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TORAMAN(10) **Pub. No.: US 2016/0230376 A1**(43) **Pub. Date: Aug. 11, 2016**(54) **TOILET WATER SAVING SYSTEM USING
WASTE WATER****Publication Classification**(71) Applicant: **Özgör Emre TORAMAN**, Istanbul (TR)(72) Inventor: **Özgör Emre TORAMAN**, Istanbul (TR)(21) Appl. No.: **15/021,426**(22) PCT Filed: **Sep. 5, 2014**(86) PCT No.: **PCT/TR2014/000331**

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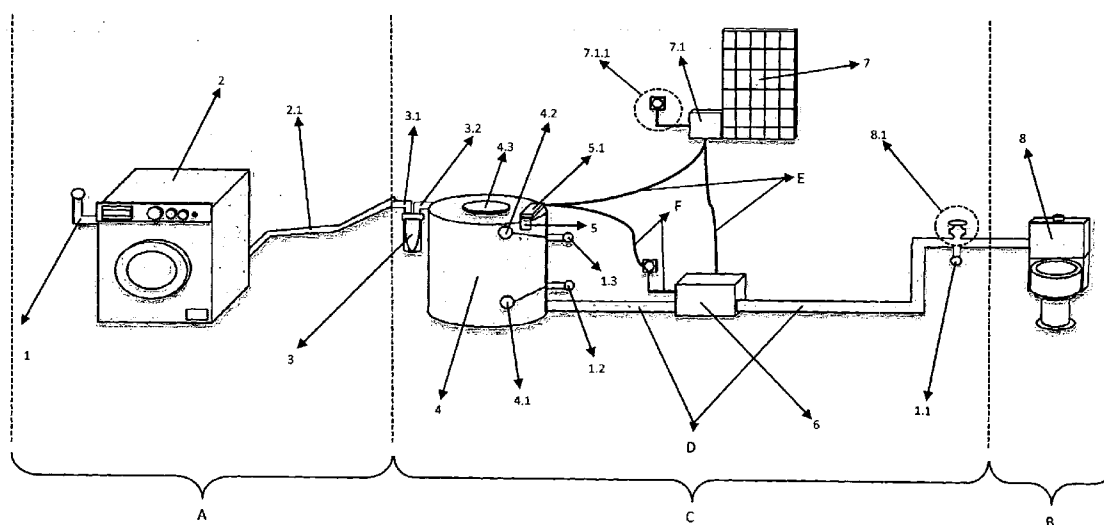
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ABSTRACT

This invention is a hygienic water saving system which can be applied to all washing machines and toilets and evaluates waste water produced by washing machines in toilets and provides water-saving in toilet siphons, produces electrical energy through solar panel.



