

**(12) PATENT**  
**(19) AUSTRALIAN PATENT OFFICE**

**(11) Application No. AU 199934063 B2**  
**(10) Patent No. 739699**

(54) Title  
**Device for saving water**

(51)<sup>7</sup> International Patent Classification(s)  
**E03D 005/00**

(21) Application No: **199934063**

(22) Application Date: **1999.02.06**

(87) WIPO No: **WO99/40265**

(30) Priority Data

(31) Number	(32) Date	(33) Country
<b>19805154</b>	<b>1998.02.09</b>	<b>DE</b>

(43) Publication Date : **1999.08.23**

(43) Publication Journal Date : **1999.10.28**

(44) Accepted Journal Date : **2001.10.18**

(71) Applicant(s)  
**Klaus Blum**

(72) Inventor(s)  
**Klaus Blum**

(74) Agent/Attorney  
**WATERMARK PATENT and TRADEMARK ATTORNEYS, Locked Bag 5, HAWTHORN  
VIC 3122**

(56) Related Art  
**GB 2266233**  
**DE 9412781**

34063/99



**PCT**  
 WELTORGANISATION FÜR GEISTIGES EIGENTUM  
 Internationales Büro  
 INTERNATIONALE ANMELDUNG VERÖFFENTLICHT NACH DEM VERTRAG ÜBER DIE  
 INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT)

(51) Internationale Patentklassifikation <sup>6</sup> : E03D 5/00	A1	(11) Internationale Veröffentlichungsnummer: <b>WO 99/40265</b>
		(43) Internationales Veröffentlichungsdatum: 12. August 1999 (12.08.99)

(21) Internationales Aktenzeichen: PCT/DE99/00318  
 (22) Internationales Anmeldedatum: 6. Februar 1999 (06.02.99)  
 (30) Prioritätsdaten:  
 198 05 154.9 9. Februar 1998 (09.02.98) DE  
 (71)(72) Anmelder und Erfinder: BLUM, Klaus [DE/CH]; Regenbogenweg 1, CH-9400 Rorschachberg (CH)  
 (74) Anwalt: LIPPERT, STACHOW, SCHMIDT & PARTNER; Frankenforster Strasse 135-137, D-51427 Bergisch Gladbach (DE).

(81) Bestimmungsstaaten: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO Patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), eurasisches Patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), europäisches Patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI Patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

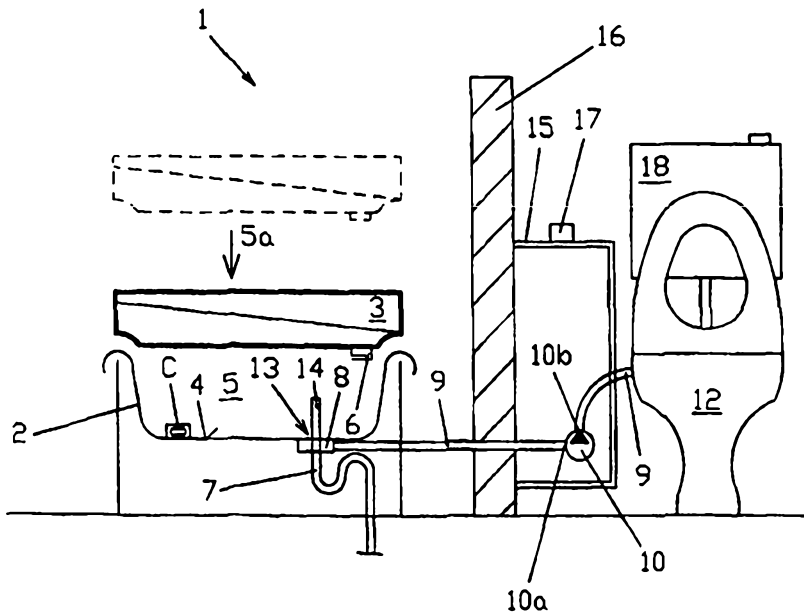
→ Buhlstrasse 2  
 CH-8700 Kusnacht/ZH  
 Veröffentlicht in der Schweiz  
 Mit internationalem Recherchenbericht.  
 Vor Ablauf der für Änderungen der Ansprüche zugelassenen Frist; Veröffentlichung wird wiederholt falls Änderungen eintreffen.

