The present invention provides an apparatus for supplying a detergent in a washer, in which a liquid detergent box supplying a liquid detergent mixed with water is provided to a powdered detergent container of a detergent box, by which the liquid detergent is conveniently supplied, and by which the decolorization or discoloration of a laundry can be prevented. The present invention includes a detergent box having a powdered detergent container to mix a powdered detergent and water to supply and a liquid detergent box detachably provided to the powdered detergent container to mix a liquid detergent and water to supply.
APPARATUS FOR SUPPLYING DETERGENT IN WASHER

[0001] This application claims the benefit of Korean Application(s) No. P2004-025965 filed on Apr. 04, 2004, which is/are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to an apparatus for supplying a detergent in a washer, by which a liquid detergent can be supplied together with water.

[0004] 2. Discussion of the Related Art

[0005] Generally, a washer is an apparatus for cleaning a laundry (clothes, linen, etc.) received in a drum through washing, rinsing, dewatering, and the like in a manner of removing filth from the laundry using a reaction between water and detergent.

[0006] A separate detergent supply device having a detergent container and a water supply passage is provided to the washer to mix a detergent with water prior to or on performing a washing cycle.

[0007] Recently, a liquid detergent tends to be widely used to prevent a water supply channel of a detergent box from being blocked by a powdered detergent or to enhance washing power.

[0008] However, the detergent supply device of the related art washer is provided with a powdered detergent container for containing a powdered detergent therein and a water supply passage but fails to be provided with a separate container for containing the liquid detergent.

[0009] Since the liquid detergent is directly supplied to the laundry in case of supplying the liquid detergent, the laundry is decolorized or discolored due to the direct contact with the liquid detergent.

SUMMARY OF THE INVENTION

[0010] Accordingly, the present invention is directed to an apparatus for supplying a detergent in a washer that substantially obviates one or more of the problems due to limitations and disadvantages of the related art.

[0011] An object of the present invention, which has been devised to solve the foregoing problem, lies in providing an apparatus for supplying a detergent in a washer, by which the decolorization or discoloration of a laundry can be prevented by supplying a liquid detergent together with water.

[0012] It is another object of the present invention to provide an apparatus for supplying a detergent in a washer, by which a liquid detergent and a powdered detergent can be simply supplied for users’ convenience.

[0013] Additional features and advantages of the invention will be set forth in the description which follows, and in part will be apparent to those having ordinary skill in the art upon examination of the following or may be learned from a practice of the invention. The objectives and other advantages of the invention will be realized and attained by the subject matter particularly pointed out in the specification and claims hereof as well as in the appended drawings.

[0014] To achieve these objects and other advantages in accordance with the present invention, as embodied and broadly described herein, there is provided an apparatus for supplying a detergent in a washer, including a detergent box having a powdered detergent container to mix a powdered detergent and water to supply and a liquid detergent box detachably provided to the powdered detergent container to mix a liquid detergent and water to supply.

[0015] Preferably, the powdered detergent container of the detergent box is partitioned into a main detergent container and a preliminary detergent container.

[0016] More preferably, the liquid detergent box comprises a first liquid detergent box detachably provided to the main detergent container and a second liquid detergent box detachably provided to the preliminary detergent container.

[0017] Preferably, a liquid detergent siphon tube is projected within the liquid detergent box and wherein a liquid detergent siphon cover connected to the liquid detergent siphon tube is provided over the liquid detergent box.

[0018] More preferably, the liquid detergent siphon cover comprises an external liquid detergent siphon tube confronting to the liquid detergent siphon tube, a display part displaying an input quantity of the liquid detergent, and a straight part restricting a rotation of the liquid detergent siphon cover.

[0019] More preferably, an upper end of the liquid detergent box is set lower than an upper end of the powdered detergent container.

[0020] More preferably, a bottom of the liquid detergent box is inclined downward at a predetermined angle toward the liquid detergent siphon tube.

[0021] More preferably, the liquid detergent box further comprises a bottom projection separating a bottom of the powdered detergent container and a bottom of the liquid detergent box.

[0022] More preferably, a tip of the bottom projection confronting the bottom of the powdered detergent container is tilted at a predetermined angle.

