A tandem configuration of automated washing machines is disclosed. A microprocessor controls solenoid valves to direct effluent of each selected cycle of one machine, into another machine for reuse. Both the machines operate in tandem applying pre-set microprocessor logic, which is further programmable for various options, keeping interlocking features intact. By placing the washing apparatus on rooftops, further recycling is achieved.

A Reservoir for Temporary Storage of Greywater may be added

Any of 100 &/or 200 may be Front or Top Loading
Fig. 1

Fig. 2A
A Reservoir for Temporary Storage of Greywater may be added

Any of 100 &/or 200 may be Front or Top Loading.

Fig. 2B

Fig. 3

Can be stacked one on top of other
Display Panels

Manually selected options are shown as □ (double line indicator), in the above. Automatically selected (as a result of manual selections) are shown as □ (reverse indicator).

Any automatically selected option above can be de-selected, upon which the corresponding options at 430 are automatically selected. For example, if in the above default selection combination, Pre-wash at 440 is de-selected as Fresh and selected as Recycled, as shown below, the panel at 430 will show □ and □.

Pre-wash □ □ Recycle □ □ Pre-wash □ □ Recycled / Fresh
Pre-wash □ □ Recycle □ □ Pre-wash □ □ Recycled / Fresh
Pre-wash □ □ Recycle □ □ Pre-wash □ □ Recycled / Fresh

Recycle □ □ Pre-wash □ □ Recycled / Fresh
Recycle □ □ Pre-wash □ □ Recycled / Fresh
Recycle □ □ Pre-wash □ □ Recycled / Fresh

Recycled □ □ Pre-wash □ □ Recycled / Fresh
Recycled □ □ Pre-wash □ □ Recycled / Fresh
Recycled □ □ Pre-wash □ □ Recycled / Fresh
The following is a typical chronological sequence of operation of both the machines in tandem, in response to a program selection such as the default program shown in A:

<table>
<thead>
<tr>
<th>Timeline</th>
<th>Machine 100</th>
<th>Machine 200</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00-0.10</td>
<td>Fill, Pre-wash</td>
<td>Fill, Soak...</td>
</tr>
<tr>
<td>0.11-0.15</td>
<td>Spin</td>
<td>...soak</td>
</tr>
<tr>
<td>0.16-0.30</td>
<td>Wash...</td>
<td>Pre-wash...</td>
</tr>
<tr>
<td>0.31-0.45</td>
<td>...wash</td>
<td>...pre-wash, Spin</td>
</tr>
<tr>
<td>0.46-0.50</td>
<td>Spin</td>
<td>Fill Washed water from 1</td>
</tr>
<tr>
<td>0.51-1.00</td>
<td>Rinse...</td>
<td>Wash</td>
</tr>
<tr>
<td>1.01-1.10</td>
<td>rinse</td>
<td>Spin</td>
</tr>
<tr>
<td>1.10-1.20</td>
<td>Spin</td>
<td>Fill Rinsed water from 1</td>
</tr>
<tr>
<td>1.21-1.30</td>
<td>2nd Rinse...</td>
<td>Rinse</td>
</tr>
<tr>
<td>1.31-1.35</td>
<td>2d Rinse</td>
<td>Spin</td>
</tr>
<tr>
<td>1.36-1.40</td>
<td>Spin</td>
<td>Fill 2nd Rinsed water from 1</td>
</tr>
<tr>
<td>1.41-1.45</td>
<td>Ready for next load</td>
<td>2nd Rinse</td>
</tr>
<tr>
<td>1.46-1.50</td>
<td></td>
<td>Spin</td>
</tr>
<tr>
<td>1.51-1.52</td>
<td></td>
<td>Fill Fresh Water</td>
</tr>
<tr>
<td>1.53-1.59</td>
<td></td>
<td>3rd Rinse</td>
</tr>
<tr>
<td>2.00-2.05</td>
<td></td>
<td>Spin</td>
</tr>
</tbody>
</table>
TANDEM WASHING SYSTEM CONFIGURATION FOR RECYCLING DETERGENT & WATER

FIELD OF INVENTION

[0001] This invention relates to a detergent and water saving device associated with automatic washing machine configurations. The invention particularly relates to a tandem washing system configuration.

[0002] Broadly the invention makes use of automatic washing machine technology for application in domestic, community, commercial and industrial uses such as in homes, hotels, laundry services, offices and factories etc. The invention by its application relates to environment pollution technology.