IP AUSTRALIA  
 23 AUG 1999  
 RECEIVED



(54) Title: DEVICE FOR SAVING WATER  
 (54) Bezeichnung: WASSERSPAREINRICHTUNG  
 (57) Abstract

The invention relates to a device for saving water, which enables flushing of a toilet (12) with slightly soiled graywater from a sanitary equipment. The inventive device comprises a graywater tank (5, 20) located under the admission level of the flushing water (11) of the toilet (12) and fed by one or more sanitary equipment. Said device also comprises a flushing water conduit (9, 27) which connects the graywater tank (5, 20) to the admission of the flushing water (11) of the toilet (12), as well as a pump (10, 23) for flushing water. Said pump (10, 23) delivers graywater that contains solid constituents and is placed outside the graywater tank (5, 20). Said tank (5, 20) has the form of a smooth wall container that can be easily cleaned through an aperture (5a) and is integrated to a sanitary equipment placed on the floor.



6 January 2000

5

PCT/DE99/00318

Klaus Blum

CH-8700 Küsnacht / ZH

10

**Device for saving water**

15 The invention relates to a device for saving water, which enables flushing of a toilet with slightly soiled graywater from sanitary equipment, comprising a graywater tank located under the admission level of the flushing water of the toilet and fed by one or more pieces of sanitary equipment, a flushing water conduit which connects the graywater tank to the admission of the flushing water of the toilet, as well as a pump for flushing water that is positioned outside the graywater tank.

20 In a conventional toilet flushing system, the flushing water admission of the toilet is supplied with water from a toilet tank via a downpipe. In this context, the gravity pressure of the water causes the toilet to flush. The situation is different with a generic device for saving water according to DE-U-94 12 781. Instead of a conventional downpipe fed from a toilet tank, this device has a flushing water conduit that is supplied directly by the pump. Flushing is caused by the flushing pressure of the  
30 pump.

35 Due to the poor accessibility of the inside of the container, the graywater tank in DE-U-94 12 781 poses cleaning and hygiene problems. The graywater tank is provided with only a small side opening, through which the inside of the container is accessible.

In addition, the retrofitting of the graywater tank according to

**AMENDED PAGE**

DE-U-94 12 781 is particularly difficult when a shower tub is present. The existing shower tub must first be dismantled in order to fit the new graywater tank underneath the shower tub.

5 Furthermore, a device for saving water is known from GB-A-2 266 233, which generates the flushing pressure in the conventional manner by gravity pressure from a toilet tank. This object does not include a pump for generating flushing pressure. A feed pump pumps the graywater over the edge of the toilet tank and fills  
10 it. The feed pump is not intended to generate a flushing pressure that would be sufficient for flushing the toilet.

Another device for saving water is known from JP-A-05-184474. In this case, the flushing pressure to flush the toilet is again  
15 generated in the conventional manner by gravity pressure from a toilet tank.

The invention is based on the technical problem of designing a simple and inexpensive device for saving water, which can be put  
20 into operation with a minimum of installation effort and whose graywater tank is easily accessible for purposes of cleaning and maintenance.

The object is solved in that the pump delivers graywater that contains solid constituents, that the graywater tank is designed as a smooth-walled container that can be easily cleaned through  
25 a top aperture and integrated in an item of sanitary equipment installed on the floor in such a way that the tub of a shower forms the graywater tank, and that the shower tub has a false  
30 floor as a standing surface for the user, with at least one drain, through which the graywater can flow into the underlying graywater tank.

The proposed device for saving water is of very simple design.  
35 Its use is preferably restricted to a single bathroom. It can



therefore be manufactured and installed inexpensively. The existing pipe system can be retained when the device is installed in an existing bathroom.