[0023] More preferably, the liquid detergent box further comprises a lateral side projection separating a sidewall of the powdered detergent container and a lateral side of the liquid detergent box.

[0024] Preferably, the apparatus further includes a bleach container in rear of the powdered detergent container to leave a gap from a bottom of the powdered detergent container and the bleach container supplies a bleach.

[0025] More preferably, a bleach siphon tube is provided within the bleach container, a first hook is provided to an outside of the bleach container, and a bleach siphon cover having an external bleach siphon tube confronting the bleach siphon tube and a first hook hole confronting the first hook is provided over the bleach container.

[0026] More preferably, a first supply hole allowing the bleach and/or water to pass through is provided to the bleach siphon cover.

[0027] More preferably, the apparatus further includes a softening agent container in rear of the powdered detergent container to leave a predetermined gap from a bottom of the
powdered detergent container and the softening agent container supplies a softening agent.

More preferably, a softening agent siphon tube is provided within the softening agent container, a second hook is provided to an outside of the softening agent container, and a softening agent siphon cover having an external softening agent siphon tube confronting the softening agent siphon tube and a second hook hole confronting the second hook is provided over the softening agent container.

More preferably, a second supply hole allowing the softening agent and/or water to pass through is provided to the softening agent siphon cover.

It is to be understood that both the foregoing explanation and the following detailed description of the present invention are exemplary and illustrative and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain the principle of the invention. In the drawings:

FIG. 1 is a perspective diagram of a detergent supply apparatus of a washer according to one embodiment of the present invention;

FIG. 2 is a schematic cross-sectional diagram of a detergent supply apparatus of a washer according to one embodiment of the present invention;

FIG. 3 is a projected perspective diagram of a detergent supply apparatus of a washer according to one embodiment of the present invention;

FIG. 4 is a layout of a detergent supply apparatus of a washer according to one embodiment of the present invention;

FIG. 5 is a cross-sectional diagram along a cutting line A-A in FIG. 4; and

FIG. 6 is a cross-sectional diagram along a cutting line B-B in FIG. 4.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

Reference will now be made in detail to the preferred embodiment(s) of the present invention, examples of which are illustrated in the accompanying drawings. Throughout the drawings, like elements are indicated using the same or similar reference designations where possible.

FIG. 1 is a perspective diagram of a detergent supply apparatus of a washer according to one embodiment of the present invention and FIG. 2 is a schematic cross-sectional diagram of a detergent supply apparatus of a washer according to one embodiment of the present invention.

Referring to FIG. 1 and FIG. 2, a washer provided with a detergent supply apparatus according to one embodiment of the present invention includes a casing 2 and a tub 10 supported within the casing 2 via a shock absorber to hold clean water W or water mixed with a detergent therein.

A drum 20 is rotatably provided within the tub 10 to receive a laundry m therein. And, a drive motor for rotating the drum 20 is installed within the tub 10. Moreover, the washer includes a water supply device 40 supplying water to the tub 10, a drain device 45 draining the polluted water within the tub 10 or the water removed from the laundry m outside the washer, and a detergent supply apparatus 50 connected to the water supply device 40 to mix a detergent with the water supplied from the water supply device 40.

The casing 2 includes a base 3 provided with a damper 3a supporting the tub 10 and a cabinet 4 provided on the base 3 to be connected to a spring 4s supporting the tub 10 by which the tub 10 is suspended. An entrance hole 5a for the laundry m is provided to a center of a front portion of the cabinet 4. And, a cabinet cover 5 provided with a door 5b for opening/closing the entrance hole 5a and a top plate 6 covering a topside of the cabinet 4 are provided to the cabinet 4.

And, a control panel 7 for operating the washer is provided over the cabinet cover 5.

Moreover, a detergent box entrance hole 7a for putting in or pulling out a detergent box that will be explained later is formed at the control panel 7.

An opening 12 for putting/pulling the laundry m in/from the drum 20 is formed at a front portion of the tub 10, and a gasket 14 is installed in the vicinity of the opening 12. The gasket 12 adheres closely to a backside of the door 5b to prevent water leakage and escape of the laundry m.