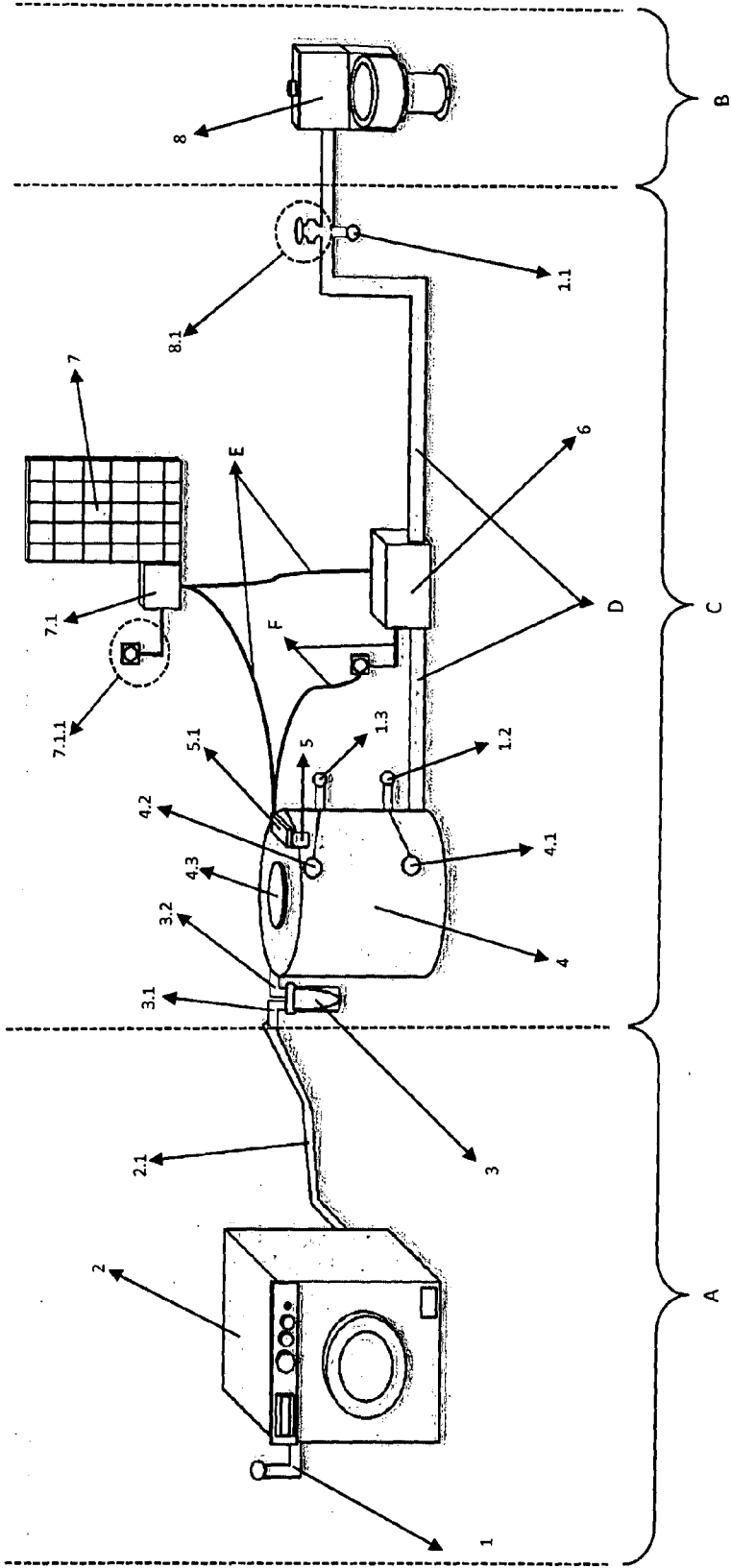


Figure - 1

TOILET WATER SAVING SYSTEM USING WASTE WATER

TECHNICAL FIELD

[0001] The present invention is about the system using waste water of washing machine and supplies water need of closets, urinals and such product groups.

PREVIOUS TECHNIC

[0002] A. Prior Technic About Toilets

[0003] The water required for toilet flushing needs of toilet groups like closet, squat toilet, urinal and etc., in toilet system, is supplied from city mains water supply (tap water/clean water). In the current systems which are connected to the mains water supply toilet flushing tank (reservoir) is filled with tap water. Though these siphon tanks vary depending on the brand and model the average has 5-12 liters volume. When user presses to the flush button or pull the siphon water is discharged from the tank to the toilet bowl and drags feces to the septic channel. In most urinals type this process is done without tank. Mains water is discharged directly into the urinal without water tank with various valves, sensors and etc.

[0004] Another toilet system concept made with the objective of providing water saving is as follows: This concept system consists of a sink and a toilet. Sink waste pipe (outlet) and also siphon tank are connected to mains water pipe. So, contrary to the above-described system, two-pipes are connected to siphon tank. Siphon tank (reservoir) is filled by 50% with waste water coming from sink as the sink is used, and filled by 50% with clean water from the mains water supply. Thus, according to the standard system, 50% water is saved for water used in closets.

[0005] Also, for closets, etc., product groups to be clean, hygienic and with fragrant odor, to remove lime, fecal residue, for convenience during cleaning with toilet brush and to color the water; bowl/reservoir blocks are used externally installed near closet or placed into reservoir. Because these closet/reservoir blocks contain various chemicals, dyes and fragrances they are used for cleaning water, coloring water and most important to remove/fix bad odors. In addition, they are also used for hygiene.

