

DESCRIPTION

CLOTHING PROCESSING DEVICE

5 TECHNICAL FIELD

[0001]

The invention relates to a clothing processing device that performs at least one type of processing out of washing and rinsing, spin-drying, and drying of clothing.

10

BACKGROUND ART

[0002]

In the related art, in the case of this type of clothing processing device, a configuration, in which a touch sensor type button is provided in an operation display that performs selection, setting, and displaying of modes, such as an operating course, and various functions, is proposed (for example, refer to PTL 1).

[0003]

In PTL 1, a configuration of the touch sensor type button to form a conductive capacitance circuit when a dielectric element is touched, with the use of potential fluctuations between a conductive plate and an earth, is proposed.

[0004]

Herein, a case of responding to an increase in the size of a display, which is a recent product trend, with the use of the configuration of the touch sensor type button of the related art described in PTL 1 is assumed. As a consequence, along with an increase in the size of a display device, a touch

sensor button portion is moved to the outside, an interval on plane between the display and the touch sensor type button (interval when seen from the front) widens, and thereby a problem of decreased operability when operating a button while checking display content of the display arises.

5

Citation List

Patent Literature

[0005]

PTL 1: Japanese Patent Unexamined Publication No. 2002-253892

10

SUMMARY OF THE INVENTION

[0006]

The invention is to solve the aforementioned problem of the related art, and is to provide a clothing processing device of which button operability while checking display content of the display is improved without widening the interval between the display and the button portion even when the display is increased in size.

[0007]

A clothing processing device of the invention includes a body housing, an operation display provided in the body housing, an operation display housing provided for the operation display, a display panel provided in the operation display housing, and a display device provided on an internal surface of the display panel. A display window is formed in a middle portion of the display panel and a circuit board having a touch sensor type conductive surface is provided between an outer peripheral portion of the display panel and an outer peripheral portion of the display device in a side view.

[0008]

Due to such a configuration, an interval between an operator to perform setting of modes, such as an operating course, and various functions and a display window that displays the set content can be made smaller. Consequently, operability can be improved even when the display window is
5 increased in size.

[0009]

According to the clothing processing device of the invention, operability of a button while checking the display content of the display in the operation display can be improved.

10

BRIEF DESCRIPTION OF DRAWINGS

[0010]

FIG. 1 is a perspective view illustrating the appearance of a washing machine that is given as an example of a clothing processing device according to an exemplary embodiment of the invention, of which a part can be seen
15 through.

FIG. 2 is a front view of an operation display of the washing machine according to the exemplary embodiment of the invention.

FIG. 3 is a sectional view of the operation display of the washing
20 machine according to the exemplary embodiment of the invention.

DESCRIPTION OF EMBODIMENT

[0011]

Hereinafter, an exemplary embodiment of the invention will be
25 described with reference to the drawings. In addition, this exemplary embodiment does not limit the invention.

[0012]

FIG. 1 is a perspective view illustrating the appearance of washing machine 100 that is given as an example of a clothing processing device according to the exemplary embodiment of the invention, of which a part can be seen through, FIG. 2 is a front view of operation display 120 of this washing machine 100, and FIG. 3 is a sectional view of operation display 120 of this washing machine 100.

[0013]

As illustrated in FIG. 1, washing machine 100 will be described as a clothing processing device in the exemplary embodiment. Inside body housing 110 of washing machine 100, water tub 112 is provided so as to freely vibrate, and rotary drum 111 that accommodates laundry is provided so as to freely rotate in water tub 112.

[0014]

Rotary drum 111 is rotation-driven by a motor (not illustrated) that is mounted on the outside of a back surface of water tub 112. Washing machine 100 of the exemplary embodiment has functions of performing a washing stroke, a rinsing stroke, a spin-drying stroke, and a drying stroke. A function of performing a drying stroke may be omitted.

[0015]

Operation display 120 to set a mode, such as an operating course, and various functions and to display a set state is provided on an upper side of a front surface (front side) of body housing 110.