BACKGROUND OF THE INVENTION

[0003] In a typical automatic washing machine, there are various cycles for example Pre-wash, Wash, Rinse and Spin, controlled through a programmable integrated circuit associated with a variable speed electric motor, solenoid valves and other electro-mechanical means. In such machines an electric water heater is also provided. These various cycles may be programmed as per the requirement of the washable load and availability of resources like water, electricity, time etc. For example, a typical automatic washing machine may be programmed to wash a predetermined load of clothes in 30 minutes to 2 hours, and with only one rinse cycle or more, with or without hot water wash etc. At each wash or rinse cycle the typical washing machine draws fresh tap water and on completion of the cycle discharges the used water through a drainage pipe. As a result, there is a heavy use of resources and subsequent discharge of used water including various quantity of detergents and impurities.

[0004] The inventor of the present invention has observed that an effective method for recycling the discharge water having varying levels of detergents will save costs and lessen environment pollution.

[0005] The prior art devices disclose storage of certain effluents of washing machine generally known as grey water, which however is restricted to rinse water only having less detergent. Various means like overhead tanks or reservoirs connected to the washing machine is used for such storage of grey water. The stored grey water is then recycled back to the same washing machine for pre-wash or used for flushing etc. None of these prior art devices is suitable for economic use of resources due to additional requirement of constructional and plumbing features. In most of these prior art devices, only rinse water is contemplated for recycling. Moreover, longer storage of used water may lead to growth of pathogens. There is no saving of detergent or input energy. On the whole, adverse cost-benefit ratio of the prior art devices preclude them from large scale application.

OBJECT OF THE INVENTION

[0006] It is an object of the invention to provide a tandem washing system configuration capable of recycling the discharge water containing different levels of detergent.

[0007] A further object of the invention is to provide a tandem washing system configuration comprising at least two automatic washing machines of identical construction being operably connected and controlled by a single system controller allowing separate recycling of grey water generated in each cycle.

[0008] A still further object of the invention is to provide a tandem washing system configuration in which the constituent automatic washing machines can be operated at tandem depending on wash-load, type of washable material, available resources, thereby optimising the resource consumption.

[0009] Yet another object of the invention is to provide a tandem washing system configuration in which storage of grey water is eliminated leading to stoppage in growth of pathogens, thereby acting as an environment friendly washing system.

[0010] A still further object of the invention is to provide a tandem washing system configuration which can be installed and operated without any specialised infrastructural requirements such as additional water entry/exit source, plumbing means, energy input point, thereby allowing accommodation of the system in a smaller space.

SUMMARY OF THE INVENTION

[0011] Accordingly there is provided a tandem washing system configuration comprising at least two automatic washing machines of identical construction disposed parallel or vertically adjacent to each other being flowably connected via a channel means having a two-way solenoid valve, each of the two automatic washing machines having individual tap water inlet separate effluent drainage outlets disposal trays containing washing chemicals, individual heating devices, separate processors, and independently designed rotatable means. The system configuration is provided with a micro-processor-based controller which causes the second automatic washing machine to use as an input the discharged water of at least one cycle of the first machine transmitted via the interconnected channel by means of the two-way solenoid valve. The controller being operable to cause the automatic washing machines to function at tandem upon selection of any of a plurality of available attributes in respect of wash cycle, wash load, washable material, intended consumption of resources, selected time and duration for operation, thereby optimising the operational inputs and improvement in wash quality.

[0012] The first machine is preferably used for less soiled load like garment etc. and the second machine for heavily soiled like linen, towels, mops, shoes and mats etc.

[0013] Discharge of various cycles of the first washing machine is selectable for routing through the channel means, into the second machine for recycling. Likewise, discharge of any cycle in both the machines is selectable for routing through the drainage pipes as effluent. Various cycles in both the machines are operable in tandem to complement each other in an interlocking fashion. Additionally, both machines are independently operable and/or combinedly.

BRIEF DESCRIPTION OF ACCOMPANYING DRAWINGS

[0014] FIG. 1 shows a simple configuration of a tandem washing system configuration according to the invention by way of example, operably interconnected having a channel means comprising solenoid valve and filters.

[0015] FIG. 2A shows a similar configuration of the washing system according to the invention. In this example, an additional reservoir is added between the two automatic washing machines.

