(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 579 025 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
02.07.2025 Bulletin 2025/27

(21) Application number: **23872866.1**

(22) Date of filing: **12.09.2023**

(51) International Patent Classification (IPC):
D06F 34/28 *(2020.01)* ***D06F 34/30*** *(2020.01)*
D06F 34/32 *(2020.01)* ***D06F 34/34*** *(2020.01)*
D06F 34/05 *(2020.01)* ***D06F 29/00*** *(2006.01)*
D06F 31/00 *(2006.01)* ***D06F 39/04*** *(2006.01)*
D06F 34/10 *(2020.01)* ***D06F 34/18*** *(2020.01)*

(52) Cooperative Patent Classification (CPC):
D06F 29/00; D06F 31/00; D06F 34/05; D06F 34/10; D06F 34/18; D06F 34/20; D06F 34/28; D06F 34/30; D06F 34/32; D06F 34/34; D06F 39/04

(86) International application number:
PCT/KR2023/013648

(87) International publication number:
WO 2024/071747 (04.04.2024 Gazette 2024/14)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

(30) Priority: **27.09.2022 KR 20220122827**

(71) Applicant: **LG Electronics Inc.**
Yeongdeungpo-gu
Seoul 07336 (KR)

(72) Inventor: **SEO, Kyunghye**
Seoul 08592 (KR)

(74) Representative: **Ter Meer Steinmeister & Partner Patentanwälte mbB**
Nymphenburger Straße 4
80335 München (DE)

(54) APPARATUS FOR TREATING LAUNDRY

(57) The present invention provides an laundry treating apparatus. According to an embodiment, the laundry treating apparatus comprises: a washing machine provided with a first drum accommodating laundry therein; a dryer provided with a second drum accommodating laundry therein; and a control panel that includes a screen on which images are output and provides a user interface (UI) for at least one of the washing machine or the dryer. The apparatus can be activated by a user input, and is provided with a preheating function for preheating the inside of the second drum. If the washing machine is operated in a state in which the preheating function is activated, the operation status of the preheating function and the time remaining until a washing course being performed in the washing machine is completed are output as a single page on the screen.

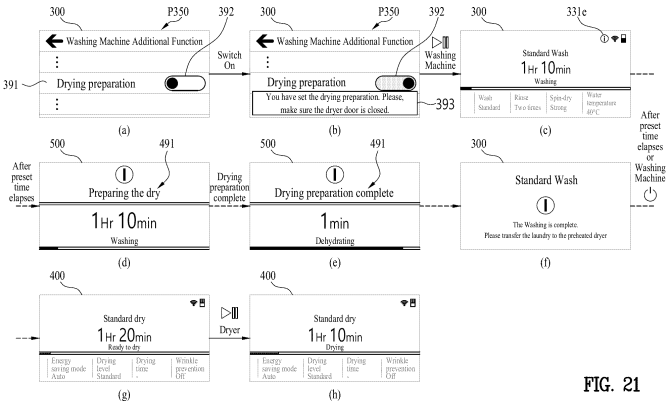


FIG. 21

EP 4 579 025 A1

Description

[Technical Field]

[0001] The present disclosure relates to a laundry treatment apparatus for treating laundry.

[Background Art]

[0002] A laundry treatment apparatus is an apparatus for performing necessary treatment on the laundry, such as removing contamination from the laundry or drying the laundry, by placing the laundry, such as clothing or bedding, inside a drum.

[0003] The necessary treatment of the laundry may be achieved through a course including one or more of a wash cycle, a rinse cycle, a dehydration cycle, a drying cycle, and a refresh cycle. The wash cycle is a process of separating foreign matter attached to the laundry with water and detergent. The rinse cycle is a process of separating the laundry and the foreign matter with water. The dehydration cycle is a process of removing water from the laundry. The drying cycle is a process of removing moisture from the laundry. The refresh cycle is a process of performing one or more of deodorization, wrinkle removal, and sterilization of laundry using one or more of air or steam.

[0004] When the laundry treatment apparatus is arranged to remove contaminants from the laundry, the laundry treatment apparatus may perform cycles such as the washing, rinsing, dehydration, and drying. The laundry treatment apparatus may include a cabinet defining an exterior, a tub accommodated in the cabinet, a drum rotatably mounted inside the tub and configured to receive laundry loaded thereinto, and a detergent supply device configured to supply detergent into the drum. When the drum is rotated by a motor with wash water supplied to the laundry accommodated in the drum, dirt may be removed from the laundry by friction between the laundry and the drum and wash water.

[0005] When the laundry treatment apparatus is arranged to dry the laundry, the laundry treatment apparatus may provide dry air to the laundry to remove moisture from the laundry. The laundry treatment apparatus may include a cabinet, a drum rotatably arranged in the cabinet, and heating means configured to heat or dry the air provided to the laundry. As dry air is provided to the laundry accommodated in the drum, moisture present in the laundry may be evaporated and removed by the dry air, and the laundry may be dried.

[0006] Korean Patent Application Publication No. 10-2022-0029635 A1 discloses a cloth treating apparatus including multiple treating apparatuses. The cloth treating apparatus of the document has a first treating apparatus arranged on the upper side and a second treating apparatus arranged on the lower side. A control panel including an operation part and a display part for controlling the first treating apparatus and the second treating apparatus is provided in the center area of the front of the cloth treating apparatus.

[0007] Recently, consumers' interest in interior design has been increasing. This interest is reflected in the trend of integrating home appliances with furniture. Home appliances, which were previously recognized as electronic devices, are now required to go beyond clunky designs with numerous control buttons and meet the increasingly refined aesthetic preferences of consumers.

[Disclosure]

[Technical Problem]

[0008] An object of the present disclosure is to provide a laundry treatment apparatus that implements a simple user interface for a control panel capable of controlling multiple treatment apparatuses constituting the laundry treatment apparatus, while also enhancing the interior aesthetics when placed in an installation environment.

[0009] Another object of the present disclosure is to provide a laundry treatment apparatus that allows images displayed on the user interface (UI) during the operation of a cycle and/or course to blend aesthetically into the installation space.

[0010] Another object of the present disclosure is to provide a laundry treatment apparatus including a user interface that allows for quick operation between successive household activities.

[0011] Another object of the present disclosure is to provide a laundry treatment apparatus including a user interface that enables the user to check important information comfortably from a long distance and easily identify the operation of the apparatus between successive household activities.

[0012] Another object of the present disclosure is to provide a laundry treatment apparatus that provides a user interface image that may be varied as needed, and that is highly aesthetic.

[0013] Another object of the present disclosure is to provide a laundry treatment apparatus that provides a user interface image that may be varied as needed, and that may increase readability by configuring an image mainly with essential information according to the situation.

[0014] Another object of the present disclosure is to provide a laundry treatment apparatus capable of displaying both

information related to the status of a first treatment apparatus and information related to the status of a second treatment apparatus on one image.

[0015] Each of the first treatment apparatus and the second treatment apparatus included in the present disclosure performs a certain treatment for laundry. One of the first treatment apparatus and the second treatment apparatus may prepare for more efficient treatment before the actual treatment. An object of the present disclosure is to provide a laundry treatment apparatus that provide an image allowing the user to recognize that the preparation may be dependent on the execution of the other one of the first treatment apparatus and the second treatment apparatus.

[0016] Another object of the present disclosure is to provide a laundry treatment apparatus capable of displaying information indicating that a cycle of one of the first treatment apparatus and the second treatment apparatus is being prepared while a cycle of the other one is being performed, and capable of displaying, on one image, both the information about the cycle being performed and the information about the cycle which is being prepared for.

[0017] The objects that may be achieved with the embodiments are not limited to what has been particularly described hereinabove and other objects not mentioned herein will become apparent to those skilled in the art from the following detailed description.

[Technical Solution]

[0018] In one aspect, an laundry treating apparatus is provided. In one embodiment, the apparatus may include a washing machine provided therein with a first drum to accommodate laundry, a dryer provided therein with a second drum to accommodate the laundry, and a control panel including a screen configured to output images, the control panel providing a user interface (UI) for at least one of the washing machine and the dryer. The dryer may have a preheating function of preheating an inside of the second drum, the preheating function being enabled by a user input. Based on the washing machine being operated while the preheating function is enabled, the screen outputs a single page showing an operation status of the preheating function and a remaining time until a washing course executed by the washing machine is completed.

[0019] In one embodiment, the operation status of the preheating function may be one of a first status and a second status. The first status may indicate that an operation for the preheating is on standby or in progress, and the second status may indicate that the preheating is completed.

[0020] In one embodiment, the screen may be a touch screen, wherein the screen may output a first apparatus operation UI for operating the washing machine, and/or a second apparatus operation UI for operating the dryer. The page may include a first area and a second area different from the first area. The remaining time may be displayed in the first area. When a touch input in the first area is received, the first apparatus operation UI is displayed on the screen. The operation status of the preheating function may be displayed in the second area. When a touch input in the second area is received, the second apparatus operation UI may be displayed on the screen

In one embodiment, the dryer may be positioned over the washing machine, and the second area may be positioned over the first area.

[0021] In one embodiment, the preheating may be completed before the washing course executed by the washing machine is completed.

[0022] In one embodiment, the screen may output a first apparatus operation UI for operating the washing machine, and/or a second apparatus operation UI for operating the dryer. Based on the washing course being completed, the output on the screen may switch from the page to the second apparatus operation UI, and the output second apparatus operation UI may display information indicating that the preheating has been completed.

[0023] In one embodiment, based on the preheating function being enabled while the dryer is powered off, the dryer may be powered on.

[0024] In one embodiment, the screen may output a first apparatus operation UI for operating the washing machine, wherein, based on the preheating function being enabled, an indicator may be displayed on the first apparatus operation UI to indicate that the preheating function is enabled.

[0025] In one embodiment, the screen may output a first apparatus operation UI for operating the washing machine. Based on the washing machine being operated with the preheating function enabled, the screen may output the first apparatus operation UI earlier than the page. After a preset time elapses, the output on the screen may switch from the first apparatus operation UI to the page.

[0026] In one embodiment, based on the washing machine being operated with the preheating function enabled, it may be sensed whether a door of the dryer is closed as a condition for executing the preheating function. Based on the door not being closed, the operation status of the preheating function may be displayed as a third status indicating that the door is not closed.

[0027] In one embodiment, based on the execution condition not being satisfied, a notification pop-up indicating that the condition for the execution is not satisfied may be output on the screen with higher priority than the single page.

[0028] In another aspect of the present disclosure, an laundry treating apparatus may include a first treatment apparatus

having a first drum configured to accommodate laundry therein, the first treatment apparatus being configured to perform a first treatment for the laundry accommodated in the first drum, a second treatment apparatus having a second drum configured to accommodate laundry therein, the second treatment apparatus being configured to perform a second treatment for the laundry accommodated in the second drum, and a control panel including a screen configured to output images, the control panel displaying a user interface (UI) for at least one of the first treatment apparatus and the second treatment apparatus, wherein the second treatment apparatus may provide a pre-preparation function of performing a pre-preparation operation before execution of the second treatment to improve efficiency of the second treatment. The pre-preparation function may be enabled by a user input. Based on the first treatment being performed by the first treatment apparatus while the pre-preparation function is enabled, the screen may output a single page showing an operation status of the pre-preparation function and a remaining time until the first treatment is completed.

[0029] In one embodiment, the operation status of the pre-preparation function may be one of a first status indicating the pre-preparation operation is on standby or in progress, and a second status indicating the pre-preparation operation is completed.

[0030] In one embodiment, the screen may be a touch screen. A first apparatus operation UI for operating the first treatment apparatus, and/or a second apparatus operation UI for operating the second treatment apparatus may be output on the screen the screen. The page may include a first area and a second area different from the first area. The remaining time may be displayed in the first area. When a touch input in the first area is received, the first apparatus operation UI is displayed on the screen. The operation status of the preheating function may be displayed in the second area. When a touch input in the second area is received, the second apparatus operation UI may be displayed on the screen

In one embodiment, when viewed from the front, the first treatment apparatus may be positioned over or under the second treatment apparatus. Based on the first treatment apparatus being positioned over the second treatment apparatus, the first area may be positioned over the second area. Based on the first treatment apparatus being positioned under the second treatment apparatus, the first area may be positioned under the second area.

[0031] In one embodiment, the second treatment apparatus may perform the second treatment after the first treatment performed by the first treatment apparatus is completed. The pre-preparation operation may be executed while the first treatment is in progress.

[0032] In one embodiment, the pre-preparation operation may be completed before the first treatment may be completed.

[0033] In one embodiment, the screen may output a first apparatus operation UI for operating the first treatment apparatus, and/or a second apparatus operation UI for operating the second treatment apparatus. Based on the first treatment being completed, the output on the screen may switch from the page to the second apparatus operation UI, wherein the second apparatus operation UI may display information indicating that the pre-preparation operation has been completed.

[0034] In one embodiment, based on the pre-preparation function being enabled while the second treatment apparatus is powered off, the second treatment apparatus may be powered on.

[0035] In one embodiment, the screen may output the first apparatus operation UI for operating the first treatment apparatus, wherein, based on the pre-preparation function being enabled, an indicator may be displayed on the first apparatus operation UI to indicate that the pre-preparation function is enabled.

[0036] In one embodiment, based on the first treatment being performed by the first treatment apparatus with the pre-preparation function enabled, it may be sensed whether a condition for executing the pre-preparation operation is satisfied.

[0037] In one embodiment, based on the execution condition not being satisfied, the operation status of the pre-preparation function may be displayed as a third status indicating that the execution condition is not satisfied.

[Advantageous Effects]

[0038] According to various embodiments, a laundry treatment apparatus may implement a simple user interface for a control panel capable of controlling multiple treatment apparatuses constituting the laundry treatment apparatus, while also enhancing the interior aesthetics when placed in an installation environment.

[0039] According to various embodiments, a laundry treatment apparatus may allow images displayed on the user interface (UI) during the operation of a cycle and/or course to blend aesthetically into the installation space.

[0040] According to various embodiments of the present disclosure, a laundry treatment apparatus may include a user interface that allows for quick operation between successive household activities.

[0041] According to various embodiments of the present disclosure, a laundry treatment apparatus may include a user interface that enables the user to check important information comfortably from a long distance and easily identify the operation of the apparatus between successive household activities.

[0042] According to various embodiments of the present disclosure, a laundry treatment apparatus may provide a user interface image that may be varied as needed, and may be highly aesthetic.

[0043] According to various embodiments of the present disclosure, a laundry treatment apparatus may provide a user interface image that may be varied as needed, and may increase readability by configuring an image mainly with essential information according to the situation.

[0044] According to various embodiments of the present disclosure, a laundry treatment apparatus may display both information related to the status of a first treatment apparatus and information related to the status of a second treatment apparatus on one image.

[0045] According to various embodiments of the present disclosure, each of the first treatment apparatus and the second treatment apparatus may perform a certain treatment for laundry. One of the first treatment apparatus and the second treatment apparatus may prepare for more efficient treatment before the actual treatment. A laundry treatment apparatus may provide an image allowing the user to recognize that the preparation may be dependent on the execution of the other one of the first treatment apparatus and the second treatment apparatus

[0046] According to various embodiments of the present disclosure, a laundry treatment apparatus may display information indicating that a cycle of one of the first treatment apparatus and the second treatment apparatus is being prepared while a cycle of the other one is being performed, and may display, on one image, both the information about the cycle being performed and the information about the cycle which is being prepared for.

[0047] The effects of the present disclosure are not limited to those described above, and other effects not described will be apparent to one of ordinary skill in the art from this description and the accompanying drawings.

[Description of Drawings]

[0048]

FIG. 1 is a perspective view of a laundry treatment apparatus according to one embodiment of the present disclosure.

FIG. 2 is a schematic diagram illustrating the interrelationship between a control panel, a first treatment apparatus, and a second treatment apparatus according to one embodiment of the present disclosure.

FIG. 3 is a front perspective view of a control panel according to one embodiment of the present disclosure.

FIG. 4 is an exploded perspective view of a control panel according to one embodiment of the present disclosure.

FIG. 5 is an exploded view of a UI part according to one embodiment of the present disclosure.

FIG. 6A shows a table listing various touch gestures for touching the touch input part according to one embodiment of the present disclosure.

FIG. 6B shows a table listing, by cause, the flows that switch images on the screen.

FIG. 7 illustrates a cycle flow according to one embodiment when a washing machine is provided as a first treatment apparatus or a second treatment apparatus.

FIG. 8 illustrates a cycle flow according to one embodiment when a dryer is provided as the first treatment apparatus or the second treatment apparatus according to one embodiment of the present disclosure.

FIG. 9 illustrates a first apparatus operation UI displayed on a touch screen according to one embodiment of the present disclosure, wherein a course selection page is output according to one embodiment.

FIG. 10 illustrates a change and flow of pages output on a first apparatus operation UI displayed on a touch screen in a UI part according to one embodiment of the present disclosure.

FIG. 11 illustrates a change and flow of pages output on the first apparatus operation UI displayed on a touch screen according to one embodiment of the present disclosure.

FIG. 12 illustrates an embodiment of a second page output on the first apparatus operation UI according to one embodiment of the present disclosure.

FIG. 13 illustrates an embodiment of an error page P340 output on the first apparatus operation UI according to one embodiment of the present disclosure.

FIG. 14 shows a UI part according to one embodiment of the present disclosure, and illustrates a flow of outputting a composite UI.

FIG. 15 illustrates a flow of receiving an input command for each of the parts labeled (1), (2), (3), and (4) in (d) of FIG. 14, and changing a page output on a touch screen.

FIG. 16 illustrates an embodiment of a composite UI according to one embodiment of the present disclosure.

FIG. 17 illustrates an embodiment of a composite UI according to embodiments of the present disclosure, wherein (a) is an embodiment for occurrence of an error in the second treatment apparatus, and (b) is an embodiment for occurrence of an error in the first treatment apparatus.

FIG. 18 illustrates an embodiment and flow of outputting a composite UI on a touch screen according to one embodiment of the present disclosure.

FIG. 19 illustrates in (e) a case where input is received through a first start/pause button while the composite UI is output as in (d) of FIG. 18, and illustrates in (f) a case where input is received through a second start/pause button.

FIG. 20 illustrates a UI part in which the first treatment apparatus is powered on and the second treatment apparatus is

powered off according to one embodiment of the present disclosure, while a course selection page of a first apparatus operation UI is output on a touch screen

FIG. 21 illustrates a flow in which the drying preparation function is set as a pre- preparation function according to one embodiment of the present disclosure, and illustrates pages displayed on the touch screen for each flow when the drying preparation function is set and a course of the first treatment apparatus is executed.

FIG. 22 illustrates a flow in which the drying preparation function is set as a pre-preparation function according to one embodiment of the present disclosure, and illustrates pages displayed on the touch screen for each flow when the drying preparation function is set and a treatment course of the first treatment apparatus is executed without the conditions for executing the drying preparation function being satisfied.

[Best Mode]

[0049] Hereinafter, embodiments of the present disclosure will be described in detail with reference to the accompanying drawings to provide a further understanding of the present disclosure to those of ordinary skill in the art.

[0050] It will be apparent to those skilled in the art that the present disclosure may be implemented in various different forms and is not limited to the embodiments described herein. In the drawings, parts irrelevant to the description have been omitted in order to clearly describe the present disclosure. Wherever possible, the same reference numbers will be used throughout the specification to refer to the same or like parts.

[0051] In the present disclosure, redundant descriptions of the same components are generally omitted.

<Definition of Terms>

[0052] As used in the following description, the term "laundry treatment apparatus" refers to any apparatus capable of treating laundry by washing, drying, or refreshing the laundry. As used herein, the term "treatment apparatus" refers to any apparatus capable of treating laundry by washing or drying the laundry, but is defined as a subordinate concept of the "laundry treatment apparatus." In the embodiments shown and described, the laundry treatment apparatus is an apparatus provided with a first treatment apparatus and a second treatment apparatus stacked on top of each other.

[0053] As used in the following description, the term "treatment of laundry" refers to treatments such as washing, sterilization, bleaching, softening, and drying performed on laundry. The treatment of laundry may be achieved by cycles and courses performed by the laundry treatment apparatus. One or more cycles are combined to form a course. One or more cycles are arranged in chronological order and may be combined to form a course. The cycles include a wash cycle, a rinse cycle, a dehydration cycle, a cooling cycle, and a refresh cycle. The wash cycle is a process of separating foreign matter attached to the laundry with water and detergent. The rinse cycle is a process of separating the laundry and the foreign matter with water. The dehydration cycle is a process of removing water from the laundry. The drying cycle is a process of removing moisture from the laundry. The cooling cycle is a process of reducing the temperature of heated laundry. The refresh cycle is a process of performing one or more of deodorization, wrinkle removal, and sterilization of laundry using one or more of air or steam.

[0054] As used in the following description, the term "detergent" refers to any substance used to sterilize or disinfect clothing, fabrics, or the like or remove impurities therefrom. In one embodiment, the detergent may be in the form of a solid, such as a powder, or a liquid.

[0055] As used in the following description, the term "softener" refers to any substance or chemical used to soften clothing, fabrics, or the like.

[0056] As used in the following description, the term "bleach" refers to any substance or chemical that chemically decomposes and removes colored substances contained in the fabrics or the like to whiten fabrics or the like.

[0057] As used in the following description, the term "laundry treating agent" refers to any substance capable of causing a chemical or physical effect to treat laundry. In one embodiment, the laundry treating agent may encompass detergent, fabric softener, and bleaches.

[0058] As used in the following description, the term "fluid" refers to any fluid that may be mixed with a laundry treating agent, or that may act as a solvent for the laundry treating agent. In one embodiment, the fluid may be wash water, i.e., water.

[0059] As used in the following description, the terms "upper side," "lower side," "left side," "right side," "front side" and "rear side" are to be understood with reference to the coordinate system in the referenced drawings.

[0060] In this specification, when a component is referred to as being "connected" or "coupled" to another component, it is to be understood that it may be directly connected or coupled to the other component, or that there may be other components in between. On the other hand, when a component is referred to in this specification as being "directly connected" or "directly coupled" to another component, it is to be understood that there are no other components in between.

