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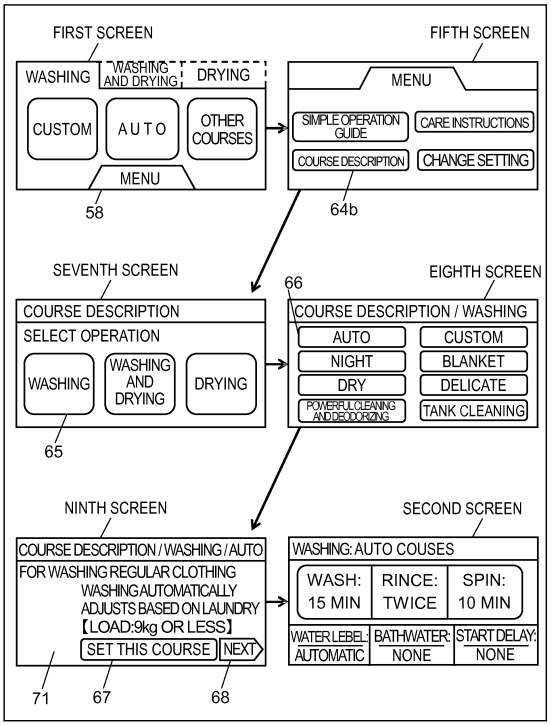
(54) WASHING MACHINE CONTROL DISPLAY DEVICE AND WASHING MACHINE EQUIPPED WITH SAME

(57) The present invention has a selection button for an operation course for determining operating conditions for washing and drying, a liquid crystal panel for displaying a setting button and setting conditions for wash, rinse, and spin, and a transparent panel having a transparent electrode, the transparent panel being superposed on the liquid crystal panel. A touch panel is also provided for performing operation by the touch of a finger to the transparent panel, and a description display screen (71) for describing the details of operation courses is provided to the touch panel. A course setting button (67) for causing the liquid crystal panel to display the setting conditions and the setting buttons is further provided to the description display screen (71).

FIG. 8



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Description

TECHNICAL FIELD

[0001] The present invention relates to a washing machine operation display device including a operation unit equipped with a liquid crystal panel.

BACKGROUND ART

[0002] A conventional washing machine operation display device will be described with reference to the drawings.

[0003] FIG. 9 is a front view of a conventional washing machine operation display device, and FIG. 10 is a front view of a controller included in the same washing machine operation display device.

[0004] As illustrated in FIG. 9 and FIG. 10, panel sheet 2 configured from a sheet material is insert molded on a top surface of operation display device 1. Operation display device 1 includes display unit 3 and operation unit 4. Liquid crystal panel 5 is arranged in a position corresponding to display unit 3, and operation button unit 6 is arranged in a position corresponding to operation unit 4.

[0005] Operation time and setting conditions for each of wash, rinse, and spin displayed on liquid crystal panel 5 can be changed by pressing cycle button 6a included in operation button unit 6. Moreover, an operation course displayed on liquid crystal panel 5 can be changed by pressing course button 6b. Additionally, washing, washing and drying, drying only, and mist can be switched between by pressing washing drying switching button 6c.

[0006] Operation display device 1 includes power-on button 6d which turns on the power, power-off button 6e which turns off the power, and start button 6f which causes a washing machine operation to start.

[0007] As illustrated in FIG. 10, controller 9 is fixed to resin case 10. Controller 9 includes button-type electric switch 7, LED element 8, and liquid crystal panel 5. Button-type electric switch 7 is disposed in a position corresponding to operation button unit 6 of operation display device. LED element 8 alerts of a press of operation button unit 6.

[0008] Screw hole 11 is provided at a perimeter of resin case 10. The operation display device is assembled by fixing resin case 10 to operation display device 1 with screws (not shown in the drawings) from behind (for example, see PTL (Patent Literature) 1).

[0009] Because this sort of washing machine is equipped with multiple functions, simplification of operation for the user has been proposed.

[0010] With this sort of washing machine, input is made through a touch panel included in the display unit. A help screen, which, for example, describes the courses, is provided for explaining operation of the washing machine in an easy to understand manner to a user not familiar with the operations (for example, see PTL 2).

[0011] However, this sort of conventional washing machine operation display device includes multiple operation buttons. As such, the multitude of operation buttons complicates operation of the washing machine when the user attempts to input a setting.

[0012] Moreover, after viewing the help screen, the user is required to press a page return button at the top of the screen multiple times in order to return to the course setting screen and enter setting conditions. This leads to an increase in the number of times the operations are used, complicating operation of the washing machine, which is problematic.

Citation List

Patent Literature

[0013]

PTL 1: Japanese Unexamined Patent Application Publication No. 2008-66163

PTL 2: Japanese Unexamined Patent Application Publication No. H09-84989

SUMMARY OF THE INVENTION

[0014] A washing machine operation display device according to the present invention includes: a liquid crystal panel for displaying a selection button for an operation course for determining operating conditions for washing and drying, and setting buttons and setting conditions for wash, rinse, and spin; and a transparent panel including a transparent electrode and superposed on the liquid crystal panel. A touch panel is provided for performing operation by a touch of a finger to the transparent panel, and the touch panel is provided with a description display screen for describing details of the operation course. The description display screen is provided with a course setting button for causing the liquid crystal panel to display the setting conditions and the setting buttons.

[0015] With this, a user can display, on the liquid crystal panel, the description display screen for describing the details of an operation course, and after viewing the description display screen, to input the setting conditions, the user can press a course setting button provided on the description display screen to jump directly to an input screen for the condition settings. Consequently, even if the washing machine is equipped with various multifunctional courses, it is possible for the user to learn details about an operation course and input the condition settings with simple operations, thereby greatly increasing the operationality of the washing machine.

BRIEF DESCRIPTION OF DRAWINGS

[0016]

FIG. 1 is a vertical cross sectional view of a washing machine equipped with a washing machine opera-

tion display device according to an embodiment of the present invention.

FIG. 2 is a perspective view of the washing machine equipped with the washing machine operation display device according to an embodiment of the present invention.

FIG. 3 is a plan view of the washing machine operation display device according to an embodiment of the present invention.

FIG. 4A is a cross sectional view taken at line 4A-4A in FIG. 3.

FIG. 4B is a cross sectional view taken at line 4B-4B in FIG. 3.

FIG. 5 is a cross sectional view taken at line 5-5 in FIG. 3.

FIG. 6 is a cross sectional view taken at line 6-6 in FIG. 3.

FIG. 7A illustrates a first screen of the liquid crystal panel of the washing machine operation display device according to an embodiment of the present invention.

FIG. 7B illustrates a second screen of the liquid crystal panel of the washing machine operation display device according to an embodiment of the present invention.

FIG. 7C illustrates a third screen of the liquid crystal panel of the washing machine operation display device according to an embodiment of the present invention.

FIG. 7D illustrates a fourth screen of the liquid crystal panel of the washing machine operation display device according to an embodiment of the present invention.

FIG. 7E illustrates a fifth screen of the liquid crystal panel of the washing machine operation display device according to an embodiment of the present invention.

FIG. 7F illustrates a sixth screen of the liquid crystal panel of the washing machine operation display device according to an embodiment of the present invention.

FIG. 8 illustrates a screen transition example of description display screens displayed on the liquid crystal panel of the washing machine operation display device according to an embodiment of the present invention.

FIG. 9 is a front view of a conventional washing machine operation display device.