[0016] FIG. 2B shows a vertical stacking configuration of the tandem washing system.
FIG. 3 is a schematic presentation of an example of the channel means of the invention including a two-way solenoid valve arrangement of the invention for expelling the used water if it is turbid, or directing it for recycling.

FIG. 4A shows a device display in the electronic panels and knobs according to the invention.

FIG. 4B presents a chronological flow chart of tandem operation of two automatic machines in the tandem washing system configuration of the invention by way of example.

FIG. 5 shows a configuration of the system in which two automatic washing machines are disposed on rooftops, for further recycling.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT OF THE INVENTION

In FIG. 1 there is a twin assembly of Washing Machines assigned with reference numerals (100 and 200). The machines (100, 200) are connected through a channel means having a two-way solenoid valve means (300), for channelling water from one to another. The input to the channel (300) passes through a Valve and/or Filtration device (310), to remove suspended impurities like lint and other large particles. Additionally, the channel means passes through an Ultraviolet or Gamma rays irradiation chamber (320) to remove pathogens. The channel is provided with a back-flush device taking input water from a tap and discharging back-flushed water into a drainage. Both the washing machines (100, 200) have independent tap water inlets (110, 210) and effluent drainage pipes (130, 230).

Both the machines (100, 200) are controlled by a single controller (400) with a pre-programmed logic and a default setting that can be changed through electronic push buttons (410) and knobs (420), and is displayed through electronic panels (430, 440) associated with the washing machines (100, 200).

The first washing machine (100) may be used for lesser soiled, e.g. garments and the second washing machine (200) can be used for heavily soiled e.g. linen, towels, mops, shoes, doormats etc.

The controller (400) is programmed to operate the two-way solenoid valve means (300), to direct effluent of each selected cycle of the first-machine (100) as input for the second machine (200). Additionally, effluent of each cycle of the washings machines (100, 200) is dischargeable as waste water through the solenoid valve means (300) directing the flow to the drainage pipes (130, 230).

The controller (400) is programmed with an interlocking logic, as explained below through a typical exemplary scenario.

The pre-wash option of the first machine (100) may include extracting fresh water from the first water inlet (110), drawing stored chemicals from disposal tray (140), soaking and tumbling the garments in the solution, and channelling the pre-washed water to the second machine (2/0) on spinning. The second machine (200) is programmed to complete its pre-wash cycle, spin and release the re-used pre-washed water through the drainage (230), while the first machine (100) is completing its Wash cycle after drawing fresh water through the first water inlet (110). If a hot wash option has been selected for the first machine (100) e.g. by selecting 'cotton' at knob (410), the controller (400) causes an inbuilt electrical heater equipped with a thermostat in the washing machines (100, 200) to control the water temperature at a desired level. When the first washing machine (100) completes its Washing cycle, it spins and channels hot/cold wash water (with remaining detergent) to the second washing machine (200) through the channel (300). The first machine (100) now starts a Rinse cycle while the second machine (200) starts its Wash cycle. Again if a hot wash option has been selected for the second machine (200), the temperature of recycled wash water is maintained at a desired level through the inbuilt heating device as explained hereinabove.

The second machine (200) on completing its Wash cycle, spins while discharging the reused washed water through the drainage (230), and stands by for input Rinsed water from the first machine (100). Likewise, at any stage the first machine (100) may also stand by till the second machine (200) is through with a cycle and becomes ready to take intended grey water. Then the first machine (100) spins and channels Rinsed water into the second machine 200. The second machine (200) then performs the rinse operation by using the recycled water. Likewise, the first and the second machines (100, 200) repeat the process if a second rinse has been opted. Finally, the first machine (100) on completing all the selected cycles, allows its door to open and is ready for the next load. The second machine (200) may, in the last cycle, draw a specified quantity of fresh tap water for a final Rinse with or without specified disinfectants stored in a disposal tray (240). The second machine (200) then completes the cycles by final spinning of its load, at a specified RPM. A typical program cycle is shown in FIGS. 4A and 4B.

Additionally, the second machine (200) may be operated to perform as many fresh water cycles as desired. For example, there may be a ‘double wash’ option at electronic panel (440), if selected will operate the second machine (200) to start a fresh water wash cycle before the final fresh water rinse in the above example. In this scenario, any or the fresh water cycle discharge may be stored and recycled as desirable.