A bottom of the drum 20 is placed to be submerged under the water W within the tub 10. And, an entrance hole 21 for the laundry m is formed at a front portion of the drum 20.

A multitude of perforated holes 22 are formed at a circumferential portion and/or a rear portion of the drum 20. And, at least one lifter 23 is provided to an inner circumference of the drum 20 to lift the laundry m.

The drive motor 30 is provided to a rear portion of the tub 10, and a rotational shaft 31 of the drive motor 30 penetrates the rear portion of the tub 10 to be connected to a rear portion of the drum 20.

The water supply device 40, as shown in FIG. 2, includes a plurality of water supply valves 42 connected to an external hose 41 to switch the water supplied via the external hose 41, a plurality of water supply hoses 43 leading the water passed through a plurality of the water supply valves 42 to the detergent supply apparatus 50, and a water supply bellows tube 44 leading the water passed through the detergent supply apparatus 50 to the tub 10.

A plurality of the water supply valves 42 include three cold water valves and one hot water valve. And, a plurality of the water supply hoses 43 include three cold water hoses and one hot water hose.

The water supply bellows tube 44 is configured to allow air in a detergent box housing 52 that will be explained later to move to the tub 10 and to allow steam flowing
backward from the tub 10 in drying or heating washing to be condensed by the water remaining in the water supply bellows tube 44.

[0052] The water supply bellows tube 44 includes a first bent part 44a having a ‘U’ shape and a second bent part 44b having a ‘C’ shape continuous with the first bent part 44a. Water remains within a lower part of a horizontal portion of the first bent part 44a, and an upper part of the horizontal portion of the first bent part 44a is located higher than a lower part of a horizontal portion of the second bent part 44b by a predetermined height h.

[0053] The drain device 45 includes a drain bellows tube 46 connected to a drain hole of the tub 10 to drain the water from the tub 10, a drain pump 47 pumping the water drained to the drain bellows tube 46, and a drain hose 48 leading the water pumped by the drain pump 47 outside the washer.

[0054] Meanwhile, the detergent supply apparatus 50, as shown in FIG. 1 and FIG. 2, is provided in rear of the control panel 7 and front and top portions of the detergent supply apparatus 50 are open. And, the detergent supply apparatus 50 includes a detergent box housing 52, connected to the water supply bellows tube 44 and a detergent box 54 detachably provided within the detergent box housing 52.

[0055] A dispenser cover 70 is provided over the detergent box housing 52 and is connected to the water supply hose 43 to supply water to the detergent box 54. And, a liquid detergent box 60 is detachably provided to the detergent box 54 to mix a liquid detergent with the water supplied to the detergent box 54.

[0056] FIG. 3 is a projected perspective diagram of a detergent supply apparatus of a washer according to one embodiment of the present invention, FIG. 4 is a layout of a detergent supply apparatus of a washer according to one embodiment of the present invention, FIG. 5 is a cross-sectional diagram along a cutting line A-A in FIG. 4, and FIG. 6 is a cross-sectional diagram along a cutting line B-B in FIG. 4.

[0057] An outlet 53 is provided to the detergent box housing 52 to discharge the water and detergent falling from the detergent box 54 to the water supply bellows tube 44.

[0058] A grip hole 54b is provided to a front portion 54a of the detergent box 54, and top and rear portions of the detergent box 54 are open.

[0059] The detergent box 54 has ventilation holes 54c in rear of the grip hole 54b to introduce external air into the detergent box housing 52.

[0060] The detergent box 54 includes a powdered detergent container 56 to supply a powdered detergent mixed with water.

[0061] The detergent box 54 includes a partition wall 54f formed long in a front-to-rear direction to partition the powdered detergent container 56 into a main detergent container 58 and a preliminary detergent container 62. And, the partition wall 54f is separated from both sidewalls 54d and 54e of the detergent box 54.

[0062] A bleach container 59 having a projected bleach siphon tube 59a is built in one body of the main detergent container 58 of the detergent box 54. And, a bleach siphon cover 60 is provided over the bleach container 59 to form a drain channel with the bleach siphon tube 59a.