[0061] The terms used in this specification are merely used to describe particular embodiments and are not intended to

limit the disclosure.

[0062] As used herein, the singular forms "a," "an," and "the" include plural referents unless context clearly dictates otherwise.

[0063] As used herein, the terms "includes" or "has" are intended to specify the presence of the features, numbers, steps, operations, components, parts, or combinations thereof disclosed in the specification, and are not to be understood as precluding the possibility of the presence or addition of one or more other features, numbers, steps, operations, components, parts, or combinations thereof.

[0064] As used herein, the term "and/or" includes a combination of a plurality of listed items or any of the plurality of listed items. As used herein, "a or b" may include "a," "b," or "both a and b."

[0065] FIG. 1 shows a laundry treatment apparatus 1 according to one embodiment of the present disclosure. In the embodiment, the laundry treatment apparatus 1 includes a first treatment apparatus 10, a second treatment apparatus 20, and a control panel 2000.

[0066] In the description of the present disclosure, the terms forward direction (+X), backward direction (-X), first side direction (+Y), second side direction (-Y), upward direction (+Z), and downward direction (-Z) may be consistently defined for the respective elements. For example, the front-to-back direction (+X, -X) of the first treatment apparatus 10 may be defined as the same as the front-to-back direction of the second treatment apparatus 20, the control panel 2000, and the like, and the side direction (Y) and the up-down direction (Z) may be defined similarly.

[0067] The first treatment apparatus 10 and the second treatment apparatus 20 may be of various types for treating laundry, such as a washing machine for washing laundry and/or a dryer for drying laundry. The first treatment apparatus 10 may be a washing machine and the second treatment apparatus 20 may be a dryer. The first treatment apparatus 10 and the second treatment apparatus 20 may both be washing machines or dryers. The first treatment apparatus 10 may be a dryer and the second treatment apparatus 20 may be a washing machine. They may be various apparatuses for treating laundry.

[0068] In an embodiment, the first treatment apparatus 10 arranged on the lower side may correspond to a washing machine for washing laundry. A first drum 12 and a tub 14 to accommodate laundry may be provided in the first treatment apparatus 10. The first drum 12 in the first treatment apparatus 10 may be rotatably arranged inside the tub 14. In one embodiment, the first drum 12 has a shaft arranged in the front-to-back direction (+X, -X).

[0069] The first treatment apparatus 10 may include a first cabinet 110 defining an exterior. The first cabinet 110 may include a first front panel 112 arranged on a front side. The first front panel 112 may include a laundry opening in communication with the inside of the first drum 12. The laundry opening may be opened and closed by a first cabinet door 17. Through the laundry opening, laundry or the like required to be treated may be introduced into the first cabinet 110 and accommodated in the first drum 12. The first treatment apparatus 10 may process the accommodated laundry. The first treatment apparatus 10 may perform treatments on the accommodated laundry, such as washing, drying, or the like.

[0070] The first treatment apparatus 10 may be provided with a first side panel 115 arranged on each side facing in the side direction Y, a first rear panel (not shown) arranged on the rear side, a first top panel (not shown) arranged on the upper side, and a first bottom panel (not shown) arranged on the lower side.

[0071] The first front panel 112, the first side panel 115, the first rear panel (not shown), the first top panel 119, and the first bottom panel (not shown) may be combined with each other to form the first cabinet 110, and may be coupled to each other. The first cabinet 110 may define a space in which built-in components constituting the first treatment apparatus 10, such as the first drum 12, are arranged. A detergent opening is formed in the first front panel 112, and the detergent storage part 30 is inserted into the detergent opening. In the laundry treatment apparatus 1 according to one embodiment, the first treatment apparatus 10 is arranged on the ground. The detergent storage part 30 may be positioned above the laundry opening of the first treatment apparatus 10, such that insertion and withdrawal of the detergent storage part 30 may be facilitated. The detergent storage part 30 may be positioned between the laundry opening of the first treatment apparatus 10 and the control panel 2000. The detergent storage part 30 may be positioned above the laundry opening of the first treatment apparatus 10 and below the control panel 2000. The detergent storage part 30 may be inserted into or drawn out of the first cabinet 110 by a user. For example, the user may separate the detergent storage part 30 from the first cabinet 110, store detergent in the detergent storage part 30, and then insert the detergent storage part 30 back into the first cabinet 110.

[0072] In one embodiment, a filter opening is formed in the first front panel 112. A filter part 40 is inserted into the filter opening. The filter part 40 is configured to capture foreign matter from the wash water. Through the filter opening, the filter part 40 may be introduced into the first cabinet 110. The filter part 40 may be arranged on one side of a lower portion of the first front panel 112. The filter part 40 may be connected to the flow path for which wash water discharged from the tub 14. The filter part 40 may filter out foreign matter from the wash water discharged from the tub 14 after the washing process is performed. The function of the filter part 40 is not necessarily limited thereto, and may be arranged to filter out foreign matter from various objects. For example, the filter part 40 may be arranged to filter out foreign matter from wash water for the wash cycle prior to the wash cycle.

[0073] A user may insert or withdraw the filter part 40 into or out of the first cabinet 110 through the filter opening. Once

withdrawn, the filter part 40 may be cleaned and reused or may be replaced. The filter part 40 may have a longer cycle of insertion and withdrawal than the detergent storage part 16. Accordingly, in one embodiment of the present disclosure, the detergent opening through which the detergent storage part 30 having a relatively short insertion and withdrawal cycle is inserted may be disposed on the upper side of the first front panel 112. Also, the filter opening through which the filter part 40 having a relatively long insertion and withdrawal cycle is inserted may be disposed on the lower side of the first front panel 112 to realize the structure of the first front panel 112 that provides excellent space utilization while improving user convenience.

[0074] Further, the wash water discharge flow path connected to the tub 14 inside the first cabinet 110 may be positioned on a lower side within the first cabinet 110 to facilitate the discharge of wash water. In one embodiment of the present disclosure, the filter part 40 may be arranged on the lower side of the first cabinet 110 to efficiently connect with the wash water discharge path.

[0075] The first treatment apparatus 10 may be provided with a first apparatus controller 19. The first apparatus controller 19 is configured to control various apparatuses including the first treatment apparatus 10. The first apparatus controller 19 is disposed inside the first cabinet 110. The first apparatus controller 19 may include a circuit board and electronic components mounted on the circuit board. In an embodiment, the first apparatus controller 19 may check information corresponding to an operation signal received through the control panel 2000 in a memory and perform apparatus control corresponding to the operation signal based on the information. The first apparatus controller 19 may transmit the status of the first treatment apparatus 10 to the control panel 2000.

[0076] In an embodiment, the second treatment apparatus 20 is positioned on the upper side of the first treatment apparatus 10. The first treatment apparatus 10 supports the second treatment apparatus 20. The second treatment apparatus 20 may correspond to a dryer for drying laundry. The second treatment apparatus 20 may include a second drum 22. The second drum 22 may accommodate the laundry therein. In an embodiment, the second drum 22 has a rotation shaft arranged in the front-to-back direction (+X, -X).

[0077] The second treatment apparatus 20 may include a second cabinet 120 defining an exterior. The second cabinet 120 may include a second front panel 122 arranged on a front side. The second front panel 122 may include a laundry opening communicating with the second drum 22. The laundry opening may be opened and closed by a second cabinet door 27.

[0078] The second treatment apparatus 20 may be provided with a second side panel 125 on each side facing in the side direction (+Y, -Y). Further, the second treatment apparatus 20 may have a second rear panel (not shown) arranged on the rear side, a second top panel (not shown) arranged on the upper side, and a second bottom panel (not shown) arranged on the lower side.

[0079] In an embodiment, the second front panel 122, the second side panel 125, the second rear panel (not shown), the second top panel 127, and the second bottom panel (not shown) may be combined with each other to form the second cabinet 120, and may be coupled to each other. The second cabinet 120 may define a space in which built-in components constituting the second treatment apparatus 20, such as the second drum 22, are arranged.

[0080] Laundry or the like required to be treated may be accommodated in the second drum 22 through the laundry opening in the second treatment apparatus 20. The second treatment apparatus 20 may process the accommodated laundry, and the laundry accommodated in the second drum 22 may be subjected to treatments such as washing, drying, and the like by the second treatment apparatus 20.

[0081] The second treatment apparatus 20 is disposed on top of the first treatment apparatus 10. In one embodiment, the upper portion of the first treatment apparatus 10 may be coupled to the lower portion of the second treatment apparatus 20. A structure that supports the second treatment apparatus 20 may be provided on the top side of the first treatment apparatus 10. For example, the first top panel (not shown) of the first treatment apparatus 10 may have a structure that directly or indirectly supports the second bottom panel (not shown) of the second treatment apparatus 20.

[0082] The second treatment apparatus 20 may be provided with a second apparatus controller 29. The second apparatus controller 29 is configured to control various devices constituting the second treatment apparatus 20. The second apparatus controller 29 is disposed inside the second cabinet 120. The second apparatus controller 29 may include a circuit board and electronic components mounted on the circuit board. In an embodiment, the second apparatus controller 29 may check information corresponding to an operation signal received through the control panel 2000 in a memory and perform apparatus control corresponding to the operation signal. The second apparatus controller 29 may transmit the status of the second treatment apparatus 20 to the control panel 2000.

[0083] The control panel 2000 is disposed between the first front panel 112 and the second front panel 122. The control panel 2000 may be positioned at a height approximately corresponding to the waist of the user. When the control panel 2000 is positioned at a height approximately corresponding to the user's waist, operational convenience may be enhanced for the user. In an embodiment, the control panel 2000 is positioned above the first front panel 112 and below the second front panel 122, and the height of the first front panel 112 and the height of the second front panel 122 may be set appropriately. In some embodiments, at least a portion of the first front panel 112 may face the side panel 125 of the second treatment apparatus 20.

[0084] The control panel 2000 may be connected to at least one of the first treatment apparatus 10 and the second treatment apparatus 20 to transmit and receive signals. In an embodiment, the control panel 2000 is connected to transmit and receive signals to and from the first treatment apparatus 10 and the second treatment apparatus 20. In an embodiment, the control panel 2000 is connected to transmit and receive signals to and from the first apparatus controller 19 and/or the second treatment apparatus 20. The connections described above may include wired or wireless connections.

[0085] A front portion 2110 of the control panel 2000 is provided with a user interface (UI) part 200 on which a UI is displayed.

[0086] FIG. 2 is a schematic diagram illustrating the interrelationship between a control panel 2000, the first treatment apparatus 10, and the second treatment apparatus 20 according to one embodiment of the present disclosure.

[0087] According to one embodiment of the present disclosure, the control panel 2000 may include a display part 2001, an input part 2002, and a controller 2003. The UI part 200 may include the display part 2001 and the input part 2002.

[0088] The display part 2001 is an element to display one or more pieces of information for interaction with a user. The display part 2001 may indicate the status of the first treatment apparatus 10 and/or the second treatment apparatus 20. The display part 2001 may display the status of the first treatment apparatus 10 and/or the second treatment apparatus 20. The display part 2001 is provided in the UI part 200. The display part 2001 displays information about at least one of the first treatment apparatus 10 and the second treatment apparatus 20. In an embodiment, the information includes information about courses that may be executed on the first treatment apparatus 10 and/or the second treatment apparatus 20, information (related to, for example, a course name and time remaining until the course is completed) about a treatment that is being operated by the first treatment apparatus 10 and/or the second treatment apparatus 20, information about an ongoing cycle (e.g., the name of the cycle), information about a set treatment option, information about a communication connection status, information about a remote control setting, information about a door lock status, information about a drying preparation setting, information about a turbo shot setting, information about a steam setting, information about an ironing alarm setting, information about a wrinkle prevention setting, and information about a reservation setting.

[0089] The input part 2002 is configured to receive input from a user for operational instructions for control of the first treatment apparatus 10 and/or the second treatment apparatus 20. The input part 2002 may be provided on the control panel 2000. The input part 2002 may be provided as a touch screen. The input part 2002 may be provided as a touch sensor. The input part 2002 may be provided as a physical button.

[0090] The controller 2003 may include a microprocessor configured to execute control of the first treatment apparatus 10 and/or the second treatment apparatus 20, and a memory storing a control program for executing control of the first treatment apparatus 10 and/or the second treatment apparatus 20. The control program may be stored on a memory medium in the memory, wherein the memory medium may be a hard disk, a disc such as a CD-ROM or DVD, or a semiconductor memory such as flash memory. The controller 2003 may be arranged inside the control panel 2000, i.e., on the rear side of the front portion 2110. The controller 2003 may include one or more controllers. The controller 2003 may be connected to the first treatment apparatus 10 and/or the second treatment apparatus 20 to transmit and receive signals. The connection may include a wired connection or a wireless connection.

[0091] The controller 2003 may be connected to the display part 2001 and/or the input part 2002 to transmit and receive signals. The signals may include a control command, user input, and apparatus status information. The controller 2003 may detect operation signals from the input part 2002. The controller 2003 may check information corresponding to the input operation signal in the memory. The controller 2003 may transmit display data to the display part 2001. The display part 2001 may display the status of the first treatment apparatus 10, the status of the second treatment apparatus 20, and/or the content of the command input from the user in response to the display data received from the controller 2003. The controller 2003 may switch the components constituting the input part 2002 to an enabled or disabled state. The controller 2003 may switch the components constituting the display part 2001 to an enabled or disabled state. The controller 2003 may include a circuit board, and electronics mounted on the circuit board.

[0092] Although the controller 2003 is described as being included in the control panel 2000 in the embodiment, the controller 2003 may not be categorized as part of the control panel 2000. The controller 2003 may be arranged at a location other than the control panel 2000. The controller 2003 may be provided on the first treatment apparatus 10 and/or the second treatment apparatus 20. The controller 2003 may be provided on each of the control panel 2000, the first treatment apparatus 10, and the second treatment apparatus 20. The controller 2003 may be integrated with the first apparatus controller 19 and/or the second apparatus controller 29. Alternatively, the controller 2003 may be understood as integrated with the first apparatus controller 19 and/or the second device controller 29.

[0093] FIG. 3 is a front perspective view of a control panel according to one embodiment of the present disclosure. Hereinafter, a description will be given with reference to FIG. 3.

[0094] The control panel 2000 includes a cover panel 2100. An electronics module 2200 (see FIG. 4) is positioned at the rear of the cover panel 2100. The cover panel 2100 includes a front portion 2110, a top portion 2120, a bottom portion (not shown), a first side portion 2142, and a second side portion 2144. The front portion 2110 defines the exterior of the cover panel 2100. The top portion 2120 extends rearward from the top surface of the front portion 2110. The bottom portion 2130

extends rearward from the bottom surface of the front portion 2110. The first side portion 2142 extends rearward from a first side surface (e.g., the left side surface when viewed from the front) of the front portion 2110. The second side portion 2144 extends rearward from a second side surface (e.g., the right side surface when viewed from the front) of the front portion 2110.

[0095] FIG. 4 is an exploded perspective view of a control panel according to one embodiment of the present disclosure.

[0096] The control panel 2000 includes a cover panel 2100 and an electronics module 2200. The electronics module 2200 is coupled to the cover panel 2100 at the rear of the cover panel 2100. The electronics module 2200 includes a supporter 2220, a sealing cover 2230, a touch screen device 2240, and a circuit board 2250.

[0097] The touch screen device 2240 may include a combination of a flat panel display 2241 and a touch layer 2242. The flat panel display 2241 provides a screen that outputs images. The flat panel display 2241 functions as a display part for displaying various kinds of information. In the description of the present disclosure, the flat panel display 2241 refers to a thin display, which may be provided in various forms, such as LCD, PDP, AMLCD, PMLCD, OLED, and LED. In one embodiment, the touch layer 2242 may be provided as a touch film, a coating film, or the like. In the embodiment, the touch layer 2242 may include two ITO layers forming the X and Y axes. The touch layer 2242 functions as an input part through which touch input is received from a user. In an embodiment, the touch screen device 2240 may also be implemented by methods not illustrated in the figure. For example, the touch screen device 2240 may be implemented by a resistive method, a capacitive method, an infrared method, an ultrasonic method, or the like.

[0098] The supporter 2220 is configured to support the flat panel display 2241. The supporter 2220 has a panel-shaped front surface. The supporter 2220 is coupled to the top portion 2120 and the bottom portion (not shown) of the cover panel 2100. The flat panel display 2241 is positioned on the front surface of the supporter 2220. The flat panel display 2241 is supported by the supporter 2220. The flat panel display 2241 is positioned between the cover panel 2100 and the supporter 2220.

[0099] The sealing cover 2230 is positioned at the rear of the supporter 2220 and is coupled to the supporter 2220. The sealing cover 2230 covers the circuit board 2250. The sealing cover 2230 is positioned at the rear of the circuit board 2250. The circuit board 2250 is positioned in the space defined between the sealing cover 2230 and the supporter 2220.

[0100] The circuit board 2250 may include multiple circuit boards. Some circuit boards of the circuit board 2250 may be covered by the cover panel 2100 to prevent contact with external air. The circuit board 2250 may include a circuit board for a speaker, which will be described later, a circuit board for the flat panel display 2241 and touch buttons provided as input buttons, and a circuit board for the communication module. The circuit board for the flat panel display 2241 is electrically connected to the flat panel display 2241 to provide signals to the flat panel display 2241, and may also receive input signals from the user via the UI. In an embodiment, the circuit board for the flat panel display 2241 may be covered by the sealing cover 2230 to prevent contact with external air.

[0101] In the circuit board 2250, the circuit board 2251 for the flat panel display 2241 is provided with a touch button. The touch button is provided with a light emitting member and a touch sensor as a pair. The touch button may be provided as any known component capable of receiving touch input. The light emitting member indicates whether the corresponding touch sensor is activated. For example, when the touch sensor is activated, the light emitting member is caused to emit light. The light emitting member may be an LED element. The supporter 2220 may focus light diffused from the light emitting element to a specific location. In an embodiment, the supporter 2220 has one or more sensor holes 2221 formed therein. The sensor holes 2221 are formed at locations corresponding to the locations where touch buttons are arranged. The sensor holes 2221 define a barrier extending forward or rearward from a perimeter of the holes. The barrier prevents light emitted from the light emitting element from spreading to the surrounding area of the touch button. By disposing the circuit board 2510 behind the supporter 2220, the light from the touch button may be prevented from spreading.

[0102] FIG. 5 illustrates a UI part 200 according to one embodiment of the present disclosure. The UI part 200 is provided with a user interface (UI). The UI included in the UI part 200 may include a power button 220, a switching button 250, a touch screen 240, an additional function button 260, and a start/pause button 270. The power button 220 may include a first power button 221 and a second power button 222. The start/pause button 270 may include a first start/pause button 271 and a second start/pause button 272.

[0103] The first power button 221, the second power button 222, the switching button 250, the additional function button 260, the first start/pause button 271, and the second start/pause button 272 may be provided as touch sensors or physical buttons. The touch screen 240 may be provided by the touch screen device 2240.

[0104] The first power button 221 may be represented by an icon in the form of a power symbol. The first power button 221 is configured to receive a user command to power the first treatment apparatus 10 on and off. In an embodiment, the first power button 221 is provided as a touch sensor. In an embodiment, when the user touches the first power button 221, the controller 2003 may receive a turn-on or turn-off command for the first treatment apparatus 10.

[0105] The second power button 222 may be represented by an icon in the form of a power symbol. The second power button 222 is disposed to occupy a different area than the first power button 221. In an embodiment, the first power button 221 and the second power button 222 may be disposed up and down. In an embodiment, the second power button 222 is disposed above the first power button 221. The second power button 222 is configured to receive a user command to

power the second treatment apparatus 20 on and off. In an embodiment, the second power button 222 is provided as a touch sensor. In an embodiment, when the user touches the second power button 222, the controller 2003 may receive a turn-on or turn-off command for the second treatment apparatus 20.

[0106] The first power button 221 and the second power button 222 may be provided as separate touch sensors that are separate from the touch input element (e.g., touch layer) for the touch screen 240. By providing the first power button 221 and the second power button 222 in an area separate from the touch screen 240, the chances of malfunction of the apparatus may be reduced. The laundry treatment apparatus 1 is placed in a moist environment. By separating the area of the touch input element (e.g., touch layer) for the touch screen 240 from the area of the first power button 221 and the second power button 222, touch malfunctions due to moisture may be minimized. For example, the second treatment apparatus 20 is turned on and access to the second apparatus operation UI 400 is attempted while the first treatment apparatus 10 is operating, touch malfunction due to moisture may be avoided, such as unintentionally changing options on the first treatment apparatus 10.

[0107] The touch screen 240 may be disposed to occupy a different area than the first power button 221 and the second power button 222. The touch screen 240 may be implemented by the touch layer 2242, which is included in the input part 2002, and a flat panel display 2241, which is included in the display part 2001. The touch screen 240 may output one of a first apparatus operation UI for controlling the first treatment apparatus 10, a second apparatus operation UI 400 for controlling the second treatment apparatus 20, and a composite UI for displaying operation information about the first treatment apparatus 10 and the second treatment apparatus 20 on a single screen. The first apparatus operation UI, the second apparatus operation UI 400, and the composite UI will be described in more detail below.

[0108] The switching button 250 is disposed to occupy a different area than the first power button 221, the second power button 222, and the touch screen 240. The switching button 250 may be provided as a separate touch sensor that is separate from the touch layer 2242 included in the touch screen 240. By providing the switching button 250 in an area separate from the touch screen 240, the chances of malfunction of the apparatus may be reduced. The laundry treatment apparatus 1 is placed in a moist environment. By separating the area of the touch layer 2242 included in the touch screen 240 from the area of the switching button 250, touch malfunctions due to moisture may be minimized. For example, the second treatment apparatus 20 is turned on and access to the second apparatus operation UI 400 is attempted while the first treatment apparatus 10 is operating, touch malfunction due to moisture may be avoided, such as unintentionally changing options on the first treatment apparatus 10.