FIG. 10 is a front view of a controller included in the conventional washing machine operation display device.

DESCRIPTION OF EMBODIMENT

[0017] Hereinafter, one embodiment of the present invention is to be described with reference to the drawings. It should be noted that the present invention is not limited to this embodiment.

[0018] FIG. 1 is a vertical cross sectional view of the washing machine according to an embodiment of the present invention. FIG. 2 is a perspective view of the whole washing machine according to an embodiment of the present invention.

[0019] As illustrated in these figures, water tank 13 is provided suspended in midair in main body 12 of the washing machine. Water tank 13 includes a closed-bottom, cylindrical rotating drum 14. Rotating drum 14 is provided rotatably and inclined such that the central axis of rotating drum 14 angles downward from front to back.

[0020] Water tank 13 is provided with clothing loading and unloading opening 15 connected with the open end of rotating drum 14. Moreover, the front of main body 12 is configured of front frame 16. The front portion of front frame 16 includes insertion opening part 17 on an inclined surface facing upward. Insertion opening part 17 includes door 18 that can be opened and closed. Opening door 18 allows for laundry to be loaded and unloaded from rotating drum 14 through clothing loading and unloading opening 15.

[0021] Providing door 18 on an inclined surface facing upward makes it possible to load and unload laundry without having to bend over, making it easier to use compared to front-load washing machines where laundry is loaded and unloaded through an opening provided horizontally on the side.

[0022] The side surface of rotating drum 14 is provided with multiple holes 19 in communication with water tank 13. Moreover, rotating drum 14 is rotationally driven in normal and reverse directions by motor 20 attached to the back side of water tank 13. Filling pipeline 21 and draining pipeline 22 are connected to water tank 13, and water fills water tank 13 and drains from water tank 13 based on regulation of filling valve 23 and draining valve 24.

[0023] Operation display device 25 is disposed on the upper portion of front frame 16. Detergent insertion case 26 is disposed in front frame 16 below operation display device 25, and can be pulled out in a forward direction. The user can set desired operation details, start operation, pause operation, and confirm the stage of progress of the operation by inserting detergent in detergent insertion case 26 before operation and then operating operation display device 25 as necessary.

[0024] By opening door 18, loading laundry in rotating drum 14, and starting operation, filling valve 23 opens and water fills detergent insertion case 26, whereby the detergent inserted in detergent insertion case 26 is swept out with water as the water fills water tank 13 via filling pipeline 21 up to a predetermined level.

[0025] When the predetermined water level is reached, rotating drum 14 is rotationally driven by motor 20 and the wash cycle begins. In the wash cycle, washing is performed by repetition of an agitation movement that lifts and drops the laundry in a rotational direction by the rotation of the rotating drum 14.

[0026] After the required washing time, draining valve

24 opens whereby dirty washing liquid is drained from draining pipeline 22, and a spin movement in which rotating drum 14 rotates at high speed removes the washing liquid remaining in the laundry.

[0027] Next, draining valve 24 closes, water from filling pipeline 21 fills water tank 13, and the rinse cycle starts. In this rinse cycle as well, the agitation movement of the laundry by rotation of rotating drum 14 is repeated to perform a rinse wash.

[0028] FIG. 3 is a plan view of the washing machine operation display device according to an embodiment of the present invention, FIG. 4A is a cross sectional view taken at line 4A-4A in FIG. 3, FIG. 4B is a cross sectional view taken at line 4B-4B in FIG. 3, FIG. 5 is a cross sectional view taken at line 5-5 in FIG. 3, and FIG. 6 is a cross sectional view taken at line 6-6 in FIG. 3.

[0029] In FIG. 3, FIG. 4A, FIG. 4B, FIG. 5, and FIG. 6, operation display device 25 is between front frame 16 and top panel 27. Panel sheet 29 made from PET film is insert molded onto transparent resin portion 28 to cover the surface of transparent resin portion 28. Panel sheet 29 is a decorative surface which is colored and printed on. Transparent resin portion 28 and panel sheet 29 include a substantially rectangular opening portion 30 in the middle.

[0030] Opening portion 30 forms a void in transparent resin portion 28 and panel sheet 29, and on a back surface, transparent panel 31, which is made of transparent glass, is attached to operation display device 25 via elastic body 32. Elastic body 32 holds the outer perimeter of transparent panel 31, and elastic body 32 is fixed by a pressing force between the area around opening portion 30 on transparent resin portion 28 and transparent panel 31.

[0031] Transparent electrode 33 is bonded to the back surface of transparent panel 31 with transparent double-sided tape 37 known as OCA tape (optical clear adhesive tape) to form touch panel 38. Consequently, touch panel 38 is transparent and has light transmitting properties.

[0032] Moreover, toward the bottom of the back surface of touch panel 38, liquid crystal panel 34 is attached to liquid crystal panel attachment base 35. Furthermore, main regulation substrate 36 which regulates transparent electrode 33 and liquid crystal panel 34 is attached to a side of liquid crystal panel attachment base 35 opposite the side to which liquid crystal panel 34 is attached.

[0033] In this way, transparent panel 31, transparent double-sided tape 37, transparent electrode 33, liquid crystal panel 34, and main regulation substrate 36 are stacked in the recited order. Symbols and text displayed on liquid crystal panel 34 are visible from the front of operation display device 25 through transparent panel 31, transparent double-sided tape 37, and transparent electrode 33, which form touch panel 38. It should be noted that a lighting device (not shown in the drawings) configured as a sheet is disposed behind liquid crystal panel 34, in other words on a side of liquid crystal panel 34 opposite the side on which touch panel 38 is disposed, and by illuminating liquid crystal panel 34, visibility of symbols and text displayed on liquid crystal panel 34 can be increased.

[0034] Touch panel dedicated IC 40 is mounted to main regulation substrate 36. Touch panel dedicated IC 40 determines whether a touch is made by a person or not by inputting and outputting signals to touch panel 38, and transmits a determination signal to microcomputer 39.

[0035] It is necessary to keep the back side of transparent panel 31 water proof since electrical components such as liquid crystal panel 34 and main regulation substrate 36 are provided there. As such, the outer perimeter portion of the substantially rectangular transparent panel 31 is covered by elastic body 32, and transparent panel 31 is attached to the back surface of the substantially rectangular opening portion 30 via elastic body 32.

[0036] Around top side 41 and bottom side 42 of opening portion 30, elastic body 32 holds transparent panel 31 in three directions-on the front surface side, back surface side, and edge surface sides of transparent panel 31. Elastic body 32 holding transparent panel 31 is pressed between operation display device 25 and liquid crystal panel attachment base 35, thereby waterproofing the structure.

[0037] Moreover, around left side 43 and right side 44 of opening portion 30, elastic body 32 abuts transparent panel 31 in two directions-on the back surface side and edge surface sides of transparent panel 31. Pressing elastic body 32 and transparent panel 31 between operation display device 25 and liquid crystal panel attachment base 35 waterproofs the structure.

[0038] It should be noted that here, the waterproof structure around left side 43 and right side 44 of opening portion 30 and the waterproof structure around top side 41 and bottom side 42 of opening portion 30 are exemplified as different structures. However, an advantageous effect can still be achieved even if the waterproof structure around left side 43 and right side 44 of opening portion 30 is made to have the same structure as the waterproof structure around top side 41 and bottom side 42 of opening portion 30.