[0016]

As illustrated in FIG. 1, operation display 120 has operation display housing 130. As illustrated in FIG. 3, in a middle portion of operation display housing 130, opening portion 133, which is rectangular when seen from the front, is formed. Step 132 is formed from an external surface toward an

internal surface side of operation display housing 130 in the vicinity of opening portion 133, and square tubular rib 131 extends toward the internal surface side on the fringe of opening portion 133.

[0017]

5 Display panel 160 formed of a colorless transparent plate or a colored transparent plate is attached to step 132 by means of adhesive 180 such as double-sided tape. As illustrated in FIG. 2, operator 162 that is a touch sensor type button portion for performing setting of modes, such as an operating course, and various functions is formed on an outer peripheral part of display
10 panel 160, that is, at a lower position and a right position when seen from the front of display panel 160 in the exemplary embodiment. Display window 161 where there is no operator 162 and no printing is configured in a substantially middle part (including a middle part) of display panel 160.

[0018]

15 As illustrated in FIG. 3, display device 140 mounted on main board 152 is provided on the internal surface side of operation display housing 130 so as to face opening portion 133. Due to such a configuration, information displayed on device display portion 141, which is a display area of display device 140, such as an operating course and each mode, can be viewed through display
20 window 161 of display panel 160.

[0019]

Circuit board 150 is mounted in clearance A between an internal surface of step 132 of operation display housing 130 and a non-display part (device non-display portion 142), which is an outer periphery of display device
25 140, by means of adhesive 170 such as double-sided tape. Conductive surface 151 of operator 162, which is a touch sensor type button portion, is formed on circuit board 150.

[0020]

If a user touches operator 162 of display panel 160, a conductive capacitance circuit is formed via display panel 160, adhesive 180, operation display housing 130, and adhesive 170, which are dielectric elements, by means of conductive surface 151 mounted on circuit board 150 and an earth when dielectric elements are touched. Consequently, button operation allows setting of modes, such as an operating course, and various functions. As described above, the display of set content and progress of a stroke is carried out on device display portion 141 of display device 140, and the display can be checked from the outside via display window 161.

[0021]

As described above, circuit board 150 is provided between the internal surface side of step 132 of operation display housing 130 and device non-display portion 142 of display device 140 (clearance A) in the exemplary embodiment. Circuit board 150 is disposed so as to overlap display device 140 when seen from the front (refer to FIG. 2). Consequently, display window 161 and operator 162 can be brought closer to each other when seen from the front. Accordingly, operator 162 can be operated while the display content, which is displayed on display window 161, is being checked, and operability can be improved.

[0022]

In addition, as illustrated in FIG. 3, pressing rib 243 is formed on an outer peripheral portion (side surface) of display device 140. Adhesion of adhesive 170 is enhanced by pressing rib 243 being pressure-welded to an internal surface side of conductive surface 151 of circuit board 150. Consequently, formation of a conductive capacitance circuit can be made more stable.

[0023]

As described above, operation display 120 is configured such that square tubular rib 131 extends toward a rear surface side from rectangular opening portion 133 provided in the substantially middle portion (including the middle portion) where there is step 132 of operation display housing 130 in the exemplary embodiment. Circuit board 150 having conductive surface 151, which is a touch sensor type button, is provided on an outer peripheral side of square tubular rib 131 and in clearance A that is formed between the internal surface side of step 132 and device non-display portion 142 of display device 140.

[0024]

Consequently, a configuration, in which a conductive capacitance circuit is formed by means of conductive surface 151 and an earth, and setting and displaying of modes, such as an operating course, and various functions are performed by a finger coming into contact with operator 162, is adopted. Consequently, an interval between touch sensor type operator 162 to perform setting of modes, such as an operating course, and various functions and display window 161 that displays the set content can be made smaller. Thus, operability of a button can be improved even when display window 161 is increased in size.

[0025]

In addition, a configuration, in which adhesion of adhesive 170 provided between circuit board 150 and the internal surface of operation display housing 130 is enhanced by pressure-welding circuit board 150 to pressing rib 243 formed in the outer peripheral portion of display device 140, is adopted. Consequently, formation of a conductive capacitance circuit can be made more stable. The presence of pressing rib 243 is not essential.