[0109] The switching button 250 may be represented by an icon in the form of a symbolizing switching. The switching button 250 receives user input to switch between control targets. It is enabled when both the first treatment apparatus 10 and the second treatment apparatus 20 are in the On state. When a user command is input through the switching button 250 while the first apparatus operation UI is displayed on the touch screen 240, the control target is switched to the second treatment apparatus 20, and the second apparatus operation UI 400is displayed on the touch screen 240. When a user input is received through the switching button 250 while the second apparatus operation UI 400is displayed on the touch screen 240, the control target is switched to the first treatment apparatus 10 and the first apparatus operation UI is displayed on the touch screen 240. The switching button 250 is disabled when at least one of the first treatment apparatus 10 and the second treatment apparatus 20 is powered off.

[0110] The additional function button 260 may be displayed in the form of text that reads "Additional Function." The additional function button 260 is disposed to occupy a different area than the first power button 221, the second power button 222, the touch screen 240, and the switching button 250. The additional function button 260 receives user input for setting additional functions of the first treatment apparatus 10 and/or the second treatment apparatus 20. In an embodiment, when the user touches the additional function button 260, the touch screen 240 may display items for establishing additional settings (e.g., scheduling, alarm tone volume, etc.) for the first treatment apparatus 10 and/or the second treatment apparatus 20.

[0111] The first start/pause button 271 may be represented by an icon in the form of a play symbol and a pause symbol. The first start/pause button 271 is disposed to occupy a different area than the first power button 221, the second power button 222, the touch screen 240, the switching button 250, and the additional function button 260. The first power button 221 receives a user input for starting or pausing the operation of the washing machine 10.

[0112] The second start/pause button 272 may be represented by an icon in the form of a play symbol and a pause symbol. The second start/pause button 272 is disposed to occupy a different area than the first power button 221, the second power button 222, the touch screen 240, the switching button 250, the additional function button 260, and the first start/pause button 271. The first start/pause button 271 and the second start/pause button 272 may be disposed up or down. In an embodiment, the second start/pause button 272 may be disposed above the first start/pause button 271. The second power button 222 receives a user command to start or pause the operation of the second treatment apparatus 20.

[0113] FIG. 6A shows a table listing features representing various touch gestures on a touch input part (including, for example, various buttons and a touch screen) distinguished from each other according to one embodiment of the present disclosure. In the present disclosure, multiple touch methods are applied. The multiple touch input methods may be implemented by various touch gestures. In the drawings described hereinafter, the features shown in FIG. 6A are used to

represent the behavior of a user providing a touch command.

[0114] A Tap (Short) gesture is a method of inputting a command with a short tap on the touch screen 240 by a user. The Tap (Short) gesture may be described as a short, light tap of the user's finger on the touch screen 240. The input command may cause a set function to be executed. In the present disclosure, the feature representing the Tap (Short) gesture is a solid circle with no border.

[0115] A Tap (Long) gesture is a method of inputting, by a user, a command by touching the touch screen 240 for a set time or longer. The input command may cause a set function to be executed. Generally, "touching for a set time or longer" is expressed as "touching for a long time." "Touching for a set time or longer" may mean "touching a specific part of the touch screen 240 and not releasing the finger until a set response." The time during which the touch is maintained, i.e., the time during which the finger remains in contact, may depend on the setting. However, it may be set to approximately 1 second or longer, as it corresponds to the time making a user to perceive not just a simple tap but a sustained touch. In the present disclosure, the feature representing the Tap (Long) gesture is a solid circle with a border.

[0116] A Tap and Hold gesture is a method of inputting a command by a user by continuously holding a touch on the touch screen 240. For example, different commands may be input depending on the duration for which the user's touch is held for the Tap and Hold gesture. The input command may cause a set function to be executed. When the Tap and Hold gesture is detected, different outputs are generated depending on the duration of the touch. For example, pressing the scroll arrow continuously to move a list corresponds to the Tap and Hold gesture. In the present disclosure, the feature representing the Tap and Hold gesture is a solid circle with a border and 'Ⓗ' written inside.

[0117] The Double Tap gesture is a method of inputting a command by a user by making two short consecutive taps on the touch screen 240. The feature representing the Double Tap gesture is a solid circle with a border and 'x2' written inside.

[0118] A Swipe gesture is a method of inputting a command by a user by touching a location on the touch screen 240 and moving the finger to another location without lifting the finger. By general definition, the Swipe gesture is a motion of sliding a finger kept in contact with the touch screen 240. The feature representing the Swipe gesture is a solid arrow with no border. The direction of the arrow may be defined by the direction of movement of the finger.

[0119] FIG. 6B illustrates the flow of image transitions on the screen and shows a table listing features that distinguish the transitions based on their causes. In the drawings described below, the features shown in FIG. 6B are used to simplify the representation of the image transition flow.

[0120] The flow of a change resulting from receiving input through the power button is represented by a combination of a solid arrow and an icon representing power that is placed adjacent to the solid arrow.

[0121] The flow of a change resulting from receiving input through the Start/Pause button is represented by a combination of a solid arrow and an icon representing Start/Pause that is placed adjacent to the solid arrow.

[0122] The flow of a change resulting from a user command input through the UI part 200 is represented by a solid arrow. The flow of a change resulting from a non-typical situation (e.g., the occurrence of an error, a warning, a user notification, etc.) in the laundry treatment apparatus 1 is also represented by a solid arrow.

[0123] The flow of a change resulting from a preset programming or the like, even though no user command is received, is represented by a dotted arrow. For example, this flow may occur when the preset conditions are satisfied by the preset programming or the like.

[0124] FIG. 7 illustrates a cycle flow according to one embodiment when a washing machine is provided as a first treatment apparatus or a second treatment apparatus. Hereinafter, a cycle flow according to one embodiment will be described with reference to FIG. 7. In the description of the present disclosure, a washing machine is provided as an embodiment of the first treatment apparatus 10.

[0125] A user loads a laundry item to be treated into the first drum 12. The user may close the first cabinet door 17 of the first treatment apparatus 10 and input an execution command to start washing. Laundry treatment may be started by the user's command (S1100). The laundry treatment may be performed based on a washing course selected by the user. In the present disclosure, the washing courses is defined as a set of control methods for treating a laundry item by controlling the components of the first treatment apparatus 10 to perform operations including rotating the first drum 12, supplying water, detergent and/or softener into the first drum 12, and draining the wash water filled in the first drum 12.

[0126] Prior to the various substantive cycles related to the laundry treatment, the amount of fabrics of the laundry item is sensed (S1110). For cycles processed thereafter, the amount of the detergent, the amount of the softener, the amount of wash water for washing, the amount of rinse water for rinsing, a wash time, a rinse time, a dehydration time, and the like may be set based on the sensed amount of fabrics.

[0127] It is determined whether a reservation is set (S1120). The reservation may be set through a reservation option. The reservation option may refer to an option to delay the end of a course. The reservation option may be very useful when the user is going out for a long period of time. In other words, it allows the user to set the washing to finish in time for their return home. Accordingly, it may eliminate the need to wait for the washing to finish or prevent the washed laundry from being left in the washing machine for a long period of time. If the reservation is set (Y), the process proceeds to the next step when the reserved time arrives (S1121). If no reservation is set (N), the process proceeds to the next step immediately.

[0128] The detergent required for washing is introduced into the first drum 12 (S1130). In an embodiment, the detergent

may be supplied together with wash water. In the case where the 'Automatic detergent/softener introduction' function is set as an additional function of the first treatment apparatus 10, the amount of detergent to be introduced is determined based on the sensed amount of fabrics (S1131), and the detergent is introduced automatically (S1132).

[0129] In an embodiment, the first treatment apparatus 10 may provide an artificial intelligence (AI) course as an example of washing courses. The AI course is a course in which the characteristics and contamination of the laundry are sensed and a series of wash cycles are performed with an option selected as optimal. It is checked whether the selected course is an AI course (S1140). If the AI course is selected (Y), the next step is to sense the material of the laundry item (S1141). The step of sensing the material of the laundry item may be implemented by various methods. The details of the material sensing will not be described herein.

[0130] In an embodiment, the first treatment apparatus 10 may provide a soaking option as one of the wash options. The soaking option allows the laundry items to be immersed in the wash water for a set period of time during the wash cycle, helping to loosen contaminants. It is checked whether the soaking option is set as a wash option (S1150). If the soaking option is selected (Y), a soaking wash step may be performed (S1141). The soaking wash may be applied in the main wash cycle (S1170), which will be described later.

[0131] In an embodiment, the first treatment apparatus 10 may provide a pre-wash option as one of the wash options. The pre-wash option adds a pre-wash cycle. The pre-wash cycle, which is pretreating the laundry prior to the main wash cycle (S1170), is a simpler cycle to wash the laundry than the main wash cycle. It is checked whether the pre-wash option is set as a wash option (S1160). If the pre-wash option is selected (Y), a pre-wash step is performed (S1161).

[0132] The main wash cycle is performed (S1170). While the wash cycle is in progress, the first apparatus operation UI 300 may indicate "Washing." The main wash cycle is a process of separating contaminants from the laundry items using wash water containing detergent. In the main wash cycle, the first drum 12 alternates between clockwise and counter-clockwise rotations, causing friction and tumbling of the laundry items. The laundry item and contaminants may be separated through friction, tumbling, and the surfactant action of the detergent.

[0133] A first rinse cycle is performed (S1180). During the first rinse cycle, the first apparatus operation UI 300 may indicate "Rinsing." The first rinse cycle uses water to separate contaminants from the laundry item. In an embodiment, the contaminants separated in the main wash cycle may be removed in the first rinse cycle. In an embodiment, in the first rinse cycle, the wash water used in the main wash cycle may be drained. Fresh water is supplied to the first drum 12 from which the wash water has been drained, and the first drum 12 is rotated to separate contaminants from the laundry item. In the first rinse cycle, the draining step of discharging the water from the first drum 12 and the water supply step of supplying fresh water to the first drum 12 may be performed once or more. In an embodiment, the number of times draining and water supply are performed in the first rinse cycle may be set by the user.

[0134] When set, a softener is introduced into the first drum 12 (S1190). In an embodiment, the softener may be supplied together with water. In the case where the 'Automatic detergent/softener introduction' function is set as an additional function of the first treatment apparatus 10, the amount of softener to be introduced is determined based on the sensed amount of fabrics (S1191) and the softener is automatically introduced (S1192). The softener softens the laundry item.

[0135] A second rinse cycle is performed (S1200). During the second rinse cycle, the first apparatus operation UI 300 may indicate "Rinsing." The second rinse cycle is a process of rinsing the laundry item using water. In an embodiment, in the second rinse cycle, the softener-added water filled in the first drum 12 is drained, fresh water is supplied into the first drum 12, and the first drum 12 is rotated.

[0136] The dehydration cycle is performed (S1210). The dehydration cycle is a process of removing water from the laundry item. In the dehydration step, the water contained in the first drum 12 is drained. After the water is drained from the first drum 12, the first drum 12 is rotated. The centrifugal force of the rotation acts on the water absorbed by the laundry item, and water is removed from the laundry item. In an embodiment, the first drum 12 may alternate between clockwise and counterclockwise rotations. By alternating the direction of rotation, the laundry items may be prevented from being entangled with each other.

[0137] Through the above-described series of processes, the laundry items may be washed. The series of processes in which the laundry items are washed may be referred to as a washing course. The washing course is a type of treatment courses for treating laundry. In an embodiment, the treatment of the laundry is washing the laundry. A series of processes in which laundry is treated using a combination of elements (e.g., various cycles, water temperature, amount of water, etc.) may be defined as a wash cycle.

[0138] Washing courses may be provided in various ways. In an embodiment, multiple washing courses may be defined. The multiple defined washing courses may be provided to be selected by a user through the UI part 200. The user may select one of the multiple set washing courses to proceed with a series of treatments using the first treatment apparatus 10.

[0139] The washing courses may be provided in various ways according to the cycle in each step. One or more washing courses may be defined as different washing courses depending on the presence or absence of each cycle. The one or more washing courses may be defined as different washing courses depending on whether additional functions are set. The one or more washing courses may be defined as different washing courses according to various parameters defined and set for washing. The various defined and set parameters may be provided as optimized values for washing laundry

items.

[0140] In an embodiment, depending on each washing course, the cycles, additional functions and/or parameters (water temperature, number of rinses, drum rotation RPM, washing time, dehydration time, etc.) may vary. To distinguish between the various washing courses, each washing course may have a unique name (washing course name). For example, the washing courses may be named to reflect their characteristics, such as "Standard Washing," "Small Load Quick Washing," "Delicate/Wool," or "AI Washing."

[0141] The user may select one of the multiple set washing courses. In an embodiment, at least one of the multiple washing courses is provided with one or more options. In an embodiment, multiple options may be provided for at least one of the multiple washing courses. In a washing course in which preset elements are provided as default elements, any element of the preset elements that is provided to be changed by the user may be defined as an option. An option may be defined as one or more elements, and/or a combination thereof, that may be changed or selected by the user among the elements constituting the washing course.

[0142] FIG. 8 illustrates a cycle flow according to one embodiment when a dryer is provided as the first treatment apparatus or the second treatment apparatus according to one embodiment of the present disclosure. Hereinafter, a cycle flow according to one embodiment will be described with reference to FIG. 8. In the description of the present disclosure, a dryer is provided as an embodiment of the second treatment apparatus 20.

[0143] A user introduces a laundry item that needs to be treated into the second drum 22. The user may input an execution command to close the second cabinet door 27 of the second treatment apparatus 20 and start drying. Based on the command from the user, the drying process may start (S2100). The drying process may be performed based on a drying course selected by the user. In the present disclosure, the drying course is defined as a set of control methods for treating an object to be dried by controlling the components of the second treatment apparatus 20, including rotating the second drum 22, and replacing the air inside the second drum 22 using a heat exchanger (not shown) such as a heat pump to discharge moisture.

[0144] Prior to the various substantive cycles related to the drying process, the amount of fabrics of the object to be dried is sensed (S2110). Based on the sensed amount of fabrics, the drying time, cooling time, whether to supply steam, etc. may be set for subsequent cycles.

[0145] It is determined whether a reservation is set (S2120). If a reservation is set (Y), proceed to the next step when the reservation time arrives (S2121). If no appointment is set (N), proceed to the next step immediately.

[0146] In an embodiment, the second treatment apparatus 20 may provide an AI course as an example of the drying course. The AI course is a course in which the characteristics and weight of the object to be dried are sensed and a series of drying cycles are performed with an option selected as optimal. It is checked whether the selected course is an AI course (S2130). If the AI course is selected (Y), the next step is to sense the material of fabrics of the object to be dried (S2131). The step of sensing the material of the material of fabrics of the object to be dried may be implemented by various methods. The details of the sensing of the material of the fabrics will not be described herein.

[0147] The drying cycle is performed (S2140). During the drying cycle, the second apparatus operation UI 400 may indicate "Drying." The drying cycle is a process of separating moisture contained in the object to be dried from the object. In the drying cycle, the air inside the second drum 22 is circulated. While the air is circulated, moisture is removed. Moisture may be removed from the object to be dried by the moisture-removed air. In the drying cycle, the second drum 22 may rotate clockwise, may rotate counterclockwise, or may alternate between clockwise and counterclockwise rotations. The object to be dried may fall due to rotation of the second drum 22. While the object to be dried falls, the area in contact with the air may increase, thereby enhancing drying efficiency.

[0148] The cooling cycle is performed (S2150). The cooling cycle is performed after the drying cycle. The cooling cycle is a process of reducing the temperature inside the second drum 22 below a set temperature. Since the internal temperature of the second drum 22 may be high after the drying cycle, which may be dangerous, the cooling cycle is performed to reduce the internal temperature of the second drum 22.

[0149] In an embodiment, the second treatment apparatus 20 may provide an anti- wrinkle option as one of the drying options. When the wrinkle prevention option is set, the option causes the second drum 22 to rotate periodically even after the drying course is completed to prevent the object to be dried from wrinkling after the drying cycle is completed. It is checked whether the wrinkle prevention option is set as a drying option (S2160). If the wrinkle prevention option is selected (Y), the wrinkle prevention operation may be performed for a set time (S2161). The set time may be set to a time for the user to open the second cabinet door 27 to withdraw the dried object from the second treatment apparatus 20. The set time may be set to a time after a period of time that begins after the completion of the preceding cycle.

[0150] The object to be dried may be dried through the series of processes described above. The series of processes for drying the object to be dried may be referred to as a drying course. The drying course is a type of treatment courses for treating laundry. In an embodiment, the treatment of the laundry is drying the laundry. A series of processes for treating an object to be dried using a combination of elements (e.g., various cycles, air temperature, drying time, etc.) may be defined as a drying course.

[0151] The drying course may be provided in various ways. In an embodiment, multiple drying courses may be provided

for definition. The multiple defined drying courses may be provided to be selected by a user through the UI part 200. The user may select one of the multiple defined drying courses to proceed with a series of processes using the second treatment apparatus 20.

[0152] The drying courses may be provided in various ways according to the cycle in each step. One or more drying courses may be defined as different drying courses depending on the presence or absence of each cycle. The one or more drying courses may be defined as different drying courses depending on whether additional functions are set. The one or more drying courses may be defined as different drying courses according to various parameters defined and set for washing. The various defined and set parameters may be provided as optimized values for drying an object to be dried.

[0153] In an embodiment, depending on each drying course, the cycles, additional functions (steam supply option, wrinkle prevention option) and/or parameters (air temperature, drying time, drum rotation RPM, amount of steam) may vary. To distinguish between the various drying courses, each drying course may have a unique name (drying course name). For example, the drying courses may be named to reflect their characteristics, such as "Standard Drying," "Small Load Quick Drying," "Delicate/Wool," or "Intensive Drying."

[0154] FIG. 9 illustrates the first apparatus operation UI 300 displayed on the touch screen 240 according to one embodiment of the present disclosure, wherein a course selection page P310 is output according to one embodiment. Hereinafter, a description will be given with reference to FIG. 9.

[0155] The course selection page P310 of the first apparatus operation UI 300 may be output on the touch screen 240. The course selection page P310 according to one embodiment includes a course display part 310, an option display part 320, and an indicator display part 330. In the course selection page P310, the course display part 310 may occupy a center area, the indicator display part 330 may occupy an upper area, and the option display part 320 may occupy a lower area. The indicator display part 330 may be disposed over the course display part 310, and the option display part 320 may be disposed under the course display part 310.

[0156] A course name 311, a course description 312, and a course browser 313 are displayed in the course display part 310.

[0157] The course name 311 is the name of a specific treatment course that is currently in a specified state among multiple treatment courses provided by the first treatment apparatus 10. The course description 312 is a description of the specific treatment course. The treatment course and the course name 311 provided in the first apparatus operation UI 300 may correspond to the name of a washing course. The treatment course and the course description 312 provided in the first apparatus operation UI 300 may correspond to a description of a washing course. In an embodiment, the course description of "Standard Washing" is "Making general laundry clean." The course name 311 may be positioned above the course description 312. The font size for displaying the course name 311 may be larger than the font size for displaying the course description 312.

[0158] In an embodiment, the course browser 313 is positioned behind the course name 311. The course browse portion 313 may be positioned on a horizontal line that overlaps the course name 311. The position of the course browser 313 may vary depending on the length of the course name 311. The course browser 313 may be provided in the form of an icon. In the illustrated embodiment, the course browser 313 is represented in a 'V' shape. The course browser 313 functions as an input part. In the illustrated embodiment, when the course browser 313 is displayed, the touch screen 240 may output a course browse page (not shown) upon receiving a touch input to the setting area. The course browser page (not shown) is a page on which multiple course names corresponding to multiple treatment courses are displayed as a list. In the course browser 313, the setting area that functions as an input part may be an area where the icon representing the course browser 313 and/or the course name 311 is displayed.

[0159] Option information is displayed in the option display part 320 displays. In an embodiment, an option name 321 and an option value 322 are displayed in the option display part 320. The option name 321 is the name of the option. The option value 322 is a value or condition of the option corresponding to the option name 321. The option name 321 may be positioned over the option value 322.

[0160] A treatment course may provide various options. In an embodiment, various options may be selected to change preset values or conditions in a specific treatment course. These options may be provided on the condition that the specific treatment course is selected. The options may include changing the conditions for each of the cycles included in the treatment course, enabling additional an additional cycle to be performed, and/or changing the time at which the course is to be completed (reservation setting).

[0161] In the illustrated embodiment, the treatment course is the washing course. In the illustrated embodiment, the washing course may provide a wash option, the number of times of rinsing, dehydration intensity, and water temperature as options. The option name 321a for the wash option may be "Washing." The option name 321b for the number of times of rinsing may be "Rinse". The option name 321c for the dehydration intensity may be "Dehydration". The option name 321d for the water temperature may be "Water temperature".

[0162] In an embodiment, the option value 322 provided by each option of the washing course may provide multiple preset option values, any one of which is selectable. In an embodiment, the "Wash option" may provide choices such as "No," "less often," "Standard," and "Strong," as the option value 322.

[0163] In another embodiment not illustrated in the figure, the treatment course is the drying course. In an embodiment, the drying course may provide an energy-saving mode, drying level, drying time, and wrinkle prevention as options. The option name for the energy-saving mode may be "Energy-saving mode." The option name for the drying level may be "Drying level." The option name for the drying time may be "Drying time." The option name for the wrinkle prevention may be "Wrinkle prevention."

[0164] In an embodiment, the option values provided by each option of the drying course may provide multiple preset option values, any one of which is selectable. In an embodiment, the option values for Wrinkle prevention" may include "On" and "Off," which are selectable

[0165] The option value 322 outputs preset default values if not changed by the user. The default values may be preset values for the respective washing courses. When the option value 322 is changed from the default values, the default values may be stored and updated as values very frequently used based on the frequency of use of the changed option value 322.

[0166] In an embodiment, any of the multiple treatment courses may provide one or more options among the multiple options that the first treatment apparatus 10 may provide. The one or more options provided by a treatment course are defined as options provided.