[0039] Bosses 45 are provided at the four corners of opening portion 30 on the back surface of operation display device 25, and liquid crystal panel attachment base 35 and back surface cover 46 are fastened with screws 47. Back surface cover 46 is a resin component that covers main regulation substrate 36 from the back surface.

[0040] When screws 47 are fastened in place, elastic body 32 presses against liquid crystal panel attachment base 35, causing elastic body 32 to bring transparent panel 31 and operation display device 25 into tight contact, thereby waterproofing the area around opening portion 30. Consequently, even if the user accidentally spills water or liquid detergent on opening portion 30, water will not come in contact with internal electrical components such as liquid crystal panel 34 and main regulation substrate 36, thereby increasing the reliability of the components and protecting them from breaking or malfunc-

tioning.

[0041] Moreover, since transparent panel 31 is attached to the back surface of opening portion 30 via elastic body 32, elastic body 32 can alleviate an impact applied from outside and keep the glass from breaking in the event of an impact. For example, if the user were to drop something on transparent panel 31 or if the wrapped appliance were to drop and fall over while being transported to the user's home, an impact force would be applied to transparent panel 31. At this time, it is possible to alleviate the impact by disposing elastic body 32 around the outer perimeter of transparent panel 31, and prevent breakage even when an external impact is applied.

[0042] Operation display device 25 includes start button 54, power-on button 52, power-off button 53, and return button 55, which are separated and independent from touch panel 38.

[0043] Start button 54 is a button the user presses to prompt start of an operation of the washing machine, after performing settings such as setting an operation course of the washing machine. Power-on button 52 and power-off button 53 are buttons the user presses to power on and off the washing machine. Return button 55 is a button the user presses to return to the previous display screen when performing an operation with the touch panel 38.

[0044] Start button 54, power-on button 52, power-off button 53, and return button 55 are provided in operation display device 25, and each is separated and independent from touch panel 38.

[0045] Start button 54, power-on button 52, power-off button 53, and return button 55, which are included in a pressure operation button unit, are each similarly configured. First, sub-contolling-substrate 50 which includes switch 49 is fixed to back surface cover 46, and thereby provided internally in operation display device 25. Moreover, operation display device 25 includes button opening portion 80 so that operation component 51 which operates switch 49 with pressure can be pressed from outside operation display device 25. It should be noted that button opening portion 80 is sealed by panel sheet 29 integrally formed with the surface of operation display device 25. This keeps water from entering the interior through button opening portion 80.

[0046] In this way, operation component 51 is provided held between operation display device 25 and back surface cover 46. Pressure operation button unit 48, which includes start button 54, power-on button 52, power-off button 53, and return button 55, does not include transparent resin portion 28, only panel sheet 29. The user pressing panel sheet 29 causes panel sheet 29 to transform and press down switch 49 via operation component 51.

[0047] With this, the user can operate switch 49 with light operation force, and an input signal of switch 49 is transmitted from sub-contolling-substrate 50 to microcomputer 39 of main regulation substrate 36 with a pressing operation.

[0048] Moreover, panel sheet 29 provides waterproofing and keeps water from entering inside operation display device 25 through pressure operation button unit 48. In other words, start button 54, power-on button 52, power-off button 53, and return button 55, which are separate and independent from touch panel 38, are each waterproofed.

[0049] FIG. 7A through FIG. 7F illustrate examples of display content displayed on the liquid crystal panel of the washing machine operation display device according to an embodiment of the present invention.

[0050] Next, a simple explanation of operation of the washing machine is given with reference to FIG. 3, FIG. 6, and FIG. 7.

[0051] FIG. 7A through FIG. 7F illustrate screens of display content displayed on liquid crystal panel 34 that are viewable through transparent electrode 33, transparent double-sided tape 37, and transparent panel 31. The user, for example, changes screens or setting details by performing a touch with his or her finger on transparent panel 31. Touch setting buttons are displayed on liquid crystal panel 34. It should be noted that none of the setting buttons displayed on liquid crystal panel 34, such as washing button 56a, which will be described later, are mechanical buttons, but are functional buttons operated by the user touching them.

[0052] The user first pushes power-on button 52 on operation display device 25 to supply power to the washing machine, thereby causing liquid crystal panel 34 to turn on and display the screen illustrated in FIG. 7A.

[0053] FIG. 7A illustrates a first screen that is displayed after power is turned on. Arranged on the top of the screen are, as setting buttons for selecting a washing and/or drying mode, washing button 56a, washing and drying button 56b, and drying button 56c, which cause switching between washing and/or drying.

[0054] Three additional buttons are arranged on the screen: auto button 57a, which in particular is frequently used by the user in each of the washing and/or drying courses, is provided in the middle of the screen, custom button 57b is provided on the left side of the screen, and other courses button 57c, which when selected displays a collection of the remaining courses, is provided on the right side of the screen.

[0055] Moreover, menu button 58, which when selected displays details on information useful to the user for, is provided as a setting button on the bottom of the screen.

[0056] In FIG. 7A, after the user selects a washing and/or drying mode, the user sets a course. In this embodiment, an example is given in which the screen illustrated in FIG. 7B is switched to by touching auto button 57a after the washing button 56a is touched.

[0057] FIG. 7B illustrates a second screen which is switched to when auto button 57a in FIG. 7A is touched. Buttons displaying times for each cycle are provided as setting buttons in the center of the screen in the vertical

direction. In other words, arranged on the screen from left to right are wash button 59a which displays the wash time, rinse button 59b which displays the number of times rinse is performed, and spin button 59c which displays the spin time.

[0058] Moreover, buttons indicating other detailed setting information for the operation are displayed on the bottom of the screen. In other words, water level button 60a indicating water level setting method, bathwater button 60b for whether bathwater is used or not, and start delay button 60c for whether the washing machine is operated on a start delay or not are arranged as setting buttons.

[0059] According to the embodiment, next an example will be given of operation performed under the assumption that the user has already touched wash button 59a to change the wash time and the screen has switched to the screen illustrated in FIG. 7C.

[0060] FIG. 7C illustrates a third screen which is switched to when wash button 59a in FIG. 7B is touched. Wash sliding button 61 for changing wash time is arranged in the center of the screen as a setting button, and set button 62 for setting the changed wash time is arranged on the bottom of the screen.

[0061] The user slides wash sliding button 61 left or right to change the wash time, and presses set button 62 to set the changed wash time. Pressing set button 62 returns the screen to the second screen illustrated in FIG. 7B. However, the display content of the wash time for the wash button 59a in the second screen illustrated in FIG. 7B displays the changed content from the screen illustrated in FIG. 7C.

[0062] FIG. 7D illustrates a fourth screen which is switched to when other courses button 57c in FIG. 7A is touched. Night button 63a and dry cleaning button 63b, which are for available courses other than custom and auto displayed on the first screen, are arranged on the screen as setting buttons. Furthermore, powerful cleaning and deodorizing button 63c, blanket button 63d, delicate button 63e, and tank cleaning button 63f are also arranged as setting buttons. The user presses one of the buttons to select a course and return to the second screen illustrated in FIG. 7B.

[0063] FIG. 7E illustrates a fifth screen which is switched to when menu button 58 in FIG. 7A is touched. As illustrated in FIG. 7E, the screen includes buttons for excerpts on how to use the washing machine taken from the operation manual. In other words, arranged on the screen as setting buttons are simple operation guide button 64a for describing the controls, course description button 64b for describing the courses, and care instructions button 64c for describing washing machine maintenance. Moreover, change settings button 64d, which when selected displays setting details that do not usually change once set, is also arranged on the screen.

