

DESCRIPTION

WASHING MACHINE

5 TECHNICAL FIELD

[0001]

The present disclosure relates to a washing machine.

BACKGROUND ART

10 [0002]

PTL 1 discloses a washing machine including a control device on a back surface of a body, the control device configured to execute a series of washing operations such as a washing process, a rinsing process, and a dehydration process.

[0003]

15 FIG. 4 is a perspective view of a main part of a conventional washing machine disclosed in PTL 1. In this conventional washing machine, inner tub 3 is rotatably supported inside outer tub 2 elastically suspended in housing 1, inner tub 3 having a rotation center axis in a substantially vertical direction, accommodating laundry, and having water passage holes. Rotary vane 4 for stirring the laundry is provided on an inner bottom of
20 inner tub 3. Inner tub 3 or rotary vane 4 is driven by motor 5. Warm air is supplied to inner tub 3 by drying air blower 6 and heater 7. An outer surface of outer tub 2 is cooled by cooling air blower 8. A controller controls a washing process, a rinsing process, a dehydration process, and a drying process. Control device 9 having the controller is configured integrally and centrally, and is vertically disposed on back surface portion 1a of
25 housing 1.

Citation List

Patent Literature

[0004]

PTL 1: Unexamined Japanese Patent Publication No. 2002-159787

SUMMARY OF THE INVENTION

5 [0005]

In the conventional configuration, back surface portion 1a of the washing machine is made of a flame-retardant material or a non-combustible material in consideration of a risk of temperature rise of control device 9. Further, back surface portion 1a of the washing machine also serves as a cover configured to cover an opening portion at a rear portion of
10 the body, and a size of back surface portion 1a becomes large. Therefore, a manufacturing cost becomes high.

[0006]

The present disclosure provides a washing machine capable of suppressing a manufacturing cost even if a back surface portion is large while dealing with a risk of
15 temperature rise of a control device.

[0007]

A washing machine according to the present disclosure includes: a washing machine body; a control device vertically disposed on a back surface portion of the washing machine body; and a resin cover configured to cover the control device and detachable from
20 the washing machine body. The control device includes: a case vertically disposed on the back surface portion of the washing machine body; a power supply board having a controller configured to execute washing operation including a washing process, a rinsing process, and a dehydration process, the power supply board being housed in the case; a metal cover configured to cover the power supply board and attached to the case; and a non-combustible
25 material sheet housed in the case and disposed between the case and the power supply board.

[0008]

With this configuration, a risk of temperature rise of the control device can be dealt

with. Further, the resin cover attached to and detached from the washing machine body need not be made of a flame-retardant material or a non-combustible material, and a manufacturing cost can be suppressed even when a size of the back surface portion becomes large.

5

BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

FIG. 1 is a side cross-sectional view of a washing machine in a first exemplary embodiment.

10

FIG. 2 is an exploded perspective view of a main part of a control device of the washing machine in the first exemplary embodiment.

FIG. 3 is a cross-sectional view of a main part of a body on a back surface side of the control device of the washing machine in the first exemplary embodiment.

FIG. 4 is a perspective view of a main part of a conventional washing machine.

15

DESCRIPTION OF EMBODIMENT

[0010]

Hereinafter, an exemplary embodiment will be described in detail with reference to the drawings. The present disclosure is not limited by the accompanying drawings and the following description.

20

[0011]

(First exemplary embodiment)

Hereinafter, a first exemplary embodiment will be described with reference to FIGS. 1 to 3.

25

[0012]

(Configuration of washing machine)

FIG. 1 is a side cross-sectional view of a washing machine in the first exemplary

embodiment. FIG. 2 is an exploded perspective view of a main part of a control device of the washing machine in the first exemplary embodiment. FIG. 3 is a cross-sectional view of a main part of a body on a back surface side of the control device of the washing machine in the first exemplary embodiment.

5 [0013]

As shown in FIG. 1, washing machine 10 has water tub 12 inside washing machine body 11. Water tub 12 is suspended and supported by suspension 13 for vibration isolation. Washing tub 14 is disposed inside water tub 12. Washing tub 14 also serves as a dehydration tub, and has a large number of water passage holes 15 on a side wall. Further, in washing tub 14, fluid balancer 16 is disposed at an upper portion, and pulsator 17 is disposed in a bottom portion in a center. Rotary shaft 18 has a hollow biaxial structure for rotating one or both of washing tub 14 and pulsator 17, and includes transmission mechanism 19. Transmission mechanism 19 incorporates a speed reduction gear (not shown), and a switching clutch (not shown) of rotary shaft 18 during washing, and a brake (not shown) for stopping washing tub 14 during dehydration.

[0014]

Motor 20 is attached to a bottom portion of water tub 12. Motor 20 has motor-side pulley 21. Motor 20 transmits power from motor-side pulley 21 to mechanical-side pulley 22 of the transmission mechanism 19 via belt 23 to rotate rotary shaft 18.

20 [0015]

Washing machine body 11 has upper frame body 24 in an upper portion. Upper frame body 24 has clothes inlet 25 for a user to take in and out laundry. Clothes inlet 25 is openably and closably covered with lid body 26. Operation display 33 is provided at the rear portion of upper frame body 24, and the user sets a washing course and executes washing by operating operation display 33.

[0016]

Control device 27 includes a controller (not shown) configured to control electrical

units such as motor 20 to execute a series of washing operations such as a washing process, a rinsing process, and a dehydration process, and is disposed on a back surface portion of washing machine body 11. Further, control device 27 includes case 29 described below, power supply board 28, metal cover 31, and non-combustible material sheet 30.

