

WASHING MACHINE

FIELD OF THE INVENTION

This invention relates to a washing machine in which a control device and
5 an electrical part are incorporated in an upper frame that is placed in an upper
part of the washing machine.

BACKGROUND OF THE INVENTION

With this type of washing machine, a structure shown in Figs. 5 and 6 is
10 conventionally popular. The structure is explained below.

Fig. 5 is an exploded view of a conventional washing machine listed in
Japanese Patent Unexamined Publication No. H5-123492. On an upper part
of cabinet 1, upper frame 2 is attached. In a front part of upper frame 2,
operation panel 4 having control unit 3 is placed. In a rear part of upper frame
15 2, electrical parts such as water feed valve 5 and safety switch 6 are installed,
and which is covered by rear panel 7.

A washing machine listed in Japanese Patent Unexamined Publication No.
2004-337203 is explained next. Fig. 6A is a top view of an upper frame of an
other conventional washing machine, and Fig. 6B is a side view of the upper
20 frame of the other conventional washing machine. Lid 9 is attached to upper
frame 8 openably and closably. Lid 9 is formed at substantially a disk shape
and which is protruded above an upper face of upper frame 8. Lid 9 is cutout
in a rear part of it and which is rotatably held by upper frame 8 with the cutout
part serving as a rotational axis. An upper face of rear panel 10 which forms
25 upper frame 8 under the rear part of lid 9 is protruded in substantially an arc
shape, forming a continued part of disk shape lid 9.

In order to enhance design of the protruded part of the upper face of rear

panel 10, rear panel cover 11 may be attached.

Fig. 7 is a cross sectional view of still other conventional washing machine. With this type of conventional structure shown in Fig. 7, panel 10 and rear panel cover 11 are engaged and fit by claw 12. In this particular case, hole 13 needs to be formed at a bottom face of rear panel 10 at a position corresponding to claw 12. However, in this case, there is a danger that water flows in through hole 13, wetting electrical parts such as water feed valve 5 and safety switch 6 installed inside.

SUMMARY OF THE INVENTION

According to an aspect of the present invention, there is provided a washing machine comprising: a cabinet constituting a washing machine main

body; an upper frame attached to an upper part of the cabinet and having a laundry input mouth; a lid openably and closably covering the laundry input mouth; a rear space provided in a rear part of the upper frame and incorporating an electrical part; and a rear panel covering an upper face of the rear space, wherein a section of the upper face of the rear panel is covered by a rear panel cover, wherein the rear panel cover and a rear part of the upper face of the rear panel are engaged and claw fit, wherein an opening is formed at a front part of a rear panel concavity formed at a front central section of the rear panel, wherein a first claw is formed at the opening , a second claw is formed at the rear panel cover so as to fit to the first claw, and the first claw and the second claw are engaged to each other, fixing the rear panel cover to the rear panel, wherein an upper frame water conduit path is formed downwardly from the opening, wherein water coming in through a space between the rear panel and the rear panel cover flows into the opening, passes through the upper frame water conduit path, and is exhausted to an outside of the rear space.

Embodiments of the above washing machine prevent water coming in through a space between the rear panel and the rear panel cover to flow into the rear

space where electrical parts are incorporated, thus enhancing waterproof and safety characteristics. Composed of at least two constituents, the rear panel and the rear panel cover, various colors of and figures may be employed for the rear cover, enhancing design flexibility.

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BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a cross sectional view of a washing machine according to an exemplary embodiment of the invention.

Fig. 2 is a top view of an upper frame rear part constituting an upper part
10 of the washing machine.

Fig. 3 is an exploded perspective view of the upper frame rear part of the washing machine.

Fig. 4 is a cross sectional view of the upper frame rear part of the washing machine.

15 Fig. 5 is an exploded view of a conventional washing machine.

Fig. 6A is a top view of an upper frame of an other conventional washing machine.