[0006] B. Previous Technic About Washing Machines

[0007] Washing machines basically are connected to the mains water to meet the need for clean water. Machinery washes laundry with clean water fed from the mains water supply and detergent put to machine by users and at the end of the washing process discharges its waste water to waste water pipeline (septic tank/outlet) as programmed. At this stage, many new generation washing machines, obtain essential pressure to discharge waste water to outlet from the motor placed into washing machine. Thus, waste water with detergent is discharged to septic channel.

PURPOSE AND DESCRIPTION OF THE INVENTION

[0008] The purpose of this innovation is; to gain 100% of 5-12 liters water wasted in each press to siphon used by people more than one time each day for their basic need of toilet and not to waste extra water for siphon. Using/assessing washing machine waste water for water needed in toilets for siphon, instead of clean mains water and to make 100% saving from mains water used for siphon in toilets.

[0009] In the previous technic while washing machine and separate toilet siphon spends water, with this inventive system no clean water is wasted in toilets. Thanks to these innovation, waste water of washing machines supplies water required by toilets. Thus, the invention system avoids of unnecessary waste of water in toilets. In the simplest terms, instead of discharging waste water of washing machine directly to septic channel, the invention uses waste water of washing machine in toilet siphons and then discharges to septic channel from toilet which would otherwise directly discharged to septic channel.

[0010] In other previous technical concept system, because sink is not used and waste water does not occur, water tank is not filled with water coming from here continuously and while previous technic provides 50% saving in contrast, this inventive system provides 100% water saving. In addition, the waste water arising from the use of sink contains various particles and harmful organisms (bacteria, fungi, etc.); it causes system blockages in pipes and siphon tank with bad smells, and provides a convenient environment for the growth of harmful organisms and algae. In the inventive system, used water is not general purpose water, and filter is not used. Thereby filter, eliminates this problem by holding particles causing blockage in the pipes and siphon tank. And because the most important innovation used in the inventive is liquid washing machine waste water; various chemicals (detergent, bleach, etc.) in this fluid content inhibits the growth of micro-organisms kills them; and accordingly washing machine waste water has anti-bacterial properties and provides toilet hygiene by eliminating bacteria-colony odors and visible stains.

[0011] Also aim is coloring water of toilet users, efficient cleaning, hygiene, perfumes and to make toilet look brighter; ensure to ceasing use of toilet/cistern blocks, naphthalene and etc., with this system; thereby eliminate economic loss and to facilitate cleaning of toilet bowls with this product.

[0012] The invention system can produce its own electricity needed by system components by producing electrical energy through solar panel and can work independently of mains water. In the description of the invention the system of invention, is described in two energy options. These two options; are equipped with solar panels and without solar panels.

DESCRIPTION OF FIGURES

[0013] FIG. 1: General perspective of elements that form invention and operation logic of the system (connection diagram).

DESCRIPTION OF REFERENCES IN THE FIGURES

- [0014]** 1. Washing machine water input (Clean Water)
- [0015]** 1.1. Siphon tank water input (Clean Water)
- [0016]** 1.2. Polyethylene tank with cold water input (clean water)
- [0017]** 1.3. Polyethylene Tank drain output (used water)
- [0018]** 2. Washing machine
- [0019]** 2.1. Washing machine waste water hose (outlet)
- [0020]** 3. Stainless steel filter capsule
- [0021]** 3.1. Filter capsule inlet
- [0022]** 3.2. Filter capsule outlet and polyethylene tank inlet

- [0023] 4. Polyethylene water tank
- [0024] 4.1. The lower limit of the float
- [0025] 4.2. The upper limit of the float
- [0026] 4.3. Ventilation Grill
- [0027] 5. Liquid level sensor
- [0028] 5.1. Electronic device reading fluid level and the display
- [0029] 6. Hydrophore (water booster)
- [0030] 7. Solar panel
- [0031] 7.1. Solar panel energy storage electronic unit
- [0032] 7.1.1. Electronic unit mains connection
- [0033] 8. The toilet siphon tank (reservoir)
- [0034] 8.1. Three-way diagonal valve
- [0035] A: Washing machine and waste water hose as external elements of system
- [0036] B: Toilet set as external element of system
- [0037] C: The system's internal (main) elements
- [0038] D: PVC connection pipes carrying liquid from polyethylene tank to water booster and from booster to siphon tank.
- [0039] E: Power cables feeding water booster and sensor kit.
- [0040] F: Water booster and sensor kit, mains electricity connection (for systems not using solar panel)

EXPLANATION OF INVENTION

[0041] The invention system operates between components of washing machine as external element of system (A) and system toiletries as external elements (B) of system. The invention system is compatible with washing machines (2) and toiletries (B).

