

Washing machine water recovery system

Technical Field

5 The present invention relates to a system for regulating the flow of water discharged from a washing machine. The present invention also relates to a method and apparatus for regulating the flow of water discharged from a washing machine.

Background

10 The need for water saving systems has increased over the years amid concerns of water shortages. In some parts of the world, water restrictions have been implemented in order to assist in circumventing wasteful use of available water supplies.

15 Attempts have been made to reuse water consumed during household activities for use in other applications. For instance, water discharged from a washing machine, such as a clothes washing machine or a dish washing machine, is manually collected in a tank and re-used for other household activities. Other household activities typically include flushing the toilet, irrigation, cleaning the house or cleaning the car. Whilst such a method can be an adequate solution for saving water, the method involves

20 constant monitoring and collection of the water discharged from the washing machine and manual transportation of the collected water to another location for re-use.

25 Accordingly, there exists a need to provide a system, method and apparatus for regulating the flow of water discharged from a washing machine that overcomes or at least ameliorates one or more of the disadvantages described above. Particularly, there exists a need for a

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system, method and apparatus that can be adapted for use with existing washing machines, and requires minimal effort on behalf of the user.

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Summary

In one aspect, there is provided a system for regulating the flow of water discharged by a water discharge pump of a washing machine during the course of a wash cycle, the system comprising:

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an outlet conduit capable of channelling water discharged from said washing machine during said wash cycle;

a storage tank in liquid communication with said outlet conduit for storing water discharged from said washing machine;

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a drainage conduit in liquid communication with said outlet conduit for draining water discharged from said washing machine;

a valve capable of channelling discharged water in said outlet conduit to either said storage tank or said drainage conduit; and

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a controller capable of operating said valve and of detecting the progress of said wash cycle based on the operation of the water discharge pump of said washing machine,

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wherein in use, said controller operates said valve to regulate, depending on the progress of said wash cycle, the flow of water from said outlet conduit to either said storage tank or said drainage conduit.

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In another aspect, there is provided a method for regulating the flow of water comprising the steps of:

(a) discharging water from a washing machine during the course of a wash cycle;

(b) channelling said discharged water through an outlet conduit to a valve;

5 (c) monitoring the progress of said wash cycle using a controller, wherein said controller detects the progress of said wash cycle based on the operation of the water discharge pump; and

10 (d) regulating, using said controller, the flow of water discharged from said valve to either a storage tank for storing said discharged water or a drainage conduit for draining said discharged water, depending on the progress of said wash cycle.

15 In another aspect, there is provided an apparatus for regulating the flow of water discharged from a washing machine during the course of a wash cycle, the apparatus comprising:

20 an outlet conduit connectable to the outlet port of a washing machine in use, said outlet conduit being capable of channelling water discharged from said washing machine during said wash cycle;

a storage tank coupled to said outlet conduit, said storage tank being capable of storing water discharged from said washing machine;

25 a drainage conduit coupled to said outlet conduit, said drainage conduit being capable of draining water discharged from said washing machine;

30 a valve having an inlet coupled to said outlet conduit and at least two outlets that are respectively coupled to said drainage conduit and said storage tank; and

a controller capable of operating said valve and detecting the progress of said wash cycle based on the

operation of the water discharge pump of said washing machine,

wherein in use, said controller operates said valve to regulate, depending on the progress of said wash cycle, the flow of water from said outlet conduit to either said storage tank or said drainage conduit.

Definitions

The following words and terms used herein shall have the meaning indicated:

The term "wash cycle" as used herein refers to at least two stages of the wash cycle of a washing machine. Each of said at least two stages having different content levels of soap in water. For example, the wash cycle may comprise a "soap washing stage" and a "rinse stage" in which the soap content in water of the soap washing stage is higher relative to the soap content in water of the rinse stage. There can be one or more stages of the soap washing stage or the rinse stage.

The term "soap washing stage" as used herein refers to a stage of the wash cycle in which water containing soap is added to the washing machine to wash materials in the washing machine.

The term "rinse stage" as used herein refers to a stage of the wash cycle in which water containing no soap is added to the washing machine and is used to rinse the materials being washed in the washing machine. The water of the rinse stage has a lower soap content relative to the soap washing stage.