[0063] The bleach container 59, as shown in FIG. 3 and FIG. 5, is provided on an upper rear portion of the main detergent container 58. A top portion of the bleach container 59 is open and a bottom of the bleach container 59 is separated from a bottom of the main detergent container 58.

[0064] The bleach siphon cover 60 is formed to cover the top portion of the bleach container 59. A first hook hole 60a is provided to the bleach siphon cover 60 to be hooked on a hook 59b provided to the bleach container 59. And, a first supply hole 60b is provided to one side of the bleach siphon cover 60 to allow a bleach or water to flow therein.

[0065] An external bleach siphon tube 60c is provided to a bottom of the bleach siphon cover 60 to be separated from the bleach siphon tube 59a. Hence, the detergent and water can flow between the external bleach siphon tube 60c and the bleach siphon tube 59a.

[0066] A hanging protrusion 60d is provided to the bleach siphon cover 60 to be caught on the control panel 7 or the dispenser cover 70 in case of pulling the detergent box 54 forward. And, an elastic part 60e is provided to the bleach siphon cover 60. The elastic part 60 prevents the hanging protrusion 60d from being caught on the control panel 7 or the dispenser cover 70.

[0067] Meanwhile, a first rib 61 is provided to the main detergent container 58 of the detergent box 54 to prevent the detergent from blocking a lower portion of the bleach container 59. The first rib 61 leaves a predetermined gap from a front portion of the bleach container 59 and also leaves a predetermined gap from a bottom of the main detergent container 58.

[0068] A softening agent container 63 is built in one body of the preliminary detergent container 62 of the detergent box 54 to have a softening agent siphon tube 63a projected from the preliminary detergent container 62. And, a softening agent siphon cover 64 is provided over the softening agent container 63 to form a drain channel together with the softening agent siphon tube 63a.

[0069] The softening agent container 63, as shown in FIG. 3 and FIG. 6, is provided to an upper part of a rear portion of the preliminary detergent container 62. A bottom of the softening agent container 63 is separated from a bottom of the preliminary detergent container 62, and a top portion of the softening agent container 63 is open.

[0070] The softening agent siphon cover 64 has a size enough to cover a top portion of the softening agent container 63, and includes a second hook hole 64a hooked on a hook 63b provided to the softening agent container 63 and a second supply hole 64b provided to one side to supply a softening agent or water.

[0071] An external softening agent siphon tube 64c is provided to a bottom of the softening agent siphon cover 64 to be separated from the softening agent siphon tube 63a. And, the softening agent and water can flow between the external softening agent siphon tube 64c and the softening agent siphon tube 63a.

[0072] Meanwhile, a second rib 65 is provided to the preliminary detergent container 62 of the detergent box 54.
to prevent a lower side of the softening agent container 63 from being blocked by the detergent. And, the second rib 65 is configured to leave a predetermined gap from the softening agent container 63 and a predetermined gap from a bottom of the preliminary detergent container 62.

[0073] The dispenser cover 70, as shown in FIG. 3, includes a top panel 72 and a bottom panel 78 having a main detergent water supply channel 73 under the top panel 72, a preliminary detergent water supply channel 74, a bleach water supply channel 75, and a softening agent water supply channel 76.

[0074] A main detergent water supply rib 73a forming the main detergent water supply channel 73, a preliminary detergent water supply rib 74a forming the preliminary detergent water supply channel 74, a bleach water supply rib 75a forming the bleach water supply channel 75, and a softening agent water supply rib 76a forming the softening agent water supply channel 76 are provided to one side of either the top panel 72 or the bottom panel 78.

[0075] The bottom panel 78 includes a multitude of main detergent water supply holes 73b provided over a front portion of the main detergent container 58, a multitude of preliminary detergent water supply holes 74b provided over a front portion of the preliminary detergent container 62, a bleach water supply hole 75b provided over the bleach container 59, and a softening agent water supply hole 76b over the softening agent container 63.

[0076] Meanwhile, a bypass hole 73c is provided to the main detergent water supply rib 73a to bypass a portion of water passing through the main detergent water supply channel 73 to front side water supply holes among a multitude of the main detergent water supply holes 73b.