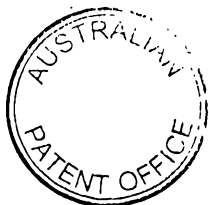
5 The graywater tank has no joints or corners in which dirt can accumulate. The graywater is pumped together with the solid constituents out of the graywater tank by the special pump and used to flush the toilet. Thus, the entire graywater contents of the tank are renewed at a rapid rate. In order to reduce the soiling  
10 of the graywater tank, it can be completely emptied at specific times via a drain or by the pump. This prevents the solid constituents of the graywater from settling during the night. No breeding ground for germs is formed.

15 Since the graywater tank is integrated in an existing piece of sanitary equipment, such as a shower tub or bathtub, no additional installation space is required. The device for saving water according to the invention can be accommodated in very small rooms.

20 The device for saving water requires no complex maintenance. It is sufficient for the graywater tank to be opened and wiped clean from time to time.

25 A device for saving water with the features described above is very inexpensive, because the standing surface is a low-priced accessory that can easily be manufactured and even installed by a layman. Compared to the prior art, considerable cost advantages result simply from the fact that the conventional shower  
30 tub in a bathroom is retained.

The device for saving water can be put into operation with a minimum of installation effort. After showering, the graywater

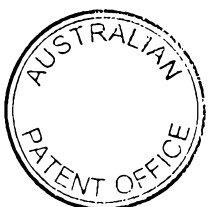


5 simply remains in the tub and is gradually used to flush the toilet. Consequently, it is particularly well suited to a tenant who would like to operate an inexpensive device for saving water in an existing bathroom, without having to make major structural changes. The top of the shower tub forms the upper, large-area aperture of the graywater tank, through which the graywater tank is easily accessible for cleaning and maintenance.

10 Particularly for use of the device for saving water in a multi-person household, it is expedient for a false floor to be provided as the standing surface for the user, which has at least one drain through which the graywater can flow into the underlying part of the shower tub that functions as the graywater tank. In this way, the user does not come into contact with the collected water of the previous user. With this design, several persons in a row can collect their graywater in the graywater tank.

15

20



In order to avoid giving the user an unpleasant feeling from the graywater used and collected by other persons, the drain in the false floor advantageously blocks the view into the graywater tank.

5

The water level is limited by the regular overflow pipe of the

D  
R  
A1  
5  
5  
5

trance to the shower, a stench trap connector is provided on the stench trap of the shower tub, to which the flushing water conduit is connected. The stench trap connector additionally has a drain opening that can be connected to the waste water system of the building. Once it exceeds a certain level, the graywater can flow through an overflow pipe into the waste water system of the building.

In a configuration which is particularly suitable for new buildings, the graywater tank is designed as an integrated tank beneath the shower tub. This particular graywater tank can have a greater volume than a conventional shower tub. It is possible to manufacture graywater tanks of different volumes which, for example, are precisely adapted to the flushing water demands of a family. In addition, graywater tanks can be adapted to different structural conditions even during manufacture.

For the sake of simplicity, the pump is connected along the flushing water conduit. The pump is connected to the graywater tank on its inlet side and to the flushing water admission of the toilet on its discharge side.

The hygiene of the device for saving water can be improved by providing a disinfecting unit. In an advantageous configuration, the disinfecting unit is connected upstream of the graywater tank, so that the graywater tank can only be filled via the disinfecting unit. Even if several items of sanitary equipment that feed the graywater tank are connected, one disinfecting unit is sufficient for treating all the incoming graywater. The capacity of the disinfecting unit can be adapted to the individual graywater throughput of a device for saving water. To this end, a modularly expandable disinfecting unit can be used, which is designed for the desired graywater throughput. Alternatively, an appropriate disinfecting unit can be selected from a series of models whose units are designed for different graywater throughput rates.





In an alternative configuration, the disinfecting unit is connected downstream of the graywater tank. The graywater can only be drawn from the graywater tank via the disinfecting unit. In this way, the graywater is not sterilised until just  
5 before being pumped into the flushing water admission of the toilet to flush the toilet. This design rules out the possibility of germs accumulating during storage getting into the toilet.

