A method for water supply in a laundry device is disclosed. An object of the present invention is to provide a method for water supply in a laundry device which prevents detergent from remaining/being stuck in/to a dispenser body by discharging detergent/wash water more smoothly. A method for water supply in a laundry device includes (a) step for supplying water; (b) step for temporarily stopping water supply for a predetermined time in the middle of the water supply; and (c) step for re-starting water supply after the predetermined time and finishing water supply to a predetermined water level.
FIG. 2

120 wash water + detergent

130 water level

150 water level frequency
FIG. 4

start

check whether signal for performing washing is inputted S110

signal inputted?

no

yes

control water supply valve/supply wash water S120

determine laundry amount, predetermined frequency(F1) S130

sense present water level frequency(F2) S210

checks whether F2 reaches frequency F3 prior to discretionally predetermined value with respect to F1 S220

no

F2 ≥ F3?

yes

control water supply valve to stop water supply temporarily S230

no

predetermined time pass?

yes

control water supply valve to re-start water supply S300

no

F2 ≥ F1?

yes

finish water supply

end
METHOD FOR WATER SUPPLY IN LAUNDRY DEVICE

[0001] This application claims the benefit of the Patent Korean Application No. 10-2005-0091804, filed on Sep. 30, 2005, which are hereby incorporated by reference as if fully set forth herein.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to a laundry device, more particularly, to a detergent box assembly having a new structure which can supply detergent smoothly.

[0004] 1. Discussion of the Related Art

[0005] In general, a laundry device is classified into a pulsator type washing machine having a drum vertically mounted therein and a drum type washing machine having a drum horizontally mounted therein.

[0006] Since the drum is horizontally mounted in the drum type washing machine as mentioned above, washing is performed by dropping the laundry loaded into the drum.

[0007] A detergent box assembly, one of compositions of the drum type washing machine, is employed for supplying various kinds of detergents used in washing together with wash water.

[0008] As shown in FIG. 1, a conventional detergent box assembly includes a dispenser body 10 in communication with a tub 2 by a bellows 12, a detergent box 20 drawably provided within the dispenser body 10 for holding various detergents therein and a wash water dispenser 30 for supplying wash water into the detergent box 20.

[0009] An outlet pipe 11 is outwardly projected from the dispenser body 10 and in communication with a rear lower portion of the dispenser body 10. The bellows 12 is connected to the outlet pipe 11.

[0010] When washing is performed in a state of detergent being supplied into the detergent box 20, wash water is supplied. The wash water is supplied into the space having detergent therein through the dispenser body 10.

[0011] Thus, the detergent is discharged into the dispenser body 10 together with the wash water, and then the detergent and wash water pass through the outlet pipe 11 and the bellows 12 to be supplied into the tub 2.

[0012] However, according to the conventional detergent box assembly, if wash water reaches a predetermined level and water supply is stopped, the detergent flowing from the detergent box 20 into the dispenser body 10 cannot be discharged through the outlet pipe 11 smoothly. In spite of the remaining detergent, the water level is lowered drastically. Therefore, there may be a problem that the detergent is remaining within the dispenser body 10 due to the decrease of water currents.

[0013] Also, while the detergent and wash water are discharged through the outlet pipe 11, too much wash water is discharged and some of the wash water forms vortex. Thereby, since the wash water which has formed vortex goes around an end of the outlet pipe 11, some of the wash water and detergent which flows along the vortex are not discharged. Thus, there may be another problem that the detergent remains within the dispenser body 10.

[0014] At that time, since the detergent which remains around the outlet pipe 11 of the dispenser body 10 contains some moisture, the detergent is getting caked, not in a powdery state, to be stuck on the portion adjacent to the outlet pipe 11.

[0015] Also, there may be still another problem in the conventional detergent box assembly. When wash water is supplied, the stuck detergent prevents the wash water from being discharged through the outlet pipe.

[0016] Especially, the stuck detergent is getting increased every washing. Still worse, the stuck detergent closes some portion of the outlet pipe 11 to cause backflow.

SUMMARY OF THE INVENTION

[0017] Accordingly, the present invention is directed to a method for water supply in a laundry device.

[0018] An object of the present invention is to provide a method for water supply in a laundry device which prevents detergent from remaining/being stuck in/to a dispenser body by discharging detergent/wash water more smoothly.

[0019] Additional advantages, objects, and features of the invention will be set forth in part in the description which follows and in part will become apparent to those having ordinary skill in the art upon examination of the following or may be learned from practice of the invention. The objectives and other advantages of the invention may be realized and attained by the structure particularly pointed out in the written description and claims hereof as well as the appended drawings.