The term "soap" is to be construed throughout the specification to include any cleaning agent suitable for cleaning any materials. For example, the soap may be a

commercially available detergent suitable for washing dishes or the soap may be a commercially available powder or soap liquid suitable for laundering of clothes.

5 The term "washing machine" as used herein refers to a machine that utilises water to wash materials and can be construed to include a clothes washing machine and a dish washing machine.

10 The term "substantially no soap" as used herein does not exclude "completely no soap". For example, water containing "substantially no soap" may be completely free of soap or it may include traces of soap. Where necessary, the word "substantially" may be omitted from the definition of the invention.

15 Unless specified otherwise, the terms "comprising" and "comprise", and grammatical variants thereof, are intended to represent "open" or "inclusive" language such that they include recited elements but also permit inclusion of additional, unrecited elements.

20 Detailed Disclosure of Embodiments

Exemplary, non-limiting embodiments of a system, method and apparatus for regulating flow of water discharged from a washing machine will now be disclosed. The water is discharged by a water discharge pump of the washing machine during the course of the wash cycle.

25 Advantageously, the system allows an operator to program the controller to allow water discharged from a washing machine, during a wash cycle, to be routed to either said storage tank or said drainage conduit. Typically, when water having a relatively high soap content is discharged from the washing machine, such as during a soap washing stage of the wash cycle, the controller can

actuate the valve to allow the discharged water to report to the discharge conduit and not the storage tank. Typically, when water having a relatively low soap content or substantially no soap, is discharged from the washing machine, such as during a rinse stage of the wash cycle, the controller can actuate the valve to allow the discharged water to report to the storage tank and not the discharge conduit. Advantageously, the disclosed system allows a user to capture and retain water having a low soap content for later utilisation.

The washing machine can be at least one of a clothes washing machine and a dish washing machine.

During the course of said wash cycle, water containing varying levels of soap content may be discharged.

The wash cycle may comprise a first washing stage in which water discharged by the water discharge pump comprises soap and a subsequent second washing stage in which water discharged by the water discharge pump comprises less soap than the first stage. The first washing cycle may comprise one or more soap washing stages in which water containing soap is used to wash materials in said washing machine and a drainage stage in which the water containing soap is discharged from the washing machine. The second washing stage may comprise one or more rinse stages in which water containing substantially no soap is used to rinse the materials being washed in said washing machine and a drainage stage in which said rinse water is discharged from said washing machine.

The controller can detect the progress of the wash cycle based on the activity of the water discharge pump. The controller may be coupled to a detector capable of detecting operation of said discharge pump. Optionally, in

use, the detector detects the progress of said wash cycle based on whether the water discharge pump is operating or not operating in the course of a wash cycle. In another embodiment, said controller detects the progress of said wash cycle based on the sequence of the water discharge pump operating and not operating in the course of a wash cycle.

During the first washing stage, the controller can operate the valve to channel the discharged water to the drainage conduit. During the second washing stage, the controller can operate the valve to channel the discharged water to the storage tank. In one embodiment, when the water of said soap washing stage is discharged from said washing machine, said controller can operate said valve to channel said discharged water to said drainage conduit. In another embodiment, when the water of said rinse stage is discharged from said washing machine, said controller can operate said valve to channel said discharged water to said storage tank.

The system may further comprise a drainage tank in liquid communication with said drainage conduit for storing water channelled to said drainage conduit.

The system may also further comprise a motor controllable by said controller to actuate movement of said valve. The motor may comprise a rotatable shaft coupled to said valve to actuate said valve to channel water between either of said storage tank or said drainage conduit. The motor may be a servo-motor.

The system may comprise a storage tank conduit connecting said storage tank to said valve.

At least one of said drainage conduit and said storage tank conduit may be positioned below said valve to allow

discharged water to flow by action of gravity. In one embodiment, the drainage conduit is positioned below said valve to allow discharged water to flow by action of gravity.

5 The system may comprise a user interface electrically coupled to said controller to allow a user to designate channelling of discharged water between said storage tank and said drainage conduit, depending on the progress of said wash cycle. The user interface may comprise a display
10 to indicate the progress of the wash cycle. The display may comprise one or more light emitting diodes (LEDs), each of said LEDs corresponding to each stage of the wash cycle.