10 The best hygiene can be achieved when both upstream and downstream disinfecting units are provided.

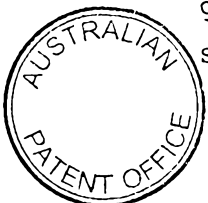
The disinfecting unit preferably has an ultraviolet lamp, with which graywater flowing through it can be sterilised. Of course,  
15 a disinfecting unit that functions according to a different principle, such as a high-voltage source, can also be provided in order to kill germs.

In a particularly inexpensive and easy-to-handle configuration  
20 of the device for saving water, a chemical disinfecting unit is provided. This unit does not require any electrical installations in the bathroom and no electrical work is required for set-up.

25 In order to save energy when operating the disinfecting unit, it is equipped with a switching unit that can be used to turn it on and off.

In an advantageous configuration, the switching unit turns on  
30 the disinfecting unit when graywater flows through it, and turns it off when it is in a static state without flow.

An alternative configuration provides for a switching unit that can activate and deactivate the disinfecting unit as a  
35 function of time or the quality of the graywater stored. In the case of activation as a function of the quality of the graywater, a suitable sensor is provided which triggers a switching signal when a certain quality level is reached.



The handling and installation of the device for saving water can be simplified if both the pump and the disinfecting unit are provided in a housing that is separate from the graywater tank. In this context, the housing can consist of individual housings for the pump and the disinfecting unit, which are mounted next to or behind the toilet. However, it can also be advantageous for the pump and the disinfecting unit to be arranged in a common housing. The housing expediently also has an activation button for the pump.

5

The conventional toilet tank should be retained, in order to be able to flush in the usual manner if there is not enough graywater in the graywater tank. The flushing water admission of the toilet, to which the conventional toilet tank is usually connected directly, can have a T-connector, for example. Both flushing systems are connected to this connector, namely the conventional toilet tank and the flushing water conduit of the device for saving water. Both systems are thus operational at all times.

10

15

In special cases, it is also possible to dispense with a conventional toilet tank and fill the graywater tank with drinking water manually or automatically if there is a lack of graywater.

20

The invention is described in more detail below based on the drawing. The figures show the following:

25

Fig. 1 A schematic front view of a device for saving water with a conventional shower tub as the graywater tank,

30

Fig. 2 A schematic top view of a device for saving water according to Fig. 1,

35

Fig. 3 A schematic front view of a device for saving water with an integrated graywater tank and a disinfecting unit connected upstream of the graywater tank,



Fig. 4 A schematic front view of a device for saving water with an integrated graywater tank and a disinfecting unit connected downstream of the graywater tank.

5 According to Fig. 1, device for saving water 1 consists of conventional shower tub 2, into which false floor 3 is placed. The space in shower tub 2, between false floor 3 and floor 4 of shower tub 2, functions as graywater tank 5. False floor 3 has a drain 6, which blocks the view into graywater tank 5.  
10 False floor 3, shown by dashed lines, indicates that shower tub 2 can be opened. False floor 3 thus uncovers top aperture 5a of the shower tub, which is then easily accessible. Of course, a false floor that can be swung open via a hinged connection can also be provided as an alternative.

15 Stench trap connector 8 is connected to stench trap 7 of shower tub 2. Flushing water conduit 9 is connected to that, along which pump 10 is connected and which leads into flushing water admission 11 of toilet 12. In this context, pump 10 is  
20 connected to stench trap connector 8 on its inlet side 10a and to flushing water admission 11 of toilet 12 on its discharge side 10b. Stench trap connector 8 is also provided with a drain opening 13 and an overflow pipe 14, where overflowing graywater can be discharged into the waste water system of the  
25 building via overflow pipe 14 and drain opening 13.

In this configuration, pump 10 is located in a separate housing 15. Housing 15 is mounted as a compact unit next to toilet 12 on a wall 16. In order to operate pump 10, an activation button 17 that is conveniently accessible to the user  
30 is provided in housing 15.

