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

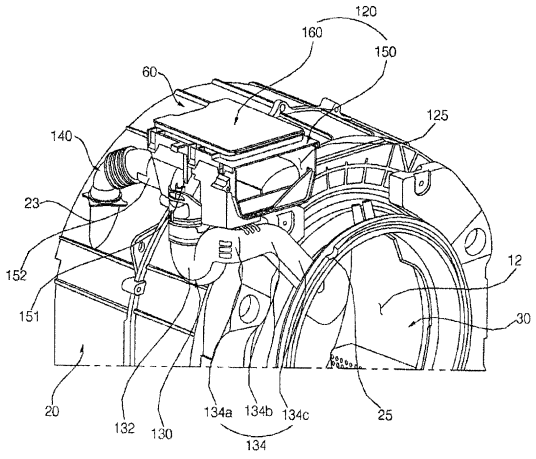
(72) Inventors:
- **KIM, Sungryong**
  Seoul 08592 (KR)
- **KIM, Jinwoong**
  Seoul 08592 (KR)
- **SEO, Hyunseok**
  Seoul 08592 (KR)

(74) Representative: **Vossius & Partner**
Patentanwälte Rechtsanwälte mbB
Siebertstrasse 3
81675 München (DE)

(54) WASHING MACHINE

(57) The washing machine according to one embodiment of the present invention comprises a cabinet forming an exterior; a tub which is disposed in the cabinet and in which laundry water is stored; a water supply unit for supplying the laundry water to the tub; a detergent box supplied with the laundry water from the water supply unit so as to provide same to the tub; a first water supply tube for supplying the laundry water from the detergent box to the front of the tub; and a second water supply tube for supplying the laundry water from the detergent box to either the side or rear of the tub. The washing machine according to the present invention has the advantage of dividing the laundry water to the detergent box by means of a flow-path separating partition and then separately supplying same to the front and/or side of the tub.

Fig. 3



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Description

[Technical Field]

[0001] The present invention relates to a washing machine and, more particularly, to a washing machine capable of supplying water in two directions at a tub.

[Background Art]

[0002] In general, a washing machine is a device to wash clothes or beddings (hereinafter referred to as 'laundry') through processes such as laundry, rinsing, and dehydration to separate pollution formed on the laundry using water and detergent and mechanical action.

[0003] The washing machine is divided into an agitator type washing machine, a pulsator type washing machine, and a drum type washing machine.

[0004] The agitator type washing machine washes laundry by horizontally rotating a washing rod protruding to a center of a washing tub. The pulsator type washing machine washes laundry using frictional force between water flow and laundry by horizontally rotating a rotary wing having a disc shape formed at a lower portion of the washing tub. The drum type washing machine washes laundry by rotating a drum in a state that water, detergent, and laundry are provided into an inside of the drum.

[0005] The drum type washing machine is mounted therein with a tub which is disposed in a cabinet forming an exterior and in which laundry water is stored. A drum is disposed at an inner side of the tub and in which the laundry water is stored. A driver for rotating the drum is mounted at a rear side of the tub. A shaft is installed at the driver to be connected with a rear side of the drum through the tub. A lifter is mounted inside the drum and raises the laundry upon rotation of the drum.

[Disclosure]

[Technical Problem]

[0006] An embodiment of the present invention provides a washing machine capable of supplying water in two directions at a tub.

[0007] An embodiment of the present invention further provides a washing machine capable of temporarily storing liquid detergent.

[0008] An embodiment of the present invention further provides a washing machine capable of minimizing water supply noises and bubbles by flowing supplied water along an inner wall of a tub.

[0009] An embodiment of the present invention further provides a washing machine capable of preventing fluid or bubble inside a tub from back-flowing into a detergent box when laundry water is supplied.

[0010] An embodiment of the present invention further provides a washing machine capable of preventing laundry water from directly dropping to laundry when laundry water is supplied.

[0011] The above information disclosed in this background section is only for enhancement of understanding of the background of the invention and therefore it may contain information that does not form the prior art that is already known in this country to a person of ordinary skill in the art.

[Technical Solution]

[0012] In accordance with an aspect of the present invention, there is provided a washing machine including: a cabinet forming an exterior; a tub which is disposed in the cabinet and in which laundry water is stored; a water supply unit for supplying the laundry water to the tub; a detergent box supplied with the laundry water from the water supply unit so as to provide same to the tub; a first water supply tube for supplying the laundry water from the detergent box to the front of the tub; and a second water supply tube for supplying the laundry water from the detergent box to either the side or rear of the tub.

[0013] The washing machine may further include: a laundry entrance hole disposed at a front of the cabinet and in which laundry enters; and a gasket disposed between the cabinet and the tube to seal the laundry entrance hole, wherein the first water supply tube is connected with the gasket.

[0014] A back-flow prevention structure may be disposed in at least one of the first water supply tube and the second water supply tube, and the back-flow prevention structure includes a U trap.

[0015] The water supply tube may include: a U trap part directly connected with the detergent box, configured to store a part of laundry water discharged from the detergent box, and bent in a gravity direction to prevent a fluid from over-flowing; and a connecting part connected with the U trap part, and configured to guide the laundry water from the U trap part to the tub, and connected with a front side of the tube to supply the laundry water.

[0016] The washing machine may further include a drum disposed inside the tub, configured to load laundry therein and rotated with respect to the tub, wherein the second water supply tube may be disposed to drop the laundry water to a space between the tub and the drum.

[0017] The second water supply tube may be disposed to drop the laundry water on an inner wall of the tub.

[0018] The washing machine may further include: a supply part disposed at the tub to guide the laundry water from the second water supply tube to an inside of the tub; a water storing part disposed inside the supply part, spaced apart from the supply part by a predetermined distance to form a first back-flow prevention path, and configured to store a part of water supplied from the second water supply tube; and a water guide installed inside the second water supply tube, configured to guide the laundry water from the second water supply tube to the tub side, a bottom end of which is inserted into an inside

of the water storing art, and spaced apart from the water storing part by a predetermined distance to form a second back-flow prevention path, wherein the laundry water supplied from the second water supply tube is stored in the water storing part and then passes through the second back-flow prevention path and the first back-flow prevention path to flow into the tub.

[0019] A bottom end of the water guide may be soaked in water of the water storing part.

[0020] A lower side of the water storing part may be disposed at a curved surface forming the tub.

[0021] A lower side of the water storing part may have a curved surface when viewed from a front of the washing machine.

[0022] The detergent box may further include: a first supply part connected with the first water supply tube; and a second supply part connected with the second water supply tube.

[0023] The washing machine may further include: a flow-path separating partition disposed inside the detergent box, wherein the flow-path separating partition separately flows the laundry water from the water supply unit to the first supply part and the second supply part.

[0024] The detergent box may further include: a dispenser installed at the cabinet and formed therein with the first supply part and the second supply part; and a drawer movably installed at the dispenser, wherein the flow-path separating partition is disposed at the dispenser.

[0025] The flow-path separating partition may divide an inside of the dispenser into a first space and a second space, the first space is connected with the first supply part and the second space is connected with the second supply part.

[0026] The washing machine may further include a swirl partition disposed at the first space, wherein the swirl partition generates a torque in laundry water flowing through the first supply part.

[0027] The first supply part may be vertically formed, and the swirl partition is disposed at a top side of the first supply part.

[0028] The swirl partition may form a spacing distance with the flow-path separating partition.

[0029] The swirl partition may have an arc shape bent rearward from a front, one end of the swirl partition is connected to the dispenser, and an opposite end of the swirl partition forms a spacing distance with the flow-path separating partition.

[0030] The first supply part may be vertically formed, the swirl partition is disposed at a top side of the first supply part, and the swirl partition divides an upper portion of the first supply part into a first swirl and a second swirl space.