Fig. 6B is a side view of the upper frame of the other conventional washing machine.

20 Fig. 7 is a cross sectional view of still other conventional washing machine.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

Below, an exemplary embodiment of the invention is explained with
25 reference to drawings. The invention is not necessarily limited to the exemplary embodiment.

(EXEMPLARY EMBODIMENT)

Fig. 1 is a cross sectional view of a washing machine according to an exemplary embodiment of the invention, Fig. 2 is a top view of an upper frame rear part constituting an upper part of the washing machine, Fig. 3 is an exploded perspective view of the upper frame rear part of the washing machine, and Fig. 4 is a cross sectional view of the upper frame rear part of the washing machine.

In Fig. 1, a cabinet constituting washing machine main body 21 cushioningly holds water tub 23, the water tub 23 rotatably incorporating wash and spin tub 22 which accommodates laundry. Onto an upper part of washing machine main body 21, upper frame 24 is attached. Laundry input mouth 25 is formed around a center part of upper frame 24. Laundry input mouth 25 is openably and closably covered by lid 26 which is composed of front lid 26a and rear lid 26b. Handle 27 is formed at front lid 26a, and lid 26 is opened and closed with handle 27.

Onto a front part of upper frame 24, operation cover 28 is adhesively attached. Inside the front part of upper frame 24, operation and control substrate 29 having a switch and others is disposed. Operation and control substrate 29 is accommodated in substrate holder 30 made of noncombustible resin and sealed with potting material or the like. Substrate holder 30 is screwed or claw fit to a rear side of the front part of frame 24 on which a button (not illustrated) and others are disposed. Operation cover 28 is printed with a labeling statement with adhesive applied to a rear side of it.

As illustrated in Figs. 2 and 3, rear space 37 is provided in a rear part of upper frame 24. In rear space 37, water filling part 31, electromagnetic water feed valve 32, abnormal vibration detection switch 33, water level sensor 34 and lead wire 35 connecting such electrical parts are incorporated. An upper face

of rear space 37 is covered by rear panel 36 shown in Fig. 1. Water is supplied through water filling part 31 to wash and spin tub 22. Electromagnetic water feed valve 32 controls water supply to water filling part 31. Abnormal vibration detection switch 33 detects abnormal vibration of water tub 23 during
5 a spinning process or the like. Water level sensor 34 measures water level in water tub 23.

Rear panel cover 38 is attached to a section of upper face of rear panel 36 for enhancing design, as is shown in Figs. 3 and 4.

Rear panel 36 has rear panel concavity 39 in its front central section for
10 accommodating rear panel cover 38. In a back part of rear panel cavity 39, rear panel rear claw 40 is formed at the claw protruding forward. Since rear panel rear claw 40 is formed at a forward sliding tool, it is unnecessary to prepare a hole in a bottom of the cavity. In a back part of rear panel cover 38, rear panel cover rear claw 41 is formed at the claw protruding backward to be
15 fit to corresponding rear panel rear claw 40, and the claw is formed at a backward sliding tool. That is, rear panel cover 38 and a rear part of an upper face of rear panel 36 are engaged with claw fitting utilizing the sliding structure of the tools.

In a front part of rear panel concavity 39, rear panel concavity opening 42
20 is formed at essentially a rectangular shape. In rear panel concavity opening 42, rear panel front claw 43 a first claw is formed protruding toward a center of rear panel concavity opening 42, the claw being formed by utilizing a mating surface between an upper tool and a lower tool. This structure is effective for reducing a tooling cost. Otherwise, the claw is formed by utilizing a pinching
25 structure of a tool. The pinching structure of the tool is effective for forming claw when a sliding tool structure is not applicable. On a backside of rear panel cover 38, rear panel cover front claw 44 a second claw is formed. Rear

panel cover front claw 44 is formed by utilizing a sliding structure of a tool. Rear panel cover front claw 44 is protruded outward of rear panel concavity opening 42, fitting to rear panel front claw 43 and getting into rear panel concavity opening 42.