[0042] Washing machine (2) washes laundry with clean water received from mains water supply (1) and user added several chemicals (detergent, bleach, etc.) as it is programmed. Washing machine (2) sends chemical wastewater resulting from washing to draining hose (2.1). This washing machine outlet hose (2.1) is connected to inlet orifice (3.1) of steel filter capsule (3). Waste water coming from washing machine outlet hose (2.1) is poured to filter capsule (3) here. Filter capsule (3), is connected to polyethylene tank inlet (3.2). Waste water passing through the filter (3) is discharged to same polyethylene tank (4) from the top level with same compulsion. Thus, all particles up to 10 microns in the waste water resulting from washing are filtered with this filter (3). Because of filter (3), polyethylene tank (4) is kept away from physical wastes and tank (4) is kept clean. In addition, the filter (3) keeps these wastes and prevents physical blockages that may occur throughout the system and prevents damage or corrosion of booster (6). This is the reason why filter (3), is placed at the beginning of the system before polyethylene tank (4) and booster (6). Filter capsule (3) is manufactured from stainless steel and resistant to corrosion and chemicals. It can be washed under running water and cleaned at regular intervals and it is for multi-time use. (On request filter (3) can be modernized, and color, odor and chemical purification functions can be added to these filters (3)).

[0043] The filtered washing machine waste water is deposited in polyethylene tank (4). Polyethylene tank (4) is used to provide a continuous flow of waste water in the system. Booster (6) takes the waste water from this tank (4) as needed. Simply polyethylene tank (4) ensures the toilet flushing tank (8) is always full. The reason for using a blue polyethylene tank (4) type; is its resistance to the sunlight and prevention of growth of microorganisms and algae due to its structural

chemistry. Also, to ensure ventilation of tank (4) ventilation grid (4.3) is disposed to on tank (4).

[0044] In order to prevent overflow when polyethylene tank (4) is full, upper limit float (4.2) is disposed into reservoir (4). When liquid in polyethylene tank (4) rises to upper limit level, the upper limit float (4.2), set at this level drains excess fluid from the outlet (1.3). Discharge outlets (1.3) are connected to septic tank channel by pipes. Upper limit (4.2) float continues to drain excess fluid within tank (4) up to desired volume until to ensure a safe tank (4). Thus overflow of the liquid in polyethylene tank (4) is prevented.

[0045] In the event of a reduction of liquid in polyethylene tank (4) to ensure system continue to operate and continuity of water flow to toilet flushing tank (8); lower limit float (4.1) is disposed to bottom of tank (4). Lower limit float (4.1) is set to a certain level and when liquid level in tank (4) falls to a minimum it starts to receive clean water support from water input (1.2) into tank (4). The lower limit of the float (4.1) continues to receive water from the mains water supply until the desired minimum water volume is achieved. When water inside tank (4) reaches to desired minimum level of liquid the lower limit float (4.1) stops water intake. So the required minimum water level inside tank (4) is preserved and water supply to flush tank (8) continues. This minimum volume required in the single system, is such as to fill at least one toilet tank (8). So this is volume of the toilet tank (8) is approximately 15 liters to fill a toilet tank (8). This volume is increased in multiple systems, proportional to the number of units. Thus, due to lower limit float (4.1) feature; while keeping the minimum liquid level within the tank (4); siphon tank (8) and corroding booster (6) when exposed to dehydrate has not been left without water and continuity of the system fluid flow is restored.