[0026]

Although an example, in which operation display 120 is provided on a substantially vertical (including vertical) front surface of body housing 110, is presented in the exemplary embodiment, the invention is not limited to this example. For example, a configuration where a slope, which is forwardly inclined, is formed on a front upper surface of body housing 110 and operation display 120 is provided on this slope may be adopted. In the case of a configuration in which operation display 120 is provided on the slope, a case where liquid detergent dripped on display panel 160 runs down and the liquid detergent infiltrates into a clearance generated between operation display housing 130 and display panel 160 occurs. When the liquid detergent infiltrated in the clearance between operation display housing 130 and display panel 160 comes into contact with the double-sided tape, which is used as adhesive 180, stickiness of the double-sided tape may reduce and the double-sided tape may come off. Accordingly, it is preferable to form the double-sided tape in a size which allows being included in the inside of display panel 160 when seen from the front.

[0027]

It is possible that operation display housing 130 also serves as display panel 160 with operation display housing 130 being made colorless and transparent or colored and transparent and display panel 160 being removed.

[0028]

In addition, although a front-loading-type washing machine has been described in detail as an example in the exemplary embodiment, a top-loading-type washing machine may be used or a clothing drier may be used in the content described in the exemplary embodiment.

[0029]

As described above, a clothing processing device according to a first aspect of the exemplary embodiment includes a body housing, an operation display provided in the body housing, an operation display housing provided for the operation display, a display panel provided in the operation display housing,
5 and a display device provided on an internal surface of the display panel. The clothing processing device is a device in which a display window is formed in a middle portion of the display panel and a circuit board having a touch sensor type conductive surface is provided between an outer peripheral portion of the display panel and an outer peripheral portion of the display device when seen
10 from the side.

[0030]

Due to such a configuration, an interval between an operator to perform setting of modes, such as an operating course, and various functions and a display window that displays the set content can be made smaller. Thus,
15 operability can be improved even when the display window is increased in size.

[0031]

In addition, according to a second aspect of the exemplary embodiment, a conductive surface of the circuit board is disposed so as to overlap the outer peripheral portion of the display device when seen from the front in the first
20 aspect.

[0032]

Since the interval between the operator and the display window can be made smaller due to such a configuration, operability can be improved even when the display window is increased in size.

25 [0033]

In addition, according to a third aspect of the exemplary embodiment, a configuration, in which a pressing rib that abuts against the circuit board is

formed in the outer peripheral portion of the display device, is adopted in the first aspect or the second aspect. Consequently, adhesion of the adhesive provided between the circuit board and an internal surface of the operation display housing can be enhanced, and formation of a conductive capacitance
5 circuit can be made more stable.

INDUSTRIAL APPLICABILITY

[0034]

As described above, according to the invention, an extraordinary effect,
10 in which operability of a touch sensor type button can be improved, can be achieved with a simple configuration. Thus, the invention is useful in that the invention can be applied to the use of another clothing processing device, such as a clothing processing device that performs at least one type of processing out of washing and rinsing, spin-drying, and drying of clothing.

15

REFERENCE MARKS IN THE DRAWINGS

[0035]

100	washing machine
110	body housing
20 111	rotary drum
112	water tub
120	operation display
130	operation display housing
131	square tubular rib
25 132	step
133	opening portion
140	display device

	141	device display portion
	142	device non-display portion
	150	circuit board
	151	conductive surface
5	152	main board
	160	display panel
	161	display window
	162	operator
	170	adhesive
10	180	adhesive
	243	pressing rib

CLAIMS

1. A clothing processing device comprising:
 - a body housing;
 - 5 an operation display provided in the body housing;
 - an operation display housing provided for the operation display;
 - a display panel provided in the operation display housing; and
 - a display device provided on an internal surface of the display panel,
 - wherein a display window is formed in a middle portion of the display
 - 10 panel, and
 - a circuit board having a touch sensor type conductive surface is
 - provided between an outer peripheral portion of the display panel and an outer
 - peripheral portion of the display device in a side view.
- 15 2. The clothing processing device of Claim 1,
 - wherein the conductive surface of the circuit board is disposed so as to
 - overlap the outer peripheral portion of the display device in a front view.
3. The clothing processing device of Claim 1 or 2,
 - 20 wherein a pressing rib that abuts against the circuit board is formed in
 - the outer peripheral portion of the display device.