 The storage tank may comprise an outlet pipe for channelling water to an appliance capable of consuming the
15 water. In one embodiment, the system comprises a water return line connected between the storage tank and the washing drum of the washing machine for routing water stored in said storage tank to said washing drum during the wash cycle.

20 The method for regulating the flow of water comprises the steps of:

 (a) discharging water from a washing machine during the course of a wash cycle;

 (b) channelling said discharged water through an
25 outlet conduit to a valve;

 (c) monitoring the progress of said wash cycle using a controller; and

 (d) regulating, using said controller, the flow of water discharged from said valve to either a storage tank
30 for storing said discharged water or a drainage conduit for draining said discharged water, depending on the progress of said wash cycle.

The discharging step (a) may comprise the step of:

(a1) discharging water containing varying levels of soap content during the course of said wash cycle.

The discharging step (a) may comprise the steps of:

5 (a2) discharging water of a soap washing stage in which water containing soap is used to wash materials in said washing machine; and

10 (a3) discharging water of a rinse stage in which said water containing substantially no soap is used to rinse the materials being washed in said washing machine.

The regulating step (d) may comprise the step of:

(d1) operating said controller to channel said discharged water of said soap washing stage from said valve to said drainage conduit.

15 The regulating step (d) may comprise the step of:

(d2) operating said controller to channel said discharged water of said rinse stage from said valve to said drainage conduit.

The method may further comprise the step of:

20 (e) providing a drainage tank in liquid communication with said drainage conduit for storing water channelled to said drainage conduit.

The method may further comprise the step of:

25 (f) channelling said discharged water in said storage tank to an appliance capable of consuming the water.

Brief Description Of Drawings

30 The accompanying drawings illustrate a disclosed embodiment and serve to explain the principles of the disclosed embodiment. It is to be understood, however, that the drawings are designed for purposes of illustration only, and not as a definition of the limits of the invention.

FIG. 1 shows a schematic view of a system for regulating flow of water discharged from a washing machine in accordance with a disclosed embodiment;

FIG. 2 shows schematic view of a valve connected to a motor and a shaft in the system of Fig. 1;

FIG. 3 shows circuit diagram of a controller used in the system of Fig. 1.

FIG. 4 shows a user interface of the system of Fig. 1; and

FIG. 5 shows a storage tank in accordance with the system of Fig. 1.

Disclosure of Detailed Embodiment

A non-limiting embodiment of a system for regulating the flow of water discharged from a washing machine will be further described in greater detail below, which should not be construed as in any way limiting the scope of the invention.

Referring to FIG. 1, there is shown a system 10 for regulating the flow of water installed onto a clothes washing machine 20. The washing machine 20 has a rotatable washing drum 20a for rotating the clothes during the course of a wash cycle.

The system 10 comprises an outlet conduit 100 for channelling water discharged by a water discharge pump (not shown) of the clothes washing machine 20 during the course of a wash cycle. The system 10 also comprises a storage tank 200 connected to the outlet conduit 100 via a storage tank conduit 210 for storing the water discharged from said clothes washing machine 20. The system 10 also comprises a

drainage conduit 110 in liquid communication with the outlet conduit 100 for draining the water discharged from the clothes washing machine 20. The system 10 also comprises a valve 300 for channelling the discharged water in said outlet conduit 100 to either the storage tank 200 or the drainage conduit 110. The system 10 also comprises a controller 400 for detecting the progress of the wash cycle and for operating the valve 300 based on the operation of the water discharge pump of the washing machine 20. The controller 400 operates the valve 300 to regulate, depending on the progress of the wash cycle, the flow of water from the outlet conduit 100 to either the storage tank 200 or the drainage conduit 110.

The storage tank 200 is positioned above the washing machine by a support stand 30. The storage tank 200 has an outlet pipe 220 which channels the water to a toilet flushing system (not shown).

During the course of the wash cycle, water containing varying levels of soap content is discharged from the washing drum 20a. In particular, the wash cycle comprises two soap washing stages - stages 1 and 2 respectively, in which water containing soap is used to wash clothes in the washing machine, and three rinse stages - stages 3 to 5, in which water containing substantially no soap is used to rinse the clothes in the washing machine 10.

When the water of the soap washing stages 1 and 2 is discharged from the washing machine 20, the controller 400 operates the valve 300 to channel the discharged water to the drainage conduit 110. The controller 400 detects the progress of the wash cycle of the washing machine 20 based on the activity of the discharge pump (not shown) that is internal to the washing machine 20. The discharge pump

pumps water from the washing machine drum 20a to the outlet conduit 100 during the course of the washing cycle.