The water level of the graywater in graywater tank 5 is limited by the regular overflow pipe 14 of shower tub 2. The  
35 graywater can flow off via this pipe and drain opening 13 of stench trap connector 8, before it flows over the edge of shower tub 2.



to flushing water admission 11 of toilet 12 on its discharge side 10b. Stench trap connector 8 is also provided with a drain opening 13 and an overflow pipe 14, where overflowing graywater can be discharged into the waste water system of the building via overflow pipe 14 and drain opening 13.

In this configuration, pump 10 is located in a separate housing 15. Housing 15 is mounted as a compact unit next to toilet 12 on a wall 16. In order to operate pump 10, an activation button 17 that is conveniently accessible to the user is provided in housing 15.

The water level of the graywater in graywater tank 5 is limited by the regular overflow pipe 14 of shower tub 2. The graywater can flow off via this pipe and drain opening 13 of stench trap connector 8, before it flows over the edge of shower tub 2.

An easy-to-operate, chemical disinfecting unit C, which holds a disinfectant, is arranged in shower tub 2. The disinfectant is gradually consumed. Therefore, fresh disinfectant must be added to the disinfecting unit after a certain time.

Conventional tank 18 of toilet 12 remains on the wall, in order to be able to flush in the usual manner if there is not enough graywater in graywater tank 5. Flushing water admission 11 of toilet 12, to which conventional tank 18 is usually connected directly, has a T-connector 19, as shown in Fig. 2. Both flushing systems, conventional tank 18 and flushing water conduit 9 of the device for saving water, are connected to this connector. Both systems are thus operational at all times.

The configurations in Figs. 3 and 4 show a device for saving wa-



ter with a wall-mounted housing 22, which is provided with a pump 23, a disinfecting unit 24 and an activation button 25 for operating pump 23.

- 5 Disinfecting unit 24 has an ultraviolet lamp 27, with which graywater flowing through the unit can be sterilised, and a switching unit 28, which turns on the disinfecting unit when graywater flows through it, and turns it off when it is in a static state without flow.

10 As the water level of graywater tank 20 rises, the graywater is prevented from overflowing, or flowing back through disinfecting unit 24, by overflow pipe 29, through which the graywater can be discharged into the waste water system of the building.

15 Flushing water conduit 30 with pump 23 is connected to a special connecting branch 31 of graywater tank 20 and via a T-connector to flushing water admission 32 of toilet 33. A T-connector is also provided in this practical example, to which a conventional tank 34 is connected in addition to flushing water conduit 30.

20 In the configuration in Fig. 3, the graywater flows down a slope from the standing surface through drain 26 and into disinfecting unit 24, flowing out of that down a slope into graywater tank 20. Additional sanitary equipment can be connected to disinfecting unit 24. In contrast, disinfecting unit 24 shown in the configuration in Fig. 4 is connected downstream of graywater tank 20. It is positioned between graywater tank 20 and pump 23 along  
flushing water con-

30



**The Claims Defining the Invention are as Follows:**

1. Device for saving water, which enables flushing of a toilet with slightly soiled graywater from sanitary equipment, including a graywater tank located under the admission level of the flushing water of the toilet and fed by one or more pieces of sanitary equipment, a flushing toilet conduit which connects the graywater tank to the admission of the flushing water of the toilet, as well as a pump for flushing water that is positioned outside the graywater tank, wherein the pump delivers graywater that contains solid constituents, that the graywater tank is designed as a smooth walled container that can be easily cleaned through a top aperture and integrated in an item of sanitary equipment installed on the floor in such a way that the tub of a shower forms the graywater tank, and that the shower tub has a false floor as a standing surface for the user, with at least one drain, through which the graywater can flow into the underlying graywater tank.

2. Device for saving water as claimed in claim 1, wherein the drain blocks the view into the graywater tank.

3. Device for saving water as claimed in any one of claims 1 or 2, wherein a stench trap connector is provided on a stench trap of the shower tub, to which the flushing water conduit is connected, and that the stench trap connector has a drain opening that can be connected to the waste water system of the building.

4. Device for saving water as claimed in claim 1, wherein the graywater tank is designed as an integrated tank underneath the shower tub.