[0167] The option display part 320 may display an option set. The option set is a set including multiple preset options among the multiple options. In the illustrated embodiment, the option set may include "Washing," "Rinse," "Dehydration," and "Water temperature." The configuration of the options in the option set remains the same even when a specific course is changed. However, the default values in the option value may vary depending on the specific treatment course. The specific course may not offer all the options in the option set. For options that are not provided by the specific treatment course, the option value may be displayed as "-."

[0168] Among the options provided by the option display part 320, the options for which the user may change the option value are represented by a first appearance, and the options for which the user cannot change the option value are represented by a second appearance. FIG. 9 shows a state in which the user may change the option value, as an example of the first appearance.

[0169] The indicator display part 330 may display one or more indicators 331. The indicators 331 are elements that indicate status information and configuration information about the apparatus. The indicators 331 may be represented as icons. The indicators 331 may be represented by respective icons for corresponding information. As the number of indicators 331 displayed increases, they may be accumulated from a first side to a second side and may be displayed so as not to overlap each other. In an embodiment, the first side may be the left side and the second side may be the right side. The indicators 331 displayed in order may have priorities. In an embodiment, an indicator having a higher priority is positioned on the left, and an indicator having a lower priority is positioned on the right.

[0170] The indicators 331 provided on the first apparatus operation UI 300 will be described by way of example. Table 1 lists information that may be displayed as indicators 331 on the first apparatus operation UI 300 in an embodiment. The priority may increase in order of "Screen Occupying Device" -> "Wi-Fi" -> "Remote Control" -> "Door Locked" -> "Drying Preparation" -> "Turbo Shot" -> "Steam" -> "Reservation" -> "Wrinkle Prevention."

[Table 1].

Information indicated by indicators (Icon examples omitted)	Description of the state of the displayed indicator	Reference numeral
Screen-occupying device	Information on the device with the enabled interface (visual indication of whether the enabled interface is the first apparatus operation UI 300 or the second apparatus operation UI 400)	331a
Wi-Fi	Wi-Fi connection status- Connected: indicated according to the connection strength - Indication of Disconnected - No icon displayed in the unregistered or no-connection state	331b
Remote control	Indicated when remote control is in operation	331c
Door Locked	Indicated when the door is locked after the start of the cycle	331d
Drying Preparation	Indicated when drying preparation is set	331e
Turbo Shot	Indicated when turbo shot is set	331f
Steam	Indicated when steam is set	331g
Reservation	Indicated when reservation is set	331h

(continued)

Information indicated by indicators (Icon examples omitted)	Description of the state of the displayed indicator	Reference numeral
Wrinkle Prevention	Indicated when wrinkle prevention is set	331i

[0171] The indicators 431 provided on the second apparatus operation UI 400 will be described by way of example. Table 2 lists information that may be displayed as the indicators 431 on the second apparatus operation UI 400 in an embodiment. The priority may increase in order of "Screen Occupying Device" -> "Wi-Fi" -> "Remote Control" -> "Door Locked" -> "Steam" -> "Turbo Shot" -> "Ironing Reminder" -> "Reservation."

[Table 2]

Information indicated by indicators (Icon examples omitted)	Description of the state of the displayed indicator	Reference numeral
Screen-occupying device	Information on the device with the enabled interface (visual indication of whether the enabled interface is the first apparatus operation UI 300 or the second apparatus operation UI 400)	431a
Wi-Fi	Wi-Fi connection status- Connected: indicated according to the connection strength - Indication of Disconnected - No icon displayed in the unregistered or no-connection state	431b
Remote control	Indicated when remote control is in operation	431c
Door Locked	Indicated when the door is locked after the start of the cycle	431d
Steam	Indicated when steam is set	431e
Ironing Reminder	Indicated when the ironing reminder is set	431f
Reservation	Indicated when reservation is set	431g

[0172] When each of the indicators 331 and 431 is generated and displayed, a motion effect may be applied to provide setting feedback

[0173] In an embodiment, the indicator 331a indicating the "screen-occupying device" provides intuitive visual information to the user as to which treatment apparatus is currently being manipulated. In an embodiment, the indicator 331a indicating the "screen-occupying device" may be in the form of two rectangles stacked top to bottom. This represents the stacked form of the first treatment apparatus 10 and the second treatment apparatus 20. In the first apparatus operation UI 300, the lower rectangle may be colored. The lower rectangle may be colored in a first color. Although not shown in FIG. 9, in the second apparatus operation UI 400, the upper rectangle may be colored. The upper rectangle may be colored in a second color. The first color and the second color are different from each other. The difference in color allows the user to quickly recognize the controlled object visually.

[0174] FIG. 10 illustrates a change and flow of pages output on the first apparatus operation UI 300 displayed on the touch screen 240 in the UI part 200 according to one embodiment of the present disclosure. Hereinafter, a description will be given with reference to FIG. 10.

[0175] In the embodiment, the first apparatus operation UI 300 is displayed on the touch screen 240. (a) illustrates a first page P320 being displayed on the touch screen 240. (b) illustrates a second page P330 displayed on the touch screen 240.

[0176] The first page P320 is output when a cycle is in progress. In an embodiment, the first page P320 displays multiple pieces of information related to the settings of the first treatment apparatus 10 and/or the treatment being executed. In an embodiment, the multiple pieces of information may be categorized into time remaining until the treatment being performed by the first treatment apparatus 10 is completed 341 and other additional information related to the first treatment apparatus 10 and/or the treatment being performed. In an embodiment, the first page P320 displays a course name 311, a remaining time 341, a status name 351 indicating a current status such as the current cycle name, a progress bar 360, an indicator 331, and an option display part 320. In an embodiment, the option value cannot be changed during execution of the cycle. The state in which the option value cannot be changed is represented by the second appearance. FIG. 10-(a) shows a state in which the user cannot change the option value, which is an example of the second

appearance.

[0177] The progress bar 360 is a means to visually indicate the progress of the laundry treatment performed by the first treatment apparatus 10. In an embodiment, the progress bar 360 may have a bar horizontal shape that extends across the touch screen 240 from side to side. The progress bar 360 indicates the progress of the laundry treatment with the length of the colored portion of the bar shape. The progress bar 360 increases the colored portion of the bar as the treatment progresses. In an embodiment, the color of the colored portion of the progress bar 360 displayed on the first apparatus operation UI 300 may be different from the color of the colored portion of the progress bar displayed on the second apparatus operation UI 400. In an embodiment, the color of the colored portion of the progress bar 360 displayed on the first apparatus operation UI 300 may be a first color. The color of the colored portion of the progress bar 360 displayed on the second apparatus operation UI 400 may be a second color. The first and second colors are the same as the first and second colors of the colored portion of the indicator 331a indicating the "screen-occupying device," or are at least colors perceived as the same by the user.

[0178] When a set time elapses without user input while the first page P320 is being output, the second page P330 is output on the touch screen 240 ((a) -> (b)).

[0179] On the second page P330, the remaining time 341 is displayed larger than on the first page P320. In addition to the remaining time 341, the second page P330 does not display one or more of the multiple pieces of additional information displayed on the first page P320. In an embodiment, compared to the first page P320, the second page P330 does not display the course name 311, the option display part 320, and the indicator 331. In an embodiment, on the second page P330, the remaining time 341 may be displayed larger than on the first page P320, and the status name 351 and the progress bar 360 may be displayed. The progress bar 360 may be disposed at a lower portion of the second page P330. By displaying the remaining time 341 in a larger size and reducing the number of displayed pieces of information, a simple design interface may be realized. Further, it is easy for a user at a distance to identify the remaining time of the first treatment apparatus 10. Further, the image provided during the cycle of the first treatment apparatus 10 may be aesthetically integrated into the installation space.

[0180] In the case where 1) a user input is generated or 2) a notification is generated from a device while the second page P330 is being output, the first page P320 is output on the touch screen 240 ((b) -> (a)). On the first page P320, the user may check the status related to the ongoing course, information on various settings, device status, etc.

[0181] In the embodiment illustrated in FIG. 10, only the first treatment apparatus 10 is operated. The second treatment apparatus 20 is shown to be in a power-off state. In the embodiment of FIG. 10, the second start/pause button 272 is in a disabled state.

[0182] In the case where only the second treatment apparatus 20 is operated, similar operations to those described with reference to FIG. 10 may be performed. Instead of the washing course, a drying course may be provided. A drying cycle may be provided instead of the wash cycle. For the options displayed on the option display part 320, options provided in each option of the drying course will be displayed. For the indicators, the indicators 431 provided in the second device operation UI 400 will be displayed. The progress bar 360 may be filled with the second color as a filling color. Related drawings will be omitted.

[0183] FIG. 11 illustrates a change and flow of pages output on the first device operator UI 300 according to one embodiment of the present disclosure. Hereinafter, a description will be given with reference to FIG. 11.

[0184] In the illustrated embodiment, the first apparatus operation UI 300 is displayed on the touch screen 240. In the figure, (a) illustrates the first page P320 being output on the touch screen 240. (b) illustrates the second page P330 output on the touch screen 240. (c) illustrates the first page P320 being output on the touch screen 240.

(a) is an image displayed on the touch screen 240 while the treatment course of the first treatment apparatus 10 is in progress. (a) is an example of the first page P320. As an example of the treatment course, "Standard Washing" in progress is shown. Referring to the indicator 331, the screen-occupying device 331a represents the first treatment apparatus 10, which is connected by Wi-Fi 331b and has a good connection. The remaining time 341 is 1 hour and 10 minutes. The status name 351 is "Washing" because the wash cycle is in progress. The option display part 320 is displayed. The option display part 320 is shown in the second appearance indicating that the option value 322 cannot be changed. The progress bar 360 provides a graphical representation of the progress of the treatment course. As the completion of the treatment course approaches, the inside of the progress bar 360 is increasingly filled. In (a), when a set time elapses with no user input, the second page P330 is displayed on the touch screen 240. The image shown in (b) is an example of the second page P330. The setting time may be determined by a preset value. The set time may be a value determined in designing the product.

(b) is an image displayed on the touch screen 240 while the treatment course of the first treatment apparatus 10 is in progress. (b) is an example of the second page P330. The first page P320 and the second page P330 are correlated with each other. The second page P330 does not include one or more pieces of the information displayed on the first page P320. In an embodiment, the time remaining 341, the status name 351, and the progress bar 360 are displayed on the second page P330. The remaining time 341 displayed on the second page P330 has a larger font size than the

remaining time 341 displayed on the first page P320. The user may easily identify the remaining time 341 even at a distance from the laundry treatment apparatus 1 during household activities.

[0185] When the user taps at least any area of the screen constituting the second page P330 with the second page P330 output on the touch screen 240, the first page P320 is displayed ((b)->(a)).

[0186] If the user touches the first start/pause button 271 while the second page P330 is output on the touch screen 240, a pause command for the first treatment apparatus 10 is input. When the pause command is input, the first page P320 is output ((b)->(c)).

[0187] (c) illustrates a configuration of the first page P320 that is output while the ongoing cycle or course is paused. The status name 351 is "Paused" because the cycle or course that was in progress has been paused. On the first page P320 provided in the "Paused" state, the option display part 320 is shown in the first appearance, and the user is allowed to change the option value 322. In an embodiment, changing the option value 322 in "Paused" may cancel an ongoing cycle or course. On the first page P320 provided in the "Paused" state, the course browser 313 is enabled and is displayed. The course browser 313 may be displayed to the right of the line on which the course name 311 is displayed. In an embodiment, when the course is changed in the "Paused" state, the course in progress may be canceled.

[0188] In the case where only the second treatment apparatus 20 is operated, similar operations to those described with reference to FIG. 11 may be performed. Instead of the washing course, a drying course may be provided. A drying cycle may be provided instead of the wash cycle. For the options displayed on the option display part 320, options provided in each option of the drying course will be displayed. For the indicators, the indicators 431 provided in the second device operation UI 400 will be displayed. The progress bar 360 may be filled with the second color as a filling color. Related drawings will be omitted.

[0189] FIG. 12 illustrates an embodiment of the second page P320 output on the first apparatus operation UI 300 according to one embodiment of the present disclosure.. Hereinafter, a description will be given with reference to FIG. 12.

(a) is an embodiment of the second page P330 that is output during the cycle of the first treatment apparatus 10. The progress bar 360 may be disposed at the lowermost end of the touch screen 240. The progress bar 360 extends from left to right to have a length leaving no margins at the left and right ends. Placing the progress bar 360 at the lowermost end of the touchscreen 240 provides the visual benefit of maximizing the perceived size of the touch screen 240. The status name 351 may be disposed over the progress bar 360. The remaining time 341 may be disposed in the center of the image forming the first page P320.

(b) is an embodiment of the second page P330 that is output after a course execution command for the first treatment apparatus 10 is input, when the reservation option is set. The remaining time 341 shows the time remaining until the course input to be executed is completed. In the illustrated embodiment, the status name 351 may be displayed as "Washing Completion Reserved."

[0190] In the case where only the second treatment apparatus 20 is operated, similar operations to those described with reference to FIG. 12 may be performed. Instead of the washing course, a drying course may be provided. A drying cycle may be provided instead of the wash cycle. The progress bar 360 may be filled with the second color as a filling color. Related drawings will be omitted.

[0191] FIG. 13 illustrates an embodiment of an error page P340 output on the first apparatus operation UI 300 according to one embodiment of the present disclosure.

(a) shows an image of the touch screen 240 displaying an error pop-up 370 when an error occurs. An error title may be displayed in the error pop-up 370. In the illustrated embodiment, the error title is shown as {{Washing Machine Error Title}}. In an embodiment, the error title may be text that includes a reason why the error occurred. In an embodiment, the error title may be "Washing machine door not closed," "Washing machine door not locked," etc. In the error pop-up 370, an error resolution guide may be displayed. In an embodiment, the error resolution guide may include details about the error and/or a resolution guide. The error resolution guide provides a user guide helping a user resolve the error on their own. In an embodiment, the error resolution guide may include a guide message, such as "Please open the washing machine door and then make sure to close it securely. Scan the QR code to learn how to self-help." The error pop-up 370 may display a QR code along with the error title and the error resolution guide. The user may scan the QR code using a terminal with a QR code scanning application, such as a smartphone, to view detailed self-help instructions. As the QR code is displayed along with the error resolution guide, the user may understand the details and take action without having to look at the manual.

[0192] When a set time elapses without user input provided while the error pop-up 370 is output, the error pop-up 370 disappears from the touch screen 240 and the error page P340 is output ((a) -> (b)).

[0193] In the figure, (b) illustrates an embodiment of the error page P340 displayed on the touch screen 240 when the set

time elapses after the error pop-up 370 is output. An error title 381 is displayed on the error page P340. An error icon 382 related to the error may be displayed on the error page P340. A text message 383 directing the user to view the error resolution guide in detail may be displayed on the error page P340. The progress bar 360 may be displayed on the error page P340. In an embodiment, in the case where an error occurs while the first page P320 is being output, the output of the touch screen 240 may switch from the first page P320 to the error page P340. In an embodiment, when an error occurs while the second page P330 is being output, the output of the touch screen 240 may switch from the second page P330 to the error page P340.

[0194] When the user taps at least any area of the screen constituting the error page P340 with the error page P340 output on the touch screen 240, the error pop-up P370 is output ((b)->(a)).

[0195] In the case where only the second treatment apparatus 20 is operated, similar operations to those described with reference to FIG. 13 may be performed. When a dryer is provided as an embodiment of the second treatment apparatus 20, a dryer error title will be displayed instead of the washing machine error title. For the indicators, the indicators 431 provided in the second device operation UI 400 will be displayed. The progress bar 360 may be filled with the second color as a filling color. Related drawings will be omitted.

[0196] FIG. 14 shows a UI part according to one embodiment of the present disclosure, and illustrates a flow of outputting a composite UI.

(a) illustrates turning on the power of the first treatment apparatus 10 while the "standard drying" is in progress as an example of the treatment course of the second treatment apparatus 20. The UI part 200 displays the second device operation UI 400. To allow a user to intuitively recognize that the UI is the second apparatus operation UI 400, the touch screen 240 displays a "screen-occupying device" icon as one of the indicators 431. The "screen-occupying device" icon may be provided in the form of two rectangles stacked top to bottom, with the top rectangle colored. The upper rectangle may be colored in the second color. This has been described in detail above. The first treatment apparatus 10 may be powered on by a touch input on the first power button 221. In the power-off state of the first treatment apparatus 10, the switching button 250 and the first start/pause button 271 may be disabled. In an embodiment, the light emitting elements provided on the back of the switching button 250 and the first start/pause button 271 may be turned off to indicate the disabled state to the user.

[0197] When the first treatment apparatus 10 is powered on during the treatment course of the second treatment apparatus 20, the UI part 200 switches from (a) to (b). The UI part 200 shown in (b) is in a state in which both the first treatment apparatus 10 and the second treatment apparatus 20 are in the power-on state, and the first apparatus operation UI 300 is displayed on the touch screen 240. When the first treatment apparatus 10 is powered on, the switch button 250 and the first start/pause button 271 are enabled. In an embodiment, the light emitting elements provided on the back of the switch button 250 and the first start/pause button 271 may be emitting light to indicate to the user the enabled state of the switch button 250 and the first start/pause button 271. In the figure, (b) illustrates inputting a command to the first treatment apparatus 10 to execute the "standard washing" course as a specific treatment course. The specific treatment course may be executed by a touch input on the first start/pause button 271.

[0198] When the treatment course of the first treatment apparatus 10 is executed during the treatment course of the second treatment apparatus 20, the UI part 200 switches from (b) to (c). The UI part 200 shown in (c) is in a state in which both the first treatment apparatus 10 and the second treatment apparatus 20 are in the power-on state, and the first apparatus operation UI 300 is displayed on the touch screen 240. (c) is a view of the second page P330 being output on the first apparatus operation UI 300. An embodiment of the second page P330 has been described in detail above.

[0199] On the condition that the treatment course of the first treatment apparatus 10 is running alongside the treatment course of the second treatment apparatus 20, the UI part 200 switches from (c) to (d) when the set time elapses without any input. In (d), the UI part 200 displays the composite UI 500 on the touch screen 240.

[0200] The composite UI 500 displays operation information about the first treatment apparatus 10 and operation information about the second treatment apparatus 20 on the same screen. The composite UI 500 is displayed when both the first treatment apparatus 10 and the second treatment apparatus 20 are operating. The composite UI 500 is provided with a first area and a second area. The operation information about the first treatment apparatus 10 is displayed in the first area. The operation information about the second treatment apparatus 20 is displayed in the second area. The first area and the second area are displayed on the same screen. The first area occupies a lower portion of the composite UI 500, and the second area occupies an upper portion of the composite UI 500.

[0201] In the first area, a progress bar indicating the progress of the treatment course of the first treatment apparatus 10, the remaining time, and a status name may be displayed. As an example of the remaining time, "1 hr. 10 min." is shown. Also, as an example of the status name, "Washing" is shown.

[0202] In the second area, a progress bar indicating the progress of the treatment course of the second treatment apparatus 20, the remaining time, and a status name may be displayed. As an example of the remaining time, "1 hr. 50 min." is shown. Also, as an example of the status name, "Drying" is shown.

[0203] The first area may receive a user touch input. Upon receiving the user touch input in the first area, the touch screen 240 is controlled to display the first apparatus operation UI 300. The touch input in the first area is a command to switch the image displayed on the touch screen 240 from the composite UI 500 to the first apparatus operation UI 300. In an embodiment, when the touch input is received for portion (1) as one of several touch gestures shown in the figure, the first apparatus operation UI 300 is displayed, as shown in (e) of FIG. 15.

[0204] The second area may receive a user touch input. Upon receiving the user touch input in the second area, the touch screen 240 is controlled to display the second apparatus operation UI 400. The touch input in the second area is a command to switch the image displayed on the touch screen 240 from the composite UI 500 to the second apparatus operation UI 400. In an embodiment, when the touch input is received for portion (2) as one of several touch gestures shown in the figure, the second apparatus operation UI 400 is displayed, as shown in (f) of FIG. 15.

[0205] When input from the first start/pause button 271 is received while the composite UI 500 is displayed, the touch screen 240 is controlled to display the first apparatus operation UI 300. The first start/pause button 271 is a button that issues a pause command when the treatment course of the first treatment apparatus 10 is in progress, and an execute command when the treatment course of the first treatment apparatus 10 is not in progress (e.g., the course is in a standby state or a pause state). In an embodiment, when a touch input is received for portion (3) as one of several touch gestures shown in the figure, the first apparatus operation UI 300 is displayed, as shown in (g) of FIG. 15. When the first start/pause button 271 is input while the treatment course of the first treatment apparatus 10 is in progress, the treatment course being executed by the first treatment apparatus 10 is paused. And the first treatment apparatus 10 in which the treatment course has been in progress is paused.

[0206] When input from the second start/pause button 272 is received while the composite UI 500 is displayed, the touch screen 240 is controlled to display the second apparatus operation UI 400. The second start/pause button 272 is a button that issues a pause command when the treatment course of the second treatment apparatus 20 is in progress, and an execute command when the treatment course of the second treatment apparatus 20 is not in progress (e.g., the course is in a standby state or a pause state). In an embodiment, when a touch input is received for portion (4) as one of several touch gestures shown in the figure, the second apparatus operation UI 400 is displayed, as shown in (h) of FIG. 15. And the second treatment apparatus 20 in which the treatment course has been in progress is paused.

[0207] FIG. 16 illustrates an embodiment of the composite UI 500 according to one embodiment of the present disclosure.

[0208] In the figure, (a) illustrates a case where a washing course is being executed by the first treatment apparatus 10 while a drying course is being executed by the second treatment apparatus 20. The time 341 remaining until the washing course is completed is displayed in the first area shows. In the first area, a progress bar 360 is displayed, which indicates the progress of the washing course to completion. A status name is displayed in the first area. In the embodiment, the status name is "Washing." The time 441 remaining until the drying course is completed is displayed in the second area. In the second area, a progress bar 460 is displayed, which indicates the progress of the drying course to completion. A status name is displayed in the second area. In the embodiment, the status name is "Drying."