[0064] Here, it is possible to return to the previously viewed operation screen by pressing return button 55 on operation display device 25.

[0065] When the user is finished setting the operation details in the first through fifth screens illustrated in FIG. 7A through FIG. 7E, the user presses start button 54 provided on operation display device 25 to start operation of the washing machine. At this time, the screen transitions to a sixth screen illustrated in FIG. 7F. The sixth screen is an operation display screen indicating the progress of the operation.

[0066] It should be noted that, to pause and restart operation of the washing machine, the user may press start button 54 when the user wishes to pause operation of the washing machine mid-operation and may press start button 54 again to restart the operation.

[0067] FIG. 8 illustrates a screen transition example of description display screens displayed on the liquid crystal panel when description of an operation course which determines operating conditions for washing and/or drying is required. Next, operation and screen transition on the touch panel regarding this will be described with reference to FIG. 8.

[0068] When menu button 58 on the first screen, which is the screen that is displayed after the power is turned on, is touched, the fifth screen is displayed. The fifth screen includes, for example, the simple operation guide button, which when selected displays descriptions of simple operations for the washing machine, the care instructions button for describing washing machine maintenance, and course description button 64b for describing the operation courses.

[0069] In the fifth screen, when the user wishes to learn about details for an operation course, the user touches course description button 64b and a seventh screen is shown.

[0070] The seventh screen is for selecting which category the operation course the user wishes to learn details about from belongs to, from among washing, washing and drying, and drying.

[0071] Here, when the category the user wishes to learn about is touched, a list of available operation courses is displayed. For example, when washing button 65 is touched on the seventh screen, a list of operation courses related to washing is displayed on an eighth screen.

[0072] In the eighth screen, when a button for an operation course the user wishes to learn about is touched, the description display screen for that operation course is displayed. For example, when auto course button 66 is touched, the screen transitions to a ninth screen.

[0073] The ninth screen displays description display screen 71 for describing details about the auto course. The user can learn about details on the operation course by reading the description in description display screen 71. When the description describing the details of the operation course does not fit on description display screen 71, description display screen 71 is used multiple times for the description. The user can view the next description by touching next button 68 provided on description display screen 71.

[0074] It should be noted that on each of the fifth, seventh, eighth, and ninth screens, it is possible to return to the previously displayed screen by pressing return button 55. For example, return button 55 is pressed four times to return to the first screen from the ninth screen.

[0075] Next, after the user is finished with learning the details on the operation course from description display screen 71, detailed settings for the operation course to be used are set.

[0076] For this purpose, the second screen must be displayed and the user must set settings for time and number of times for wash, rinse, and spin, for example, but according to the descriptions for FIG. 7, the second screen is transitioned to after the first screen, so from the ninth screen, the user must push return button 55 four times to return to the first screen. This high number of operations the user must make is cumbersome.

[0077] As such, in order to simplify the operations, the ninth screen-description display screen 71-includes course setting button 67. By touching course setting button 67, transition from the ninth screen directly to the second screen can be performed. With this, the second screen, which is a setting screen for an operation course on which setting conditions and setting buttons are arranged, can be displayed, and detailed settings for the operation course can be set without having to press return button 55 from the ninth screen multiple times.

[0078] In this way, the washing machine operation display device according to the embodiment displays on the liquid crystal panel the description display screen which displays details about an operation course for the user to learn about. After viewing the description display screen, to input the setting conditions, the user can press a course setting button provided on the description display screen to jump directly to an input screen for the condition settings. Consequently, even if the washing machine is equipped with various multifunctional courses, it is possible for the user to learn details about an operation course and input the condition settings with simple operations, thereby greatly increasing the operationality of the washing machine.

[0079] As described above, the present invention includes (i) a liquid crystal panel for displaying a selection button for an operation course for determining operating conditions for washing and drying, and setting buttons and setting conditions for wash, rinse, and spin, and (ii) a transparent panel including a transparent electrode and being superposed on the liquid crystal panel.

A touch panel is also provided for performing operation by the touch of a finger to the transparent panel, and a description display screen for describing the details of an operation course is provided to the touch panel. A course setting button for causing the liquid crystal panel to display the setting conditions and the setting buttons is further provided to the description display screen. With this, the description display screen for describing the details of an operation course can be displayed on the liquid crystal panel, and after viewing the description display screen, to input the setting conditions, the user can press a course setting button to jump directly to an input screen for the condition settings. Consequently, even if the washing machine is equipped with various multifunctional courses, it is possible for the user to learn details about an operation course and input the condition settings with simple operations, thereby greatly increasing the controllability of the washing machine.

INDUSTRIAL APPLICABILITY

[0080] As described above, with the washing machine operation display device according to the present invention, it is possible for the user to learn details about an operation course and input the condition settings with simple operations, thereby greatly increasing the operationality of the washing machine. As such, the washing machine operation display device according to the present invention is not limited to a washing machine, and is applicable to any home appliance that includes a multifunctional operation course.

REFERENCE MARKS IN THE DRAWINGS

[0081]

1	operation display device
2	panel sheet
3	display unit
4	operation unit
5	liquid crystal panel
6	operation button unit
6a	cycle button
6b	course button
6c	washing drying switching button
6d	power-on button
6e	power-off button
6f	start button
7	button-type electric switch
8	LED element
9	controller
10	resin case
11	screw hole
12	main body
13	water tank
14	rotating drum
15	clothing loading and unloading opening
16	front frame
17	opening part
18	door
19	hole
20	motor
21	filling pipeline
22	draining pipeline
23	filling valve
24	draining valve
25	operation display device
26	detergent insertion case

27 top panel
28 transparent resin portion
29 panel sheet
30 opening portion
31 transparent panel
32 elastic body
33 transparent electrode
34 liquid crystal panel
35 liquid crystal panel attachment base
36 main regulation substrate
37 transparent double-sided tape
38 touch panel
39 microcomputer
40 touch panel dedicated IC
41 top side
42 bottom side
43 left side
44 right side
45 boss
46 back surface cover
47 screw
48 pressure operation button unit
49 switch
50 sub-contolling-substrate
51 operation component
52 power-on button
53 power-off button
54 start button
55 return button
56a washing button
56b washing and drying button
56c drying button
57a auto button
57b custom button
57c other courses button
58 menu button
59a wash button
59b rinse button
59c spin button
60a water level button
60b bathwater button
60c start delay button
61 wash sliding button
62 set button
63a night button
63b dry cleaning button
63c powerful cleaning and deodorizing button
63d blanket button
63e delicate button
63f tank cleaning button
64a simple operation guide button
64b course description button
64c care instructions button
64d change settings button
65 washing button
66 auto course button
67 course setting button
68 next button
71 description display screen
80 button opening portion

Claims

1. A washing machine operation display device comprising a touch panel including:

a liquid crystal panel for displaying a selection button for an operation course for determining operating conditions for washing and drying, and setting buttons and setting conditions for wash, rinse, and spin; and
a transparent panel including a transparent electrode, the transparent panel being superposed on the liquid crystal panel, the touch panel being for performing operation by a touch of a finger to the transparent panel,
wherein the touch panel is provided with a description display screen for describing details of the operation course, and the description display screen is provided with a course setting button for causing the liquid crystal panel to display the setting conditions and the setting buttons.