When the water of the rinse stages 3 to 5 is discharged from the washing machine 20, the controller 400 operates the valve 300 to channel the discharged water to the storage tank 200.

Referring to FIG. 2, there is shown an outlet conduit 100, a storage tank conduit 210 and a drainage conduit 110 connected to one another by a T-joint 120. The storage tank conduit 210 and the drainage conduit 110 are aligned along a vertical plane to allow the discharged water to flow from the outlet conduit 100 to the drainage conduit 110 under gravity. The valve 300 is disposed along the drainage conduit 110 and slightly below the T-joint 120. The valve 300 is connected to a shaft 310 rotatable to actuate the valve 300 to channel water between either of the storage tank 200 or the drainage conduit 110. The shaft 310 is connected to a motor 320 controllable by the controller 400 to actuate movement of the valve 300 via the shaft 310. The controller 400 controls the motor 320 via an electrical relay switch 330 operable to supply voltage to the motor 320 during selected stages (i.e. soap washing stages 1 and 2) of the wash cycle in which the discharged water is to be channelled to the drainage conduit 110. There is no supply of voltage to the motor 320 during the other stages (i.e., rinse stages 3 to 5) of the wash cycle in which the rinse water is to be channelled to the storage tank 200.

Referring to FIG. 3, there is shown the controller 400, a user interface 410 and a detector 420. FIG. 4 shows the user interface 410. The user interface and the controller are connected to a power source 430. The user interface

410 is electrically coupled to the controller 400 to allow a user to designate channelling of the discharged water between the storage tank 200 and the drainage conduit 110, depending on the progress of the wash cycle. The user is
5 able to carry out the designation by means of five (5) switches 440, each respectively corresponding to each stage of the wash cycle (i.e., stages 1 to 5). The switches 440, when activated by the user, instructs the controller 400 to operate the valve 300 to channel the discharged water of
10 the corresponding stage of the wash cycle to the drainage conduit 110. The switches 440, when not activated by the user, instructs the controller 400 to operate the valve 300 to channel the discharged water of the corresponding stages of the wash cycle to the storage tank 200.

15 The user interface 410 comprises a display to indicate the progress of the wash cycle. The display comprises five wash cycle indicators , in the form of red light emitting diodes (LEDs) 450, each of the wash cycle indicators corresponding to each stage of the wash cycle. Each of the
20 LEDs 450 lights up during the corresponding stages of the wash cycle.

The user interface 410 also comprises a drainage indicator in the form of orange LED 460 which lights up during draining of the discharged water through the
25 drainage conduit.

The user interface also includes a reset button 470 for the user to re-set the settings.

The detector 420 is coupled to the controller 400 and is connected to an output pump of the washing machine to
30 monitor the progress of the wash cycle. The detector 420 comprises an electrical relay coil 480 connected to a 'live' and 'neutral' voltage terminal of the output pump.

A wire 490 connects the electrical relay coil 480 to the controller 400 for providing signals relating to the activity of the discharge pump to thereby indicate whether the discharge pump is operating "on" and discharging water from the washing drum 20a or "off" and not discharging water from the washing drum 20a. As the controller 400 is able to monitor the discharge pump being switched "on" and "off" during the course of a wash cycle, the controller 400 is able to determine the exact progress of the wash cycle. The wash cycle of the washing machine 20 is tabulated in the Table 1 below:

Table 1: Wash Cycle Algorithm

Stage	Discharge Pump	Activity	Valve (300)	Discharge Point
1	Off	Wash + Soap	Closed	No Discharge
1	On (S1)	Drain	Open	Drain Conduit (110)
2	Off	Wash + Soap	Close	No Discharge
2	On (S2)	Drain	Open	Drain Conduit (110)
3	Off	Rinse	Close	No Discharge
3	On (S3)	Drain	Close	Storage Tank (200)
4	Off	Rinse	Close	No Discharge
4	On (S4)	Drain	Close	Storage Tank (200)
5	Off	Rinse	Close	No Discharge
5	On (S5)	Drain	Close	Storage Tank (200)

As can be seen from Table 1 above, the controller 400 monitors when the discharge pump is turned on and off as shown by the column "Discharge Pump" above. In stage 1, the water and soap is in the washing drum 20a and clothes are subjected to washing (stage 1). At the end of stage 1, the discharge pump is turned on and the detector 420

detects that the discharge pump is on via wire 490 and sends a signal (S1) to the controller 400. The controller 400 is programmed to read the first signal S1 and ensures that the valve 300 is "open" so that discharged water containing soap reports to the drainage conduit 110.