[0020] To achieve these objects and other advantages and in accordance with the purpose of the invention, as embodied and broadly described herein, a method for water supply in a laundry device includes: (a) step for supplying water; (b) step for temporarily stopping water supply for a predetermined time in the middle of the water supply; and (c) step for re-starting water supply after the predetermined time and finishing water supply to a predetermined water level.

[0021] Here, (a) step includes steps of controlling a water supply valve based on a control signal for performing cycles to start water supply; sensing the laundry amount during the water supply and setting a water level corresponding to the sensed laundry amount; and defining the set water level as the predetermined water level of (c) step.

[0022] Also, (b) step is performed, if the present water level according to the water supply of (a) step reaches a water level frequency prior to a discretionary predetermined value with respect to the water level frequency corresponding to the predetermined water level, compared with the predetermined frequency corresponding to the predetermined water level of (c) step.

[0023] At that time, the discretionary predetermined value may be a frequency between 0.1–0.5 kHz.

[0024] Also, the predetermined time for temporarily stopping the water supply in (b) step may be between 1–5 sec.

[0025] Preferably, (b) step is performed at least one time after the water supply starts.
Also, preferably, (b) step is performed at least one time during the water supply, in case that the water supply of (a) step is for a main washing.

Furthermore, (b) step may be performed in the beginning of the water supply.

On/off of the water supply valve may be alternatively repeated in (b) step.

The on/off operation, which is one time of (b) step, may be repeatedly performed within 3 to 10 times.

The water supply of (c) step is finished, if the present water level according to the water re-supply reaches the predetermined water level frequency.

It is to be understood that both the foregoing general description and the following detailed description of the present invention are exemplary and explanatory 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 sectional view illustrating key parts of a conventional drum type washing machine according to the prior art;

FIG. 2 is a block view illustrating a laundry device according to an embodiment of the present invention;

FIG. 3 is a sectional view illustrating key parts of a detergent box assembly of the laundry device according to the embodiment of the present invention; and

FIG. 4 is a flow chart illustrating a method for water supply in the laundry device according to the embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

Referring to the drawings, a method for water supply in a laundry device according to the present invention will be described as follows.

First of all, referring to FIGS. 2 to 4, a preferred embodiment of the present invention will be described in detail.

A laundry device according to the embodiment of the present invention includes a water supply valve 110, a detergent box assembly 120, a tub 130, a water level sensor 140 and a controller 150, as shown in FIG. 2.

The water supply valve 110 selectively opens/closes a pipe way of a water supply pipe 4 connected to a water pipe 5.

The water supply valve 110 is controlled to be on/off by the controller 150.

As shown in FIG. 2, the detergent box assembly 120 includes a detergent box 121, a dispenser body 122 and a wash water dispenser 123. The detergent box 121 holds detergent therein and the detergent box 121 is provided within the detergent. The dispenser body 122 supplies wash water drawn through the water supply pipe 4 into the detergent box 121.

An outlet pipe 124 is projectedly formed in a downside of a rear surface of the dispenser body 122. An end of a bellows 125 is connected to the outlet pipe 124 and the other end of the bellows 125 is connected to the tub 130.

At that time, the wash water dispenser 123 is connected to the water supply pipe 4.

Next, the tub 130 stores wash water therein and a drum 131 for having the laundry therein is rotatably mounted within the tub to perform actual washing therein.

The water level sensor 140 senses a water level of the tub 130 and transmits water level frequencies variable based on a water level to the controller 150.

The controller 150 controls various operation parts of the laundry device such as various valves and a motor. Commonly, the controller 150 is a micro and a water level frequency value for the laundry amount is stored in look-up-the-table method.

A method for controlling water supply in the laundry device having the above configurations according to the embodiment of the present invention will be described, referring to FIG. 4.

The method for controlling water supply in the laundry device according to the embodiment of the present invention includes a water supply step (S100), a temporary stop step (S200) and a final water supply step (S300).

Each step will be described in detail.

First, the water supply step (S100) is performed by the controller 150 of the laundry, if a control signal for performing washing is inputted.

At that time, the control signal is created by a user's operation of various switches provided on a control panel (not shown) and the controller 150 receives the signal.

If the signal is inputted in the middle of checking whether a signal for performing cycles is inputted by the controller 150, the controller 150 controls the water supply valve 110 to perform water supply (S120).

Here, when the water supply valve 110 is on, the water supply is opened.