2. A washing machine equipped with the washing machine operation display device according to claim 1.

FIG. 1

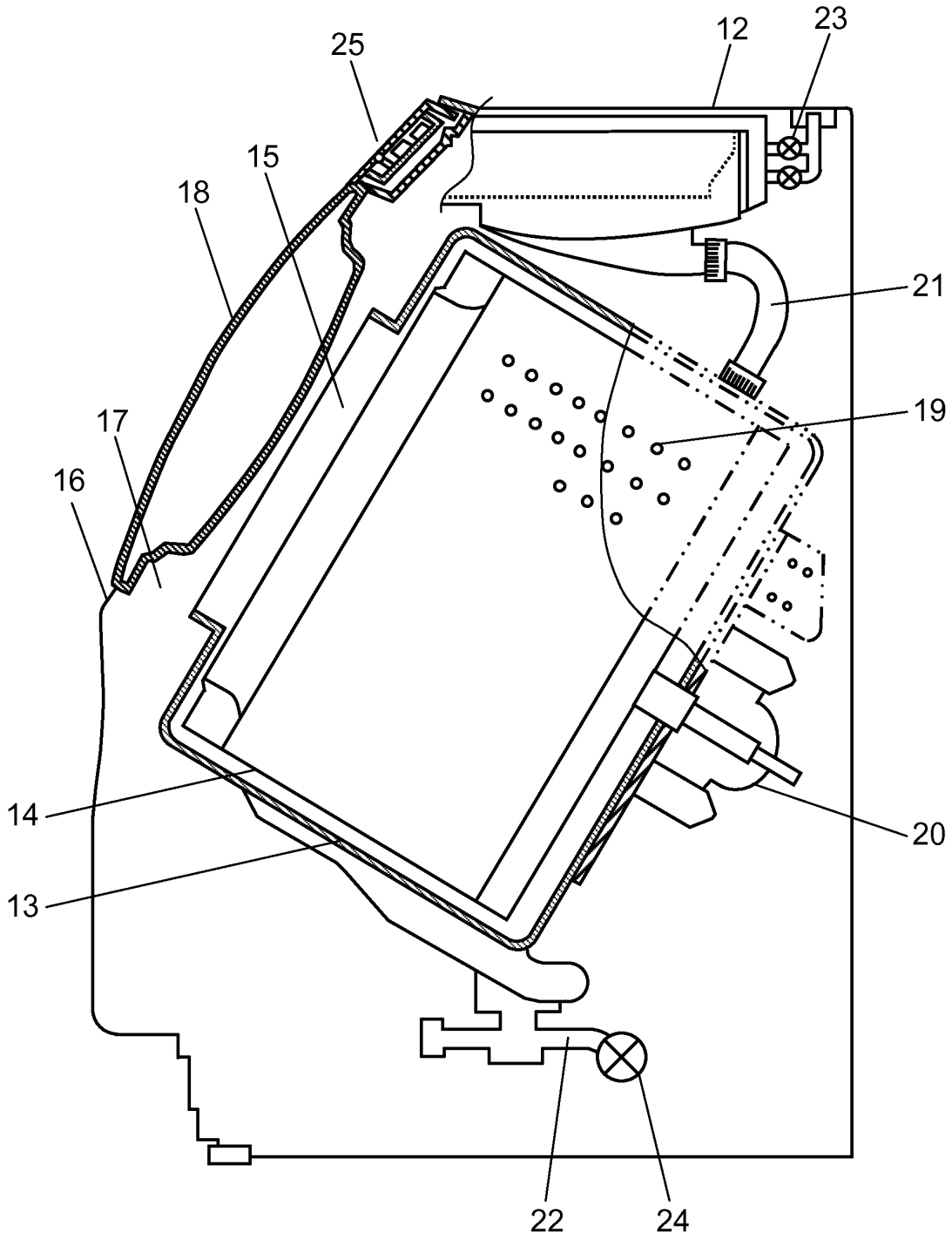


FIG. 2

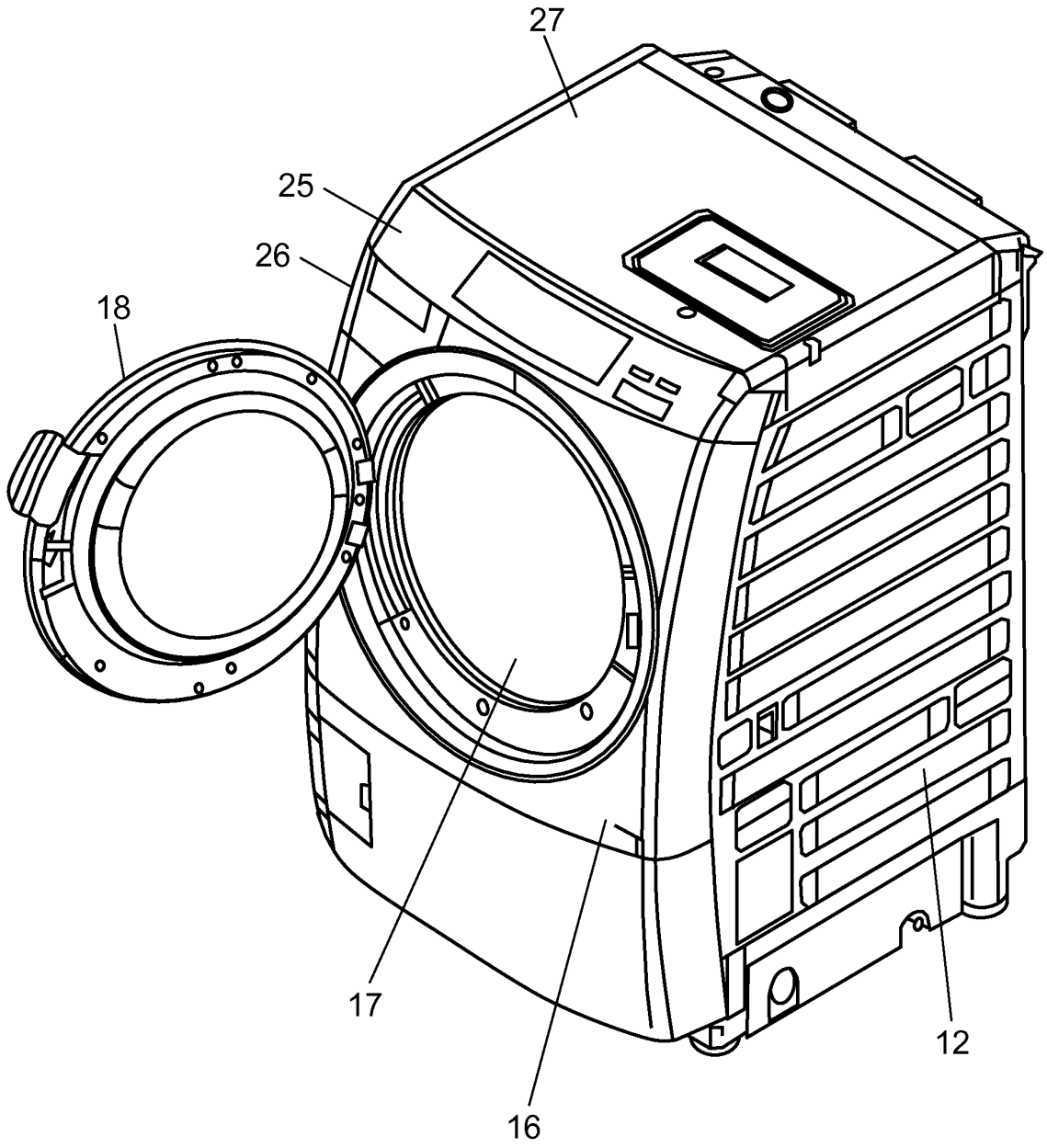


FIG. 3

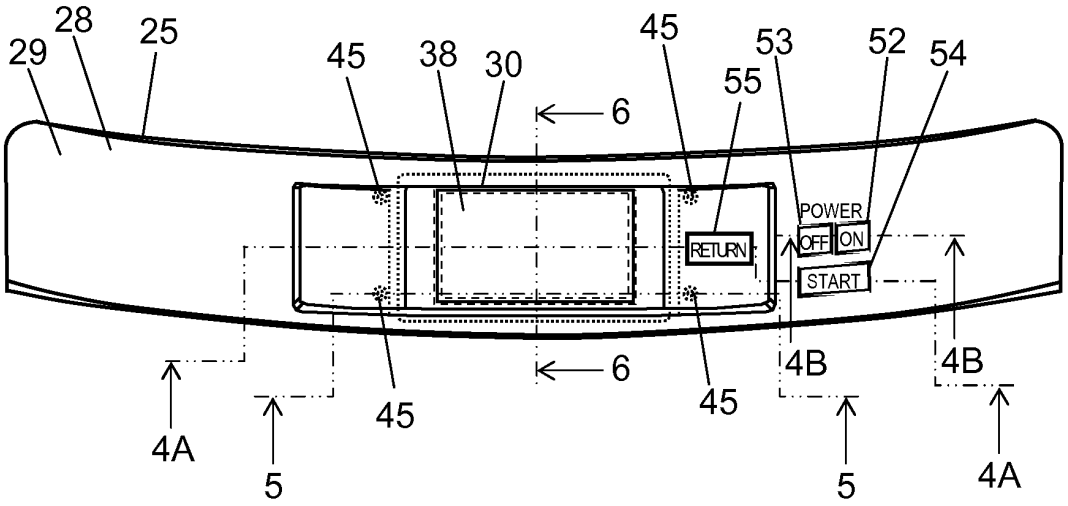

29
28
25
45
38
30
6
45
55
53
52
54
POWER
OFF
ON
RETURN
START
4A
5
45
6
45
4B
5
4B
4A

FIG. 4A

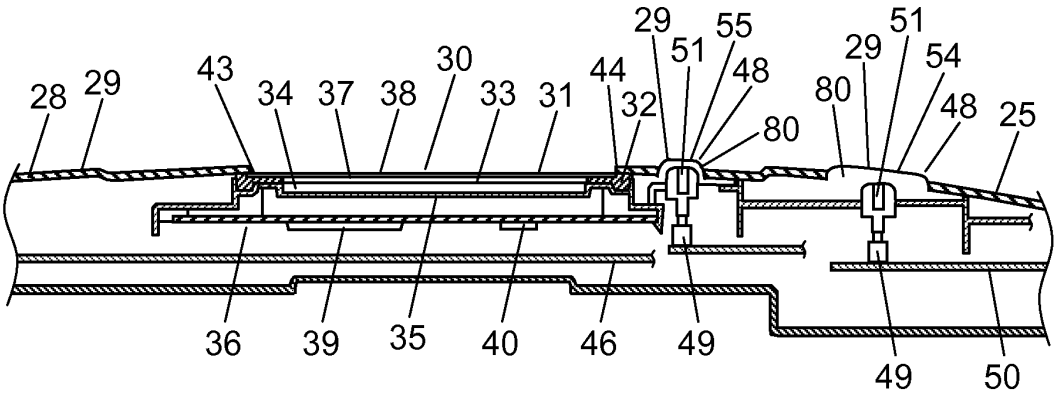


FIG. 4B

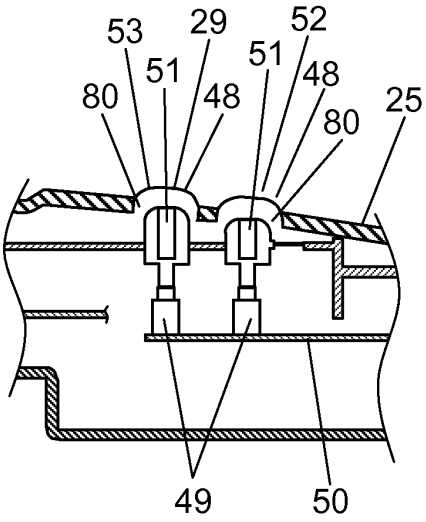


FIG. 5

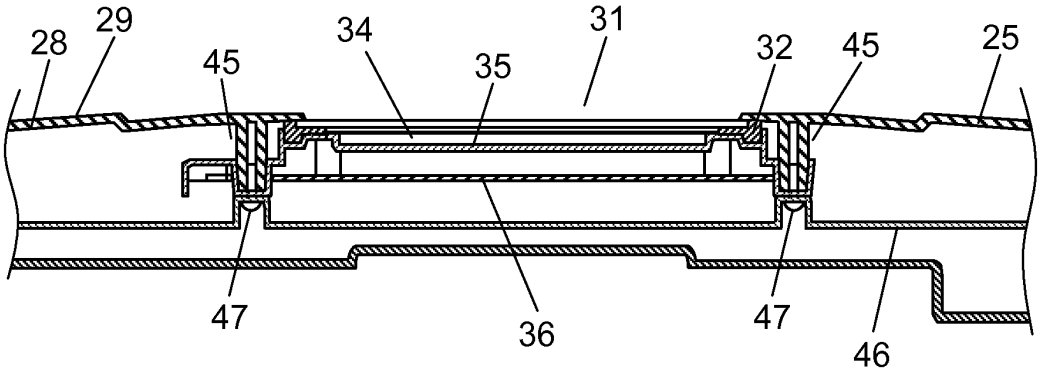


FIG. 6

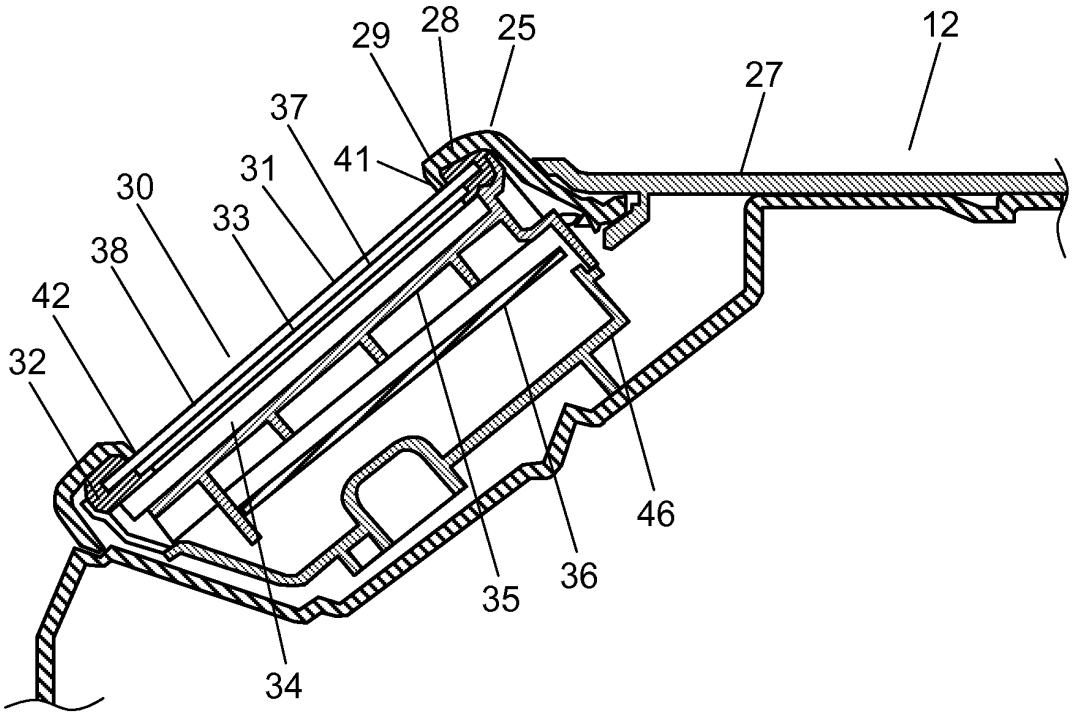


FIG. 7A

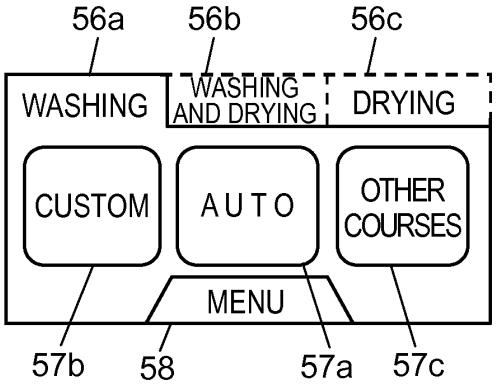


FIG. 7B

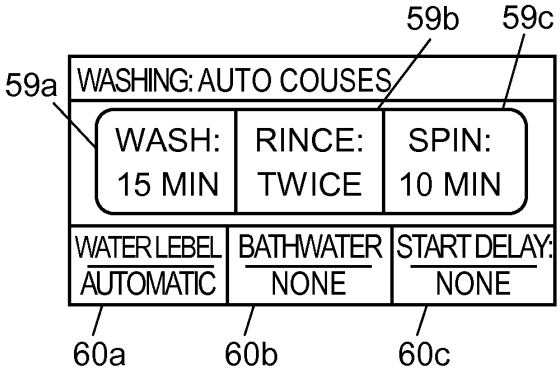


FIG. 7C

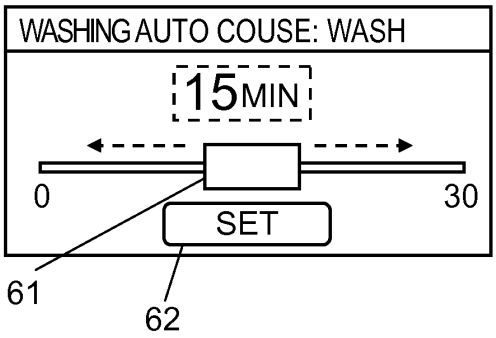


FIG. 7D

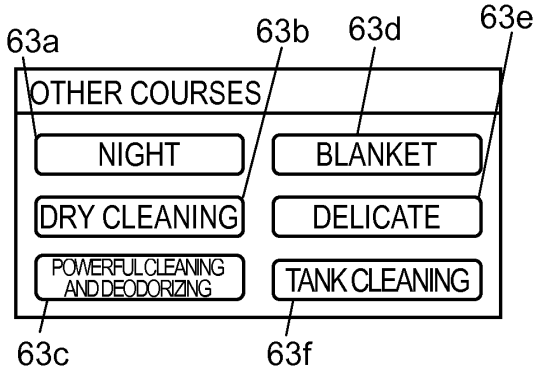


FIG. 7E