[0077] And, a bypass hole 74c is provided to the preliminary detergent water supply rib 74a to bypass a portion of water passing through the preliminary detergent water supply channel 74 to front side water supply holes among a multitude of the preliminary detergent water supply holes 74b.

[0078] Preferably, the top and bottom panels 72 and 78 are assembled to each other by thermal fusion.

[0079] A first hose connecting part 79a is provided to one side of either the top panel 72 or the bottom panel 78 to supply cold water to the bleach water supply channel 75. And, second, third, and fourth hose connecting parts 79b, 79c, and 79d are also provided to one side of either the top panel 72 or the bottom panel 78 to supply cold water to the main detergent water supply channel 73, the preliminary detergent water supply channel 74, and the softening agent water supply channel 76, respectively.

[0080] The liquid detergent box 80, as shown in FIGS. 3 to 6, preferably includes a first liquid detergent box 82 detachably provided to the main detergent container 58 and a second liquid detergent box 92 detachably provided to the preliminary detergent container 62.

[0081] Alternatively, the liquid detergent box 80 can include one liquid detergent box 82 detachably provided to the main detergent container 58. Alternatively, the liquid detergent box 80 can include one liquid detergent box 92 detachably provided to the preliminary detergent container 62.

[0082] The first liquid detergent box 82, as shown in FIG. 5, is inserted in a front portion of the main detergent container 58 to be loaded therein. Preferably, an upper end of the first liquid detergent box 82 is set lower than that of the main detergent container 58.

[0083] The second liquid detergent box 92, as shown in FIG. 6, is inserted in a front portion of the preliminary detergent container 62 to be loaded therein. Preferably, an upper end of the second liquid detergent box 92 is set lower than that of the preliminary detergent container 62.

[0084] A plurality of bottom projections 83 or 93, as shown in FIG. 5 or FIG. 6, are provided to a bottom of the liquid detergent box 82 or 92 to leave a predetermined gap between the bottom of the liquid detergent box 82 or 92 and the bottom of the powdered detergent container 56.

[0085] A horizontal width of the liquid detergent box 82 or 92, as shown in FIG. 3 or FIG. 4, is formed smaller than a width between the sidewalls 54f and 54e or a width between the sidewalls 54d and 54e. Hence, a gap t lies between a side portion of the liquid detergent box 82 or 92 and the sidewalls 54d, 54e, or 54f.

[0086] And, a plurality of side projections 84 or 94 are provided to the liquid detergent box 82 or 92 to separate the side portion of the liquid detergent box 82 or 92 from the sidewall 54d, 54e, or 54f of the powder detergent container 56.

[0087] Meanwhile, a liquid detergent siphon tube 85 or 95 is projected from one side of the liquid detergent box 82 or 92, and a liquid detergent siphon cover 86 or 96 is provided to the liquid detergent box 82 or 92 to form a drain channel together with the liquid detergent siphon tube 85 or 95.

[0088] A tilted portion 87 or 97 inclined downward toward the liquid detergent siphon tube 85 or 95 is provided to a bottom of the liquid detergent box 82 or 92.

[0089] A straight portion 86a or 96a is provided to a wall of the liquid detergent box 82 or 92 to restrict a rotational motion of the liquid detergent siphon cover 86 or 96. And, a portion of the liquid detergent siphon cover 86 or 96 is bent to form a display part 86b or 96b displaying an upper limit input quantity of the liquid detergent.

[0090] And, the liquid detergent siphon cover 86 or 96 includes an external liquid detergent siphon tube 86c or 96c separated from the liquid detergent siphon tube 85 or 95. Hence, the liquid detergent and water can flow between the external liquid detergent siphon tube 86c or 96c and the liquid detergent siphon tube 85 or 95.

[0091] An operation of the above-configured present invention is explained with reference to FIGS. 1 to 6 as follows.

[0092] First of all, in case of intending to perform main washing with a liquid detergent after completion of performing preliminary washing using the liquid detergent, the first and second liquid detergent boxes 82 and 92 are loaded in the main and preliminary detergent containers 58 and 62, respectively. And, the liquid detergent is put in each of the main and preliminary detergent containers 58 and 62.