Wash water supplied through the water pipe 5 is flowing along the water supply pipe 4 and passes through the wash water dispenser 123, to be supplied into the detergent box 121. Hence, the wash water together with detergent stored in the detergent box 121 is flowing to the dispenser body 122, the outlet pipe 124 and the bellows 125 in order. Finally, the wash water is supplied into the tub 130.

While the above water supply steps are performed, the controller 150 operates the drum 131 to sensing the
laundry amount and sets a water level corresponding to the sensed laundry amount (S130).

0058 At that time, the set water level is diffused and defined as a water level frequency (hereinafter, a predetermined frequency) to be stored in the controller 150. The controller 150 determines when the water supply is finished based on the set water level.

0059 Next, the temporary stop step (S200) will be described in detail.

0060 In the temporary stop step (S200), water supply is temporarily stopped for a predetermined time before the water supply is finished.

0061 Here, the time when the water supply is finished is the time when the water level reaches the predetermined frequency F1 stored in the controller 150.

0062 The temporary stop step (S200) is performed if the water level frequency F2 sensed by the water level sensor reaches a frequency F3 prior to a discretionary predetermined value with respect to the predetermined frequency F1.10.

0063 That is, the controller 150 repeatedly receives the present water level frequency F2 sensed by the water level sensor 140 (S210) and repeatedly checks whether the frequency F2 reaches the frequency F3 (for example 19.5 kHz) prior to 0.5 kHz with respect to the predetermined frequency F1 (for example 20 kHz (S220)). Hence, if the present water level frequency F2 reaches the frequency F3, the controller 150 controls the water supply valve 110 to stop water supply temporarily (S230). At that time, the discretionary predetermined value is a frequency between 0.5–0.1 kHz.

0064 Alternatively, the discretionary predetermined value may be out of the range.

0065 However, if the discretionary predetermined value is more than a frequency of 0.5 kHz, the next step of the final water supply (S300) should be performed for a relatively long time. Thus, detergent may be remaining again. Also, if the discretionary predetermined value is less than a frequency of 0.1 kHz, the final water supply step (S300) may not be performed for a enough time to remove remaining detergent. Thereby, it is not preferred.

0066 Preferably, the time for stopping the water supply in the temporary stop step (S200) is between 1–5 sec.

0067 Alternatively, the time may also be out of the range. However, if the water supply is stopped during the time longer than the maximum of the above range, detergent may be stuck. Thus, even though the next step of final water supply is performed, the stuck detergent may not be removed smoothly. If the water supply is stopped during the time shorter than the minimum of the above range, that is, the final water supply is started before the range of the time, water currents are not changed enough. Thus, detergent and wash water are not discharged through the outlet pipe 124, and come around the outlet pipe 124. Thereby, the detergent may remain near the outlet pipe 124 after the final water supply step (S300) is completed, which is not preferred.

0068 As described above, when the series of water supply step are performed, most wash water temporarily remaining within the body dispenser is discharged through the outlet pipe 124. At that time, detergent which may not discharged together with the wash water may be remaining in a portion near the outlet pipe 124 within the dispenser body 122.

0069 However, the remaining detergent will be completely removed in the final water supply step (S300) which will be described later.

0070 Meanwhile, the temporary stop step (S200) may be performed one time and alternatively may be performed at least two times, as needed.

0071 Next, the final water supply step (S300) will be described in detail.

0072 In the final water supply step (S300), after the temporary stop step (S200) is completed, the water supply valve 110 is controlled to re-start water supply to the predetermined frequency (that is, the final water level). Thereby, detergent remaining in a portion near the outlet pipe 124 of the dispenser body 122 is completely removed.

0073 More specifically, the detergent, which is not discharged through the outlet pipe 124 of the dispenser body 122 in the water supply step (S100), is remaining in a portion of the bottom of the dispenser body 122 near the outlet pipe 124. But, before the detergent is stuck and getting hard, the re-water supply of the final water supply step (S300) is performed and the detergent may be completely discharged through the outlet pipe 124.

0074 At that time, the reason why the detergent is not completely discharged is that some of wash water forms vortex due to too much discharge of the wash water such that the wash water turns around an entrance of the outlet pipe 124. That is, some of detergent is around together with the wash water turning around the outlet pipe 124 and remains near the outlet pipe 124 during the temporary stop step (S200) after the water supply step (S100).

0075 Thus, thanks to the sequential performance of the water supply step (S100), the temporary stop step (S200) and the final water supply step (S300), the detergent is preventing from remaining within the dispenser body 122.

0076 The method for water supply in the laundry device according to the embodiment of the present invention may be alternated.

0077 For example, the time when detergent and wash water are mixedly supplied may be in a preliminary washing or a main washing.