[0031] The first supply part may be disposed at a side of the dispenser, the second supply part is disposed at a rear side of the dispenser, and the second supply part is disposed at a rear side of the first space.

[0032] The details of other embodiments are contained in the detailed description and accompanying drawings.

[Advantageous Effects]

[0033] The washing machine and a control method thereof according to the present invention have following one or more effects.

[0034] First, the washing machine according to the present invention has the advantage of dividing the laundry water to the detergent box by means of a flow-path separating partition and then separately supplying same to the front and/or side of the tub.

[0035] Second, in the washing machine according to the present invention, since laundry water is moved downward along an inner wall of a tub and then lifts upward from a lower portion upon water supply, detergent may be sufficiently dissolved at a lower portion of the tub to soak laundry.

[0036] Third, the washing machine according to the present invention has the advantage of preventing fluids such as bubbles or steams inside the tub from back-flowing to a detergent box.

[0037] Fourth, in the washing machine according to the present invention, upon front water supply, liquid detergent is temporarily stored in a U trap part, and is diluted by supplied laundry water to be supplied to the tub.

[0038] Fifth, in the washing machine according to the present invention, laundry water does not directly drop on laundry to prevent detergent or a fabric softener from being concentrated in only a specific laundry.

[0039] Sixth, in the washing machine according to the present invention, since laundry water lifts from a bottom of the tub to soak laundry, the detergent may be uniformly dissolved.

[0040] Seventh, in the washing machine according to the present invention, upon side supply of laundry water, since the laundry water flows along an inner wall of the tub, water supply noise is minimized.

[0041] Eighth, in the washing machine according to the present invention, a flow-path separating partition is disposed at a dispenser so that laundry water may be separately supplied by a first supply part and a second supply part.

[0042] Ninth, in the washing machine according to the present invention, since a swirl partition is formed at a dispenser, torque may be applied to the laundry water, and minimized detergent may be remained in the dispenser.

[0043] Tenth, in the washing machine according to the present invention, in order to avoid interference with a tub, a tub avoiding part is formed at a dispenser.

[0044] Eleventh, in the washing machine according to the present invention, a second supply part is disposed at a rear side of a first space and an installation length of a second supply tub for supplying laundry water to a side of the tub may be minimized.

[0045] Twelfth, in the washing machine according to the present invention, the flow-path separating partition

is spaced apart from the swirl partition so that laundry water of a first space is rapidly exhausted to the first supply part.

[0046] Effects of the present invention may not be limited to the above and other objects and other objects which are not described may be clearly comprehended to those of skill in the art to which the embodiment pertains through the following description.

[Description of Drawings]

[0047]

FIG. 1 is a partially exploded perspective view illustrating a washing machine according to an embodiment of the present invention.

FIG. 2 is a front sectional view illustrating a washing machine according to an embodiment of the present invention.

FIG. 3 is a perspective view illustrating an installation structure of a detergent box according to an embodiment of the present invention.

FIG. 4 is a left side view of FIG. 3.

FIG. 5 is a perspective view illustrating a lower body shown in FIG. 3.

FIG. 6 is a plan view of FIG. 5.

FIG. 7 is a perspective view illustrating a first water supply tube shown in FIG. 3.

FIG. 8 is an enlarged sectional view illustrating a water supply tube shown in FIG. 2.

[Mode for Invention]

[0048] The advantages, the features, and schemes of achieving the advantages and features of the disclosure will be apparently comprehended by those skilled in the art based on the embodiments, which are described later in detail, together with accompanying drawings. However, the present invention is not limited to following disclosed embodiments and various embodiments may be realized. Present embodiments are provided to complete the disclosure of the present invention and to completely indicate the scope of the present invention to those of ordinary skill in the art. The present invention is defined by a scope of claims. The same reference numeral in the specification refers to the same constituent element.

[0049] Hereinafter, the present invention will be described with reference to FIG. 1 to FIG. 8.

[0050] The washing machine according to an embodiment of the present invention includes a cabinet 10 forming an exterior; a tub 20 configured to store laundry water; a drum 30 disposed in the tub 20 and rotated to receive laundry therein; a driver (not shown) configured to rotate the drum 30; a water supply unit 50 configured to supply laundry water from an external water source to the tub 20; and a detergent box 60 configured to store washing detergent and to mix the washing detergent with the laundry water.

[0051] The cabinet 10 forms an exterior of the washing machine. The tub 20 is disposed in the cabinet 10.

[0052] A laundry entrance hole 12 is formed at a front side of the cabinet 10 so that laundry may enter and be exhausted. A door 15 is rotatably provided at a front side of the cabinet 10 to open/close the laundry entrance hole 12.

[0053] A gasket 25 is disposed at a front of the tub 20. The gasket 25 is disposed between the cabinet 10 and the tub 20 and prevents laundry water from being leaked into the cabinet 10. The gasket 25 is formed therein with the laundry entrance hole 12. The door 15 adheres to the gasket 25. The door 15 may be partially inserted into the gasket 25 side.

[0054] The cabinet 10 includes a control panel 13 which receives a command from a user to display various state information of the washing machine. The detergent box 60 is withdrawably provided at the cabinet 10 and stores detergent such as washing detergent, rinsing detergent, or bleach.

[0055] The drum 30 is rotated while storing laundry. The drum 30 is formed therein with a plurality of through holes 31 through which the laundry water pass. A lifter 32 may be disposed at an inner wall of the drum 30 and lift the laundry to a predetermined height upon rotation of the drum 30. The drum 30 is connected to the driver and receives a torque from the driver to be rotated.

[0056] The drum 30 is not completely horizontally disposed but has a predetermined slope so that a front side of the drum 30 is high and a rear side of the drum 30 descends lower than a horizontal region.

[0057] The detergent box 60 stores detergent such as washing detergent, rinsing detergent, or bleach. The detergent box 60 may be withdrawn through the front side of the cabinet 10.

[0058] When the laundry water is supplied, the detergent in the detergent box 60 is mixed with the laundry water and the mixture is introduced into the tub 20. The detergent box 60 may be divided into a region for storing the washing detergent, a region for storing the rinsing detergent, and a region for storing the bleach.

[0059] In the present embodiment, the detergent box 60 supplies the laundry water in two directions in the tub 20. The laundry water of the detergent box 60 may be supplied to a front side of the tub 20. Further, the laundry water of the detergent box 60 may be supplied to a side of the tub 20.

[0060] The detergent box 60 includes a dispenser 110 formed therein with a 2-way water supply flow path and a drawer 210 movably installed at the dispenser 110.

[0061] The dispenser 110 includes a dispenser body 120 for storing laundry water, and a first water supply tube 130 and a second water supply tub 140 for connecting the dispenser body 120 with the tub 20.

[0062] The dispenser body 120 includes a lower body 150 and an upper body 160.

[0063] The laundry water is stored in the lower body 150. In the present embodiment, the first water supply

tube 130 and the second water supply tub 140 are connected to the lower body 150. Unlike the present embodiment, a water supply flow path may be connected with the upper body 160 according to a shape.

[0064] A drawer entrance hole 125 is formed at a surface side of the dispenser body 120.

[0065] The drawer entrance hole 125 is formed by coupling the lower body 150 with the upper body 160.

[0066] The lower body 150 has a basket shape of which a top side is open.

[0067] The lower body 150 is formed with a first supply part 151 connected with the first water supply tube 130 and a second supply part 152 connected with the second water supply tube 140.

[0068] The first supply part 151 is formed downward.

[0069] The second supply part 152 is formed rearward.

[0070] The first supply part 151 is separated from the second supply part 152 by the flow-path separating partition 155. The flow-path separating partition 155 separates laundry water supplied from the water supply unit to provide the separated laundry water to the first supply part 151 and the second supply part 152.

[0071] The flow-path separating partition 155 is formed inside the lower body 150. The flow-path separating partition 155 divides an inside of the lower body 150 into two spaces. Although the flow-path separating partition 155 may have a straight line, the flow-path separating partition 155 is bent in the present embodiment.