[0209] In the figure, (b) illustrates a case where the first treatment apparatus 10 is executing a reservation cycle, which is performed by a command input to execute the washing course along with a reservation option, while the second treatment apparatus 20 is executing a drying course. The reservation cycle is a process that does not execute a specific treatment course for a set time when the specific treatment course is to be completed at a set future time, but waits for the specific treatment course to be executed when the set time is reached. The time 341 remaining until the washing course is completed is displayed in the first area. A progress bar 360 that indicates the progress until the washing course is completed is displayed in the first area. A status name is displayed in the first area. In the embodiment, the status name is "Washing Completion Reserved." The time 441 remaining until the drying course is completed is displayed in the second area. In the second area, a progress bar 460 is displayed, which indicates the progress of the drying course to completion. A status name is displayed in the second area. In the embodiment, the status name is "Drying."

[0210] FIG. 17 illustrates an embodiment of a composite UI according to embodiments of the present disclosure, wherein (a) is an embodiment for occurrence of an error in the second treatment apparatus, and (b) is an embodiment for occurrence of an error in the first treatment apparatus.

[0211] In the figure, (a) illustrates a case where a washing course is being executed by the first treatment apparatus 10 while an error occurs in the second treatment apparatus 20. In the embodiment, the time 341 remaining until the washing course is completed is displayed in the first area shows. In the first area, a progress bar 360 is displayed, which indicates the progress of the washing course to completion. A status name is displayed in the first area. In the embodiment, the status name is "Washing." An error title 481 is displayed in the second area. In the second area, a progress bar 460 is displayed, which indicates the progress of the drying course to completion. In the second area, a text message directing the user to view the error resolution guide in detail is displayed.

[0212] In the figure, (b) illustrates a case where an error occurs in the first treatment apparatus 10, while the second treatment apparatus 20 is executing a drying course. An error title 381 is displayed in the first area. A progress bar 360 that indicates the progress until the washing course is completed is displayed in the first area. In the first area, a text message

directing the user to view the error resolution guide in detail may be displayed. The time 441 remaining until the drying course is completed is displayed in the second area. In the second area, a progress bar 460 is displayed, which indicates the progress of the drying course to completion. A status name is displayed in the second area. In the embodiment, the status name is "Drying."

[0213] FIG. 18 illustrates an embodiment and flow of outputting a composite UI on the touch screen 240 according to one embodiment of the present disclosure. The flow in FIG. 18 is similar to the flow in FIG. 14. Only the order of execution of the first treatment apparatus 10 and the second treatment apparatus 20 is changed. Hereinafter, a description will be given with reference to FIG. 18.

[0214] In the figure, (a) shows the first apparatus operation UI 300, which is displayed while the "standard washing" is in progress as an example of the treatment course of the first treatment apparatus 10. The second treatment apparatus 20 may be powered on by a touch input on the second power button 222. When the power of the second treatment apparatus 20 is switched to the On state by touching the second power button 222, the image displayed on the touch screen 240 switches from (a) to (b).

[0215] In (b), both the first treatment apparatus 10 and the second treatment apparatus 20 are in the power-on state, and the second apparatus operation UI 400 is displayed on the touch screen 240. (b) shows a course selection page where one of the multiple treatment courses provided by the second treatment apparatus 20 can be selected, while showing a screen on which "standard drying" is specified as a specific treatment course. When an execution command is input by touching the second start/pause button 272, the image displayed on the touch screen 240 switches from (b) to (c).

[0216] In (c), the second apparatus operation UI 400 is displayed. "Standard drying" is executed as a treatment course of the second treatment apparatus 20, and the second page P330 is output on the second apparatus operation UI 400. On the condition that the treatment course of the first treatment apparatus 10 is running alongside the treatment course of the second treatment apparatus 20, the image displayed on the touch screen 240 switches from (c) to (d) when the set time elapses without any input. In (d), the composite UI 500 is displayed on the touch screen 240.

[0217] FIG. 19 illustrates in (e) a case where input is received through the first start/pause button 271 while the composite UI is output as in (d) of FIG. 18, and illustrates in (f) a case where input is received through the second start/pause button 272. FIG. 19 is the same as the flow described in (e) and (f) of FIG. 15. FIG. 19 illustrates an embodiment of an image displayed on the touch screen 240 in an enlarged view for ease of understanding.

[0218] FIG. 20 illustrates a UI part in which the first treatment apparatus is powered on and the second treatment apparatus is powered off according to one embodiment of the present disclosure, while a course selection page of a first apparatus operation UI 300 is output on the touch screen 240.

[0219] In the UI part 200, the additional function button 260 is indicated as enabled. Whether the additional function button 260 is enabled may be indicated by the emission status of light from a light emitting member positioned at the rear of the additional function button 260. When the additional function button 260 is enabled, the light emitting member emits light, causing the additional function button 260 to be illuminated. Upon receiving user input through the additional function button 260, the touch screen 240 may display an additional function page P350. The additional function page P350 is described in more detail with reference to FIG. 21.

[0220] FIG. 21 illustrates a flow in which the drying preparation function is set as a pre- preparation function according to one embodiment of the present disclosure, and illustrates pages displayed on the touch screen 240 for each flow when the drying preparation function is set and a course of the first treatment apparatus is executed.

[0221] According to one embodiment of the present disclosure, the laundry treatment apparatus 1 includes a pre-preparation function. In one embodiment, the pre-preparation function is a function for performing pre-preparation that may increase the efficiency of the main treatment (e.g., the washing course or the drying course) prior to the main treatment to be performed by the first treatment apparatus 10 or the second treatment apparatus 20. In the context of the present disclosure, the pre-preparation may be defined as a preparation that is executed prior to the main treatment and may thus increase the efficiency of the main treatment. The present description describes a washing machine as an example of the first treatment apparatus 10 and a dryer as an example of the second treatment apparatus 20, but is not limited thereto. Furthermore, the terms first treatment apparatus and second treatment apparatus as used in the claims in connection with the pre-preparation function may not be the same as the described terms first treatment apparatus 10 and second treatment apparatus 20, and the claims should preferably be read as they are.

[0222] The pre-preparation function may be enabled by a user input. In one embodiment, when the pre-preparation function is enabled, pre-preparation operation for a treatment to be performed by the second treatment apparatus 20 may be executed in connection with the execution of the first treatment apparatus 10. In one embodiment, when the pre-preparation function is enabled, the pre-preparation operation for the treatment to be performed by the first treatment apparatus 10 may be executed in connection with the execution of the second treatment apparatus 20. In one embodiment, when the pre-preparation function is enabled, the pre-preparation operation for the treatment to be performed by the second treatment apparatus 20 may be executed in dependence on the execution of the first treatment apparatus 10. In one embodiment, when the pre-preparation function is enabled, the pre-preparation operation for the treatment to be performed by the first treatment apparatus 10 may be executed in dependence on the execution of the

second treatment apparatus 20.

[0223] In an embodiment, the pre-preparation function may include a "drying preparation function". The "drying preparation function" may include a 'preheating function'. The pre-preparation function will be described in detail hereinafter using the "drying preparation function" as an example, but is not limited to the description. The pre-preparation function may provide various functions, such as a function of automatic cleaning of various parts.

[0224] In an embodiment, the drying preparation function is a function that notifies the user after the wash treatment ends and prepares the dryer for operation before the end of the wash cycle, such that the dryer is ready for use as soon as the wash cycle ends. In an embodiment, the drying preparation function includes a "preheating function", which preheats the interior of the second drum 22 to a set temperature.

[0225] In figure, (a) shows an additional function page P350 according to one embodiment. The additional function page P350 is a page that enables settings to enable or disable one or more of several functions for the laundry treatment apparatus 1 including the first treatment apparatus 10. In an embodiment, the additional function page P350 may belong to the first apparatus operation UI 300. In an embodiment, an additional function item 391 configurable in the additional function page P350 may be "Drying preparation." In the additional function page P350, a user command may be input to enable the drying preparation function. A switch 392 may be displayed in the additional function item 391 according to one embodiment. The switch 392 may be of a type that is switched between On/Off by touch. The switch 392 using the touch screen 240 may be represented in various ways. The illustrated embodiment is an example of representing the switch 392. When the switch 392 is touched, the switch 392 is switched to On ((a)->(b)).

[0226] (b) is an image displayed on the touch screen 240 immediately after the switch 392 is switched to On. A setting completion pop-up 393 is output on the touch screen 240. The setting completion pop-up 393 may be a pop-up window indicating that the setup of a specific function is complete. The setting completion pop-up 393 may include a text message indicating that the setup of the specific function is complete. In an embodiment, the setup complete pop-up 393 may display a text message that reads "You have set the drying preparation. Please, make sure the dryer door is closed." Even when the second treatment apparatus 20 is in a power-off state, the treatment apparatus 20 is powered on when the "drying preparation function" is enabled. In an embodiment of the first treatment apparatus 10 with the drying preparation function enabled, when an input is provided through the first start/pause button 271 of the washing machine, a specific treatment course of the first treatment apparatus 10 is executed. In this embodiment, the specific treatment course is "standard washing" ((b)->(c)).

[0227] In the figure, (c) illustrates the first apparatus operation UI 300 displayed on the touch screen 240 while the washing course is being executed with the "drying preparation function" set. The first page P320 is displayed on the first apparatus operation UI 300. Indicators 331 are displayed on the first page P320 displays. One of the indicators 331 is indicator 331e, which indicates that the "drying preparation function" is set. As in (c), when a set time elapses without any user input provided while the first page P320 is output on the first apparatus operation UI 300, the second page P330 is displayed on the touch screen 240 ((a) -> (b)).

[0228] (d) illustrates the composite UI 500 output when the "drying preparation function" is set and the treatment course of the first treatment apparatus 10 is in progress. The composite UI 500 may be output when the "drying preparation function" is set and the treatment course of the first treatment apparatus 10 is in progress. A page including the composite UI 500 that is output is provided with a first area and a second area. In the first area, the time 341 remaining until the treatment course of the first treatment apparatus 10 is completed is displayed. In the second area, a drying preparation status 491 is displayed, which corresponds to the operational status of the drying preparation. In the embodiment, in (d), the drying preparation status 491 is indicated as "Preparing to dry." "Preparing to dry" is a message indicating that the drying preparation is either on standby or currently being executed.

[0229] (e) illustrates that the completion time of the washing course of the first treatment apparatus 10 is imminent and the drying preparation operation has been completed. In the illustrated embodiment, the time remaining before the completion of the washing course performed by the first treatment apparatus 10 is 1 minute, and the dehydration course is in progress. In the illustrated embodiment, the drying preparation operation is completed, and the drying preparation status 491 is indicated as "Ready to dry". In an embodiment, the 'drying preparation operation' is completed prior to the completion of the washing course, which is a treatment course performed by the first treatment apparatus 10. In an embodiment, the 'drying preparation operation' is completed prior to the completion of the dehydration cycle.

[0230] (f) shows the first apparatus operation UI 300 displayed on the touch screen 240 when the washing course of the first treatment apparatus 10 is completed. Immediately after the washing course is completed, a message indicating that the washing is complete is output. In the case where the "drying preparation function" is set, it is notified that the washing has been completed and that the drying is ready. For example, the notification may include a text message, "The washing is complete. Please transfer the laundry to the preheated dryer." When a set time elapses without user input while the image in (f) is displayed, or when the first treatment apparatus 10 is powered off by touching the first power button 221 of the first treatment apparatus 10, the second apparatus operation UI 400 is displayed on the touch screen 240 ((f)->(g)).

[0231] (g) is an image of the second apparatus operation UI 400 displayed in the "ready to dry" state, where the treatment course of the second treatment apparatus 20 is not executed but is on standby. The information displayed in the second

apparatus operation UI 400 includes information indicating that the drying preparation has been completed. The second apparatus operation UI 400 displays an indicator, a course name, remaining time, and a status name. In this embodiment, the course name is "Standard Drying," the remaining time is "1 hr. 20 min.," and the status is "Ready to Dry. The user opens the second cabinet door 27 of the second treatment apparatus 20, which is ready for drying, and transfers the laundry objects treated by the first treatment apparatus 10 into the second drum 22. The user then closes the second cabinet door 27 and inputs a command to execute the treatment course of the second treatment apparatus 20 through the second start/pause button 272. Upon receiving the command to execute the treatment course through the second start/pause button 272, the second treatment apparatus 20 executes the treatment course. When the treatment course is executed, the status name of the second treatment apparatus 20 displayed on the touch screen 240 may change from "Ready to dry" to "Drying" ((g)->(h)).

[0232] FIG. 22 illustrates a flow in which the drying preparation function is set as a preparation function according to one embodiment of the present disclosure, and illustrates pages displayed on the touch screen 240 for each flow when the drying preparation function is set and a treatment course of the first treatment apparatus is executed without the conditions for executing the drying preparation function being satisfied (e.g., without the second cabinet door of the second treatment apparatus closed).

[0233] In figure, (a) shows an additional function page P350 according to one embodiment. The additional function page P350 is a page that enables settings to enable or disable one or more of several functions for the laundry treatment apparatus 1 including the first treatment apparatus 10. In an embodiment, an additional function item 391 configurable to be enabled in the additional function page P350 may be "Drying preparation." A switch 392 may be displayed in the additional function item 391 according to one embodiment. The switch 392 may be of a type that is switched between On/Off by touch. The switch 392 using the touch screen 240 may be represented in various ways. The illustrated embodiment is an example of representing the switch 392. When the switch 392 is touched, the switch 392 is switched to On ((a)->(b)).

[0234] (b) is an image displayed on the touch screen 240 immediately after the switch 392 is switched to On. A setting completion pop-up 393 is output on the touch screen 240. The setting completion pop-up 393 may be a pop-up window indicating that the setup of a specific function is complete. The setting completion pop-up 393 may include a text message indicating that the setup of the specific function is complete. In an embodiment, the setup complete pop-up 393 may display a text message that reads "You have set the drying preparation. Please, make sure the dryer door is closed." Even when the second treatment apparatus 20 is in a power-off state, the treatment apparatus 20 is powered on when the "drying preparation function" is enabled. In an embodiment of the first treatment apparatus 10 with the drying preparation function enabled, when an input is provided through the first start/pause button 271 of the washing machine, a specific treatment course of the first treatment apparatus 10 is executed. In this embodiment, the specific treatment course is "standard washing" ((b)->(c)).

[0235] (d) illustrates the composite UI 500 output when the "drying preparation function" is enabled and the treatment course of the first treatment apparatus 10 is in progress. When the "drying preparation function" is set, the laundry treatment apparatus 1 senses whether the current state of the second treatment part 20 satisfies a condition for executing the "drying preparation" operation. In an embodiment, the sensing may be performed by various sensors not shown. The condition for executing the the "drying preparation" operation is provided as a preset execution condition. In an embodiment, the condition for execution is that the second cabinet door 27 is closed (the dryer door is closed). (d) shows a notification pop-up 570 that is displayed when the "drying preparation function" is enabled, and the second cabinet door 27 of the second treatment apparatus 20 is not closed while the treatment course of the first treatment apparatus 10 is in progress. The notification pop-up 570 may indicate that the execution condition for "Ready to dry" has not been satisfied. In an embodiment, the notification pop-up 570 displays an error title indicating that the condition for executing the drying preparation function is not satisfied and a method for satisfying the condition for executing the drying preparation function. The error title 481 displays information related to the condition for executing the drying preparation function. In the embodiment, the notification pop-up 570 displays "Dryer door not closed" as the error title and "Please close the dryer door and press the button to prepare for drying" as the method for satisfying the condition to clear the error. When a set time elapses without any input from the user while the image (d) is output on the touch screen 240, the image (e) is output on the touch screen 240.

[0236] (d) illustrates the composite UI 500 output when the "drying preparation function" is enabled and the treatment course of the first treatment apparatus 10 is in progress. The page constituting the composite UI 500 includes a first area and a second area. In the first area, the time 341 remaining until the treatment course of the first treatment apparatus 10 is completed is displayed. In the first area, a status name, which is the name of the ongoing cycle or status of the treatment course currently being executed by the first treatment apparatus 10 is displayed. The first area displays a progress bar 360 of the first treatment part 10. In the second area, the operation status of the drying preparation function is displayed. In the embodiment, the operation status of the drying preparation function is that the drying preparation function is not executed because the execution conditions for executing the drying preparation function is not satisfied. The operation status of the drying preparation function is indicated by an error title 481. In the embodiment, the error title 481 is "Dryer door not closed."

"Dryer door not closed" is an example of a notification indicating that the state of the second treatment apparatus 20 does not satisfy the execution conditions for executing the "drying function." When any part of the second area is touched, a notification pop-up 570 may be output. The second area displays a text message that the notification pop-up 570 may output. In the embodiment, since the method to output the notification pop-up is touching the second area, the text message may be "Touch for instructions." The notification pop-up 570 in the illustrated embodiment relates to the second treatment apparatus 20 and may therefore be included in the second apparatus operation UI 400.

[0237] (f) illustrates the composite UI 500 that is displayed while the treatment course of the first treatment apparatus 10 is in progress with the "drying preparation function" set. (f) shows an image displayed when all the execution conditions of the "drying preparation function" are satisfied. In the embodiment, when the user closes the door of the dryer (the second cabinet door 27) and touches the second start/pause button 272 while the image of (d) is output, the image of (f) is output. In the embodiment, when the user closes the door of the dryer (the second cabinet door 27) and touches the second start/pause button 272 while the image of (e) is output, the image of (f) is output. In the composite UI 500 shown in (f), a drying preparation status 491 indicating that the drying preparation is completed is displayed in the second area of the composite UI 500. In the embodiment, in (d), the drying preparation status 491 is indicated as "Preparing to dry." "Preparing to dry" is a message indicating that the drying preparation operation is on standby or being executed.

[0238] While the present disclosure has been illustrated and described with reference to specific embodiments, it will be apparent to those of ordinary skill in the art that various modifications and variations can be made to the present disclosure without departing from the scope of the disclosure as defined by the appended claims.

Claims

1. An laundry treating apparatus, comprising:

a washing machine provided therein with a first drum to accommodate laundry;
a dryer provided therein with a second drum to accommodate the laundry; and
a control panel comprising a screen configured to output images, the control panel providing a user interface (UI) for at least one of the washing machine and the dryer,
wherein the dryer has a preheating function of preheating an inside of the second drum, wherein, based on the washing machine being operated while the preheating function is enabled, the screen outputs a single page showing an operation status of the preheating function and a remaining time until a washing course executed by the washing machine is completed.

2. The laundry treating apparatus of claim 1, wherein the operation status of the preheating function is one of a first status and a second status,

wherein the first status indicates that an operation for the preheating is on standby or in progress,
wherein the second status indicates that the preheating is completed.

3. The laundry treating apparatus of claim 1, wherein:

the screen is a touch screen configured to receive touch inputs from a user,
wherein the screen is configured to output one of:

a first apparatus operation UI for operating the washing machine; and
a second apparatus operation UI for operating the dryer,
wherein the single page comprises a first area and a second area different from the first area,
wherein:

the remaining time is displayed in the first area; and
the operation status of the preheating function is displayed in the second area,
wherein:

based on a touch input being received in the first area, the screen outputs the first apparatus operation UI; and
based on a touch input being received in the second area, the screen outputs the second apparatus operation UI.

4. The laundry treating apparatus of claim 3, wherein:

the dryer is positioned over the washing machine; and
the second area is positioned over the first area.

5. The laundry treating apparatus of claim 1, wherein the preheating of the second drum by the preheating function is terminated before the washing course in the washing machine is completed.

6. The laundry treating apparatus of claim 1, wherein:

the screen is configured to output one of:

a first apparatus operation UI for operating the washing machine; and
a second apparatus operation UI for operating the dryer,
wherein, based on the washing course being completed, the screen switches from the single page to the second apparatus operation UI;
wherein the second apparatus operation UI displays information indicating that the preheating of the second drum by the preheating function has been completed.

7. The laundry treating apparatus of claim 1, wherein, based on the preheating function being enabled while the dryer is powered off, the dryer is powered on.

8. The laundry treating apparatus of claim 1, wherein the screen is configured to output a first apparatus operation UI for operating the washing machine,
wherein, based on the preheating function being enabled, an indicator is displayed on the first apparatus operation UI to indicate that the preheating function is enabled.

9. The laundry treating apparatus of claim 1, wherein the screen is configured to output a first apparatus operation UI for operating the washing machine,
wherein:

based on the washing machine being operated with the preheating function enabled, the screen outputs the first apparatus operation UI; and
based on a preset time elapsing after the first apparatus operation UI is output, the screen switches from the first apparatus operation UI to the single page.

10. The laundry treating apparatus of claim 1, wherein, based on the washing machine being operated with the preheating function enabled, the dryer senses whether a door of the dryer is closed as a condition for executing the preheating function,
wherein, based on the door not being closed, the operation status of the preheating function is displayed as a third status indicating that the door is not closed.

11. The laundry treating apparatus of claim 10, wherein, based on the condition for executing the preheating function not being satisfied, a notification pop-up indicating that the condition for the execution is not satisfied is output on the screen with higher priority than the single page.

12. A laundry treating apparatus, comprising:

a first treatment apparatus having a first drum configured to accommodate laundry therein, the first treatment apparatus being configured to perform a first treatment for the laundry accommodated in the first drum;
a second treatment apparatus having a second drum configured to accommodate laundry therein, the second treatment apparatus being configured to perform a second treatment for the laundry accommodated in the second drum; and
a control panel comprising a screen configured to output images, the control panel displaying a user interface (UI) for at least one of the first treatment apparatus and the second treatment apparatus,
wherein the second treatment apparatus provides a pre-preparation function of performing a pre-preparation operation before execution of the second treatment to improve efficiency of the second treatment,
wherein the pre-preparation function is enabled by a user input,

wherein, based on the first treatment being performed by the first treatment apparatus while the pre-preparation function is enabled, the screen outputs a single page showing an operation status of the pre-preparation function and a remaining time until the first treatment is completed.