5. Device for saving water as claimed in any one of claims 1 to 4, wherein the pump is connected along the flushing water conduit, and that it is connected to the graywater tank on its suction side and to the flushing water admission of the toilet on its discharge side.



6. Device for saving water as claimed in any one of claims 1 to 5, wherein a disinfecting unit is provided.

7. Device for saving water as claimed in claim 6, wherein the disinfecting unit is connected upstream of the graywater tank, and that the graywater tank can only be filled via the disinfecting unit.

8. Device for saving water as claimed in claim 6, wherein the disinfecting unit is connected downstream of the graywater tank, and that the graywater can only be drawn from the graywater tank via the disinfecting unit.

9. Device for saving water as claimed in any one of claims 6 to 8, wherein the disinfecting unit has an ultraviolet lamp, with which graywater flowing through it can be sterilized.

10. Device for saving water as claimed in any one of claims 6 to 8, wherein a chemical disinfecting unit is provided.

11. Device for saving water as claimed in any one of claims 6 to 10, wherein the disinfecting unit is equipped with a switching unit that can be used to turn it on and off.

12. Device for saving water as claimed in claim 11, wherein the switching unit turns on the disinfecting unit when graywater flows through it, and turns it off when it is in a static state without flow.

13. Device for saving water as claimed in claim 11, wherein a switching unit can activate and deactivate the disinfecting unit, depending on the time or on the quality of the graywater stored.



14. Device for saving water as claimed in any one of claims 6 to 13, wherein both the pump and the disinfecting unit are provided in a housing that is separate from the graywater tank.

15. Device for saving water as claimed in claim 14, wherein the housing as an activation button for the pump.

16. Device for saving water as claimed in any one of claims 1 to 15, wherein the device includes a conventional toilet tank for exceptional cases when there is not enough graywater in the tank.

17. Device for saving water as claimed in claim 16, wherein the flushing water admission of the toilet has a T-connector, to which both the conventional toilet tank and the flushing water conduit with the pump is connected.

**DATED** this 17<sup>th</sup> day of August, 2001.

**KLAUS BLUM**

WATERMARK PATENT & TRADEMARK ATTORNEYS  
21<sup>ST</sup> FLOOR, "ALLENDALE SQUARE TOWER"  
77 ST GEORGE'S TERRACE  
PERTH WA 6000