5 [0017]

Opening portion 11a is formed on the back surface portion of washing machine body 11, and resin cover 32 is attached to cover opening portion 11a.

[0018]

As shown in FIG. 2, insulating non-combustible material sheet 30 and power supply
10 board 28 are housed in frame body 35 of case 29 formed of flame-retardant ABS. Insulating non-combustible material sheet 30 is disposed between case 29 and power supply board 28. Non-combustible material sheet 30 and power supply board 28 are inserted into frame body 35, and a moisture-proof potting agent (not shown) made of urethane resin or the like is filled. The potting agent covers entire power supply board 28. Power supply
15 board 28 is covered with metal cover 31 made of a metal steel plate, and is attached to case 29. Power supply board 28 is provided with the controller configured to control the electrical units such as motor 20 to execute the series of washing operations such as the washing process, the rinsing process, and the dehydration process.

[0019]

20 As shown in FIG. 3, control device 27 is disposed vertically on the back surface portion of washing machine body 11. Control device 27 includes case 29, insulating non-combustible material sheet 30, power supply board 28 having the controller (not shown), and metal cover 31. Control device 27 is covered with resin cover 32 molded of a recycled resin PP material, and is vertically attached to opening portion 11a on the back surface
25 portion of washing machine body 11.

[0020]

(Washing operation)

Operation of washing machine 10 configured as described above will be described.

[0021]

The user opens lid body 26 and puts the laundry into washing tub 14. The user puts a detergent and a softener in a predetermined place, and starts washing operation by a start switch provided on operation display 33. As a result, control device 27 starts the washing process. A water supply valve (not shown) is opened for a predetermined time, and washing water is supplied to washing tub 14. When the washing water reaches a predetermined water level, the water supply valve is closed and the water supply is stopped. Control device 27 drives motor 20 to rotate pulsator 17 and perform the washing process. When the washing process is completed, dirty washing water is drained. Control device 27 drives motor 20 to rotate washing tub 14, performs intermediate dehydration, and starts the rinsing process. In the rinsing process, the water supply valve is opened for a predetermined time, and washing water is supplied to washing tub 14. When a predetermined water level is reached, the water supply valve is closed and the water supply is stopped. Control device 27 drives motor 20 to rotate pulsator 17 and perform the rinsing process. When the rinsing process is completed, dirty washing water is drained, and control device 27 drives motor 20 to start the dehydration process where washing tub 14 is rotated.

[0022]

Control device 27 drives motor 20 to rotate pulsator 17 through the electrical components on power supply board 28. At this time, in control device 27, the electrical components (not shown) that are disposed on power supply board 28 and a high current flows through generate heat. Even if the electrical components have high temperatures, the high temperatures occur inside a closed space surrounded by insulating non-combustible material sheet 30 and the metal cover 31. Therefore, even if an ignition temperature is reached, fire will be extinguished by suffocation. That is, safety is further ensured against the risk of temperature rise of control device 27.

[0023]

(Actions and the like)

As described above, the washing machine of the present disclosure includes washing machine body 11, control device 27 vertically disclosed on a back surface side of washing machine body 11, and resin cover 32 that covers control device 27 and is detachable from washing machine body 11. Control device 27 has case 29 disposed vertically on the back surface portion of washing machine body 11, power supply board 28 having the controller configured to execute the washing operation including the washing process, the rinsing process, and the dehydration process, the power supply board 28 being housed in case 29, metal cover 31 covering power supply board 28 and attached to case 29, and non-combustible material sheet 30 housed in case 29 and disposed between case 29 and power supply board 28. Note that “vertically” means not only completely vertical, but also substantially vertical.

[0024]

As a result, the risk of temperature rise of control device 27 can be dealt with, resin cover 32 need not be made of a flame-retardant or non-combustible material, so that a manufacturing cost can be suppressed.

[0025]

Further, as in the above exemplary embodiment, case 29 includes frame body 35, frame body 35 may house power supply board 28 and non-combustible material sheet 30.

[0026]

This improves manufacturing efficiency.

INDUSTRIAL APPLICABILITY

[0027]

As described above, since the washing machine of the present disclosure has a configuration that can further ensure the safety of the product against the temperature rise of the control device, the resin cover attached to and detached from the washing machine body

need not be made of a flame-retardant material or a non-combustible material. Therefore, even if a size becomes large, the manufacturing cost can be suppressed.

REFERENCE MARKS IN THE DRAWING

5	[0028]	
	10	washing machine
	11	washing machine body
	11a	opening portion
	12	water tub
10	13	suspension
	14	washing tub
	15	water passage hole
	16	fluid balancer
	17	pulsator
15	18	rotary shaft
	19	transmission mechanism
	20	motor
	21	motor-side pulley
	22	mechanism-side pulley
20	23	belt
	24	upper frame body
	25	clothes inlet
	26	lid body
	27	control device
25	28	power supply board
	29	case
	30	non-combustible material sheet

31	metal cover
32	resin cover
33	operation display
35	frame body

CLAIMS

1. A washing machine comprising:

a washing machine body;

5 a control device vertically disposed on a back surface portion of the washing machine body; and

a resin cover configured to cover the control device and detachable from the washing machine body,

wherein the control device includes:

10 a case vertically disposed on the back surface portion of the washing machine body;

a power supply board having a controller configured to execute washing operation including a washing process, a rinsing process, and a dehydration process, the power supply board being housed in the case;

a metal cover configured to cover the power supply board and attached to the case;

15 and

a non-combustible material sheet housed in the case and disposed between the case and the power supply board.

2. The washing machine, wherein

20 the case includes a frame body, the frame body housing the power supply board and the non-combustible material sheet.