[0093] After a laundry m is inputted to the drum 20, the door 5b is closed and the washer is actuated via the control panel 7. The washer then checks whether a washing cycle is
selected. If the washing cycle is selected, the water supply for washing the laundry is initiated.

[0094] At least one of a plurality of the water supply valves 42 supplies water supplied via the external hose 41 to the preliminary detergent water supply channel 74 within the dispenser cover 70. The supplied water falls toward the front portion of the preliminary detergent container 62 via a multitude of the preliminary detergent side water supply holes 74b.

[0095] In doing so, the water valve 42 actuated to supply the water to the preliminary detergent water supply channel 74 allows the water to be intermittently passed through in order to prevent the flood of the liquid detergent or water which may occur in supplying the water to the second liquid detergent box 92 excessively.

[0096] Namely, the water supply valve 42 actuated to supply the water to the preliminary detergent water supply channel 74 is firstly turned on during a first setup time and is then turned off during a second setup time. Specifically, the water supply valve is repeatedly turned on and off with a predetermined timing interval.

[0097] Preferably, each of the first and second setup times is set up according to a volume of the second liquid detergent box 82.

[0098] Meanwhile, the water falling toward the front portion of the preliminary detergent container 62 is held within the second liquid detergent box 92 and is then mixed with the liquid detergent previously put therein.

[0099] The mixed liquid detergent and water, as shown in FIG. 6, ascends via the gap between the liquid detergent siphon tube 95 of the second liquid detergent box 92 and the external liquid detergent siphon tube 96c of the liquid detergent siphon cover 96 and then descends via the liquid detergent siphon tube 95 of the second liquid detergent box 92 to fall down to the bottom of the preliminary detergent container 62.

[0100] The liquid detergent and water having fallen to the bottom of the preliminary detergent container 62 moves to the rear portion of the preliminary detergent container 62 to flow in the detergent box housing 52.

[0101] Subsequently, the liquid detergent and water passes through the outlet 53 of the detergent box housing 52 and the bellows tube 44 in turn to be supplied to the tub 10. And, the supplied liquid detergent and water is used for preliminary washing.

[0102] Once main washing is carried out after completion of the preliminary washing, at least another one of the water supply valves 42 supplies water supplied via the external hose 41 to the main detergent water supply channel 73 within the dispenser cover 70. The supplied water falls toward the front portion of the main detergent container 58 via a multitude of the main detergent water supply holes 73b.

[0103] In doing so, the water supply valve 42 actuated to supply the water to the main detergent water supply channel 73 allows the water to be intermittently passed through in order to prevent the flood of the liquid detergent or water.

[0104] Namely, the water supply valve 42 actuated to supply the water to the main detergent water supply channel 73 is firstly turned on during a third setup time and is then turned off during a fourth setup time. Preferably, each of the third and fourth setup times is set up according to a volume of the first liquid detergent box 82.

[0105] Meanwhile, the water falling toward the front portion of the main detergent container 58 is held within the first liquid detergent box 82 and is then mixed with the liquid detergent previously put therein.

[0106] The mixed liquid detergent and water, as shown in FIG. 5, ascends via the gap between the liquid detergent siphon tube 85 of the first liquid detergent box 82 and the external liquid detergent siphon tube 86c of the liquid detergent siphon cover 86 and then descends via the liquid detergent siphon tube 85 of the first liquid detergent box 82 to fall down to the bottom of the main detergent container 58.

[0107] The liquid detergent and water having fallen to the bottom of the main detergent container 58 moves to the rear portion of the main detergent container 58 to flow in the detergent box housing 52 and is then supplied to the tub 10 to be used for main washing of the laundry.

[0108] After completion of the main washing, the washer drains the polluted washing water outside the washer and then carries out a following cycle according to a selection of a rinsing or dewatering cycle.

[0109] Namely, if the rinsing cycle is selected, the washer turns on the valve 42 for supplying new water to the main detergent container 58. The newly supplied water is passed through the dispenser cover 70 like the washing cycle to fall in the first or second liquid detergent box 82 or 92.

[0110] The water then moves to the rear portion of the main or preliminary detergent container 58 or 62 to flow in the detergent box housing 52.