[0046] Liquid level in tank (4) can be read liquid level sensor (5). Liquid level sensor (5) forwards liquid level sensor information (5) inside tank (4) to connected electronic device (5.1). In this way, users can see the amount of liquid in tank (4) from the screen of electronic device (5.1). In addition, this electronic device (5.1) can be modernized and fully automated; and can perform functions of water supply to tanks (4) and fluid drain electronically instead of float upper limit (4.2) and the lower limit float (4.1).

[0047] Booster (6), is connected tank (4) with connection pipe (D) operates when toilet flushing tank (8) runs empty, and begins to take waste water from tank (4). Booster (6) pumps/forwards fluid taken from the connecting pipe (D), to siphon tank (8) at desired flow rate. Until siphon tank (8) is full booster (6) continues to pump fluid. When siphon tank (8) is full, as usual pump float interrupts the flow of fluid within siphon tank (8) and booster (6) stops working simultaneously. As siphon tank (8) evacuated; booster (6) is engaged and pumps waste water taken from tank (4) to siphon tank (8). Thus, button of siphon tank (8), is pressed by users, washing machine waste water in siphon tank (8) is discharged into the closet inside. Water pressure provided by booster (6), is equal to the mains water pressure. This pressure is approximately 3 bars.

[0048] User when requested may cut washing machine waste water with a three-way diagonal valve (8.1) placed on the connection tube (D) next to siphon tank (8) and may fill siphon tank (8) with mains water. On inlet of three-way diagonal valve (8.1) is connected to booster (6) one is connected to the connecting pipe (D), and the other is connected to mains water inlet (1.1) and one inlet is connected to the siphon tank

(8). When required users can turn this valve (8.1) and; may transfer clean water from mains water inlet (1.1) directly to the siphon tank (8) and again by turning this valve (8.1) users may transfer washing machine waste water coming from (4) to siphon tank (8). Three-way diagonal valve (8.1) can be turned to three directions; when it is turned to one direction it stops mains water input (1.1) and opens connection between connection pipe (D) and siphon tank (8); and when it is turned to the opposite direction it cuts the way of connecting pipe is (D) and opens mains water input (1.1). Thus, user can decide on what kind of water to fill to siphon tank (8).

[0049] Electrical energy to operate booster (6) as among system's internal components (C) and sensor set (5) (5.1) is provided in two options. The first of these is; electricity produced by solar panel (7). Solar panel (7) produces energy and sends energy to energy storing electronics unit (7.1) and energy is stored there. Energy storing electronics unit (7.1) consists of dry batteries and electronic circuits. The electronic unit (7.1) has two cables (E) and one is connected to booster (6) and the other is connected to sensor set (5) (5.1). The electronic unit (7.1); provides the desired voltage electrical with power cables (E) to booster (6), and sensor set (5) (5.1). Thus booster (6) and sensor set (5) (5.1) would have to meet their energy needs and energized from this electronic unit (7.1) as needed. (Liquid level sensor (5) and the fluid level reading electronic device (5.1) and display of with two component are called as sensor set (5) (5.1).)

[0050] Energy-storing electronic unit (7.1) is also electrically connected to mains power supply (7.1.1). The purpose of this feature is to ensure operation of system with energy supplied from the mains (7.1.1) in case of insufficient energy deposition in electronic unit (7.1) and/or in case of malfunctioning of the system. Thus, the system can continue to work uninterruptedly. In case an error, etc. occurs in electronic unit (7.1) relay in the electronic unit (7.1) is engaged in the mains electricity (7.1.1) starts to deliver support. The electronic unit (7.1) takes energy from the mains only in such cases (7.1.1). During normal operation, it uses the energy produced by solar panel (7). Moreover, LEDs located on the electronic unit (7.1). LED flashes green during normal operation and red in case of failures to warn user.

[0051] Second energy option to run boosters (6) and sensor set (5) (5.1) is the system without solar panel (7) and accessories. This option is left to the user's opinion. In case users prefer a system without solar panel (7) the system provides electrical energy as follows: booster (6) and the sensor set (5) (5.1) are directly connected to the water supply (F) and these elements receive electrical energy requirements from mains power connection (F).

