



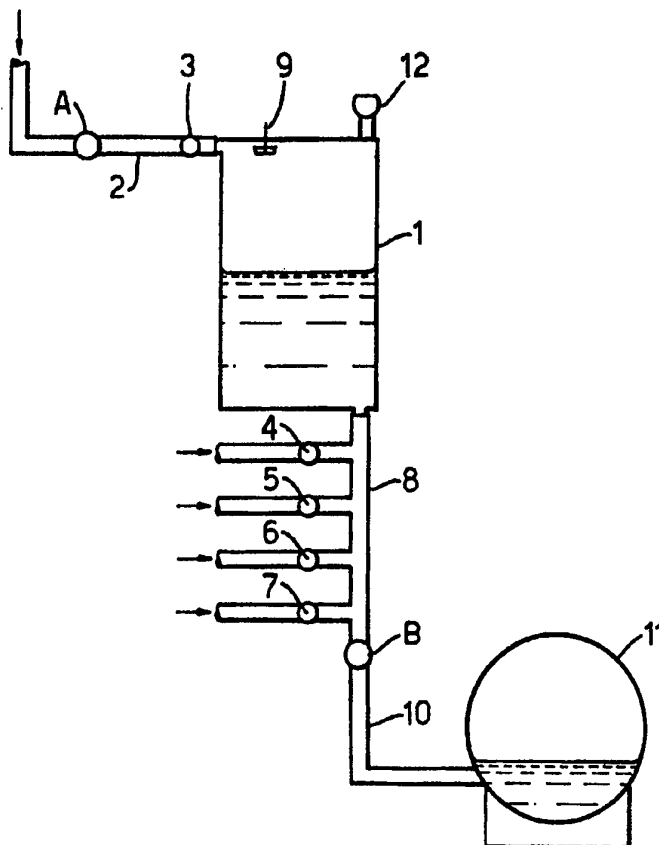
## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/EP96/02293 (22) International Filing Date: 29 May 1996 (29.05.96) (30) Priority Data: 95201507.1      8 June 1995 (08.06.95)      EP (34) Countries for which the regional or international application was filed: AT et al. (71) Applicant (for all designated States except AU BB CA GB IE KE LK LS MN MW NZ SD SG SZ TT UA): UNILEVER N.V. [NL/NL]; Weena 455, NL-3013 AL Rotterdam (NL). (71) Applicant (for AU BB CA GB IE KE LK LS MN MW NZ SD SG SZ TT UA only): UNILEVER PLC [GB/GB]; Unilever House, Blackfriars, London EC4P 4BQ (GB). (72) Inventors: LOS, Leendert; Druivengaarde 26, NL-3992 KR Houten (NL). DOUMA, Bennie; Antilopespoor 28, NL-3605 CV Maarssen (NL). (74) Common Representative: UNILEVER N.V.; Patent Division, P.O. Box 137, NL-3130 AC Vlaardingen (NL).		(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).  Published With international search report.	

(54) Title: PROCESS AND DEVICE FOR DOSING DETERGENT COMPOSITIONS

## (57) Abstract

A method is provided of delivering a liquid detergent product, characterised by the steps of (i) allowing a predetermined volume of water to be dosed into a container (1), using a flow meter (3), a valve means (A) and, optionally, a water supply pump means; (ii) activating a pump means so as to deliver a liquid detergent product into said container until the container is completely filled, said filling operation being controlled by a level sensor (9) located on the container; (iii) delivering the content of the container. Using said method, viscous and caustic liquids can be accurately and safely dosed. Furthermore, a device is provided for carrying out said method.



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PROCESS AND DEVICE FOR DOSING DETERGENT COMPOSITIONS

Field of the invention

5 The present invention relates to a process and a device for dosing detergent compositions. More in particular, it relates to a process and a device for accurately dosing one or more liquid detergent compositions which may be aggressive and give rise to corrosion.

10

Background of the invention

Caustic and viscous chemicals are often not metered but rather pumped during a specified amount of time, because flow meters are expensive and such chemicals may corrode  
15 and destroy the flow meters.

Another problem associated with liquid detergent delivery systems of the prior art is concerned with the corrosion of the pumps and tubes applied in such systems to transport  
20 the detergent material.