[0111] The water flowing in the detergent box housing 52 is supplied to the tub 10 like the washing cycle.

[0112] After the main washing has been performed, the polluted water is discharge outside the washer. And, the new water supply, rinsing, and draining are repeated by setup times.

[0113] Subsequently, if the dewatering cycle is selected, the washer actuates the drive motor 30 to rotate the drum 20 at a high rotational speed.

[0114] Meanwhile, in case of intending to perform washing with a bleach, the bleach is put in the bleach container 59. Once the washer is actuated, water supplied via the external hose to the bleach water supply channel 75 within the dispenser cover 70 falls toward the rear portion of the main detergent container 58 via a multitude of the bleach side water supply holes 75b.

[0115] In doing so, the water valve 42 actuated to supply the water to the bleach water supply channel 75 allows the water to be intermittently passed through in order to prevent the flood of the bleach or water like the preliminary or main washing.

[0116] Namely, the water supply valve 42 actuated to supply the water to the bleach water supply channel 75 is firstly turned on during a fifth setup time and is then turned off during a sixth setup time. And, such an on/off operation is repeated.
Preferably, each of the fifth and sixth setup times is set up according to a volume of the bleach container 59.

Meanwhile, the water falling toward the rear portion of the main detergent container 58 flows in the bleach container 59 and is then mixed with the bleach previously put therein.

The mixed bleach and water ascends via the gap between the bleach siphon tube 59a of the bleach container 59 and the external bleach siphon tube 60a of the bleach siphon cover 60 and then descends via the bleach siphon tube 59a of the bleach container 59 to fall down to the bottom of the main detergent container 58. And, the bleach and water having fallen to the bottom of the main detergent container 58 is supplied to the tub 10 like the preliminary or main washing.

Meanwhile, in case of intending to perform rinsing using a softening agent, the softening agent is firstly put in the softening agent container 63 and the washer is actuated. The water supplied via the external hose 41 is supplied to the softening agent water supply channel 76 within the dispenser cover 70 and then falls toward the rear portion of the preliminary detergent container 68 via a multitude of the softening agent water supply holes 76b. In doing so, the water valve 42 actuated to supply the water to the softening agent water supply channel 76 allows the water to be intermittently passed through in order to prevent the flood of the softening agent or water.

Namely, the water supply valve 42 actuated to supply the water to the softening agent water supply channel 76 is firstly turned on during a seventh setup time and is then turned off during an eighth setup time. And, such an on/off operation is repeated.

Preferably, each of the seventh and eighth setup times is set up according to a volume of the softening agent container 63.

Meanwhile, the water falling toward the rear portion of the preliminary detergent container 62 flows in the softening agent container 63 and is then mixed with the softening agent previously put therein.

The mixed softening agent and water ascends via the gap between the softening agent siphon tube 63a of the softening agent container 63 and the external softening agent siphon tube 64a of the softening agent siphon cover 64 and then descends via the soft agent siphon tube 63a of the softening agent container 63 to fall down to the bottom of the preliminary detergent container 62. The softening agent and water having fallen to the bottom of the preliminary detergent container 62 is then supplied to the tub 10 like the preliminary or main washing.

Besides, the present is not limited to the above-described embodiment but is applicable to a case that the liquid detergent box is loaded in either the main detergent container 58 or the preliminary detergent container 62.

Accordingly, the present invention provides the following effects and/or advantages.

First of all, in the detergent supply apparatus of the washer according to the present invention, the liquid detergent box is provided to the powdered detergent container of the detergent box to mix the liquid detergent with water to supply, whereby the liquid detergent can be conveniently supplied and whereby the decolorization or discoloration of a laundry can be prevented.

Secondly, the liquid detergent box is detachable from the powdered detergent container of the detergent box, whereby the liquid detergent and/or the powdered detergent can be simply selected for user’s convenience.

Thirdly, the powdered detergent container is partitioned into the main detergent container and the preliminary detergent container and the liquid detergent box includes the first liquid detergent box detachable from the main detergent container and the second liquid detergent box detachable from the preliminary detergent container, whereby the powdered liquid detergent is co-usable.