During stage 2, additional soap with fresh water reports to the wash drum 20a to further clean the clothes. At the end of stage 2, the discharge pump is turned on and the detector 420 detects that the discharge pump is on via wire 490 and sends a signal (S2) to the controller 400. The controller 400 is programmed to read the second signal S2 and ensures that the valve 300 is "open" so that discharged water containing soap reports to the drainage conduit 110.

During stage 3, fresh water with no soap reports to the wash drum 20a to further rinse soap from the clothes. At the end of stage 3, the discharge pump is turned on and the detector 420 detects that the discharge pump is on via wire 490 and sends a signal (S3) to the controller 400. The controller 400 reads the third signal S3 and ensures that the valve 300 is "closed" so that discharged water containing less soap than stages 1 and 2 reports to the storage tank 200. Stages 4 and 5 repeat the process of stage 3 so that signals S4 and S5 ensure that the valve 300 is closed and the water reports to the storage tank 200.

In this way, the controller 400 monitors the progress of the wash cycle of washing machine 20 by monitoring the on-off sequence of the discharge pump during a wash cycle. The controller 400 does not therefore have to be programmed to work on a specific time based switching mechanism wherein the valve 300 is opened and closed based on the time progress of the wash cycle. This allows the

controller 400 to be used for different washing machines that may have different time settings for the wash cycle and also allows a person commissioning the system 10 to implement the controller 400 simply by connecting the
5 detector 420 to the discharge pump without having to expend time synchronising the timing of the wash cycle. It is merely necessary for the person to know the sequence of the stages in a wash cycle to control routing of water to either the drainage conduit 110 or the storage tank 200.

10 Prior to the selection, the power source 430 to the controller and the user interface 420 was activated and switches 450 deactivated by pressing the reset button 470.

When the washing machine is in stage 1 of the wash cycle, the controller 400 activates wash cycle indicator 1
15 to inform the user that the washing machine 20 is operating in stage 1 of the wash cycle. The controller 400 activates the electrical relay switch 330 connected to the motor 320 to thereby rotate the shaft 310 to open the valve 300. In doing so, the discharged water from stage 1 of the wash
20 cycle is channelled to the drainage conduit 110. During drainage, the controller 400 also activates the drainage indicator 460 to inform the user that draining of the discharged water being carried out. The valve 300 is opened for a time period that is in line with the
25 activation period of the washing machine output water pump.

When drainage is completed, the washing machine 20 proceeds to stage 2 of the wash cycle. The same procedure as stage 1 of the wash cycle is repeated.

When the washing machine 20 is in stage 3 of the wash
30 cycle, the controller 400 detects a signal from the detector 420 via the wire 490. Wash cycle indicator 3 is activated to inform the user that the washing machine 20 is

currently operating in stage 3 of the wash cycle. The controller 400 does not activate the electrical relay switch 300 and the valve 300 therefore remains in a closed position. The discharged water from stage 3 of the wash cycle is accordingly channelled to the storage tank 200. As drainage does not occur in stage 3 of the wash cycle, the drainage indicator 460 is not activated.

The same procedure is repeated for stages 4 and 5 of the wash cycle.

The storage tank 200 as shown in FIG. 5 comprises a water level valve 230 connected to the storage tank conduit 210 for regulating flow of the water into the storage tank 200. The storage tank 200 also comprises a tap water input 240 for supplying water into the storage tank 200 during the period of no wash activity in the washing machine 20. This is to maintain a minimum water level in the storage tank 200 to ensure sufficient supply of water to the toilet flushing system during the period of no wash activity in the washing machine 20. Additionally, water consumed in other household activities such as washing the dishes can be poured into the storage tank for re-use. Small vents 250 are created at the top of the side walls of the storage tank 200 for ventilation purposes. An overflow opening 260 is provided in the storage tank 200 to warn the user when the storage tank 200 is filled up. A floating weight rubber ball connected to a spring 270 is also provided near the top of the storage tank for setting the water from 240 to a sufficient water level in the storage tank 200 during the period of no wash activity. Advantageously, the water level in the storage tank 200 reaches the floating weight rubber ball connected to the spring 270, water is routed to the drainage conduit 110 to ensure that there is no

possibility of water in the storage tank 200 reaching the tap water input 240 and contaminating the fresh water in the fresh water supply pipe line.