[0072] In the present embodiment, the flow-path separating partition 155 divides the inside of the lower body 150 by taking into consideration laundry water dropped from the drawer 210.

[0073] Unlike the present embodiment, the flow-path separating partition 155 may be formed at the drawer 210. When the flow-path separating partition 155 is formed at the drawer 210, the flow-path separating partition 155 may protrude downward from a lower side of the drawer 210.

[0074] The flow-path separating partition 155 includes a first partition 156 formed forward and rearward, and a second partition 157 connected with the first partition 156 to be diagonally formed at a rear side of the first partition 156.

[0075] The flow-path separating partition 155 prevents the laundry water from overflowing to a close space. In particular, the flow-path separating partition 155 prevents the laundry water dropped from the drawer 210 form flowing to a close space. Accordingly, the fabric softener or detergent stored in the drawer 210 may be supplied into the tub 20 through a desired water supply flow path.

[0076] In the present embodiment, a located space of the first supply part 151 is defined as a first space 121 and a located space of the second supply part 152 is defined as a second space 122.

[0077] The flow-path separating partition 155 divides an inside of the dispenser into the first space 121 and the second space 122. The first space 121 is connected with the first supply part 151. The second space 122 is connected with the second supply part 152.

[0078] In the present embodiment, the second supply part 152 is located at a rear side of the first space 121. The first supply part 151 is located at a side of the first space 121. The second supply part 152 is located at a rear side of the first space 121.

[0079] The first space 121 is further formed therein with a swirl partition 153 configured to guide laundry water to the first supply part 151.

[0080] The swirl partition 153 improves discharge speed of the laundry water. The swirl partition 153 has an arc shape when viewed from the plan. The swirl partition 153 is convexly formed forward of the washing machine.

[0081] The swirl partition 153 is disposed at an upper portion of the first supply part 151. The swirl partition 153 is disposed through an upper portion of the first supply part 151. The swirl partition 153 may horizontally divide an upper portion of the first supply part 151.

[0082] One end of the swirl partition 153 is coupled with the dispenser 119 and an opposite end of the swirl partition 153 is spaced apart from the flow-path separating partition 155.

[0083] That is, the swirl partition 153 and the flow-path separating partition 155 forms a separation distance 154, and flows the laundry water through the separation distance 154. In the present embodiment, the separation distance 154 is formed between the swirl partition 153 and the first partition 156.

[0084] The swirl partition 153 guides the laundry water flowing to the first supply part 151 to be rotated. The laundry water may be rotated along an inner wall of the first supply part 151 by the swirl partition 153 to be moved downward.

[0085] In the present embodiment, the swirl partition 153 extends to an inside of the first supply part 151. The swirl partition 153 may be disposed at an inner top side of the first supply part 151 and may divide the inner top side of the first supply part 151 into two regions.

[0086] In the present embodiment, the swirl partition 153 horizontally divides an inside of the first supply part 151. The swirl partition 153 divides the first supply part 151 into a first swirl space 151a and a second swirl space 151b. In the present embodiment, the swirl partition 153 divides an input side of the first supply part 151.

[0087] Thus, a part of the laundry water of the first space 121 may be exhausted into the first swirl space 151a and remaining laundry water may flow along the swirl partition 153 to be exhausted into the second swirl space 151b.

[0088] Meanwhile, a tub avoiding part 158 is convexly formed upward at the second space 122 of the lower body 150.

[0089] The lower body 150 may fully adhere to an outer side of the tub 20 by the tub avoiding part 158. The tub avoiding part 158 has an advantage of minimizing an installation space of the detergent box 60 and the tub 20.

[0090] A backflow prevention structure for preventing

bubble or steam inside the tub 29 from back-flowing to the detergent box 60 is installed at the first water supply tube 130 and the second water supply tube 140.

[0091] The first water supply tube 130 connects the first supply part 151 with a front side of the tub 20. The laundry water supplied through the first water supply tub 30 does not directly drop on the laundry. In the present embodiment, the first water supply tube 130 is connected with a gasket 25 which is disposed at the front of the tub 20. Unlike the present embodiment, the first water supply tube 130 may be directly connected with the tub 20. The laundry water from the first water supply tube 130 may be supplied through the gasket 25 to flow in a space between the tub 20 and the drum 30.

[0092] The first water supply tube 130 is installed therein with a structure for prevent steams or bubbles from back-flowing to the detergent box 60.

[0093] In the present embodiment, the first water supply tube 130 is installed therein with a U trap structure as a back-flow prevention structure.

[0094] The first water supply tube 130 includes a U trap part 132 connected with the first supply part 151 to substantially store the laundry water or the detergent; a connecting part 134 connected with the U trap part 132 and the front side of the tub 20; and an abrasion prevention part 136 formed in at least one of the U trap part 132 or the connecting part 134.

[0095] The first supply part 151 is vertically formed and the U trap part 132, and the U trap part 132 is coupled with a lower side of the first supply part 151. The laundry water of the first space 121 flows through the U trap part 132 through the first supply part 151.

[0096] The U trap part 132 stores a predetermined amount of laundry water or laundry water with which the detergent is mixed. The laundry water stored in the U trap part 132 is supplied by the additionally supplied laundry water.

[0097] The U trap part 132 is disposed forward and rearward of the washing machine.

[0098] A front end of the U trap part 132 is directed toward a forward direction.

[0099] The connecting part 134 connects the U trap part 132 with the tub 20.

[0100] The connecting part 134 is connected with a front end of the U trap part 132.

[0101] In the present embodiment, the connecting part 134 includes a bending connector 134a connected with a front end of the U trap part 132; a horizontal connector 134b connected with the bending connector 134a to be horizontally formed; and an inclined connector 134c connected with the horizontal connector 134b and inclined downward to be connected with the tub 20.

[0102] The connecting part 134 may have a straight line. In the present embodiment, the laundry water is moved by taking into consideration a structure of the U trap part 132 and is supplied to the front of the tub 20 along the inclined connector 134c.

[0103] The U trap part 132 and the connecting part 134 adheres to a lower side of the lower body 150 and minimizes a volume in an inner space of the washing machine.

[0104] The U trap part 132 may temporarily store the detergent supplied to the detergent box.

[0105] When the laundry water is supplied, the detergent stored in the drawer 210 may flow to the first water supply tube 130 through the dispenser body 120.

[0106] When liquid detergent is stored in the drawer 210, the liquid detergent may be temporarily stored in the U trap part 132.

[0107] When the washing machine vibrates, the abrasion prevention part 136 prevents direct shock from being transferred to the first water supply tube 130.

[0108] In the present embodiment, the abrasion prevention part 136 includes a first abrasion prevention portion 136a formed at the U trap part 132 and a second abrasion prevention portion 136b formed at the connecting part 134.

[0109] In the present embodiment, the first abrasion prevention portion 136a is formed at a tub 20 side and buffers contact with the tub 20. The second abrasion prevention portion 136b is formed at a top side of the connecting part 134 and buffers contact with the lower body 150. Unlike the present embodiment, a position of the abrasion prevention part 136 may be changed according to a design.

[0110] The second water supply tube 140 connects the second supply part 152 with a side of the tub 20. The second water supply tube 140 is disposed to vertically drop the laundry water.

[0111] A bellows structure may be formed in at least a part of the second water supply tube 140 and buffer vibration or a distance change.

[0112] The second water supply tube 140 flows the laundry water through an inner wall of the tub 20. The laundry water from the second water supply tube 140 is dropped to a space between the drum 30 and the tub 20. The laundry water dropped from the second water supply tube 140 flows downward along an inner wall of the tub 20.

[0113] Since the laundry water supplied from the second water supply tube 140 flows along the inner wall of the tub 20, a drop noise of the laundry water may be minimized. The laundry water supplied through the second water supply tube 140 is not directly dropped on the laundry.