5 At a rear side of rear panel concavity opening 42, rear panel water conduit rib 45 a first rib is formed facing downward. Upper frame water conduit rib 46 a second rib is formed at upper frame 24, surrounding rear panel water conduit rib 45. Upper frame water conduit path 47 is formed surrounded by upper frame water conduit rib 46. It passes through rear space 37 and
10 communicates to an underside of rear space 37.

Rear panel cover rear claw 41 is engaged with rear panel rear claw 40. Rear panel cover front claw 44 is engaged with rear panel front claw 43. Thus, rear panel cover 38 is fixed to rear panel 36. Rear panel concavity opening 42 is arranged to be communicated to an outside of rear space 37. Rear panel 36
15 to which rear panel cover 38 being attached is then screw fixed or claw fit to the upper face of rear space 37. In this structure, water coming in through a space between rear panel 36 and rear panel cover 38 flows into rear panel concavity opening 42 without flowing into rear space 37 of upper frame 24, passes through upper frame water conduit path 47, and is securely exhausted to an
20 outside. The water passing through upper frame water conduit path 47 is dropped onto water tub cover 48 covering an upper opening of water tub 23 and flows into water tub 23 via a through hole (not illustrated) formed at water tub cover 48. Alternately, water passing through upper frame water conduit path 47 may be directly dropped into wash and spin tub 22.

25 In the above exemplary embodiment, the upper face of rear space 37 is covered by rear panel 36, but the upper face may be formed at upper frame 24 and an underside of upper frame 24 may be closed by a cover installed with

electrical parts.

- 21- main body
- 22 - spin tub
- 23 - water tub
- 24 - upper frame
- 25 - laundry input mouth
- 26 - lid
- 26a - front lid
- 26b - rear lid
- 27 - handle
- 28 - operation cover
- 29 - operation and control substrate
- 30 - substrate holder
- 31 - water filling part
- 32 - electromagnetic water feed valve
- 33 - abnormal vibration detection switch
- 34 - water level sensor
- 35 - lead wire
- 36 - rear panel
- 37 - rear space
- 38 - rear panel cover
- 39 - rear panel concavity
- 40 - rear panel rear claw
- 41 - rear panel cover rear claw
- 42 - rear panel concavity opening
- 43 - rear panel front claw
- 44 - rear panel cover front claw
- 45 - rear panel water conduit rib
- 46 - upper frame water conduit rib
- 47 - upper frame water conduit path
- 48 - water tub cover

CLAIMS:

1. A washing machine comprising:
 - a cabinet constituting a washing machine main body;
 - an upper frame attached to an upper part of the cabinet and having a laundry input mouth;
 - a lid openably and closably covering the laundry input mouth;
 - a rear space provided in a rear part of the upper frame and incorporating an electrical part; and
 - a rear panel covering an upper face of the rear space,
 - wherein a section of the upper face of the rear panel is covered by a rear panel cover,
 - wherein the rear panel cover and a rear part of the upper face of the rear panel are engaged and claw fit,
 - wherein an opening is formed at a front part of a rear panel concavity formed at a front central section of the rear panel,
 - wherein a first claw is formed at the opening , a second claw is formed at the rear panel cover so as to fit to the first claw, and the first claw and the second claw are engaged to each other, fixing the rear panel cover to the rear panel,
 - wherein an upper frame water conduit path is formed downwardly from the opening, wherein water coming in through a space between the rear panel and the rear panel cover flows into the opening, passes through the upper frame water conduit path, and is exhausted to an outside of the rear space.

2. A washing machine of claim 1,

wherein a first rib is formed downward at a rear side of the opening and a second rib is formed at the upper frame so as to surround the first rib,

wherein the upper frame water conduit path that is formed surrounded by the second rib passes through a rear space and is communicated to an underside of the rear space.