The storage tank 200 is installed above the toilet flushing system for the purpose of providing sufficient water pressure to the toilet flushing system. Accordingly, a pump for displacing the rinse water to the toilet flushing system is thus not necessary. In this example, the storage tank 100 is positioned at a height of 26 cm higher than the toilet flush system.

The system 10 is easily installed for use with existing washing machines simply by connecting the first electric relay coil 480 to the 'Live' and 'neutral' terminal of the washing machine output pump and wire 490 to the controller 400 as provided above.

The components forming the system can also be obtained commercially. The controller 400, for instance, can include a programmable Modulo-N Counter (model MC4017) obtained from Motorola and a housing encasing the programmable Modulo-N counter can be obtained commercially. The switches 440, the electrical relay switch 330, the electrical relay coil 480, the wire 490, the LEDs for the wash cycle indicators 450 and the drainage indicator 460, the reset button 470 for deactivating all of the switches, and all other electrical components known to a person skilled in the art to assemble the system of the disclosed embodiment can be obtained commercially.

Applications

It will be appreciated that the system and method in the disclosed embodiment is not limited to recycling rinse water from the clothes and dish washing machine and can be

adapted to be installed on other household appliances that consumes water.

It will be appreciated that as the controller is capable of detecting the progress of said wash cycle based on the activity of the water discharge pump. Accordingly, the user is able to determine the progress of the wash cycle by monitoring the sequence during which the discharge pump is turned on and off during the course of a wash cycle. This provides convenient and easier installation compared to prior art systems that use time-based synchronisation to monitor progress of the washing cycle. The system 10 is therefore simple to install and provides a more convenient control system than the prior art. The system avoids the use of complicated time-based control systems, which can be expensive to implement and can be unreliable in detecting the progress of the wash cycle.

It will be appreciated that the system in the disclosed embodiment can be adapted for use on any existing clothes and dish washing machines.

It will be appreciated that the system in the disclosed embodiment is automatic and require minimal effort by the user to operate.

It will be appreciated that the system in the disclosed embodiment is effective in saving water consumption within the household, low in cost and simple to use.

It will be apparent that various other modifications and adaptations of the invention will be apparent to the person skilled in the art after reading the foregoing disclosure without departing from the spirit and scope of the invention and it is intended that all such

modifications and adaptations come within the scope of the appended claims.

Claims

1. A system for regulating the flow of water discharged by a water discharge pump of a washing machine during the course of a wash cycle, the system comprising:

an outlet conduit capable of channelling water discharged from said washing machine during said wash cycle;

a storage tank in liquid communication with said outlet conduit for storing water discharged from said washing machine;

a drainage conduit in liquid communication with said outlet conduit for draining water discharged from said washing machine;

a valve capable of channelling discharged water in said outlet conduit to either said storage tank or said drainage conduit; and

a controller capable of operating said valve and of detecting the progress of said wash cycle based on the operation of the water discharge pump of said washing machine,

wherein in use, said controller operates said valve to regulate, depending on the progress of said wash cycle, the flow of water from said outlet conduit to either said storage tank or said drainage conduit.

2. A system as claimed in claim 1, wherein said washing machine is at least one of a clothes washing machine and a dish washing machine.

3. A system as claimed in claim 1, wherein during the course of said wash cycle, water discharged by said water

discharged pump containing varying levels of soap content is discharged.

4. A system according to claim 1, wherein said wash cycle comprises a first washing stage in which water discharged by said water discharge pump comprises soap and a subsequent second washing stage in which water discharged by said water discharge pump comprises less soap than said first stage.

5. A system as claimed in claim 4, wherein said first washing stage comprises one or more soap washing stages in which water containing soap is used to wash materials in said washing machine, and said second washing stage comprises one or more rinse stages in which water containing substantially no soap is used to rinse the materials being washed in said washing machine.