The European patent application 403,296 addresses these problems related to the delivery of viscous and caustic chemical materials. This document discloses a liquid  
25 chemical delivery system, comprising a liquid distribution line having a plurality of output ports; a manifold coupled to said liquid distribution line; a plurality of pump means coupled to said manifold, each pump means including means for pumping a corresponding chemical into said manifold;  
30 transport pump means, coupling said manifold to said distribution line; and water supply means coupled to said manifold.

However, this liquid delivery system is rather complex and  
35 expensive. Furthermore, this system was found to be less

suitable for accurately dosing liquid detergent chemicals into a washing machine.

It is, therefore, an object of the present invention to provide a process for accurately dosing liquid detergent materials, in particular viscous and caustic detergent materials. A further object is to provide a device suitable for carrying out said process. It was surprisingly found that these objects could be achieved with the process and the device of the present invention.

10

#### Definition of the invention

According to a first aspect of the present invention, there is provided a method of delivering a liquid detergent product, characterised by the steps of

- 15 (i) allowing a predetermined volume of water to be dosed into a container (1), using a flow meter (3), a valve means (A) and, optionally, water supply pump means;
- (ii) activating a pump means so as to deliver a liquid detergent product into said container until the container is completely filled, said filling operation being
- 20 controlled by a level sensor (9) located on the container;
- (iii) delivering the content of the container.

According to a second aspect of the invention, there is

25 provided a device for carrying out the method according to any of the preceding claims, comprising

- (a) a container (1) provided with a level sensor (9) and coupled with an output line (10) provided with an output valve (B);
- 30 (b) one or more pump means (4-7) coupled to said container, each pump means having means for pumping a corresponding detergent product into said container;
- (c) an input valve means (A) and a flow meter (3) located on a water input line (2) connected to said container and
- 35 allowing a predetermined amount of water to be accurately dosed;

(d) control means connected to said one or more pump means (4-7), said level sensor (9), said input and output valve means (A,B), said flow meter (3) and optionally said water supply pump means, for activating or deactivating specific  
5 pump means or the valve means A or B.

Detailed description of the invention

Accurate dosing is possible with the device of the present invention, for the following reasons. The volume of detergent material to be dosed is determined by the volume of  
10 the container controlled with the level sensor and the volume of the water supplied therein and is governed by the equation

$$V_d = V_c - V_w,$$

15 wherein  $V_d$  is the volume of the detergent material

$V_c$  is the volume of the container

$V_w$  is the water volume in said container.

The volume of the container is constant and the volume of  
20 the water which is fed into the container before the detergent material is dosed, is programmable and controlled by a flowmeter and valve means located in the water input line. It follows that the detergent material can be accurately dosed by controlling the volume of water fed into the  
25 container.

Said volume of water is also suitable for adequately diluting viscous detergent material to be dosed.

Furthermore, it is an important characteristic of the device of the invention that no flow meter is needed for  
30 controlling the volume of detergent material to be dosed; this is done by the flow meter in the water input line. As a consequence, the flow meter applied cannot be corroded or even destroyed if caustic detergent materials are applied. Furthermore, the flow meter cannot be blocked by undissolved material if suspended liquids are used.  
35

An additional advantage of the process and device according to the present invention is that a predetermined and accurate amount of detergent product can be filled into the container some time before it is needed for use and that, as a consequence, said product can be delivered quickly when it is needed.

The device of the invention is particularly suitable for delivering liquid detergent product into a washing machine. The device of the invention can be used for dosing various amounts of the same liquid detergent product. However, said device is preferably used for dosing various products into a washing machine. In that case, a plurality of pump means is used for pumping corresponding detergent products into the container. Furthermore, control means are present for timely activating specific pump means and dosing accurate amounts of predetermined detergent products into the container.

The device of the invention is particularly suitable for dosing various detergent products into an industrial washing machine.

The control means applied in the device of the invention for (de-)activating specific pump means and the valve means A and B, are preferably such that automatic operation of the device of the invention will be possible.

The maximum volume which can be dosed is restricted by the total volume of the container and two or more dosing procedures are required if more than said volume needs to be dosed.

For cleaning purposes, it is preferred to flush the container by pumping water through it after each time that a liquid product has been pumped into the container and supplied to a washing machine. Furthermore, blockages are

prevented from occurring by carrying out this flushing procedure. After the flush with water, a flush with air may be applied.