Fourthly, the bottom of the liquid detergent box is separated from the bottom of the powdered detergent container, whereby the flow of the liquid detergent and water is facilitated.

Fifthly, the sidewall of the liquid detergent box is separated from that of the powdered detergent container and the upper end of the liquid detergent box is formed lower than that of the powdered detergent container, whereby the flood of the liquid detergent and water is prevented to maintain a clean environment thereof.

Sixthly, the liquid detergent siphon tube is projected from one side of the liquid detergent box and the liquid detergent siphon cover is provided to configure the drain channel together with the liquid detergent siphon tube, whereby the mixing and supply of the liquid detergent and water are facilitated.

Seventhly, the tilted portion inclined downward toward the liquid detergent siphon tube is provided to the bottom of the liquid detergent box, whereby an amount of the remaining liquid detergent is minimized.

Finally, the portion of the liquid detergent siphon cover is bent to form the display part displaying the upper limit of an input quantity of the liquid detergent, whereby the overuse and flood of the liquid detergent can be prevented.

It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover such modifications and variations, provided they come within the scope of the appended claims and their equivalents.

What is claimed is:
1. An apparatus for supplying a detergent in a washer, comprising:
   a detergent box having a powdered detergent container to mix a powdered detergent and water to supply; and
   a liquid detergent box detachably provided to the powdered detergent container of the detergent box to mix a liquid detergent and water to supply.
2. The apparatus of claim 1, wherein the powdered detergent container of the detergent box is partitioned into a main detergent container and a preliminary detergent container.
3. The apparatus of claim 2, wherein the liquid detergent box comprises a first liquid detergent box detachably pro-
vided to the main detergent container and a second liquid detergent box detachably provided to the preliminary detergent container.

4. The apparatus of claim 1, wherein a liquid detergent siphon tube is projected within the liquid detergent box and wherein a liquid detergent siphon cover connected to the liquid detergent siphon tube is provided over the liquid detergent box.

5. The apparatus of claim 4, wherein the liquid detergent siphon cover comprises an external liquid detergent siphon tube confronting to the liquid detergent siphon tube, a display part displaying an input quantity of the liquid detergent, and a straight part restricting a rotation of the liquid detergent siphon cover.

6. The apparatus of claim 4, wherein an upper end of the liquid detergent box is set lower than an upper end of the powdered detergent container.

7. The apparatus of claim 6, wherein a bottom of the liquid detergent box is inclined downward at a predeter-
mained angle toward the liquid detergent siphon tube.

8. The apparatus of claim 4, wherein the liquid detergent box further comprises a bottom projection separating a bottom of the powdered detergent container and a bottom of the liquid detergent box.

9. The apparatus of claim 8, wherein a tip of the bottom projection confronting the bottom of the powdered detergent container is tilted at a predetermined angle.

10. The apparatus of claim 8, wherein the liquid detergent box further comprises a lateral side projection separating a sidewall of the powdered detergent container and a lateral side of the liquid detergent box.

11. The apparatus of claim 1, further comprising a bleach container in rear of the powdered detergent container to leave a gap from a bottom of the powdered detergent container, the bleach container supplying a bleach.

12. The apparatus of claim 11, wherein a bleach siphon tube is provided within the bleach container, a first hook is provided to an outside of the bleach container, and a bleach siphon cover having an external bleach siphon tube confronting the bleach siphon tube and a first hook hole confronting the first hook is provided over the bleach container.

13. The apparatus of claim 12, wherein a first supply hole allowing the bleach and/or water to pass through is provided to the bleach siphon cover.

14. The apparatus of claim 11, further comprising a softening agent container in rear of the powdered detergent container to leave a predetermined gap from a bottom of the powdered detergent container, the softening agent container supplying a softening agent.

15. The apparatus of claim 14, wherein a softening agent siphon tube is provided within the softening agent container, a second hook is provided to an outside of the softening agent container, and a softening agent siphon cover having an external softening agent siphon tube confronting the softening agent siphon tube and a second hook hole confronting the second hook is provided over the softening agent container.

16. The apparatus of claim 15, wherein a second supply hole allowing the softening agent and/or water to pass through is provided to the softening agent siphon cover.

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