6. A system according to claim 4, wherein during said first washing stage, said controller operates said valve to channel said discharged water to said drainage conduit.

7. A system according to claim 4, wherein during said second washing stage, said controller operates said valve to channel said discharged water to said storage tank.

8. A system as claimed in claim 1, comprising a drainage tank in liquid communication with said drainage conduit for storing water channelled to said drainage conduit.

9. A system as claimed in claim 1, comprising a motor controllable by said controller to actuate movement of said valve.

5 10. A system as claimed in claim 9, wherein said motor comprises a rotatable shaft coupled to said valve to actuate said valve to channel water between either of said storage tank or said drainage conduit.

10 11. A system as claimed in claim 9, wherein said motor is a servo-motor.

12. A system as claimed in claim 1, comprising a storage tank conduit connecting said storage tank to said valve.

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13. A system as claimed in claim 12, wherein at least one of said drainage conduit and said storage tank conduit are positioned below said valve to allow discharged water to flow by action of gravity.

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14. A system as claimed in claim 12, wherein said drainage conduit is positioned below said valve to allow discharged water to flow by action of gravity when said valve is open and wherein said storage tank conduit is above said valve to allow water to flow to said storage tank when said valve is closed.

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15. A system according to claim 1, comprising a user interface electrically coupled to said controller to allow a user to designate channelling of discharged water between said storage tank and said drainage conduit depending on the progress of said wash cycle.

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16. A system according to claim 15, wherein the user interface comprises a display to indicate the progress of the wash cycle.

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17. A system according to claim 16, wherein said display comprises one or more light emitting diodes (LEDs), each of said LEDs corresponding to each stage of the wash cycle.

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18. A system according to claim 1, wherein said controller detects the progress of said wash cycle based on whether the water discharge pump is operating or not operating in the course of a wash cycle.

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19. A system according to claim 1, wherein said controller detects the progress of said wash cycle based on the sequence of the water discharge pump operating and not operating in the course of a wash cycle.

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20. A method for regulating the flow of water comprising the steps of:

(a) discharging water from a washing machine during the course of a wash cycle;

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(b) channelling said discharged water through an outlet conduit to a valve;

(c) monitoring the progress of said wash cycle using a controller, wherein said controller detects the progress of said wash cycle based on the operation of the water discharge pump; and

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(d) regulating, using said controller, the flow of water discharged from said valve to either a storage tank for storing said discharged water or a drainage conduit for

draining said discharged water, depending on the progress of said wash cycle.

21. A method as claimed in claim 20, wherein the
5 regulating step (d) comprises the step of:

(d1) operating said controller to channel said discharged water of said soap washing stage from said valve to said drainage conduit.

10 22. A method as claimed in claim 20, wherein the regulating step (d) comprises the step of:

(d2) operating said controller to channel said discharged water of said rinse stage from said valve to said drainage conduit.

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23. A method as claimed in claim 20, further comprising the step of:

(f) channelling said discharged water in said storage tank to an appliance capable of consuming the water.

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24. A method as claimed in claim 20, wherein said monitoring step (c) comprises the step of:

(c1) monitoring the progress of said wash cycle based on whether the water discharge pump is operating or not
25 operating in the course of a wash cycle.

25. A method as claimed in claim 20, wherein said monitoring step (c) comprises the step of:

(c2) monitoring the progress of said wash cycle based
30 on the sequence of the water discharge pump operating and not operating in the course of a wash cycle.

26. An apparatus for regulating the flow of water discharged from a washing machine during the course of a wash cycle, the apparatus comprising:

an outlet conduit connectable to the outlet port of a washing machine in use, said outlet conduit being capable of channelling water discharged from said washing machine during said wash cycle;

a storage tank coupled to said outlet conduit, said storage tank being capable of storing water discharged from said washing machine;

a drainage conduit coupled to said outlet conduit, said drainage conduit being capable of draining water discharged from said washing machine;

a valve having an inlet coupled to said outlet conduit and at least two outlets that are respectively coupled to said drainage conduit and said storage tank; and

a controller capable of operating said valve and detecting the progress of said wash cycle based on the operation of the water discharge pump of said washing machine,

wherein in use, said controller operates said valve to regulate, depending on the progress of said wash cycle, the flow of water from said outlet conduit to either said storage tank or said drainage conduit.