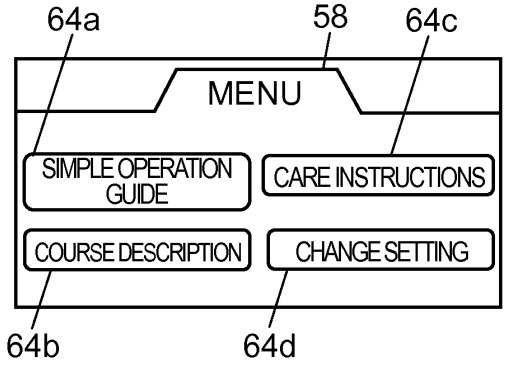


FIG. 7F

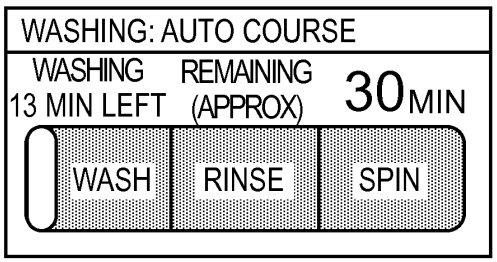


FIG. 8

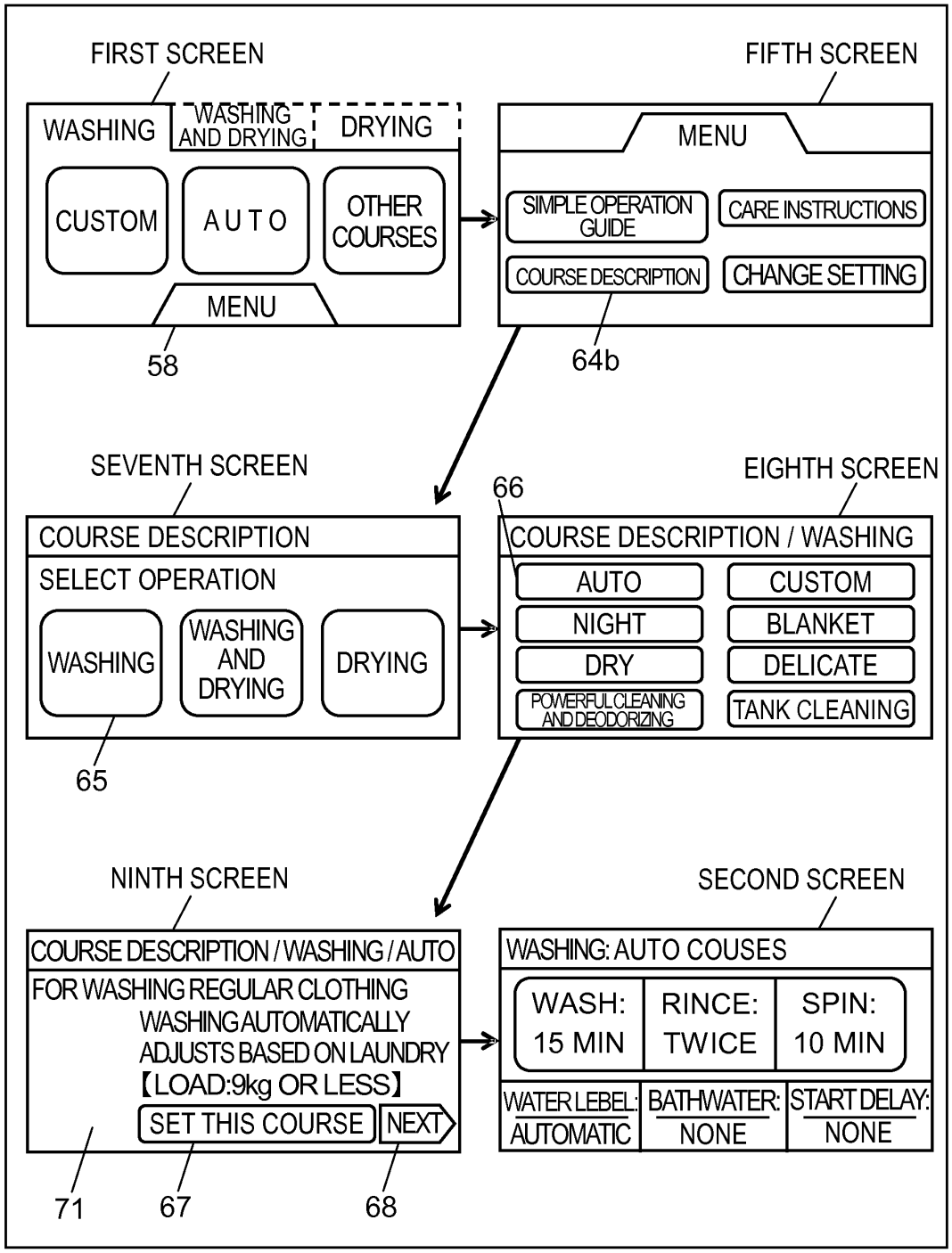

FIRST SCREEN
WASHING
WASHING AND DRYING
DRYING
CUSTOM
AUTO
OTHER COURSES
MENU
58
FIFTH SCREEN
MENU
SIMPLE OPERATION GUIDE
CARE INSTRUCTIONS
COURSE DESCRIPTION
CHANGE SETTING
64b
SEVENTH SCREEN
COURSE DESCRIPTION
SELECT OPERATION
WASHING
WASHING AND DRYING
DRYING
65
66
EIGHTH SCREEN
COURSE DESCRIPTION / WASHING
AUTO
CUSTOM
NIGHT
BLANKET
DRY
DELICATE
POWERFUL CLEANING AND DEODORIZING
TANK CLEANING
NINTH SCREEN
COURSE DESCRIPTION / WASHING / AUTO
FOR WASHING REGULAR CLOTHING
WASHING AUTOMATICALLY
ADJUSTS BASED ON LAUNDRY
【LOAD:9kg OR LESS】
SET THIS COURSE
NEXT
71
67
68
SECOND SCREEN
WASHING: AUTO COUSES
WASH: 15 MIN
RINCE: TWICE
SPIN: 10 MIN