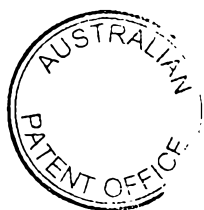




Fig. 1

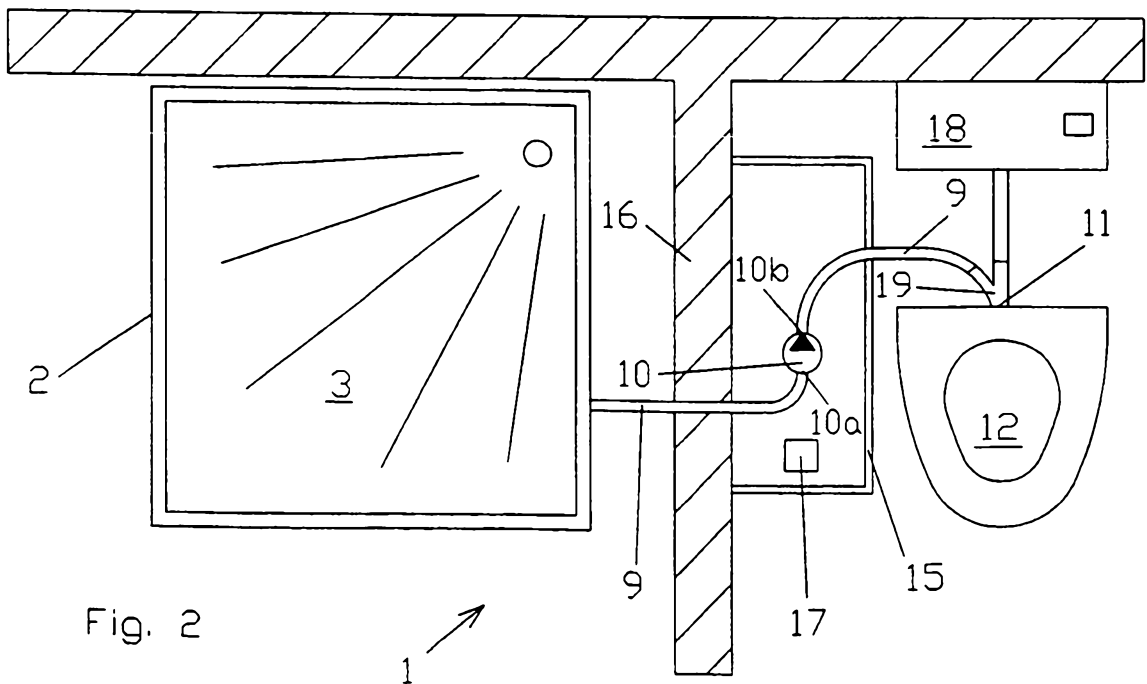
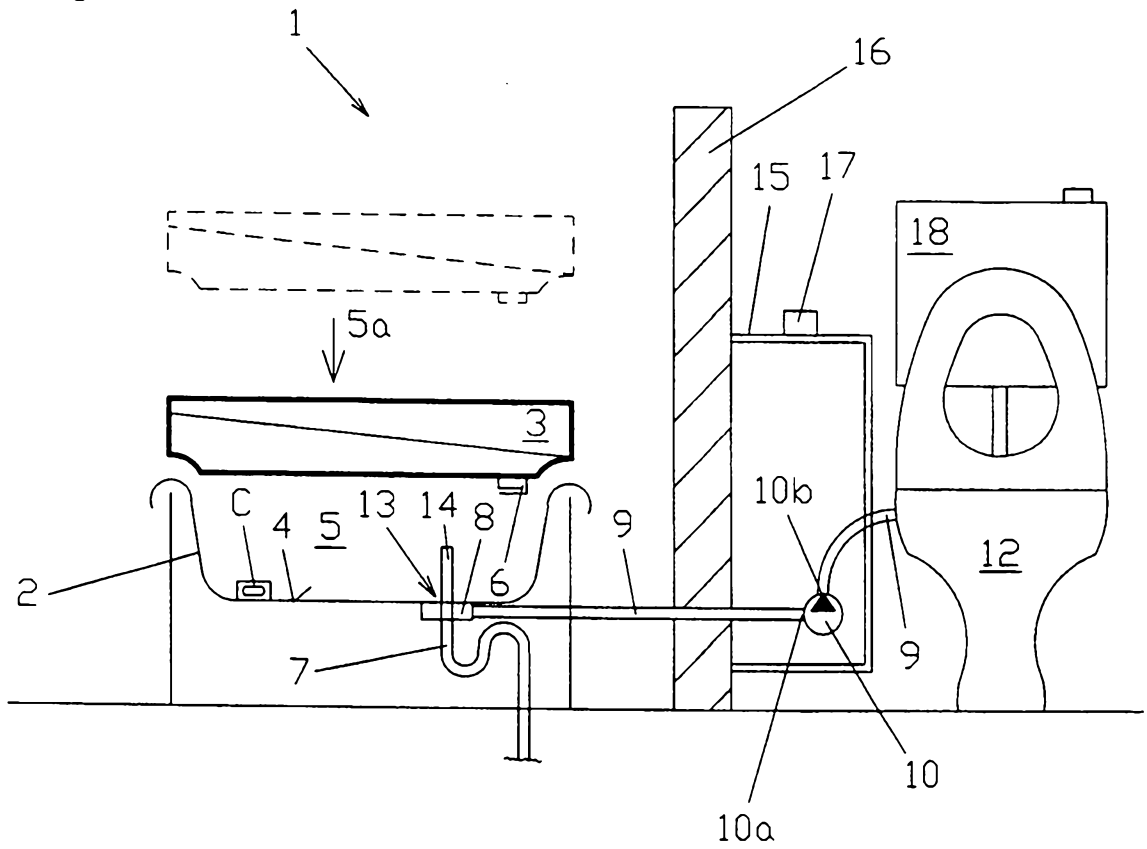