The Rinse cycles may consist several short bursts of rinses in which little water is used, which may be expelled through the drainage pipes (130, 230), while the rinsed water of full rinse cycles only be channelled into the next machine.

A reservoir chamber may be also provided between the two machines (100, 200) for temporary storage of water of each cycle, operated through a second set of solenoid valve means connecting it with the machines (100, 200) on both the sides, as shown in FIGS. 2A and 2B. In that case, the channel (300) may be placed between the intermediate reservoir and the second machine (200). In another configuration, the filter/sieve (310) is disposed between the first machine (100) and the intermediate reservoir while the irradiation device (320) may be designed between the intermediate reservoir and the second machine (200). Both the machines (100, 200), the intermediate reservoir including the channel are configurable in a vertically stacked system as shown in FIG. 2B.

The filter/sieve (310) may be provided with a known back-flush means. In case of the intermediate reservoir being provided, the program logic is accordingly set, e.g. the first machine (100) will hold from releasing grey water selected for recycling if the intermediate storage is not ready to take it. Additionally, the system may be operable to store grey water of any particular cycle of any of the machines, for later use in the starting cycle of any of the machines as desired. If a machine is being used singly, tile grey water so stored for later use may be of any cycle and in that case, if a single machine
is used again, the stored water is also recycled to any cycle as selected in the controller. For example, if the machines (100, 200) are selected to operate singly, the wash water of wash cycle of the first machine (100) may be selected for use as recycled wash water for the next load of the second machine (200), or of the first machine (100) again, by causing the two-way solenoid valves to operate as shown in FIG. 2A. (0032) The channel (300) may also be provided with an electronic sensor (330) to check turbidity of the channelled pre-washed and/or rinsed water of the first machine (100), and beyond a specified threshold, causes the controller (400) to show a warning signal and/or halt operations. Alternatively, the controller (400) is programmable to operate a solenoid valve (340), to release the extra turbid water as effluent, as shown in FIG. 3B. In this scenario, the controller (400) may be further operable to cause the second machine (200) to extract fresh tap water at (210) for the next cycle. In any of the cycles, the second machine (200) may also be operable to draw additional detergents stored in the disposal tray (240). (0033) Additional disinfection means may be provided such as Gamma ray irradiation at tile first machine (100) before the start of first cycle and/or at the second machine (200) after the last cycle. (0034) Separate motors are provided to run both the machine (100, 200) in tandem, controlled through the common controller (400), incorporated with interdependent logics such as explained herein above by way of examples. (0035) Likewise, there may be other options, with an essential interlock of wash cycles in the first and the second machine (100) and (200) in such a way that whenever the second machine (200) is not ready to take intended input of grey water from the first machine (100), the next cycle of the first machine (100) will remain on hold, and vice-versa i.e. the second machine (200) will hold the next cycle till the first machine (100) has performed a corresponding task selected. There may also be an option of switching off the interlock program. Then both the machines (100, 200) become independent machines operable separately like conventional washing machines. (0036) In that case the controller (400) may operate both the machines (100, 200) independently, or two separate conventional controllers of the machines (100, 200) may operate each machine individually. (0037) FIG. 4A shows a typical example situation of text displayed at the panels (430, 440) The Knob (410) preferably has wash type options for (100), e.g. Cotton, Synthetic etc. Likewise, the knob (420) has options for the second machine (200), like Soiled (for heavily soiled items like mops, doormats, shoes etc.), Linen etc. (0038) Display panels (430, 440) shows typical default setting and maneuverability of individual cycles in each machine. In the example display panel, 5 cycles in each machine are selectable as yes/no (y/n) options. Against each of these 5 cycles at the display panel (430), there is an additional option selections viz. ‘Recycle or Not’ at the display panel (430). Similarly, against each of the 5 options at the display panel (440). Recycled or Fresh water usage is displayed, depending on selections in the first machine (100). Upon selecting a particular cycle option in one machine, certain options are automatically selected in the other. For example any selected cycle at the display panel (430) also selected as Recycle will automatically lead to the corresponding cycle of the other display panel (440) selected as ‘y’ and ‘Recycled’. Likewise, if any cycle at the display panel (440) is selected as “Freshwater” the corresponding previous cycle in the other display panel (430) displays as ‘n’ against ‘Recycle,’ and operate the first machine (100) accordingly. As such, various permutations and combinations are applicable by selecting options at the knobs (410) (420) and at the display panels (430, 440). A typical chronological sequence of tandem operation of the two machine cycles corresponding to the default selections of FIG. 4A is shown in FIG. 4B. (0039) To simplify the panel options at the display panels (430, 440), pre-set combinations may be selectable through text displays like “Max Cleaning+Low Water Saving” for example in case of the default setting shown here. However, if all cycles are selected for Recycle in the example situation, the text display may be “Max Cleaning+Highest Water Saving”. Likewise, if only Wash and One Rinse cycle is selected and both are also selected for Recycle, the text can be “Min Cleaning+Max Water Savings. If however, additionally Pre-Wash is also selected, it could be “Medium cleaning+Max Water Saving” and if yet another Fresh Rinse is selected at the display panel (440), it could be “Medium Cleaning+Low water Saving” etc. In each of these selections, further program logic, also known as Fuzzy logic in automated washing machines, may be applied, such as shortening the length of wash cycle automatically if the selection is “Min Cleaning+Max Power Saving” etc. (0040) The tandem type configurations of tie washing system may be preferably horizontal as shown here, or a vertically stacked twin i.e. the first machine (100) on top of the second machine (200), to save space or any other desirable reason. (0041) Typical Wash Cycles for both the machines (100, 200) operating in tandem, controlled through the common controller (408) is shown below for example: (0042) Various advantageous features of the washing machine are the following: (0043) 1. Any cycle of the first machine (100) dischargeable as effluent and rest recyclable as input for the second machine (200). (0044) 2. Fresh water at any cycle option for the second machine (200) as well, e.g. last rinse as exemplified above. (0045) 3. Any selected cycle of the first machine (100), also being selectable as ‘recycle’ in the second machine (200). (0046) 4. Independent temperature controls of the machines (100, 200) (0047) 5. Different wash logic selectable in the first and second machine (100, 200); e.g. ‘delicate’ in the first machine (100) and ‘hard’ in the second machine (200). (0048) 6. Controlling cycles in the machines (100, 200), depending on selection of washables types e.g. Cotton in the first machine (100) and heavily Soiled kitchen mops in the second machine (200). (0049) 7. Interlocked delay operations like starting the machines (100, 200) at a particular time, or stopping at a particular stage e.g. after pre-washing at the first machine (100). Additionally, keeping the first machine (100) on ‘hold’ till the second machine (200) is not ready to take the intended input of grey water from the first machine (100). (0050) 8. On finishing the cycles of a particular machine earlier, allowing the door to open for taking away the cleaned laundry and placing next load to be washed. (0051) 9. After removing the laundered material, grey water is returned from tile machine still in use to the emptied one, for further use in any of the machines as selected. The 2nd Rinse water may be redirected to the first machine (100) for
temporary storage and subsequent use for the first cycle of the next load in the second machine (200).

