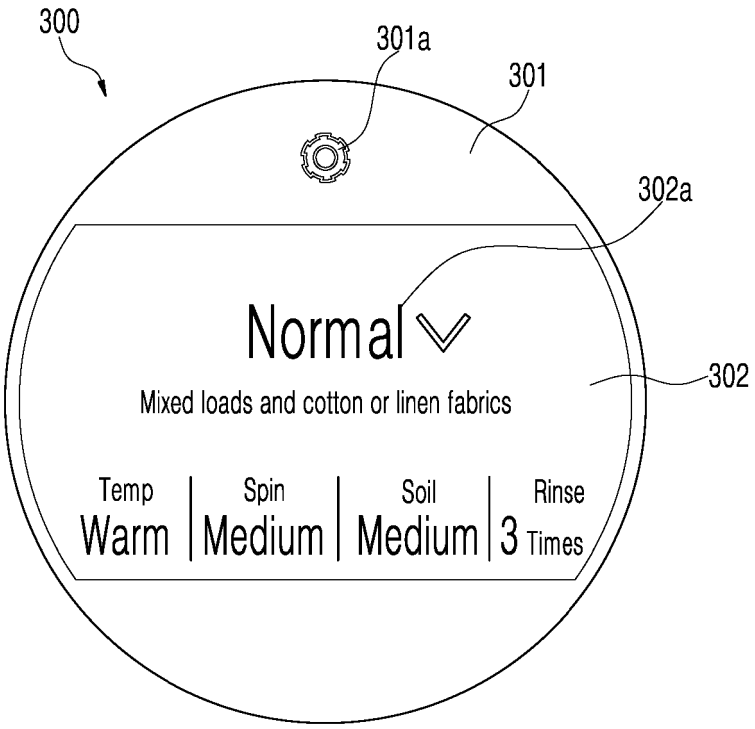

300
301a
301
302a
Normal
302
Mixed loads and cotton or linen fabrics
Temp
Warm
Spin
Medium
Soil
Medium
Rinse
3 Times