Fig. 2

Fig. 3

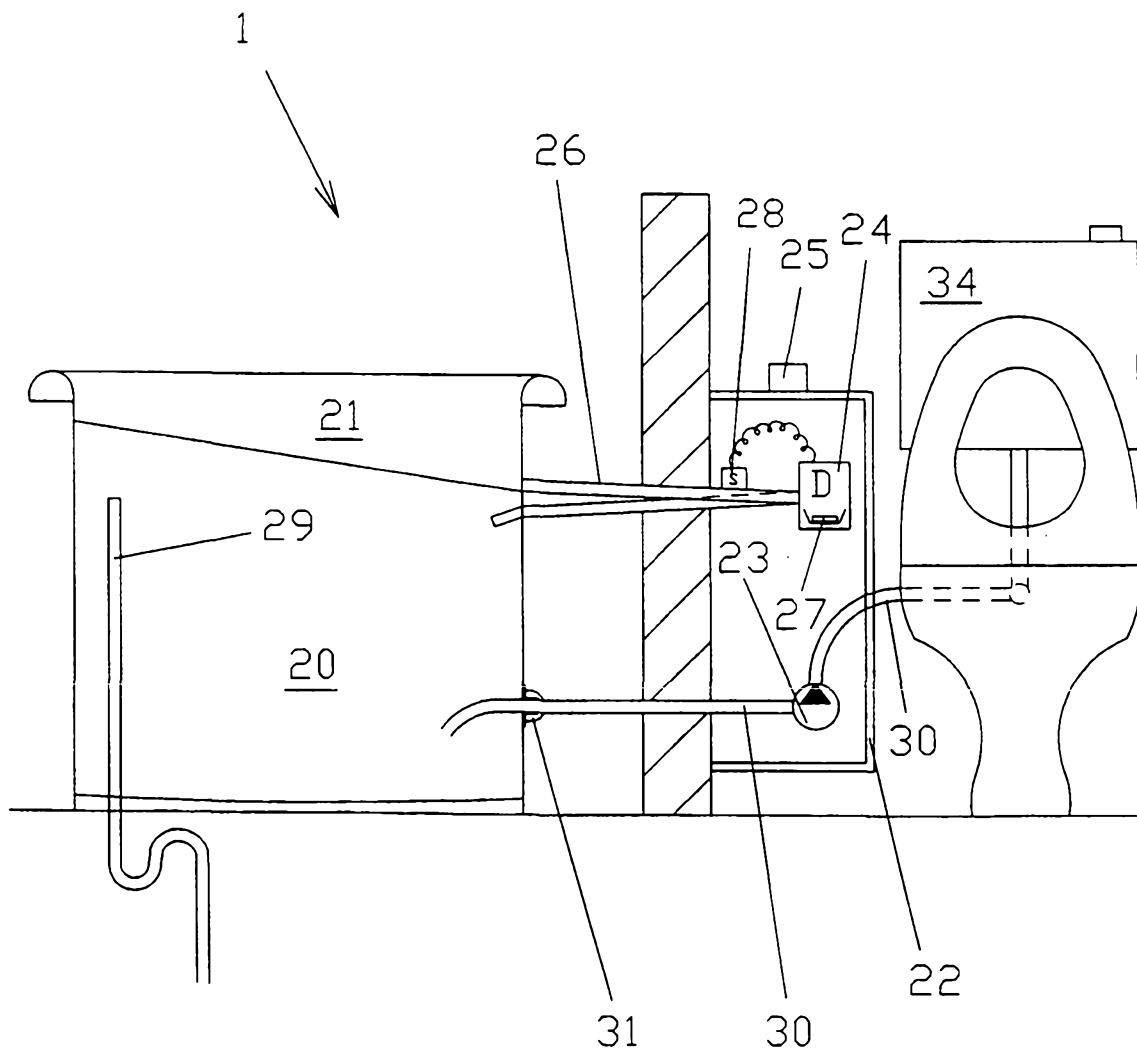


Fig. 4