[0052] Likewise, when only the first machine (100) is used, using the second machine (200) for storing grey water of any cycle, e.g. either wash or rinse, for later use in any cycle of the first machine (100).

[0053] On switching off the interlock logic, both the machine (100, 200) are operable independently as two conventional machines.

[0054] 12. Interrupted disposal of Detergent, Bleach and other Solvent through disposal trays (140, 240) in both machines (100, 200); i.e. any of the cycle may be interrupted to operate the machine to extract specified material stocked in the disposal tray (140, 240).

[0055] The multiple combination may have one or more of any type of automatic washing machine such as front loading tumble or top loading agitator etc. For example the first machine may be front loading tumble wash suitable for delicate clothes and the second may be top loading agitator wash more suitable for heavily soiled linen etc.

[0056] The tandem type washing system may be placed on the roof-top for further recycling of effluent waters of the first machine (100) and/or the second machine (200) discharged through their associated drainage pipes (130, 230). In this configuration, the said drainage pipes (130, 230) are connected to a storage device such as a reservoir (500). The reservoir may pass the effluent water through a Channel means that may be similar to the channel means (300), shown here at (505). The channel means (505) may lead to a storage tank (510) that may have filtration means such as divider plates with descending level of pores or no-porous plates placed in such a way that it allows overflow to the next chamber. Additionally, the storage tanks may have transparent panels that allow solar rays to pass through in the stored water, for prevention of and further breakdown of pathogens. A solar heater may also be employed if the water is desired to be heated.