13. The laundry treating apparatus of claim 12, wherein the operation status of the pre-preparation function is one of:

a first status indicating the pre-preparation operation is on standby or in progress; and
a second status indicating the pre-preparation operation is completed.

14. The laundry treating apparatus of claim 12, the screen is a touch screen configured to receive touch inputs from a user, wherein the screen is configured to output one of:

a first apparatus operation UI for operating the washing machine; and
a second apparatus operation UI for operating the dryer,
wherein the single page comprises a first area and a second area different from the first area,
wherein:

the remaining time is displayed in the first area; and
the operation status of the pre-preparation function is displayed in the second area, wherein:

based on a touch input being received in the first area, the screen outputs the first apparatus operation UI; and
based on a touch input being received in the second area, the screen outputs the second apparatus operation UI.

15. The laundry treating apparatus of claim 14, wherein:

based on the first treatment apparatus being positioned over the second treatment apparatus, the first area is positioned over the second area; and
based on the first treatment apparatus being positioned under the second treatment apparatus, the first area is positioned under the second area.

16. The laundry treating apparatus of claim 12, wherein the second treatment apparatus is configured to:

execute the pre-preparation operation while the first treatment executed by the first treatment apparatus is in progress; and
perform the second treatment after the first treatment is completed.

17. The laundry treating apparatus of claim 16, wherein the pre-preparation operation is completed before the first treatment is completed.

18. The laundry treating apparatus of claim 12, wherein the screen is configured to output one of:

a first apparatus operation UI for operating the first treatment apparatus; and
a second apparatus operation UI for operating the second treatment apparatus;
wherein, based on the first treatment being completed, the screen switches from the single page to the second apparatus operation UI,
wherein the second apparatus operation UI displays information indicating that the pre-preparation operation has been completed.

19. The laundry treating apparatus of claim 12, wherein, based on the pre-preparation function being enabled while the second treatment apparatus is powered off, the second treatment apparatus is powered on.

20. The laundry treating apparatus of claim 15, wherein the screen is configured to output the first apparatus operation UI for operating the first treatment apparatus,
wherein, based on the pre-preparation function being enabled, an indicator is displayed on the first apparatus operation UI to indicate that the pre-preparation function is enabled.

21. The laundry treating apparatus of claim 12, wherein, based on the first treatment being performed by the first treatment apparatus with the pre-preparation function enabled, the second treatment apparatus senses whether a condition for executing the pre-preparation operation is satisfied;
wherein, based on the execution condition not being satisfied, the operation status of the pre-preparation function is displayed as a third status indicating that the execution condition is not satisfied.

FIG. 1

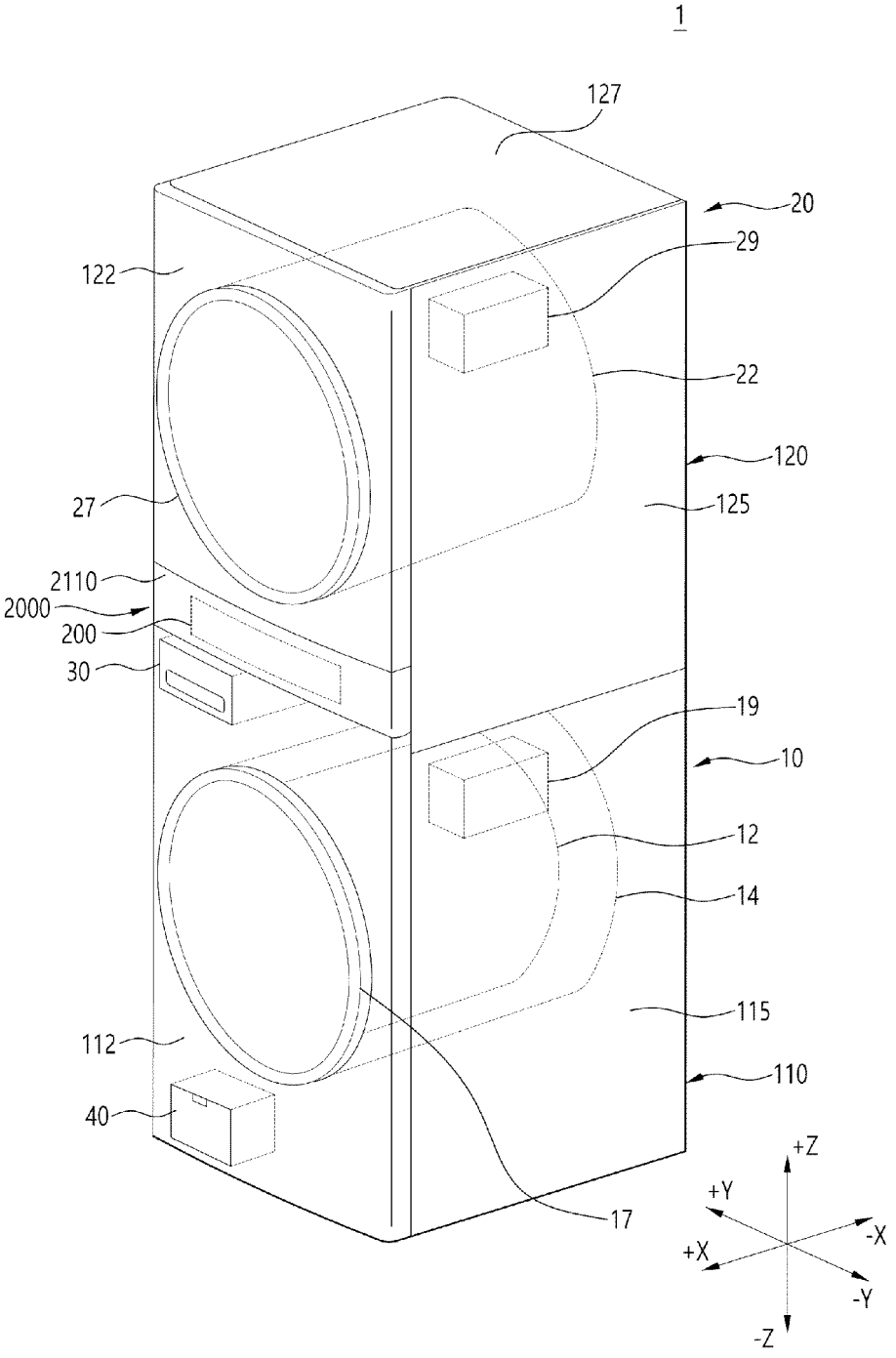

1
127
20
29
122
22
120
27
125
2110
2000
200
30
19
10
12
14
115
112
110
40
17
+Z
+Y
-X
+X
-Y
-Z

FIG. 2

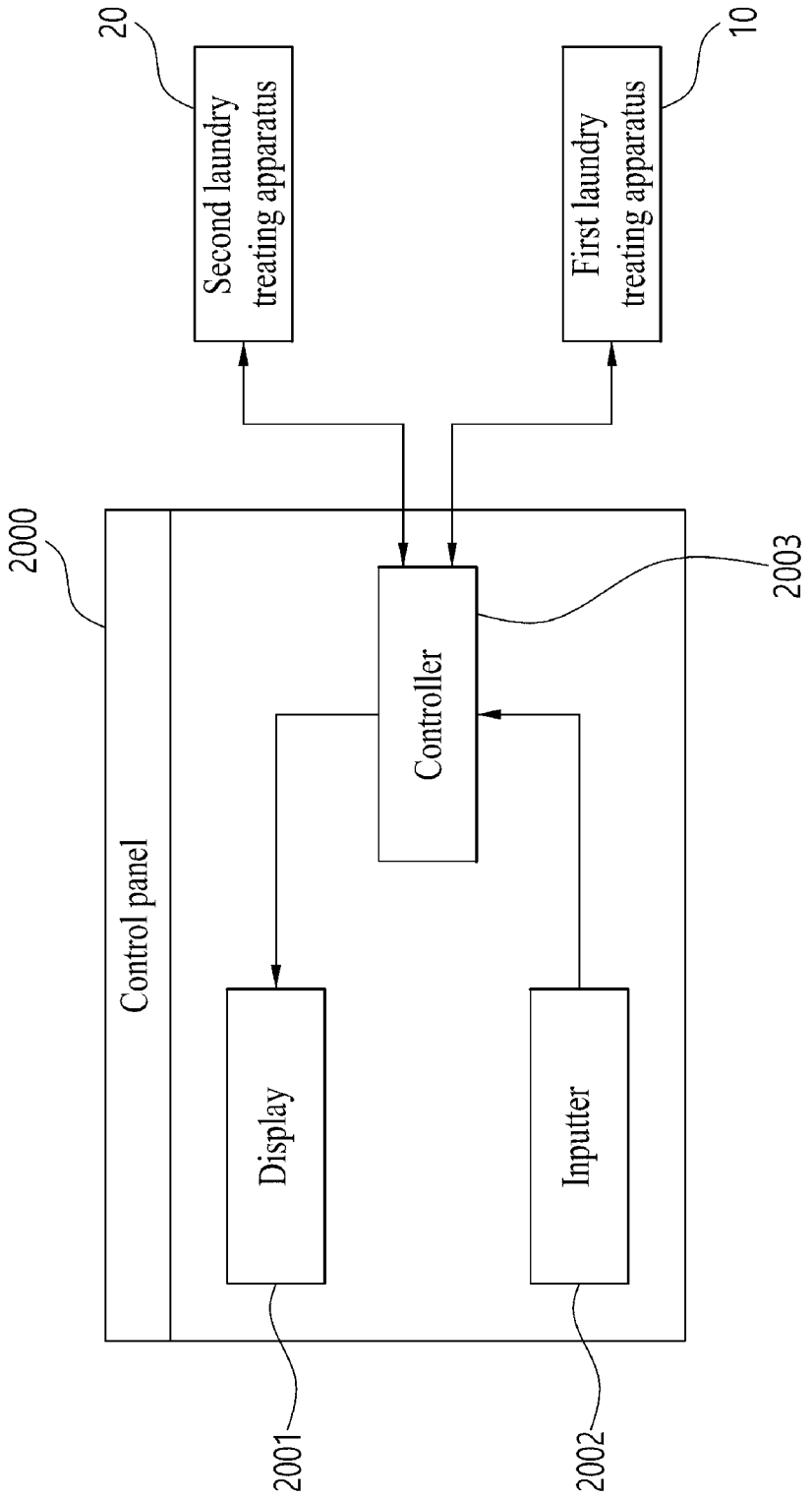
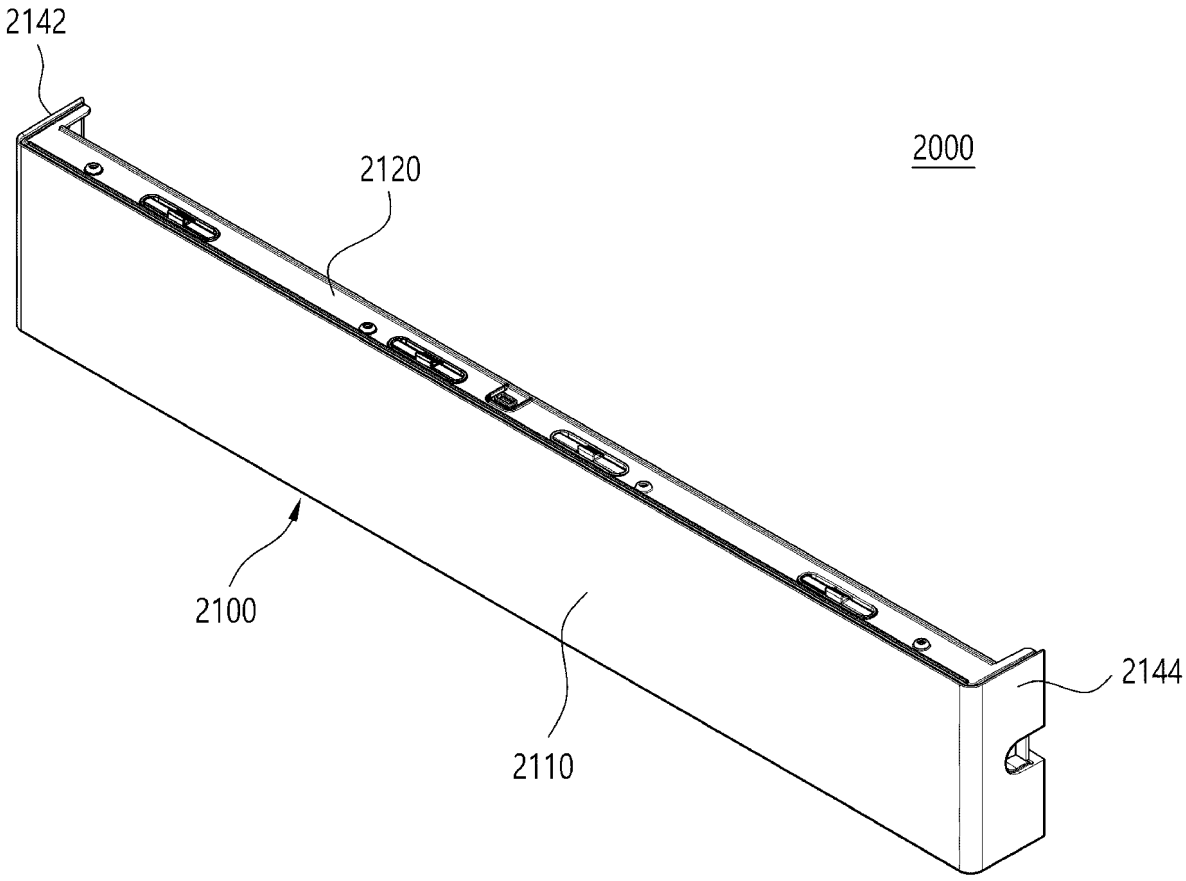

20
Second laundry treating apparatus
10
First laundry treating apparatus
2000
Control panel
Controller
2003
Display
Inputter
2001
2002

FIG. 3



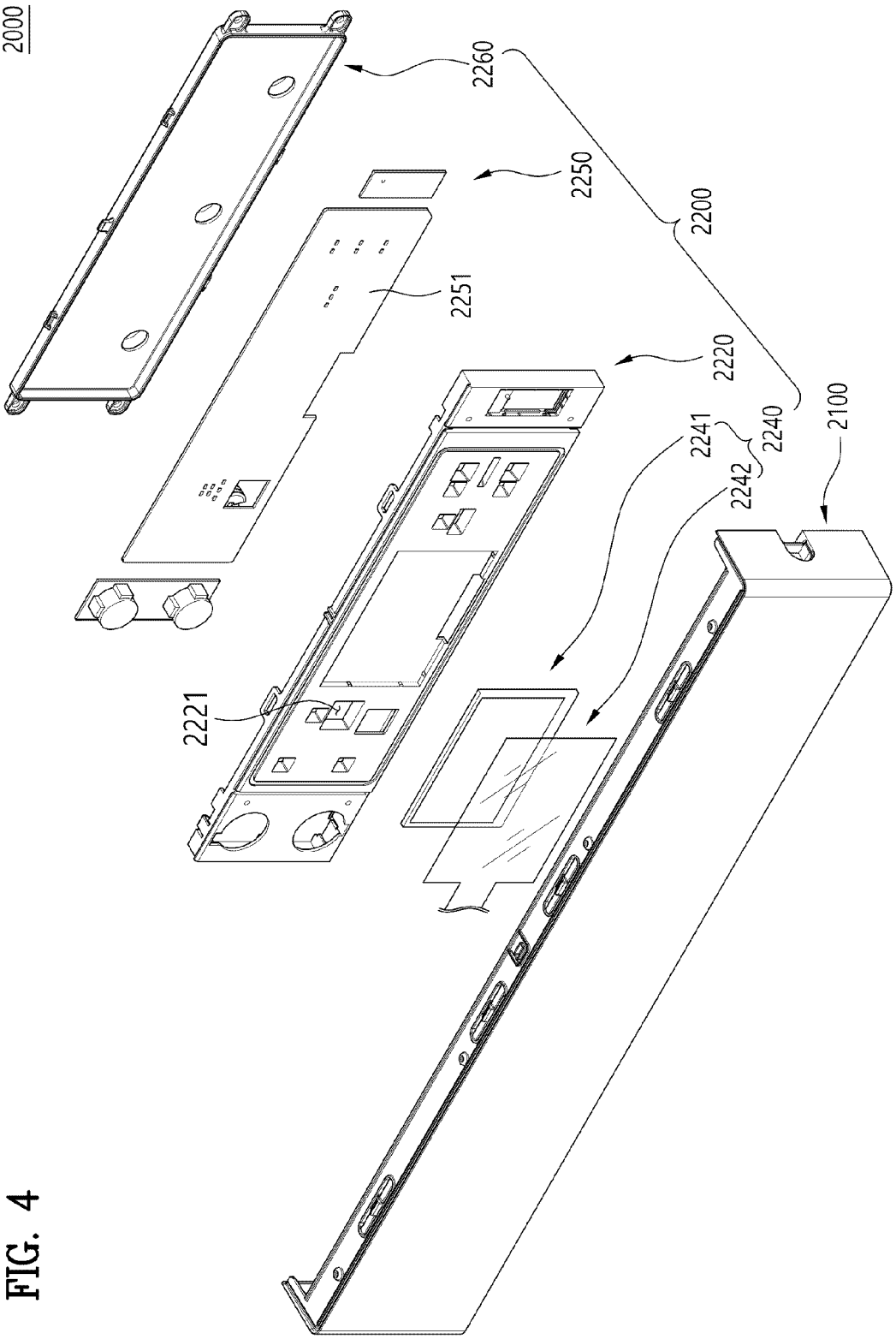


FIG. 4

FIG. 5

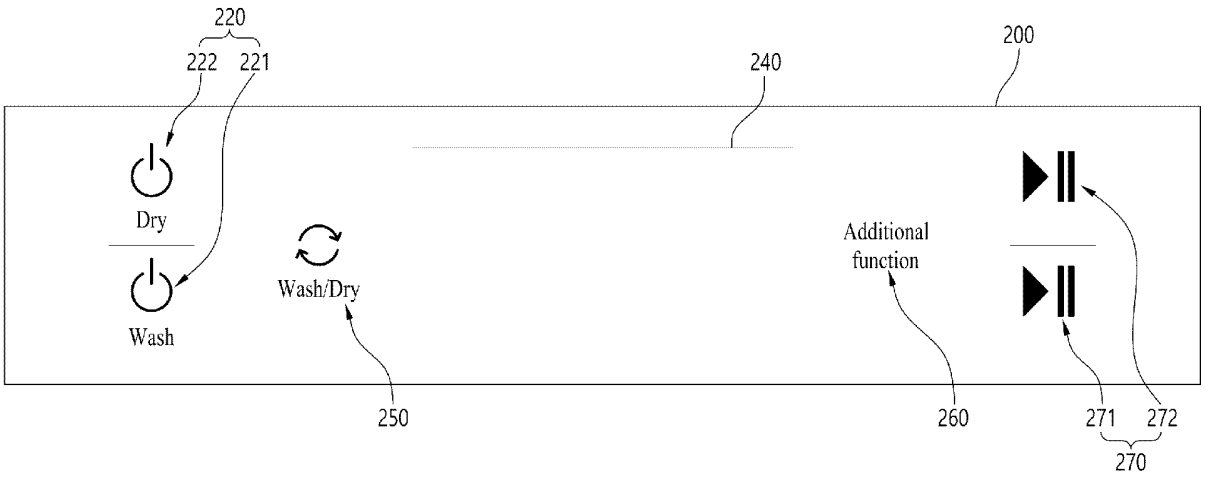


FIG. 6a

Tap (Short)	Tap (Long)	Tap and Hold	Double Tap	Swipe (Drag)
				

FIG. 6b

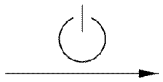
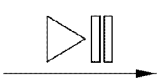
Receiving input through the power button	Receiving input through the start/pause button	Flow (user, device)	Flow (user, sub/described)
			