[0114] The second water supply tube 140 is installed therein with a structure configured to prevent the steam or the bubble from over-flowing to the detergent box 60.

[0115] Since the second water supply tube 140 vertically supplies the laundry water, a U trap is not installed in a pipeline as in the first water supply tube 130 but a back-flow prevention structure of a U trap structure is installed inside a tube.

[0116] A third supply part 23 protrudes from a tub 20 connected with the second water supply tube 140. The third supply part 23 has a tube shape.

[0117] The back-flow prevention structure 170 is installed between the third supply part 23 and the second water supply tube 140. The back-flow prevention structure 170 is formed therein with a flow-path which is vertically bent twice from at least one of an inside of the second water supply tube 140 or the third supply part 23.

[0118] The back-flow prevention structure 170 includes a water storing part 190 disposed inside the third supply part 23, spaced apart from the third supply part 23 by a predetermined distance to form a first back-flow prevention path 191, and to partially store water supplied from the second water supply tube 140; and a water guide 180 installed inside the second water supply tube 140 to guide the laundry water from the second water supply tube 140 to the tub 30 side and a bottom end of which is inserted into an inside of the water storing part 190, and spaced apart from the water storing part 190 by a predetermined distance to form a second back-flow prevention path 192.

[0119] After the laundry water supplied from the second water supply tube 140 is stored in the water storing part 190, the stored laundry water passes through the second back-flow prevention path 192 and the first back-flow prevention path 191 to flow inside the tub 30.

[0120] The water storing part 190 is disposed inside the third supply part 23 and the water guide 180 is disposed inside the water storing part 190. The first back-flow prevention path 191 and the second back-flow prevention path 192 communicate with each other, and the directions thereof are changed at 180°. The second back-flow prevention path 192 and the water hole 181 communicate with each other, and the directions thereof are changed at 180°.

[0121] The water guide 180 is formed therein with the water hole 181. The laundry water from the second water supply tube 140 flows to the water storing part 190 through the water hole 181.

[0122] The water guide 180 is vertically disposed. The water guide 180 may be installed at one of the second water supply tube 140 or the third supply part 23. In the present embodiment, the water guide 180 is installed at a connection region between the second water supply tube 140 and the third supply part 23.

[0123] The water guide 180 is locked with a top end of the third supply part. The second water supply tube 140 surrounds the water guide 180, and is coupled with a top end of the third supply part 23.

[0124] The water guide 180 includes a water guide body 182 locked with the third supply part 23 and a guide part 184 formed at an inner side of the water guide body 182 and is formed therein with a water hole 181 to guide the laundry water to the tub 20 side.

[0125] The guide part 184 longitudinally extends upward and downward. The water hole 181 is formed at an inner side of the guide part 184.

[0126] A diameter of the guide part 184 differs from a diameter of the water guide body 182. The diameter of the water guide body 182 is smaller than a diameter of the guide part 184.

[0127] A bottom end of the guide part 184 is inserted into the water storing part 190 and the guide part 184 is partially sunk in the stored laundry water.

[0128] In the present embodiment, the water storing part 190 is disposed at an inner side of the third supply part 23 and is spaced apart from an inner side of the third supply part 23 by a predetermined distance. The water storing part 190 is spaced apart from the guide part 184 by a predetermined distance.

[0129] Thus, a first back-flow prevention path 191 is formed between the water storing part 190 and the guide part 184 and a second back-flow prevention path 192 is formed between the water storing part 190 and the third supply part 23.

[0130] The first back-flow prevention path 191 and the second back-flow prevention path 192 form a U trap.

[0131] The water storing part 190 may has a cup shape. In the present embodiment, a lower side of the water storing part 190 is disposed at a continuous curved surface with an outer side of the tub 20.

[0132] That is, in the present embodiment, a lower side of the water storing part 190 has a curved surface. The lower side 195 of the water storing part 190 has a curved surface on a curvature radius forming the tub 20.

[0133] The lower side of the water storing part 190 guides the laundry water supplied through the first and second back-flow prevention paths 191 and 192 to an inner wall of the tub 20.

[0134] The laundry water may be vertically dropped from the second back-flow prevention path 192, and may flow along an inner side of the tub 20.

[0135] When the laundry water of low pressure is supplied, the laundry water may flow along an inner wall of the tub 20 due to surface tension. In order to maximize the above effect, when viewing a front surface of the washing machine, it is preferred that the second back-flow prevention path 192 adheres to a side of the tub 20.

[0136] If the second back-flow prevention path 192 adheres to the side of the tub 20, the laundry water may easily flow along an inner wall of the tub 20.

[0137] Unlike the present embodiment, the second water supply tube 140 may be installed to flow the laundry water along an inner wall in a rearward direction of the tub 20.

[0138] The first water supply tube 130 and the second water supply tube 140 provide a flow path structure capable of supplying laundry water to a tub, and prevent bubbles or steams inside the tub 20 from being introduced into the detergent box 60.

[0139] The laundry water stored in the U trap part 132 of the first water supply tube 130 prevents the bubbles or the steams inside the tub 20 from being introduced into the detergent box 60.

[0140] The laundry water stored in the water storing part 190 of the second water supply tube 140 prevents the bubbles or the steams inside the tub 20 from being introduced into the detergent box 60.

[0141] In the present embodiment, the water supply unit 50 may separately supply the laundry water to the first space 121 and the second space 122 of the detergent box 60.

[0142] In the present embodiment, the laundry water for the present laundry is supplied to the first space 121. In the present embodiment, a fabric softener or laundry water for free water supply is supplied to the second space 122.

[0143] The laundry water supplied from the water supply unit 50 is dropped at a drawer 210, and then flows to the first space 121 or the second space 122.

[0144] For the present laundry, the laundry water supplied to the first space 121 is supplied to the front of the tub 20 through the third water supply tube 130. The laundry water supplied to the tub 20 through the first water supply tube 130 is minimized to directly reach the laundry.

[0145] Likewise, the laundry water supplied to the third space 122 for free water supply or rinsing detergent may be supplied to a lateral side or a rear side of the tube 20. The laundry water supplied to the tub 20 through the second water supply pipe 140 flows along an inner wall of the tub 20 or is dropped to a space between the tub 20 and the drum 30 so that minimized laundry water reaches the laundry.

[0146] Although embodiments have been described with reference to a number of illustrative embodiments thereof, it should be understood that numerous other modifications and embodiments can be devised by those skilled in the art that will drop within the spirit and scope of the principles of this disclosure.

Claims

1. A washing machine comprising:

a cabinet forming an exterior;
a tub which is disposed in the cabinet and in which laundry water is stored;
a water supply unit for supplying the laundry water to the tub;
a detergent box supplied with the laundry water from the water supply unit so as to provide same to the tub;
a first water supply tube for supplying the laundry water from the detergent box to the front of the tub; and
a second water supply tube for supplying the laundry water from the detergent box to either the side or rear of the tub.

2. The washing machine of claim 1, further comprising:

a laundry entrance hole disposed at a front of the cabinet and in which laundry enters; and
a gasket disposed between the cabinet and the tube to seal the laundry entrance hole,
wherein the first water supply tube is connected with the gasket.

3. The washing machine of claim 1, wherein a back-flow prevention structure is disposed in at least one of the first water supply tube and the second water supply tube, and the back-flow prevention structure includes a U trap.

4. The washing machine of claim 1, wherein the water supply tube comprises:

a U trap part directly connected with the detergent box, configured to store a part of laundry water discharged from the detergent box, and bent in a gravity direction to prevent a fluid from over-flowing; and
a connecting part connected with the U trap part, and configured to guide the laundry water from the U trap part to the tub, and connected with a front side of the tube to supply the laundry water.