[0057] The biggest advantage of this novel construction is that the effluent grey water discharged and stored at the roof top does not require any pumping. As the fresh water used for washing is generally already stored at the rooftops, there is net saving of energy. The grey water may be further processed using sun-rays and may be supplied through a separate pipelines for flushing (520), gardening (530), car-wash (540) and the like. Moreover, laundering at roof top will also facilitate drying clothes under the sun, further saving efforts to carry the washed clothes there. An additional drainage pipe running through the bottom of all compartments (550) may be connected to a hydrant (560) for any use including for ground water recharging through a pit (570), additional water source in emergencies like fire as shown (580).

[0058] In a different scenario, more than two machines may be interconnected serially, e.g. a third machine operable to extract selected effluents of the second and/or first machine, and so on. This type of modular configuration may be more useful in an industrial situation where heavily soiled load maybe more.

[0059] Many known devices and processed may be used to clean the final effluents of the tandem washing machines placed at the rooftops. Through additional mechanical means, alternative drainage and fool-proofing systems may be provided for contingencies like power-failure, system crash and/or overflow etc.

[0060] Although the present invention has been described in detail here, various changes, substitutions, and alterations may be readily ascertainable by those skilled in the art and may be made herein without departing from the spirit and scope of the present invention as defined in the following claims. Moreover, the present invention is not intended to be limited in any way by any statement in the specification that is not otherwise reflected in the appended claims.

1. A multiple industrial washing configuration comprising: at least two washing machines flowably connected and operated in tandem through an electric controller; each capable of washing separate loads, comprising an inlet, an outlet, a disposal tray and a drum; the outlet of the first machine directly connected to the inlet of a second machine via a channel means having a two-way solenoid valve, a filtration and a treatment devices; the controller being operable to cause the said machines and the said channel to function in synchronization upon selection of any of a plurality of available attributes; the said channel operable to directly deliver an effluent water of at least one selectable cycle of said first machine as an input in at least one selectable cycle of the second machine; the improvements comprising directly inputting such effluent water for recycling without storing, thereby saving space and plumbing and avoiding loss of heat, detergency and growth of pathogens in the said effluent water due to storage.

2. A twin (two-in-one) washing machine comprising at least two parts parallelly or vertically; each part capable of washing separate loads, comprising an inlet, an outlet, a disposal tray and a drum; the outlet of the first part directly connected to the inlet of a second part via a channel means having a two-way solenoid valve, a filtration and a treatment devices; an electric controller being operable to cause the said parts and the said channel to function in tandem upon selection of any of a plurality of available attributes; the said channel operable to directly deliver an effluent water of at least one selectable cycle of said first part as an input in at least one selectable cycle of the second part; the said channel operable to filter and treat the said effluent water before the said delivery, the said treatment comprising irradiation.

3. The washing system configuration as claimed in claim 1, the channel comprises an irradiation device to remove pathogens from the discharged water.

4. The system configuration as claimed in claims 1, the channel means is provided with a sensor to determine the turbidity of the discharged water from the first part being transmitted to the second part.

5. The washing system configuration as claimed in claim 4, comprising a solenoid valve means to release turbid water in case the sensor determines turbidity of the discharged water to be more than a predetermined level.

6. The washing system configuration as claimed in claim 5 further comprising: on said release of turbid water, the said solenoid valve operable to instead draw freshwater from the freshwater source and detergent stored in disposal tray in the second part, and resume operations of both parts.

7. The washing system configuration as claimed in claim 4 further comprising the sensor activating an audio alarm and/or an electronic display if the turbidity of discharged water is above a predetermined level.

8. The washing system configuration as claimed in claim 7 further comprising, the sensor causing the controller to withhold further operation of the second machine if the turbidity of discharged water is above a predetermined level.

9. The washing system configuration claimed in claim 3, providing an intermediate chamber for irradiating the discharged water for recycling.
10. The washing system configuration as claimed in claim 2, wherein the controller is operable to interlock operating cycles of two parts, whereby on completion of a selected cycle of any of the two parts, the next selected cycle of said part is operable to remain on hold till the time the other of the two parts completes the said interlocked cycle.