FIG. 7

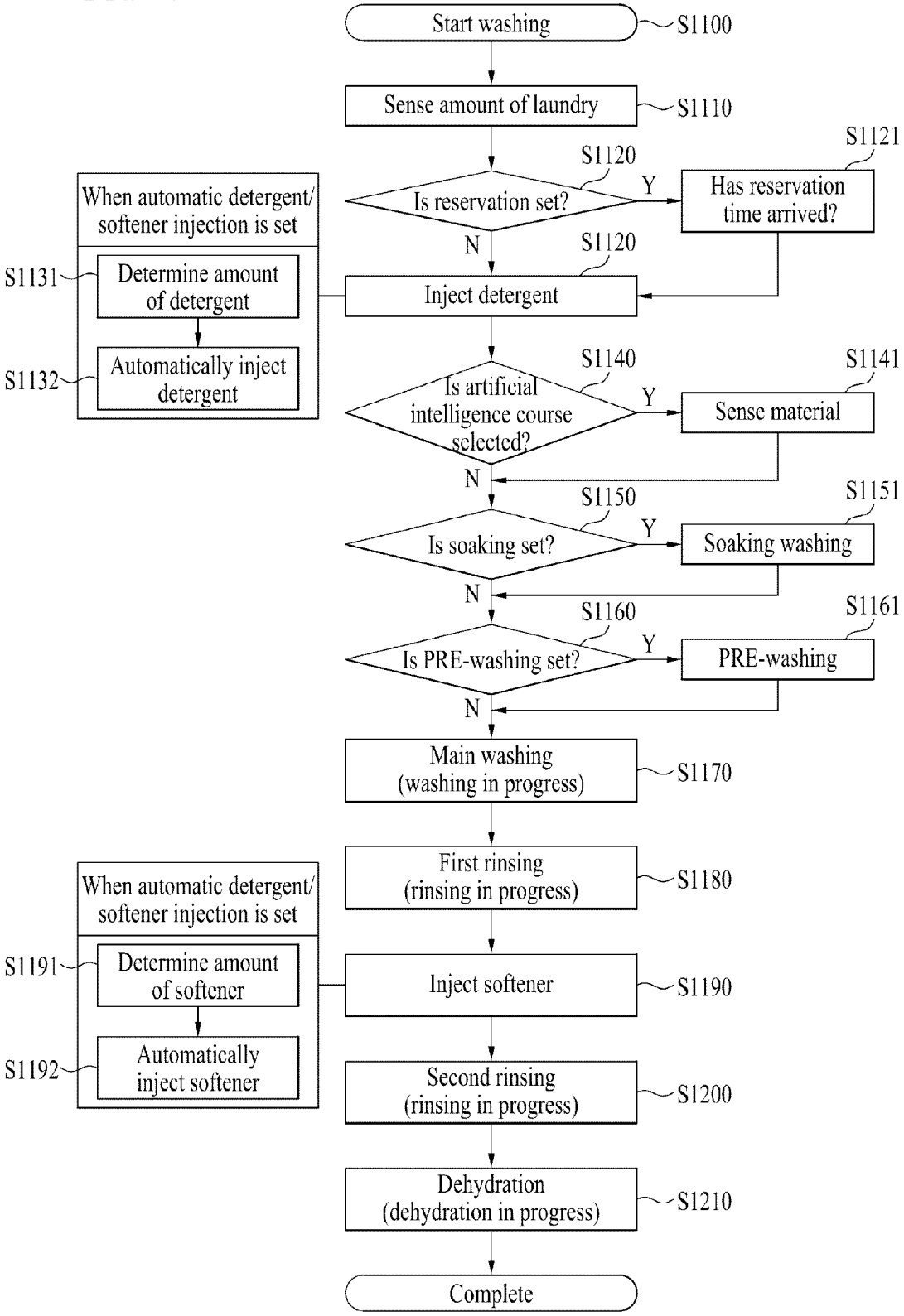

Start washing
S1100
Sense amount of laundry
S1110
S1120
Is reservation set?
Y
S1121
Has reservation time arrived?
N
S1120
Inject detergent
When automatic detergent/ softener injection is set
S1131
Determine amount of detergent
S1132
Automatically inject detergent
S1140
Is artificial intelligence course selected?
Y
S1141
Sense material
N
S1150
Is soaking set?
Y
S1151
Soaking washing
N
S1160
Is PRE-washing set?
Y
S1161
PRE-washing
N
Main washing (washing in progress)
S1170
First rinsing (rinsing in progress)
S1180
When automatic detergent/ softener injection is set
S1191
Determine amount of softener
S1192
Automatically inject softener
Inject softener
S1190
Second rinsing (rinsing in progress)
S1200
Dehydration (dehydration in progress)
S1210
Complete

FIG. 8

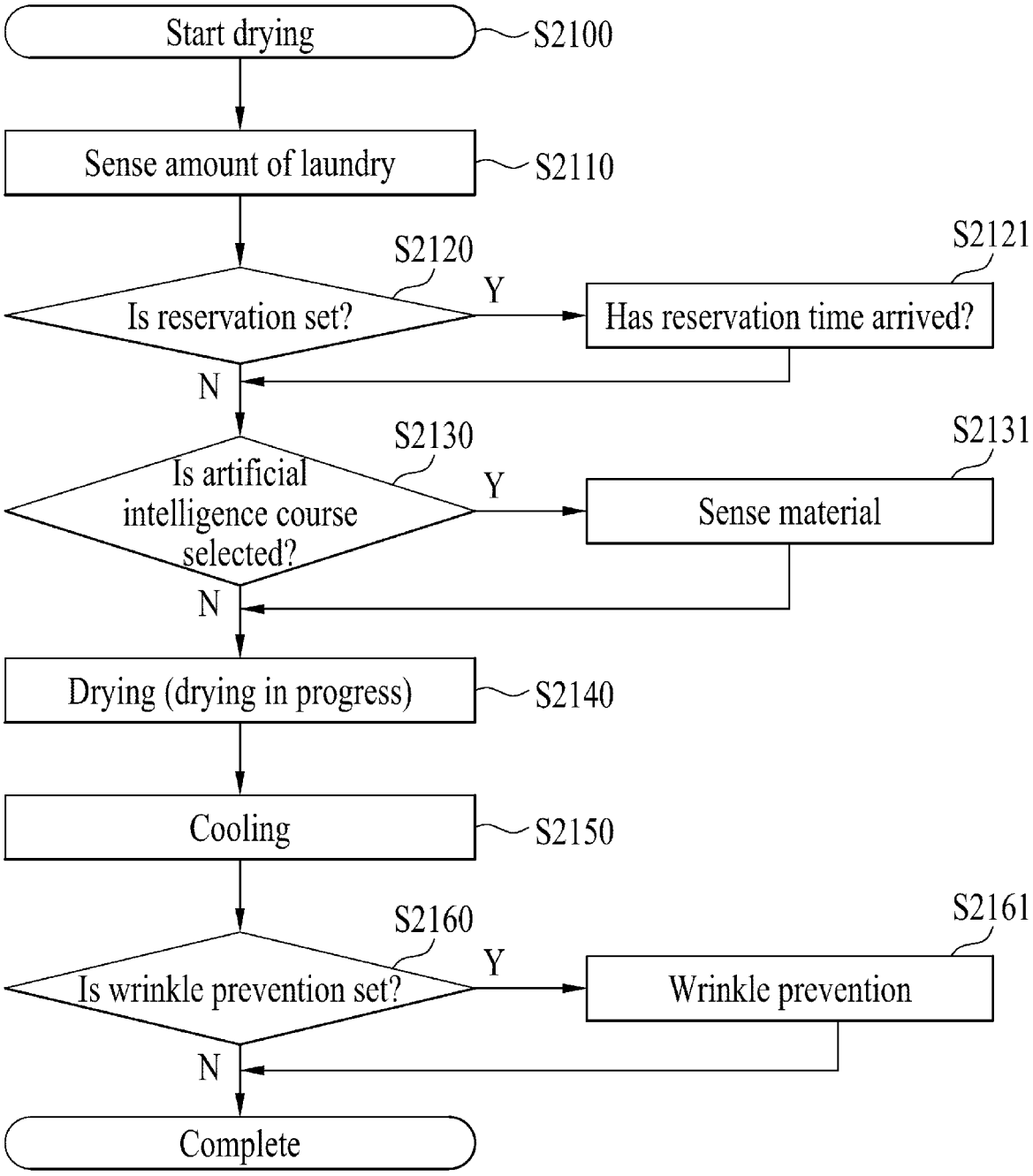
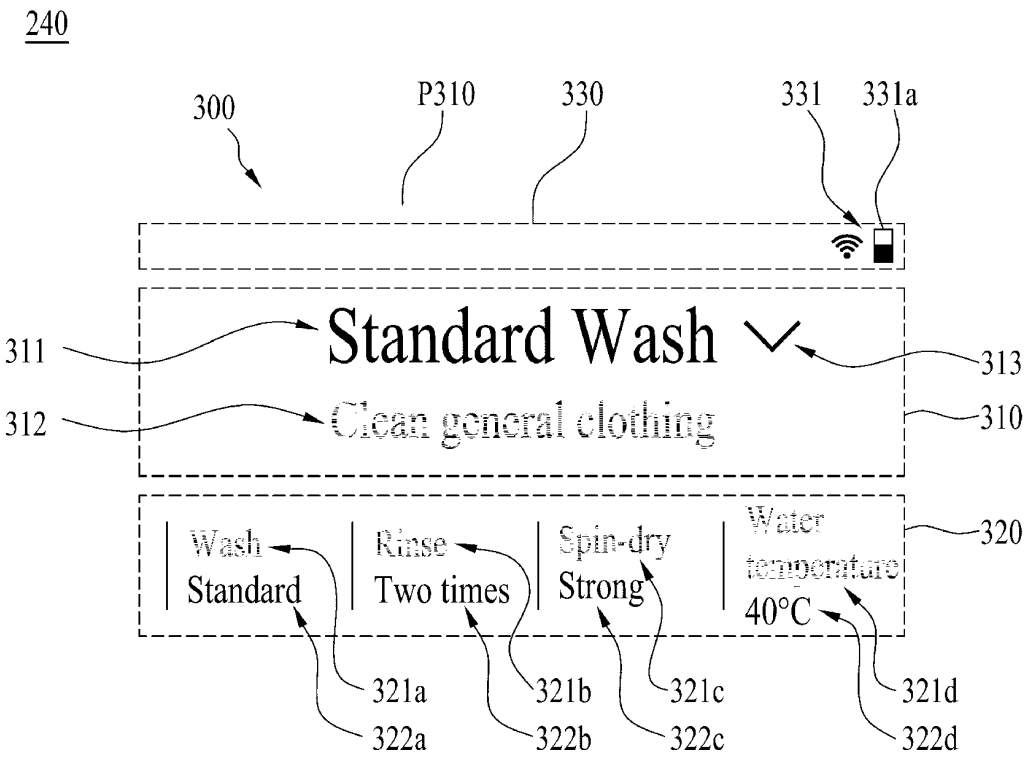

Start drying
S2100
Sense amount of laundry
S2110
S2120
Is reservation set?
Y
S2121
Has reservation time arrived?
N
S2130
Is artificial intelligence course selected?
Y
S2131
Sense material
N
Drying (drying in progress)
S2140
Cooling
S2150
S2160
Is wrinkle prevention set?
Y
S2161
Wrinkle prevention
N
Complete

FIG. 9



321 : 321a,321b,321c,321d
322 : 322a,322b,322c,322d

FIG. 10

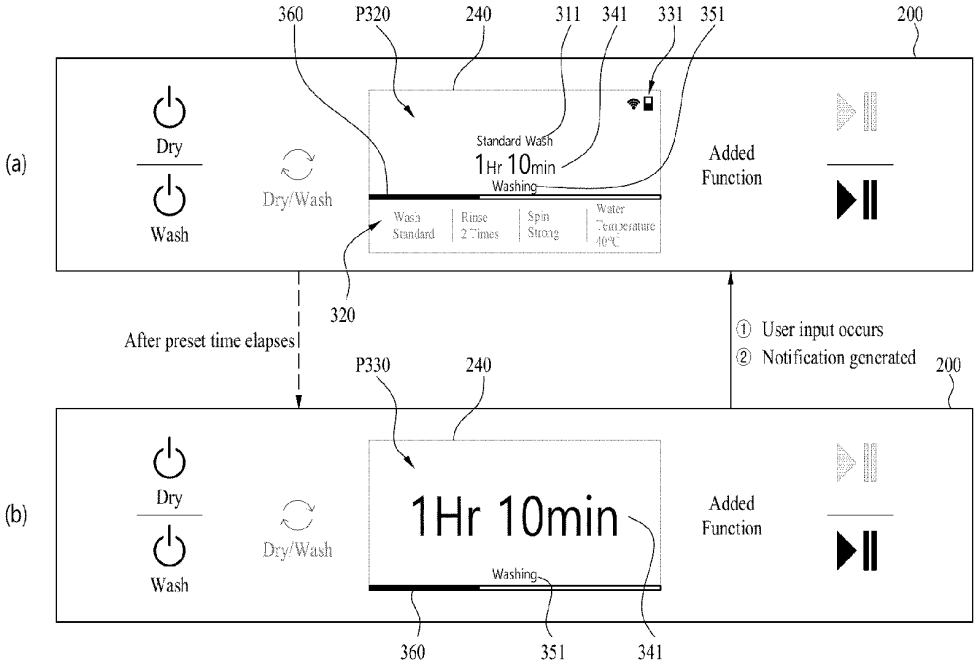


FIG. 11

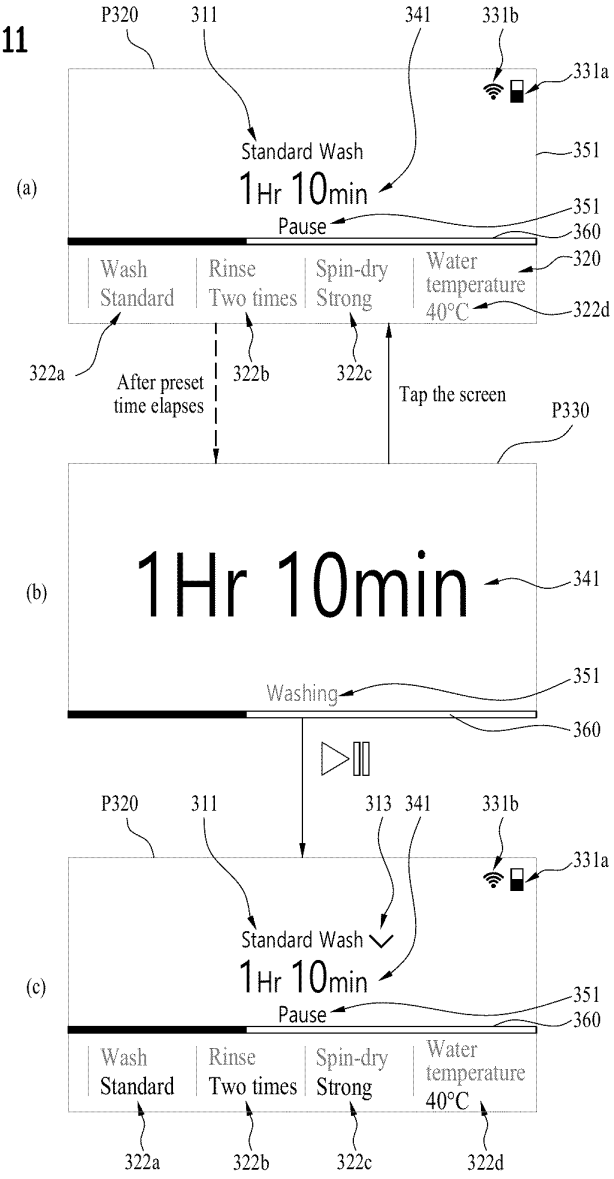

P320
311
341
331b
331a
351
Standard Wash
1Hr 10min
Pause
360
Wash
Standard
Rinse
Two times
Spin-dry
Strong
Water
temperature
40°C
320
322d
322a
322b
322c
After preset
time elapses
Tap the screen
P330
(a)
(b)
(c)
1Hr 10min
Washing
313

FIG. 12

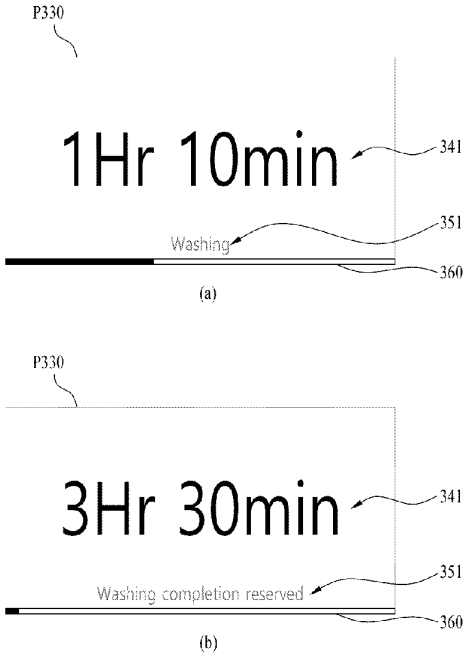

P330
1Hr 10min
341
Washing
351
360
(a)
P330
3Hr 30min
341
Washing completion reserved
351
360
(b)

FIG. 13

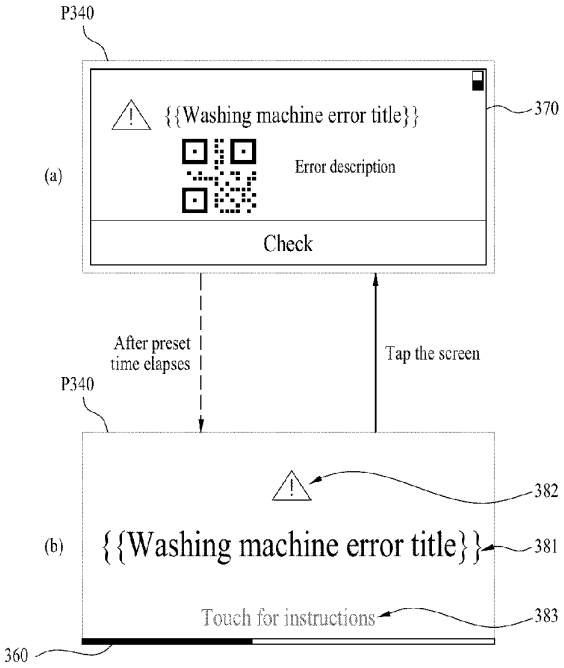

P340
{{Washing machine error title}}
370
(a)
Error description
Check
After preset time elapses
Tap the screen
P340
382
(b)
{{Washing machine error title}}
381
Touch for instructions
383
360

FIG. 14

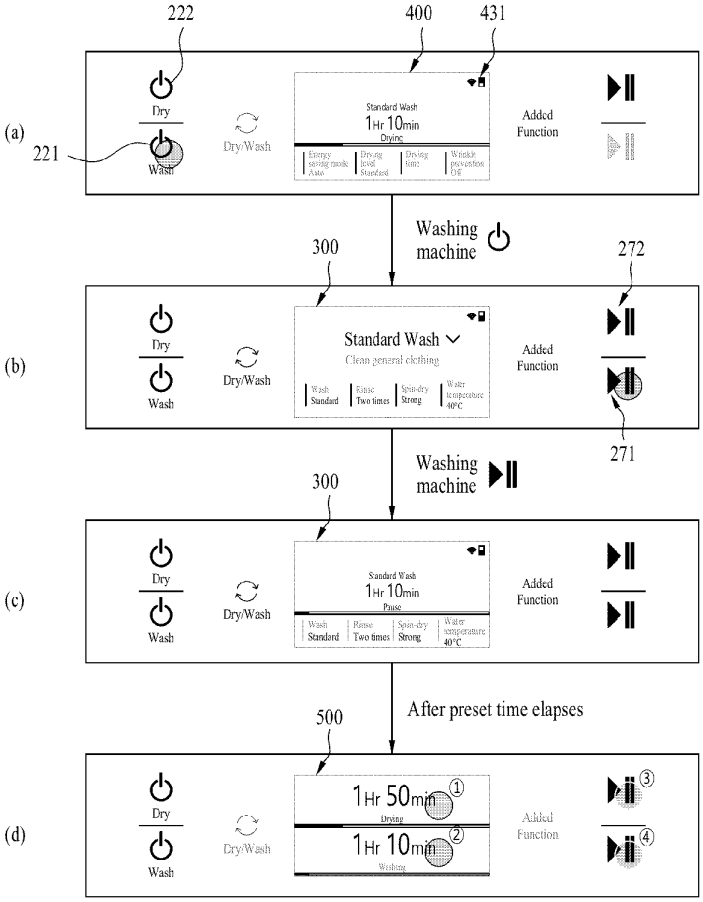

222
400
431
(a)
221
Dry
Wash
Dry/Wash
Standard Wash
1Hr 10min
Drying
Added Function
Washing machine
300
272
(b)
Standard Wash
Clean general clothing
271
300
(c)
Pause
After preset time elapses
500
(d)
1Hr 50min
1Hr 10min

FIG. 15

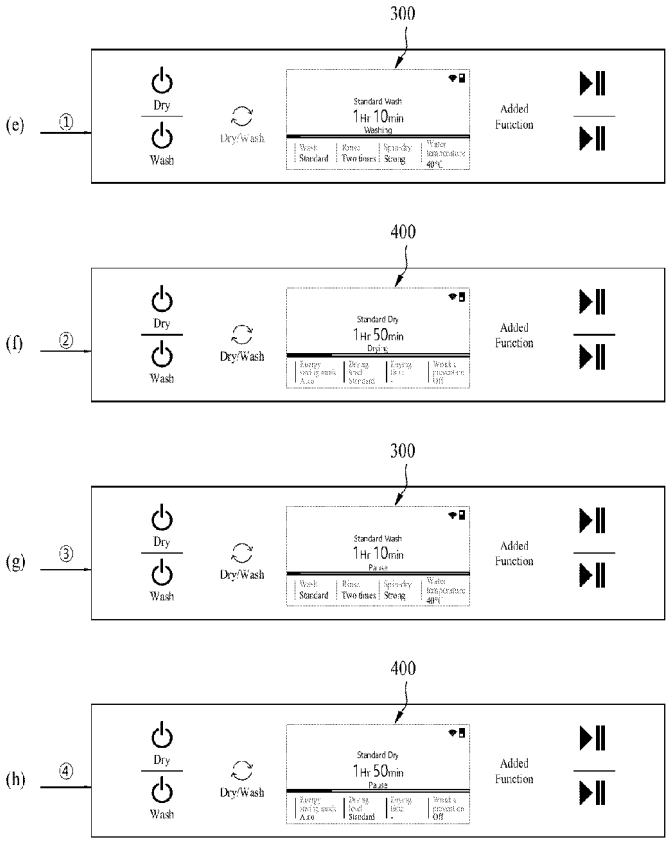

300
(e)
①
Dry
Wash
Dry/Wash
Standard Wash
1Hr 10min
Washing
Added Function
400
(f)
②
Dry
Wash
Dry/Wash
Standard Dry
1Hr 50min
Drying
Added Function
300
(g)
③
Dry
Wash
Dry/Wash
Standard Wash
1Hr 10min
Pause
Added Function
400
(h)
④
Dry
Wash
Dry/Wash
Standard Dry
1Hr 50min
Pause
Added Function