5. The washing machine of claim 1, further comprising a drum disposed inside the tub, configured to load laundry therein and rotated with respect to the tub,
wherein the second water supply tube is disposed to drop the laundry water to a space between the tub and the drum.

6. The washing machine of claim 5, wherein the second water supply tube is disposed to drop the laundry water on an inner wall of the tub.

7. The washing machine of claim 5, further comprising:

a supply part disposed at the tub to guide the laundry water from the second water supply tube to an inside of the tub;
a water storing part disposed inside the supply part, spaced apart from the supply part by a predetermined distance to form a first back-flow prevention path, and configured to store a part of water supplied from the second water supply tube; and
a water guide installed inside the second water supply tube, configured to guide the laundry water from the second water supply tube to the tub side, a bottom end of which is inserted into an inside of the water storing art, and spaced apart from the water storing part by a predetermined distance to form a second back-flow prevention path,
wherein the laundry water supplied from the second water supply tube is stored in the water storing part and then passes through the second back-flow prevention path and the first back-flow prevention path to flow into the tub.

8. The washing machine of claim 7, wherein a bottom end of the water guide is soaked in water of the water storing part.

9. The washing machine of claim 7, wherein a lower side of the water storing part is disposed at a curved surface forming the tub.

10. The washing machine of claim 7, wherein a lower side of the water storing part has a curved surface when viewed from a front of the washing machine.

11. The washing machine of claim 1, wherein the detergent box further comprises:

a first supply part connected with the first water supply tube; and
a second supply part connected with the second water supply tube.

12. The washing machine of claim 11, further comprising:

a flow-path separating partition disposed inside the detergent box,
wherein the flow-path separating partition separately flows the laundry water from the water supply unit to the first supply part and the second supply part.

13. The washing machine of claim 12, wherein the detergent box further comprises:

a dispenser installed at the cabinet and formed therein with the first supply part and the second supply part; and
a drawer movably installed at the dispenser,
wherein the flow-path separating partition is disposed at the dispenser.

14. The washing machine of claim 13, wherein the flow-path separating partition divides an inside of the dispenser into a first space and a second space,
the first space is connected with the first supply part and the second space is connected with the second supply part.

15. The washing machine of claim 14, further comprising a swirl partition disposed at the first space,
wherein the swirl partition generates a torque in laundry water flowing through the first supply part.

16. The washing machine of claim 15, wherein the first supply part is vertically formed, and the swirl partition is disposed at a top side of the first supply part.

17. The washing machine of claim 15, wherein the swirl partition forms a spacing distance with the flow-path separating partition.

18. The washing machine of claim 17, wherein the swirl partition has an arc shape bent rearward from a front, one end of the swirl partition is connected to the dispenser, and an opposite end of the swirl partition forms a spacing distance with the flow-path separating partition.

19. The washing machine of claim 15, wherein the first supply part is vertically formed, the swirl partition is disposed at a top side of the first supply part, and the swirl partition divides an upper portion of the first supply part into a first swirl and a second swirl space.

20. The washing machine of claim 14, wherein the first supply part is disposed at a side of the dispenser, the second supply part is disposed at a rear side of the dispenser, and the second supply part is disposed at a rear side of the first space.