[0052] In addition, in the direction of demands of users; with a larger solar panel (7) electronic unit (7.1) can be modernized and electric power needs of washing machine (2) may be provided by connecting the washing machine (2) to solar panel (7) by using the electronic unit (7.1) and an additional power cable. Thus, the solar panel (7) can feed also washing machine (2).

[0053] In FIG. 1 single invention system is described with single sample. The invention system may be applied to more than one washing machine (2) and toilet group (B). As unit number of external components of the system (A), (B) increases in multiple projects, proportionally the number of units of internal members of the system (C) also increases and/or optimization of these elements is performed. In this mentioned central system, for example, if 3 toilet sets (B) are

to be used; larger polyethylene tank (4), stronger booster (6), a wider solar panel (7) and modernized electronic unit (7.1) are required. Accordingly, the connecting pipes (D) and other elements of the system are shaped according to the project. For example, if invention system; is to be used from laundry complex of to the toilets in all rooms, particular project is drawn for such project. Project optimization can be achieved by drawing the project according to calculations of connection pipes (D) thickness, the reservoir (4) size etc., and width, length, flow, force, etc. of all other units of the system components. In short, the invention system may be applied to other multi/central structures as well as individual systems. (FIG. 1/1)

METHOD OF APPLYING THE INVENTION TO INDUSTRY

[0054] The invention described herein, can be produced and used in any field of industrial sector and applicable to the industry. The invention can be applied as single or multi structural projects in all residential, office, hotel, resort, sites and so on having washing machine and toilets.

1. The present invention is a water-saving toilet system comprised of filter capsule inlet port (3.1) which adjusts to drainage hoses of all washing machines (A) and connecting pipe (D) which adjusts to all water closets, urinals, squatting pans, etc., toilet groups (B).

2. The invention is a water saving system evaluating detergent waste water of washing machines in toilet products and comprised of;

Corrosion-resistant, manually cleaned and multi-time-use stainless steel filter (3), holding particles coming from washing machine (2) via waste water,

Polyethylene tank (4) storing the liquid which should be readily deposited and required for siphoning,

Booster (6), automatically pumping fluid in polyethylene tank (4) to siphon tank (8) at a certain flow rate,

Solar panel (7) producing electrical energy required to run the booster (6) and the sensor set (5) (5.1),

Energy storing electronic unit (7.1), serving to store this energy

Electronic unit electricity mains connection (7.1.1) to ensure of the system in case of any failure that may occur in solar panel (7) or in electronic unit (7.1),

External power supply cables (F), to ensure sustainability and operability of sensor set (5) (5.1) and booster (6) in systems without solar panel (7) by obtaining energy from mains electricity supply directly.

PVC connection pipes (D); transferring fluid in the tank (4) to booster (6) and from booster (6) to the siphon tank (8).

3. Steel filter (3) in claim 2 is the filter protecting the whole system against particles, and comprised of a filter (3) protecting polyethylene tank (4) against sludging which may occur at its base; and protecting PVC pipes (D), the siphon tank (8) and the booster (6), against residues/particles which may cause blockages.

4. Polyethylene tank (4) in claim 2 is comprised of structure chemistry (polyethylene) to prevent algacide and bacterial growth, upper limit float (4.2) preventing overflow and liquid drain outlet (1.3), lower limit float (4.1) which is for important continuous operability of the system and protecting minimum liquid level in the tank (4), mains water support inlet (1.2), enabling measurement of liquid level in the tank (4) and ventilation grille (4.3) on the tank (4) ventilating liquid level sensor assembly (5) (5.1) and tank (4).

5. Three-way diagonal valve (8.1) in claim 1 (C) is comprised of three-way diagonal valve (8.1) enabling user to prefer siphon tank (8) to be filled either with washing machine (2) waste water or mains water (1.1) and one inlet is placed to PVC connection pipes (D), and one inlet is placed to mains water line (1.1), and one inlet is connected to siphon tank (8), and placed just before siphon tank (8).

6. In claim 1, laundry machine (2) and the toilet set (B) are characterized with using washing machine (2) detergent waste water that provides antifungal-antibacterial effect in toilet bowls, urinals and etc., toiletry products (B) and providing hygiene, fragrance and effective cleaning.

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