FIG. 16

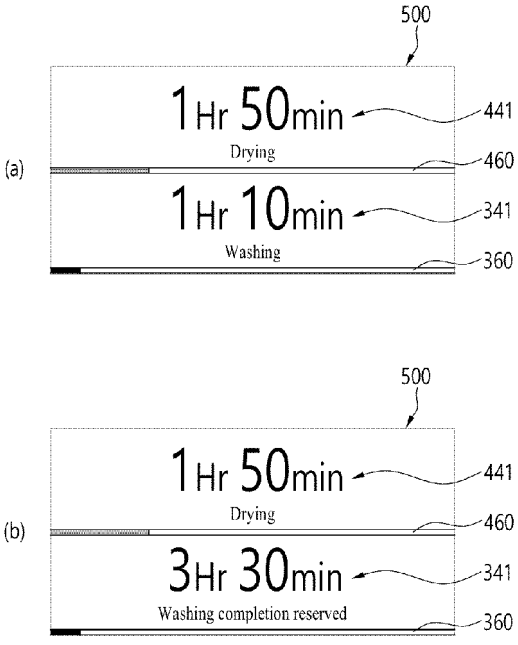

500
(a)
1Hr 50min
441
Drying
460
1Hr 10min
341
Washing
360
500
(b)
1Hr 50min
441
Drying
460
3Hr 30min
341
Washing completion reserved
360

FIG. 17

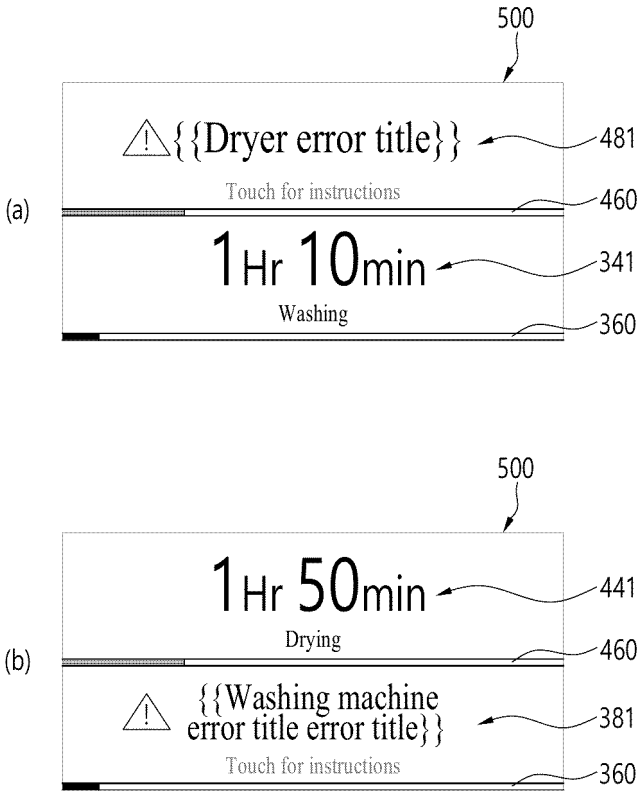

500
{{Dryer error title}}
481
Touch for instructions
460
(a)
1Hr 10min
341
Washing
360
500
1Hr 50min
441
Drying
460
(b)
{{Washing machine error title error title}}
381
Touch for instructions
360

FIG. 18

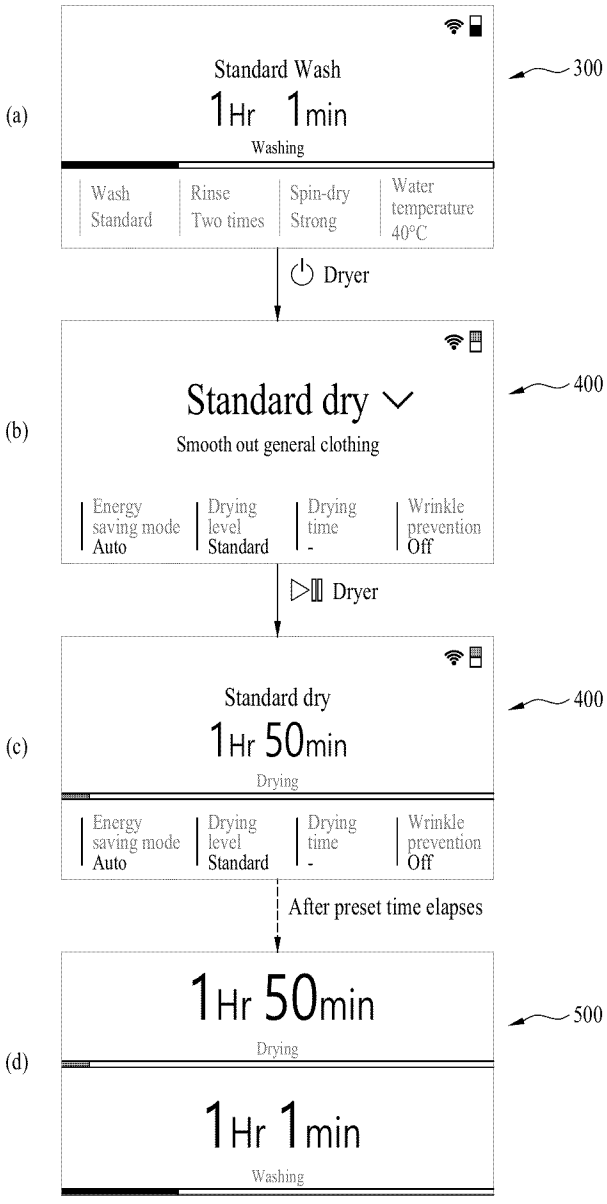

(a)
Standard Wash
1Hr 1min
Washing
300
Wash
Standard
Rinse
Two times
Spin-dry
Strong
Water temperature
40°C
Dryer
(b)
Standard dry
Smooth out general clothing
400
Energy saving mode
Auto
Drying level
Standard
Drying time
-
Wrinkle prevention
Off
Dryer
(c)
Standard dry
1Hr 50min
Drying
400
Energy saving mode
Auto
Drying level
Standard
Drying time
-
Wrinkle prevention
Off
After preset time elapses
(d)
1Hr 50min
Drying
500
1Hr 1min
Washing

FIG. 19

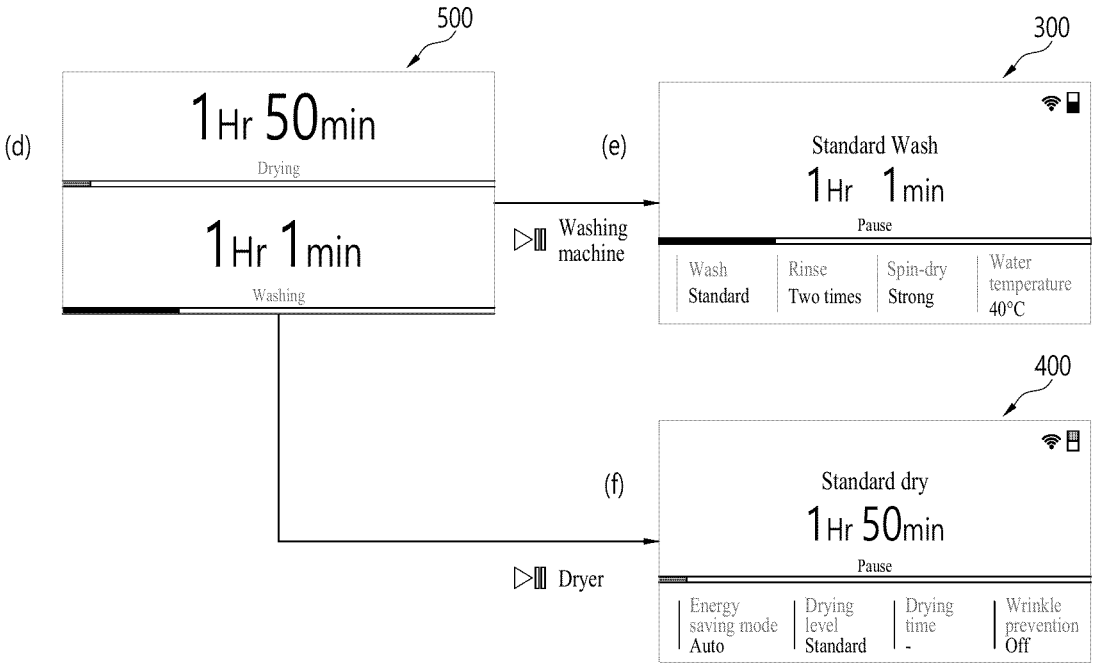
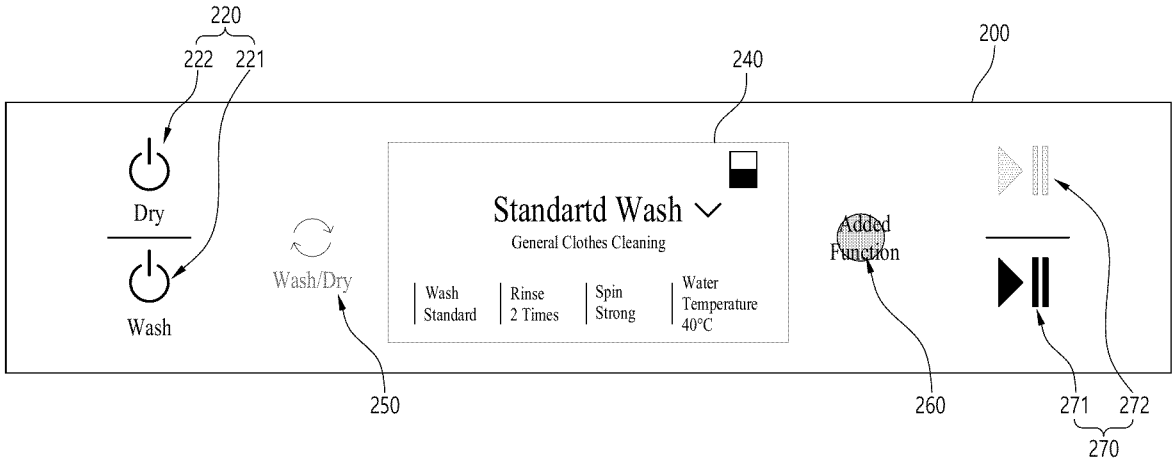

500
1Hr 50min
Drying
1Hr 1min
Washing
(d)
(e)
Washing machine
300
Standard Wash
1Hr 1min
Pause
Wash
Standard
Rinse
Two times
Spin-dry
Strong
Water temperature
40°C
400
(f)
Standard dry
1Hr 50min
Pause
Dryer
Energy saving mode
Auto
Drying level
Standard
Drying time
-
Wrinkle prevention
Off

FIG. 20


220
222
221
240
200
Dry
Wash
Wash/Dry
Standartd Wash
General Clothes Cleaning
Wash
Standard
Rinse
2 Times
Spin
Strong
Water
Temperature
40°C
Added Function
250
260
271
272
270

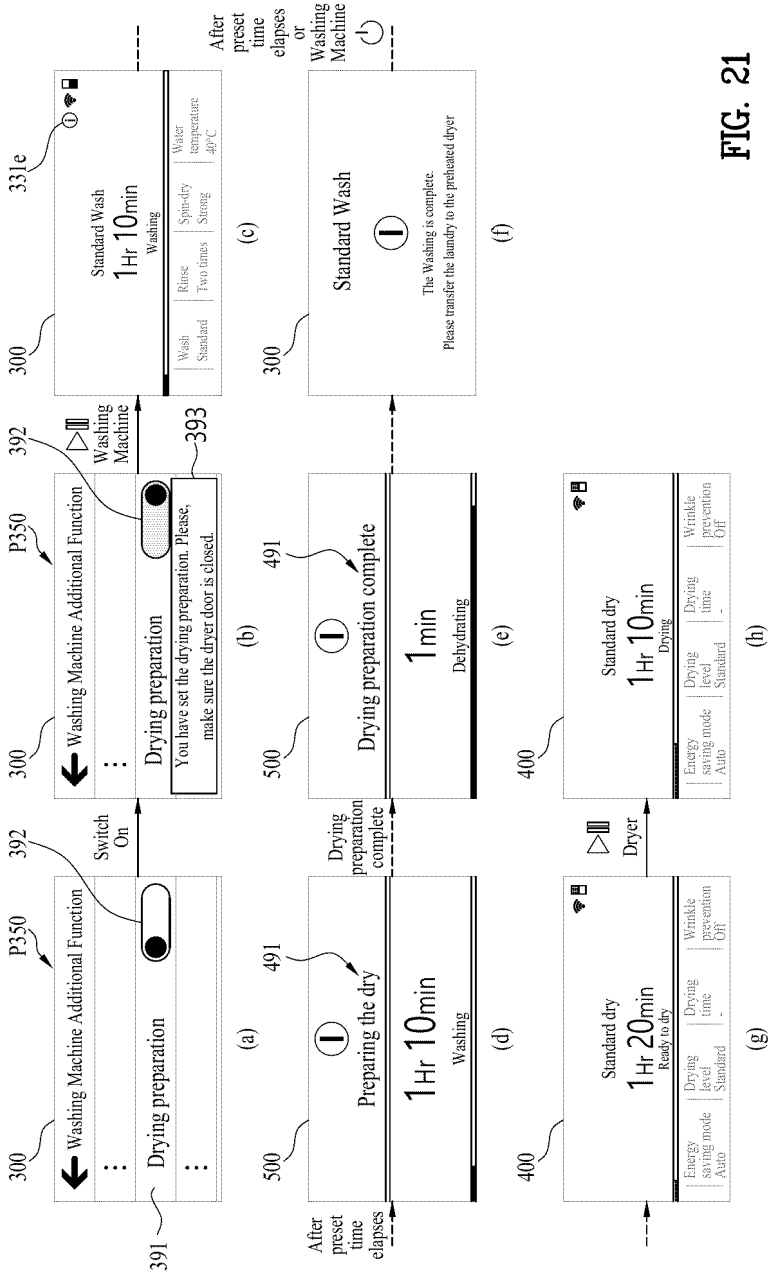
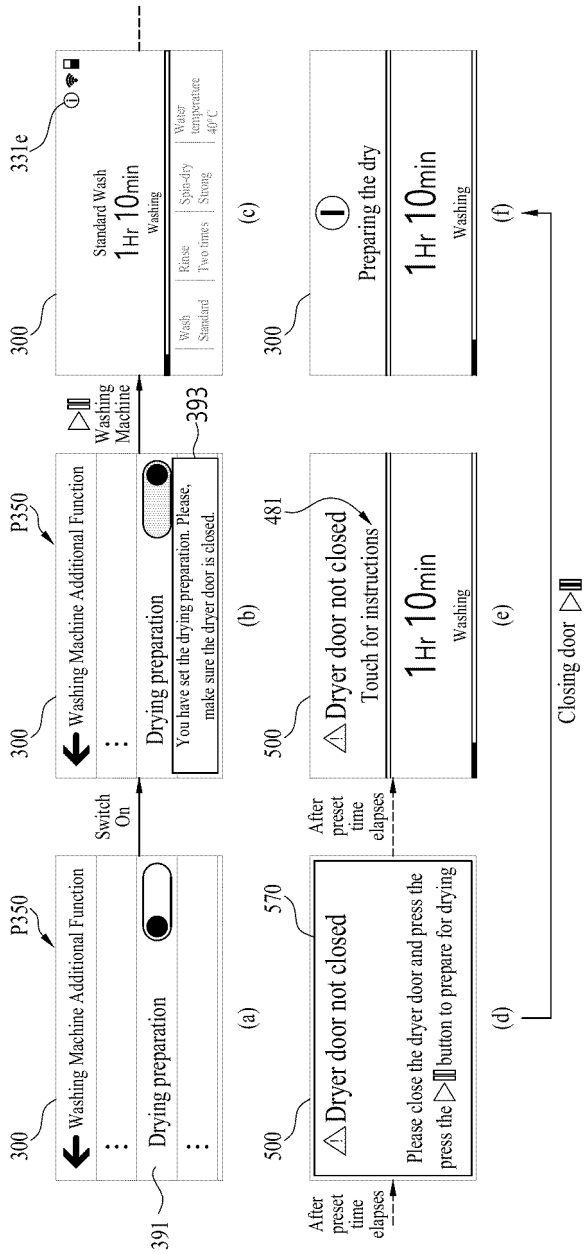

300
Washing Machine Additional Function
Drying preparation
391
P350
392
Switch On
(a)
300
Washing Machine Additional Function
Drying preparation
You have set the drying preparation. Please, make sure the dryer door is closed.
393
P350
392
Washing Machine
(b)
300
Standard Wash
1Hr 10min
Washing
Wash Standard
Rinse Two times
Spin-dry Strong
Water temperature 40°C
331e
(c)
After preset time elapses or Washing Machine
300
Standard Wash
The Washing is complete.
Please transfer the laundry to the preheated dryer
(f)
500
Preparing the dry
1Hr 10min
Washing
491
(d)
After preset time elapses
Drying preparation complete
500
Drying preparation complete
1min
Dehydrating
491
(e)
400
Standard dry
1Hr 20min
Ready to dry
Energy saving mode Auto
Drying level Standard
Drying time -
Wrinkle prevention Off
(g)
Dryer
400
Standard dry
1Hr 10min
Drying
Energy saving mode Auto
Drying level Standard
Drying time -
Wrinkle prevention Off
(h)

FIG. 21

FIG. 22


300
Washing Machine Additional Function
Drying preparation
391
P350
(a)
Switch On
Drying preparation
You have set the drying preparation. Please, make sure the dryer door is closed.
393
(b)
Washing Machine
Standard Wash
1Hr 10min
Washing
Wash Standard
Rinse Two times
Spin-dry Strong
Water temperature 40° C
331e
(c)
Preparing the dry
1Hr 10min
Washing
(f)
Closing door
500
Dryer door not closed
Touch for instructions
481
1Hr 10min
Washing
(e)
After preset time elapses
Dryer door not closed
Please close the dryer door and press the press the button to prepare for drying
570
(d)
After preset time elapses

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2023/013648

A. CLASSIFICATION OF SUBJECT MATTER

D06F 34/28(2020.01)i; **D06F 34/30**(2020.01)i; **D06F 34/32**(2020.01)i; **D06F 34/34**(2020.01)i; **D06F 34/05**(2020.01)i; **D06F 29/00**(2006.01)i; **D06F 31/00**(2006.01)i; **D06F 39/04**(2006.01)i; **D06F 34/10**(2020.01)i; **D06F 34/18**(2020.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

D06F 34/28(2020.01); D06F 31/00(2006.01); D06F 33/02(2006.01); D06F 33/30(2020.01); D06F 34/05(2020.01); D06F 34/10(2020.01); D06F 39/00(2006.01); D06F 58/24(2006.01)

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

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

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

eKOMPASS (KIPO internal) & keywords: 세탁기(washing machine), 건조기(drying machine), 컨트롤패널(control panel), 현황(status), 시간(time)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 10-2018-0086168 A (LG ELECTRONICS INC.) 30 July 2018 (2018-07-30) See paragraphs [0001]-[0243], claims 1-18 and figures 1-13.	1-4,6,8-9,12-15,18,20
A		5,7,10-11,16-17,19,21
Y	KR 10-1954968 B1 (QINGDAO HAIER DRUM WASHING MACHINE CO., LTD.) 06 March 2019 (2019-03-06) See paragraphs [0005]-[0070], claims 1-16 and figures 1-5.	1-4,6,8-9,12-15,18,20
Y	KR 10-2002-0092816 A (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.) 12 December 2002 (2002-12-12) See paragraphs [0033]-[0079], claims 1-10 and figures 1-8.	1-4,6,8-9,12-15,18,20
Y	KR 10-2021-0087897 A (SAMSUNG ELECTRONICS CO., LTD.) 13 July 2021 (2021-07-13) See paragraphs [0035]-[0430], claims 1-20 and figures 1-25.	2-4,6,13-15,18,20

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

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

Date of the actual completion of the international search	Date of mailing of the international search report
29 December 2023	**02 January 2024**
Name and mailing address of the ISA/KR **Korean Intellectual Property Office** **Government Complex-Daejeon Building 4, 189 Cheongsa-ro, Seo-gu, Daejeon 35208** Facsimile No. **+82-42-481-8578**	Authorized officer Telephone No.

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

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2023/013648

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 10-2021-0122022 A (LG ELECTRONICS INC.) 08 October 2021 (2021-10-08) See paragraphs [0007]-[0150], claims 1-25 and figures 1-6.	1-21

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/KR2023/013648

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
KR 10-2018-0086168 A	30 July 2018	AU 2017-204095 A1	02 August 2018
		AU 2017-204095 B2	08 August 2019
		CN 108301165 A	20 July 2018
		CN 108301165 B	29 January 2021
		EP 3348698 A1	18 July 2018
		EP 3348698 B1	14 April 2021
		US 11198964 B2	14 December 2021
		US 2018-0202091 A1	19 July 2018
KR 10-1954968 B1	06 March 2019	CN 106032625 A	19 October 2016
		CN 106032625 B	13 December 2019
		EP 3269863 A1	17 January 2018
		EP 3269863 B1	02 December 2020
		JP 2018-516606 A	28 June 2018
		JP 6596777 B2	30 October 2019
		US 10711381 B2	14 July 2020
		US 2018-0057987 A1	01 March 2018
		WO 2016-141714 A1	15 September 2016
KR 10-2002-0092816 A	12 December 2002	CN 100381630 C	16 April 2008
		CN 1389618 A	08 January 2003
		CN 2563178 Y	30 July 2003
		JP 2002-360986 A	17 December 2002
		JP 4457524 B2	28 April 2010
		TW 591152 A	11 June 2004
		TW 591152 B	11 June 2004
		US 2002-0178765 A1	05 December 2002
		US 6966203 B2	22 November 2005
KR 10-2021-0087897 A	13 July 2021	DE 212020000499 U1	26 August 2021
		EP 3882389 A1	22 September 2021
		EP 3882389 A4	16 February 2022
		KR 10-2021-0087764 A	13 July 2021
		KR 10-2023-0031266 A	07 March 2023
		KR 10-2236743 B1	06 April 2021
		KR 10-2236743 B9	15 October 2021
		US 11421367 B2	23 August 2022
		US 2021-0207309 A1	08 July 2021
		US 2022-0349107 A1	03 November 2022
		US 2023-0235496 A1	27 July 2023
		WO 2021-137417 A1	08 July 2021
KR 10-2021-0122022 A	08 October 2021	EP 3889337 A1	06 October 2021
		US 2021-0301448 A1	30 September 2021

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

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- KR 1020220029635 A1 **[0006]**