FIG. 9

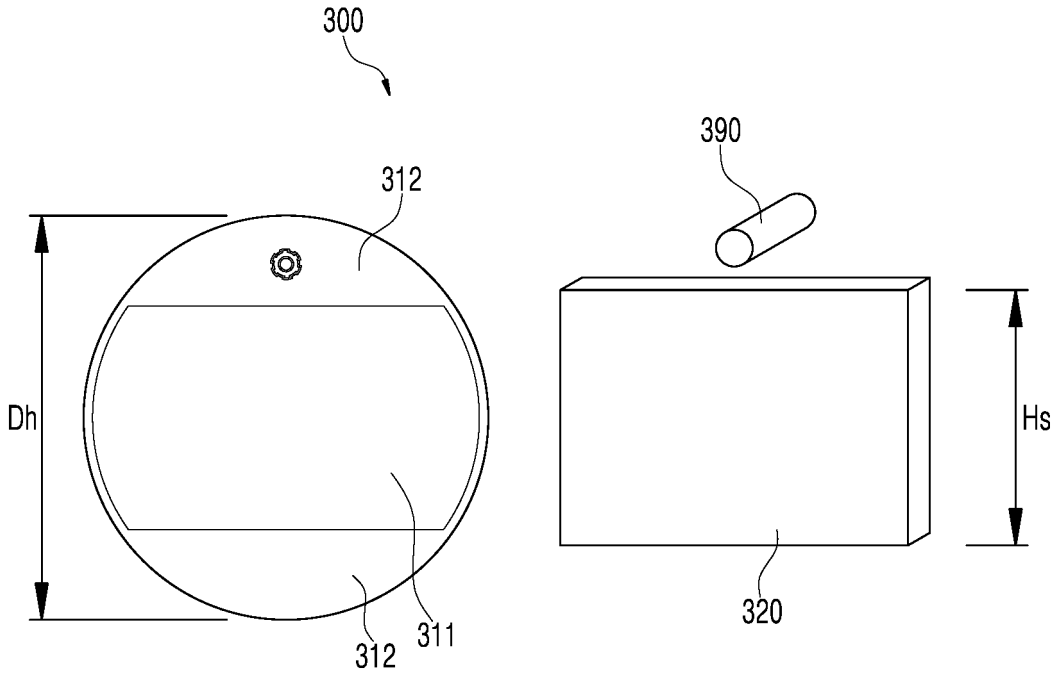

300
312
Dh
312
311
390
320
Hs

FIG. 10

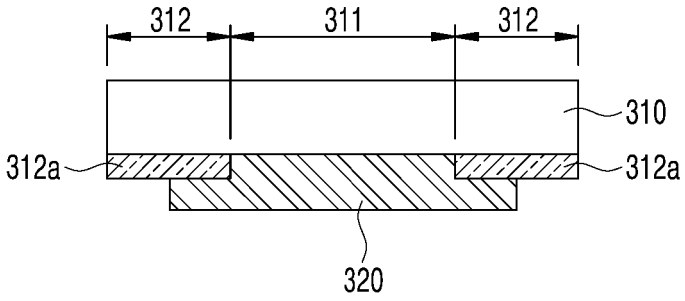


FIG. 11

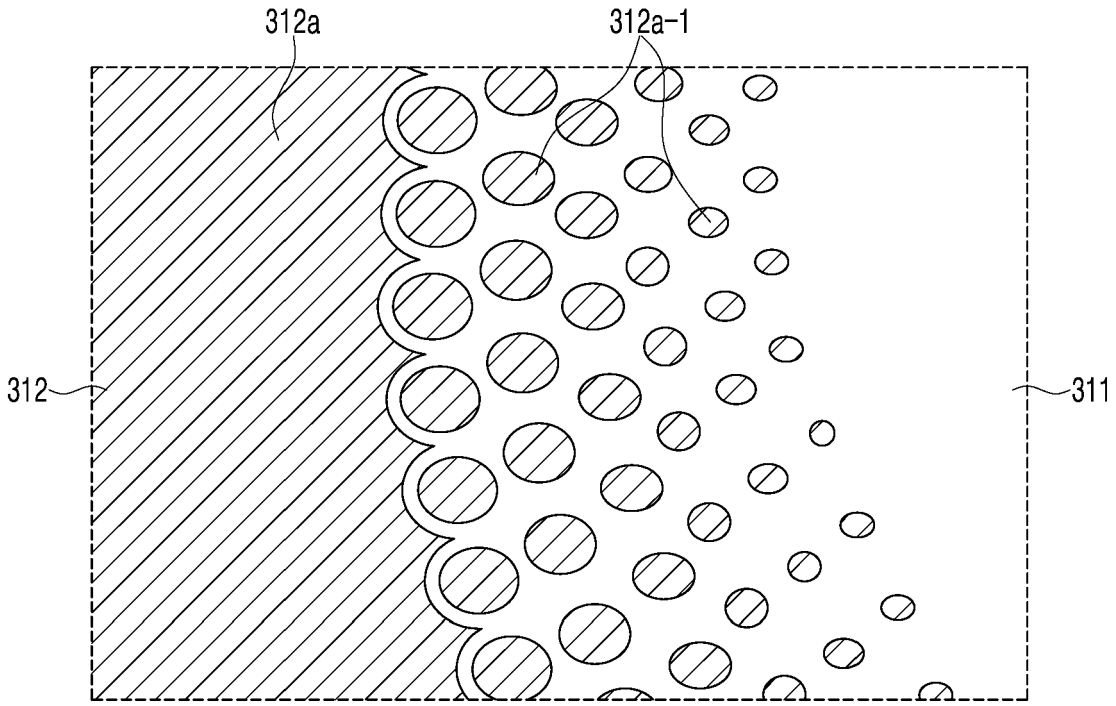
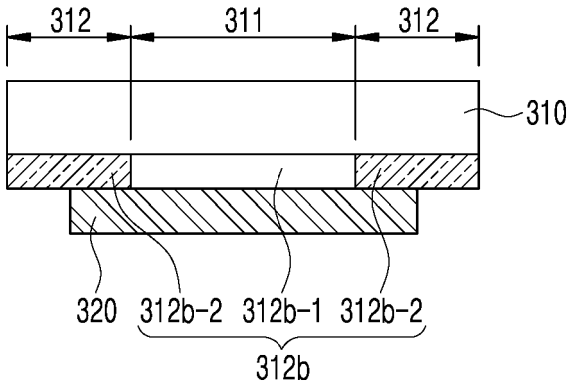


FIG. 12



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2023/014288

A. CLASSIFICATION OF SUBJECT MATTER

D06F 34/34(2020.01)i; **D06F 34/32**(2020.01)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 34/34(2020.01); D06F 33/30(2020.01); D06F 39/00(2006.01); D06F 39/12(2006.01)

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

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

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

eKOMPASS (KIPO internal) & keywords: 세탁물 처리기기(laundry treating apparatus), 캐비닛커버(cabinet cover), 컨트롤패널(control panel), 관통홀(hole), 윈도우(window), 터치스크린(touchscreen), 코팅가이드(coating guide)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 10-1364879 B1 (LG ELECTRONICS INC.) 20 February 2014 (2014-02-20) See paragraphs [0051]-[0052] and [0059]-[0060]; claims 1 and 7; and figures 1-4.	1-14
Y	KR 10-2007-0066604 A (LG ELECTRONICS INC.) 27 June 2007 (2007-06-27) See paragraphs [0022]-[0038]; and figures 3-4.	1-14
Y	KR 10-1122071 B1 (LG ELECTRONICS INC.) 15 March 2012 (2012-03-15) See paragraphs [0025]-[0027]; and figures 2-4.	6-11
Y	KR 10-2017-0111163 A (SAMSUNG ELECTRONICS CO., LTD.) 12 October 2017 (2017-10-12) See paragraph [0021]; claim 1; and figures 1-3.	12
A	JP 2016-059715 A (HITACHI APPLIANCES INC.) 25 April 2016 (2016-04-25) See paragraphs [0010]-[0066]; and figures 1-6.	1-14

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

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
02 January 2024	**02 January 2024**

Name and mailing address of the ISA/KR	Authorized officer
Korean Intellectual Property Office **Government Complex-Daejeon Building 4, 189 Cheongsa-ro, Seo-gu, Daejeon 35208**	
Facsimile No. **+82-42-481-8578**	Telephone No.

Form PCT/ISA/210 (second sheet) (July 2022)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/KR2023/014288

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
KR 10-1364879 B1	20 February 2014	KR 10-2008-0056989 A	24 June 2008
KR 10-2007-0066604 A	27 June 2007	None	
KR 10-1122071 B1	15 March 2012	KR 10-2005-0123232 A	29 December 2005
KR 10-2017-0111163 A	12 October 2017	KR 10-2501691 B1	21 February 2023
		US 10738405 B2	11 August 2020
		US 2017-0275803 A1	28 September 2017
JP 2016-059715 A	25 April 2016	JP 6254920 B2	27 December 2017

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- KR 102257622 **[0008]**
- KR 1020130109356 **[0012]**