Fig. 1

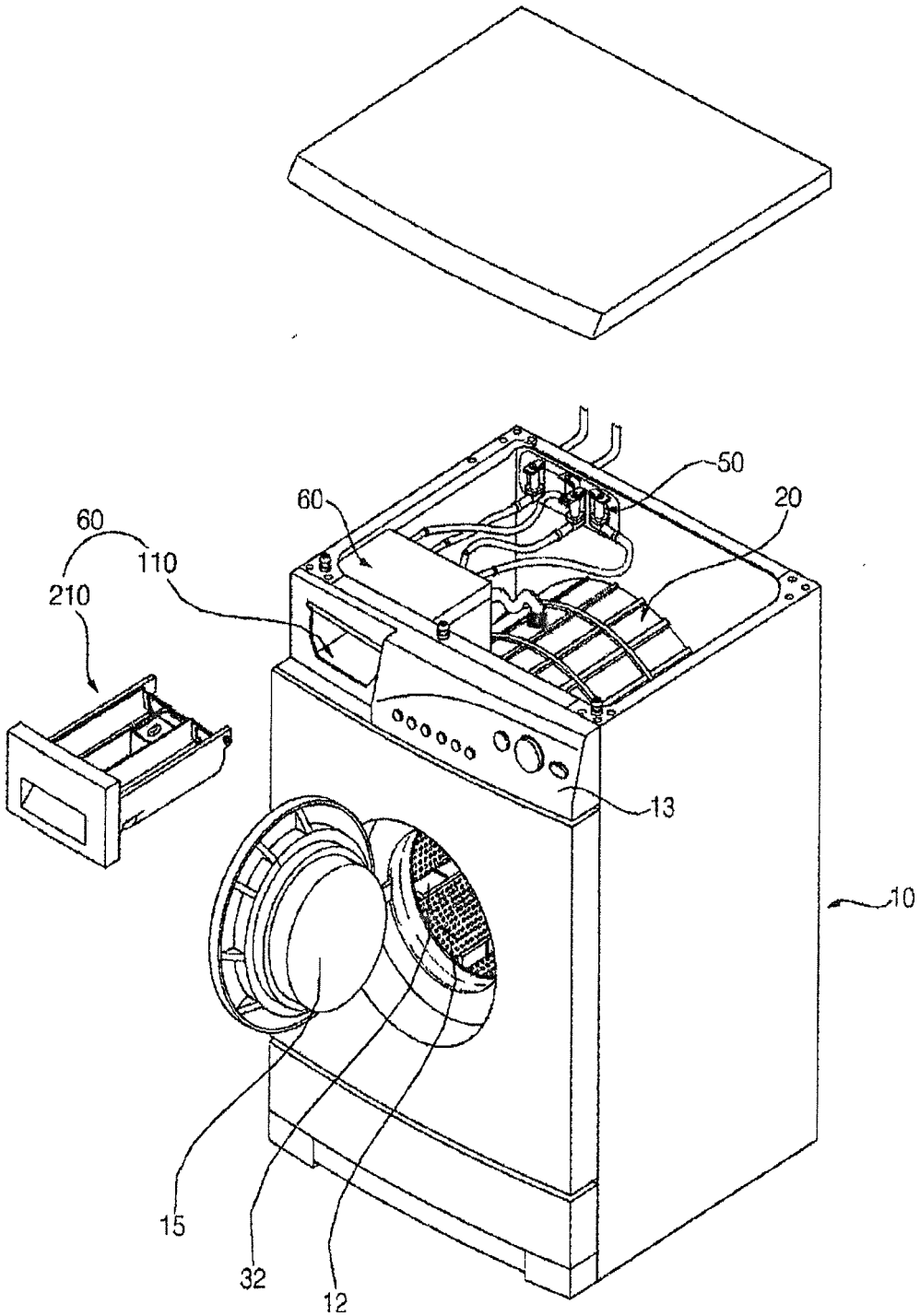

Fig. 2

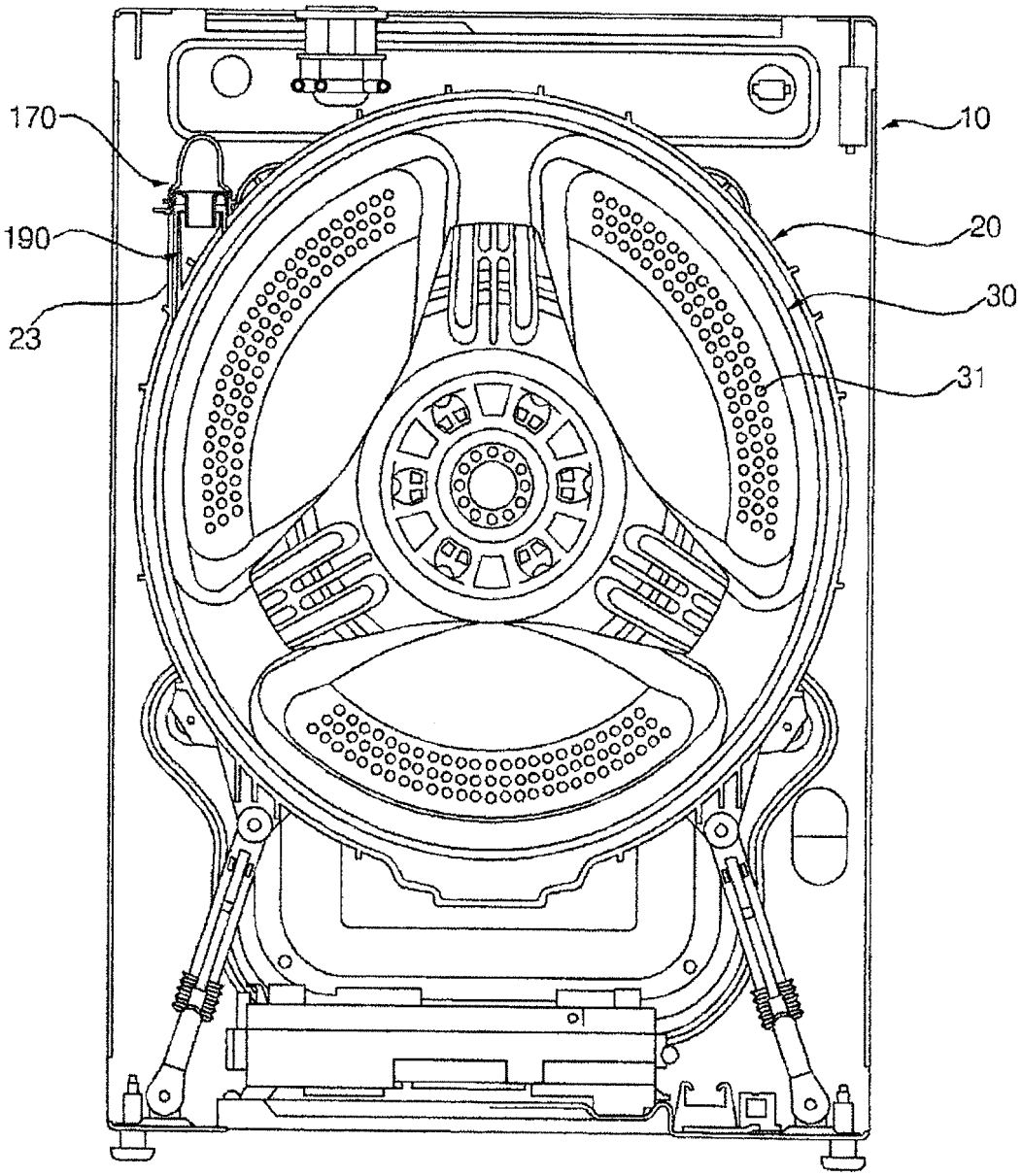

Fig. 3

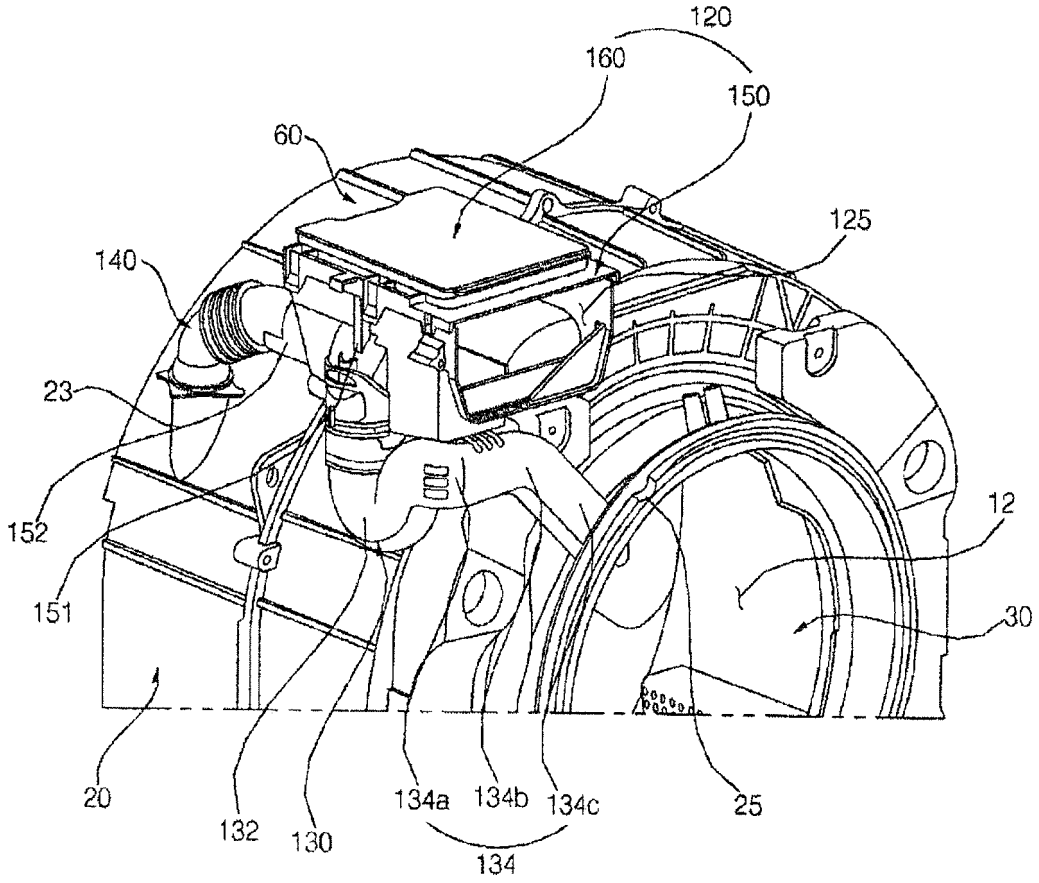
120
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Fig. 4