0078 In the preliminary washing, the detergent may be perfectly prevented from remaining within the dispenser body 122 by the processes described above. When water supply is performed for a long time such as in the main washing, the detergent is flowing to a front portion within the dispenser body 122 due to the vortex generated in the portion near the outlet pipe 124 and stuck on the front portion.

0079 Thus, when water supply is performed for a long time such as in the main washing, it is preferred that the water supply valve 110 is controlled to be on/off at least one time.

0080 Also, preferably, the on/off control of the water supply valve 110 is performed in the beginning of the water
supply, because most of detergent is moving together with wash water into the dispenser body 122 in the beginning of the water supply.

[0081] At that time, the on/off control of the water supply valve 110 may be varied based on the time of entire water supply, and it is preferred that the on/off control of the water supply valve 110 is more than 3 times and less than 10 times.

[0082] If the on/off control of the water supply valve 110 is performed too often, the entire water supply is increased to cause user’s dissatisfaction, and if the on/off control of the water supply valve 110 is not performed for a long time, detergent may be flowing to a front portion within the dispenser body 122.

[0083] The method for water supply in the laundry device may be varied into various embodiments, as needed.

[0084] Described before, the method for water supply in the laundry device has following advantageous effects.

[0085] First, since water supply is temporarily stopped and re-started, the method for water supply in the laundry device of the present invention has an advantageous effect that detergent is prevented from remaining within the dispenser body.

[0086] Second, since the time before the water supply is completed is perceived through the water level frequency checked by the water level sensor, it is possible to determine the precise time for water supply, for temporarily stopping water supply and for final water supply.

[0087] Third, since the on/off control of the water supply is additionally performed in case the water supply is performed for a long time, the problem of remaining detergent can be solved perfectly.

[0088] 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 inventions. Thus, it is intended that the present invention covers the modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

What is claimed is:

1. A method for water supply in a laundry device comprising:
   (a) step for supplying water;
   (b) step for temporarily stopping water supply for a predetermined time in the middle of the water supply; and
   (c) step for re-starting water supply after the predetermined time and finishing water supply to a predetermined water level.

2. The method for water supply in a laundry device as claimed in claim 1, wherein the water level of (a) and (c) step is sensed by a water level sensor which outputs frequencies corresponding to a sensed water level.

3. The method for water supply in a laundry device as claimed in claim 1, wherein (a) step comprises steps of:
   controlling a water supply valve based on a control signal for performing cycles to start water supply;
   sensing the laundry amount during the water supply and setting a water level corresponding to the sensed laundry amount; and
   defining the set water level as the predetermined water level of (c) step.

4. The method for water supply in a laundry device as claimed in claim 1, wherein (b) step is performed, if the present water level according to the water supply of (a) step reaches a water level frequency prior to a discretionally predetermined value with respect to the water level frequency corresponding to the discretionally predetermined water level, compared with the predetermined frequency corresponding to the predetermined water level of (c) step.

5. The method for water supply in a laundry device as claimed in claim 3, wherein (b) step is performed, if the present water level according to the water supply of (a) step reaches a water level frequency prior to a discretionally predetermined value with respect to the water level frequency corresponding to the predetermined water level, compared with the predetermined frequency.

6. The method for water supply in a laundry device as claimed in claim 4, wherein the discretionally predetermined value is a frequency between 0.1–0.5 kHz.

7. The method for water supply in a laundry device as claimed in claim 4, wherein the predetermined time for temporarily stopping the water supply in (b) step is between 1–5 sec.

8. The method for water supply in a laundry device as claimed in claim 4, wherein (b) step is performed at least one time after the water supply starts.

9. The method for water supply in a laundry device as claimed in claim 4, wherein (b) step is performed at least one time during the water supply, in case that the water supply of (a) step is for a main washing.

10. The method for water supply in a laundry device as claimed in claim 9, wherein (b) step is performed in the beginning of the water supply.

11. The method for water supply in a laundry device as claimed in claim 9, wherein on/off of the water supply valve is alternatively repeated in (b) step.

12. The method for water supply in a laundry device as claimed in claim 11, wherein the on/off operation, which is one time of (b) step, is repeatedly performed within 3 to 10 times.

13. The method for water supply in a laundry device as claimed in claim 1, wherein the water supply of (c) step is finished, if the present water level according to the water re-supply reaches the predetermined water level frequency.

14. The method for water supply in a laundry device as claimed in claim 3, wherein the water supply of (c) step is finished, if the present water level according to the water re-supply reaches the predetermined water level frequency.