11. A method of selectively utilizing effluent of a first washing load directly as an input for a second washing load, without any storage of the said effluent to be recycled, the method comprising:

placing at least two types of wash loads in two separate wash tubs having separate inlets, outlets, detergent disposal trays and wash drums electrically operable in tandem by a controller means

classifying the first tub's outlet the second tub's inlet, through a channel comprising solenoid valves means, the said valves operable through the said controller to selectively discharge effluent of the first tub as input to the second tub.

operating the said channel to selectively direct an effluent of a first cycle of the first tub to a drainage sewer and selectively direct an effluent of a second cycle of the first tub to the second tub directly

directly recycling the said effluent as an input in a wash-cycle in said second tub.

12. The method claimed in claim 11 further comprising;

filtering and treating the said recycled water before inputting it in the second tub.

13. The method of claim 12, the said treating comprises an irradiation through an irradiation means.

14. The method as claimed in claim 11, further comprising;

synchronizing the inputs, the outputs and the wash cycles of said first tub and second tub in tandem with each other through said controller.

15. A fuzzy logic for implementing a tandem washing system for synchronizing working of at least a two-part washing machine, each part comprising separate inlet, outlet and drum, both parts interconnected through an electric controller and through a flow channel operable to selectively deliver an effluent of the first part as input to the second part for recycling, the logic causing the controller to operate the said parts and the said channel in tandem as per selectable attributes in respect of recycling the said effluent, the logic having capability to receive signals for a challenge in such selected recycling applying sensor means, and the logic further having capability for implementing a pre-set response to such challenge.

16. A twin-tub domestic washing machine comprising two washing compartments each comprising separate washing drums with inlets and outlets connected to fresh water source and a drainage sewer respectively, the outlet of the said first compartment also directly connected to the inlet of the second compartment via a channel means having a two-way solenoid valve, an electric controller being operable to cause the said drums, inlets, outlets and the said channel to function in tandem upon selection of any of a plurality of available attributes in respect of both tubs, the said channel operable to directly deliver an effluent water of at least one selectable cycle of said first compartment as an input in at least one selectable cycle of the said compartment, the said controller also operable to interlock selected wash cycles of each compartments in a way that operation of one compartment is kept on hold till the other completes such an interlocked cycle.

17. The domestic washing machine of claim 16 further comprising; the said channel is provided with a filtration, an irradiation and a sensor means.

18. The domestic washing machine of claim 16 further comprising; the said controller being operable to receive electronic signals from the said sensor and to respond with alternative operations in the event of the said signals being as per specified parameters.

19. A tandem washing machine operable through a controller, to synchronize working of at least two automatic washing machines directly interconnected through a channel means comprising a filtration device, a treatment device and valves, the said program operating the said machines to work in tandem with each other, in response to the recycling attributes for each machine selected by a user through display panel means, the said program also operating the said channel to selectively direct an effluent of a first machine as input to a second machine directly if the said first machine is ready to discharge and the said second machine is ready to receive the said effluent as selected, and if any of the said machines not being ready, keeping the operation of the other machine on hold.

20. The tandem washing machine program of claim 19 further comprising; the channel means operable to filter and treat the said effluent water before recycling, the said treatment comprising irradiation utilizing an irradiation means.

21. The tandem washing machine program of claim 19 further comprising; the channel means operable to check the suitability of a selected effluent through a sensor means and in the event of such effluent being unsuitable, the program in response to a signal from the sensor holding the operation of both machines and causing a voice and/or display signal to transmit to the user.

22. The washing machine program of claim 21 further comprising; the program operating the channel to flush out such unsuitable effluent in a drainage sewer and instead draw fresh water in the said second machine and to also draw detergents stored in a disposal tray in the said machine, to continue completion of washing cycles of both machines as selected.

23. The tandem washing machine program of claim 18 further comprising; one of the program selections capable of operating both the machines independently and simultaneously as two separate machines.


25. A method of utilizing turbidity sensors in checking the suitability of an effluent water for recycling in a washing process.

26. A controller means and a channel means for interconnecting at least two washers for a tandem operation of the said washers in synchronization with the said channel, for discharging effluent of one washer as input drawn in another, the said discharge being drawn directly through the said channel for recycling without storing, the said channel comprising solenoid valves electrically controlled through the said controller.

27. The channel means of claim 26 further comprising a filtration device and a treatment device.

28. The channel means of claim 27, the treatment device comprising an irradiation device.

29. The controller means and the channel means of claim 26 further comprising an electronic sensor device operable to transmit an electronic signal to the controller device.

30. A recycling process for directly inputting an effluent of a first wash load as an input for a second wash load, without storing the said effluent to be recycled.

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