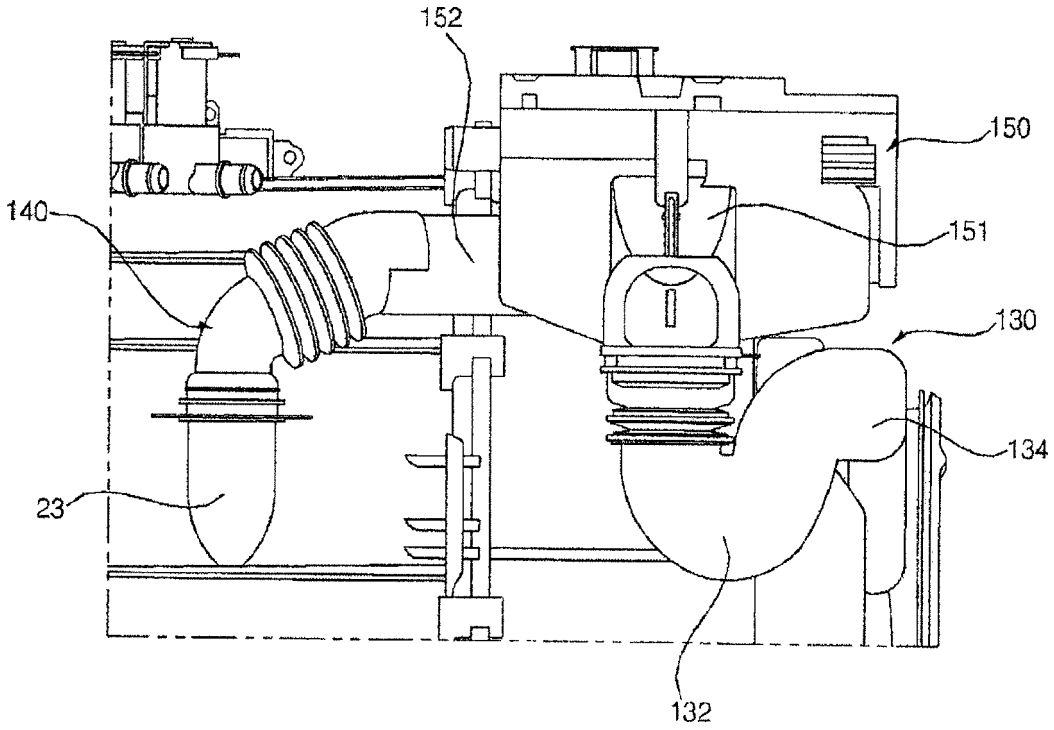


Fig. 5

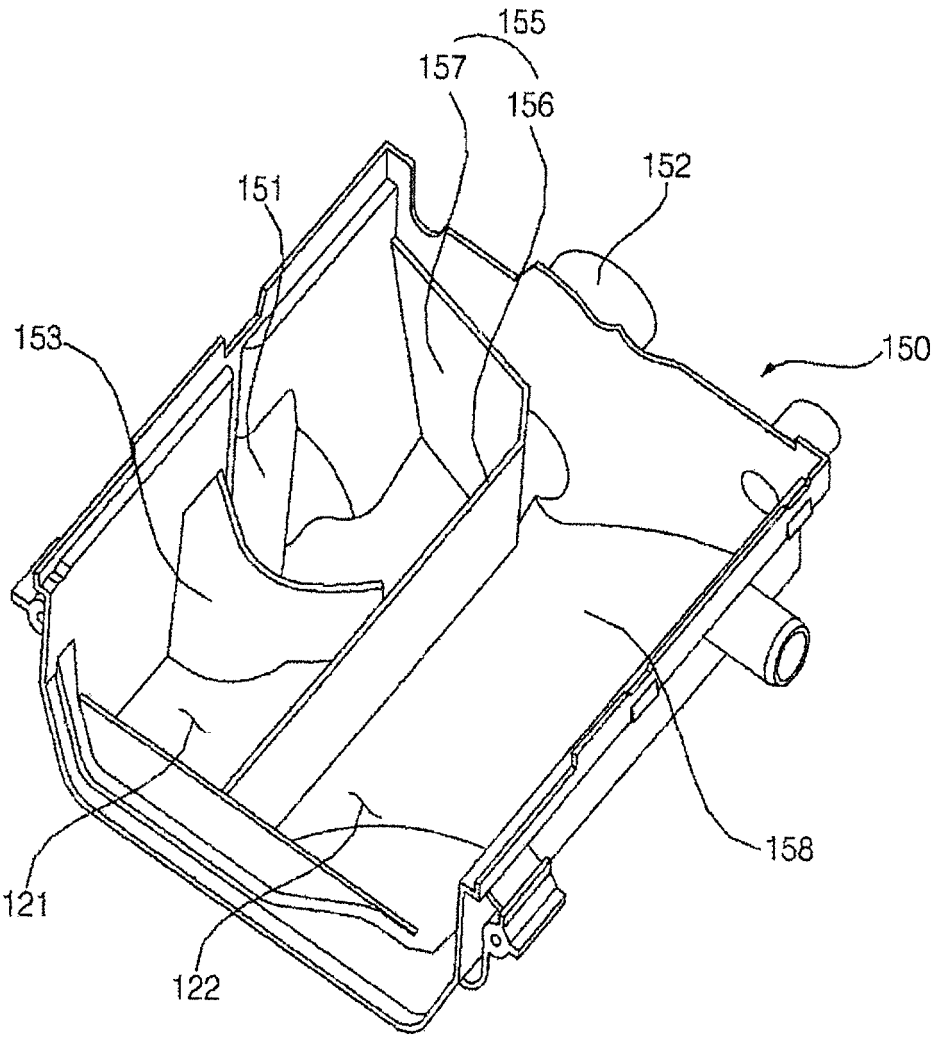


Fig. 6

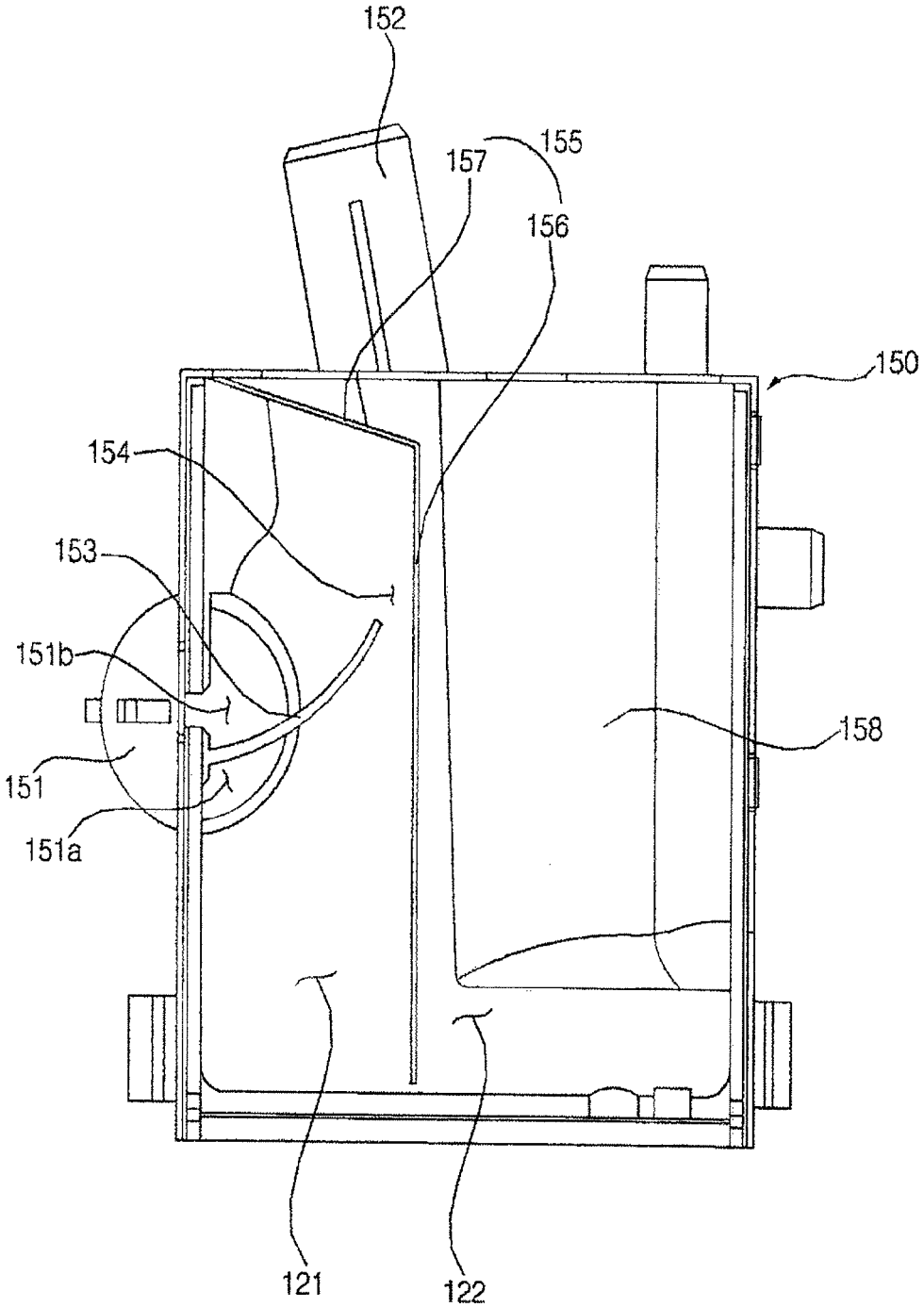


Fig. 7

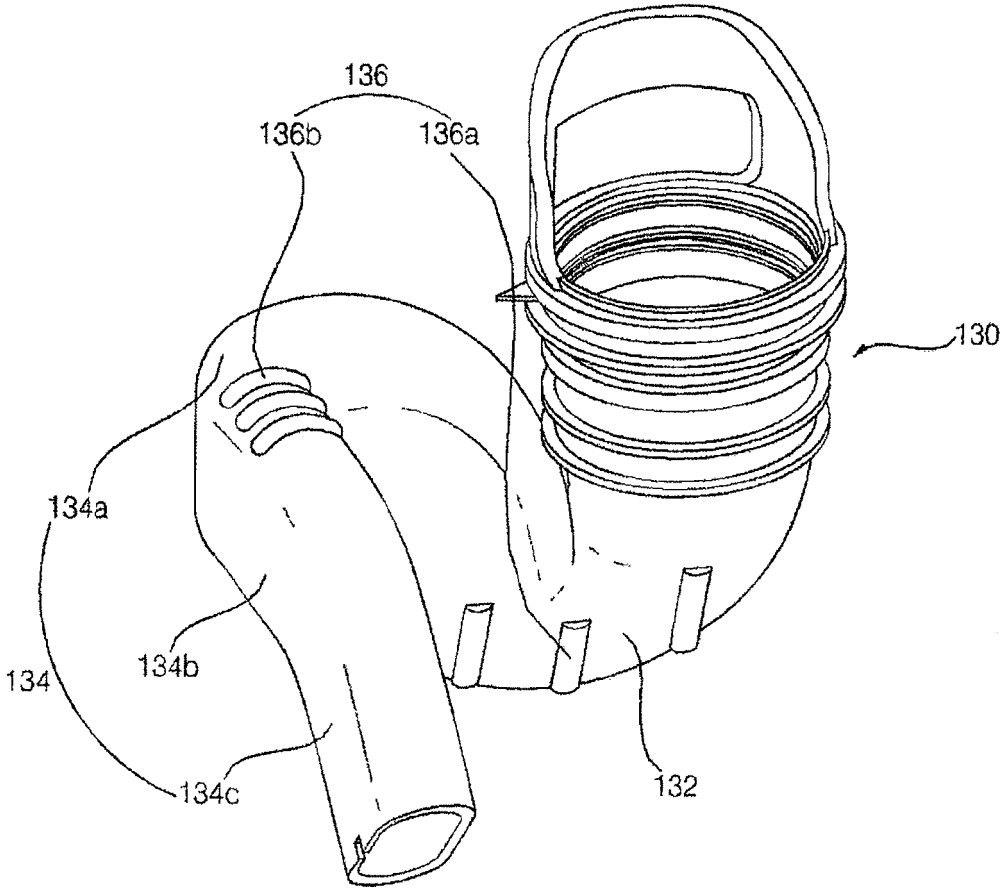
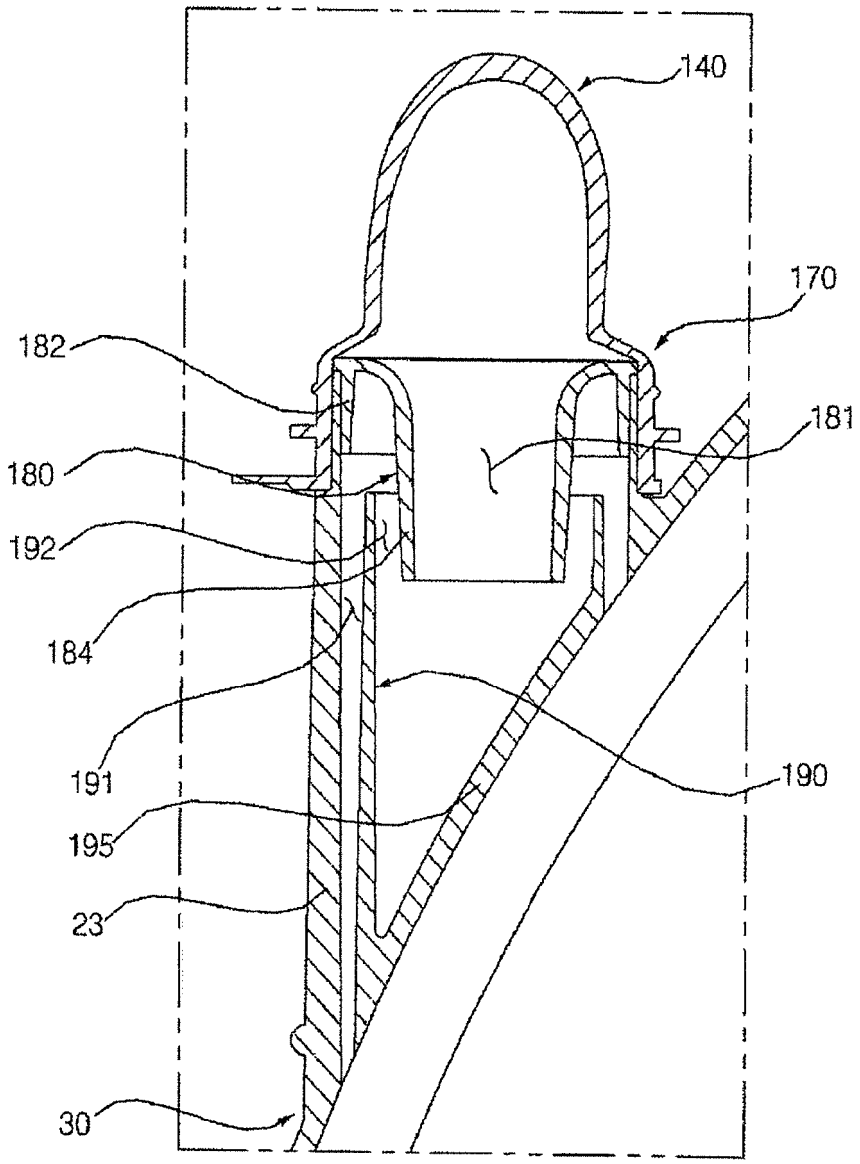


Fig. 8



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2016/010952

A. CLASSIFICATION OF SUBJECT MATTER

D06F 39/08(2006.01)i, D06F 39/02(2006.01)i, D06F 37/04(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)
D06F 39/08; D06F 39/12; D06F 25/00; D06F 31/00; D06F 39/02; D06F 37/04

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: washing machine, cabinet, tub, water supply unit, detergent box, first water supplying pipe, second water supplying pipe, backdraft prevention

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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Y		4,6,12-20
A		7-10
Y	CN 102733155 A (PANASONIC HOME APPLIANCES R&D CENTER (HANGZHOU) CO., LTD. et al.) 17 October 2012 See paragraphs [0026]-[0029] and figures 1-6.	4,6
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A	KR 10-1403957 B1 (SAMSUNG ELECTRONICS CO., LTD.) 09 June 2014 See paragraphs [0032]-[0034] and figures 3-4.	1-20
A	KR 10-2008-0100168 A (SANYO ELECTRIC CO., LTD.) 14 November 2008 See paragraphs [0129]-[0142] and figures 4-7.	1-20

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

* Special categories of cited documents:
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"P" document published prior to the international filing date but later than the priority date claimed
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Date of the actual completion of the international search	Date of mailing of the international search report
24 JANUARY 2017 (24.01.2017)	**25 JANUARY 2017 (25.01.2017)**

Name and mailing address of the ISA/KR	Authorized officer
Korean Intellectual Property Office Government Complex-Daejeon, 189 Seonsa-ro, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Telephone No.

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Information on patent family members

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