WATER LEBEL: AUTOMATIC
BATHWATER: NONE
START DELAY: NONE

FIG. 9

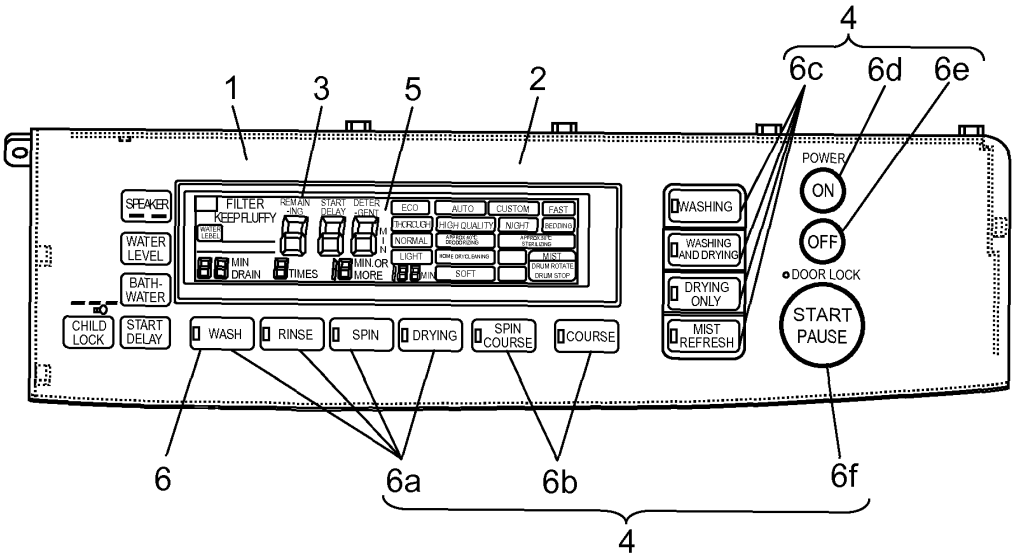
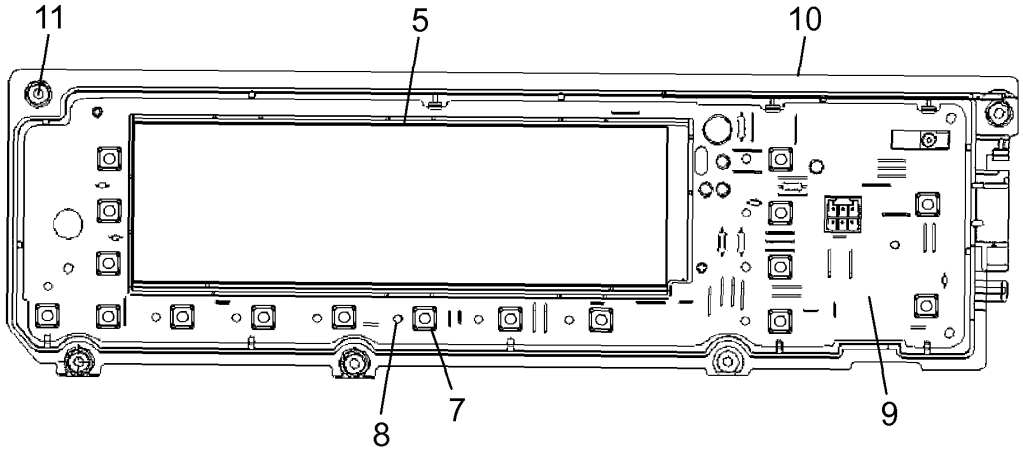

4
1
3
5
2
6c
6d
6e
POWER
ON
OFF
DOOR LOCK
START PAUSE
SPEAKER
WATER LEVEL
BATH-WATER
CHILD LOCK
START DELAY
WASH
RINSE
SPIN
DRYING
SPIN COURSE
COURSE
WASHING
WASHING AND DRYING
DRYING ONLY
MIST REFRESH
6
6a
6b
6f
4

FIG. 10


11
5
10
8
7
9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2013/004472

A. CLASSIFICATION OF SUBJECT MATTER
D06F33/02(2006.01)i, *D06F39/00*(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
D06F33/02, D06F39/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2013
Kokai Jitsuyo Shinan Koho 1971-2013 Toroku Jitsuyo Shinan Koho 1994-2013

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 09-084989 A (Hitachi, Ltd.), 31 March 1997 (31.03.1997), paragraphs [0067] to [0074]; fig. 7 to 13 (Family: none)	1-2
Y	JP 05-237285 A (Tosen Machinery Corp.), 17 September 1993 (17.09.1993), paragraphs [0020] to [0022]; fig. 4 (Family: none)	1-2
A	JP 09-201485 A (Hitachi, Ltd.), 05 August 1997 (05.08.1997), paragraphs [0081] to [0085]; fig. 10 (Family: none)	1-2

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

* Special categories of cited documents:
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
07 October, 2013 (07.10.13)	15 October, 2013 (15.10.13)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 2009)

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Patent documents cited in the description

- JP 2008066163 A **[0013]**
- JP H0984989 B **[0013]**