- 5 Examples of detergent compositions which can be dosed by means of the process of the invention are the non-ageous liquids disclosed in the European patent application 266,199 (Unilever). When this type of liquids is dosed, it is desirable that these liquids are introduced into the
- 10 container from the upper side (i.e. on top of the water volume already present therein). Other types of liquid detergent products are, however, usually fed into the container at the bottom side, as further described below.
- 15 The invention will now be further explained by means of the accompanying drawing, in which Figures 1-4 are schematic views of the device according to the invention.

Figure 1 shows a container 1 into which water has been fed

20 via conduit 2. The amount of water fed or pumped into the container is controlled with flow meter 3 and solenoid valve A. This valve has been closed immediately after the programmed volume of water has been supplied.

Subsequently, one of the detergent pumps 4 - 7 is activated

25 to dose the corresponding detergent product via conduit 8 into the container 1 in which the predetermined volume of water is already present. The supply pump is switched off when container 1 is completely filled. This is detected by a level sensor 9. A float switch is preferably used as

30 level sensor.

For smooth operation of the device of the invention, an air vent 12 is provided on the container 1.

Figure 2 shows the container 1 into which both water and

35 detergent material have been fed.

After the detergent supply pump has been switched off, solenoid valve B is opened to supply the content of the container via conduit 10 into a washing machine 11. As final step of this preferred embodiment of the invention, container 1 and lines 8 and 10 are flushed with water and subsequently with air.

The flush with water is carried out by opening both valve A and B and, optionally, by activating a water supply pump means (not shown).

To further clean container 1 and transport lines 8 and 10, a "flush" with air is applied after the water flush. This air flush is carried out in two steps, as depicted in figures 3 and 4.

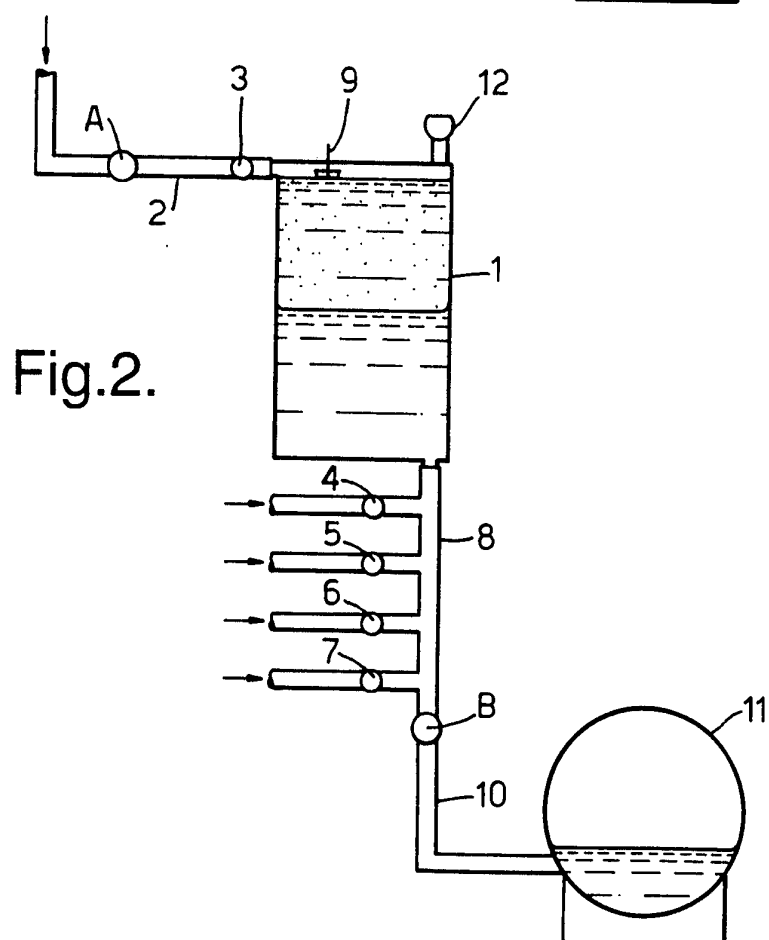
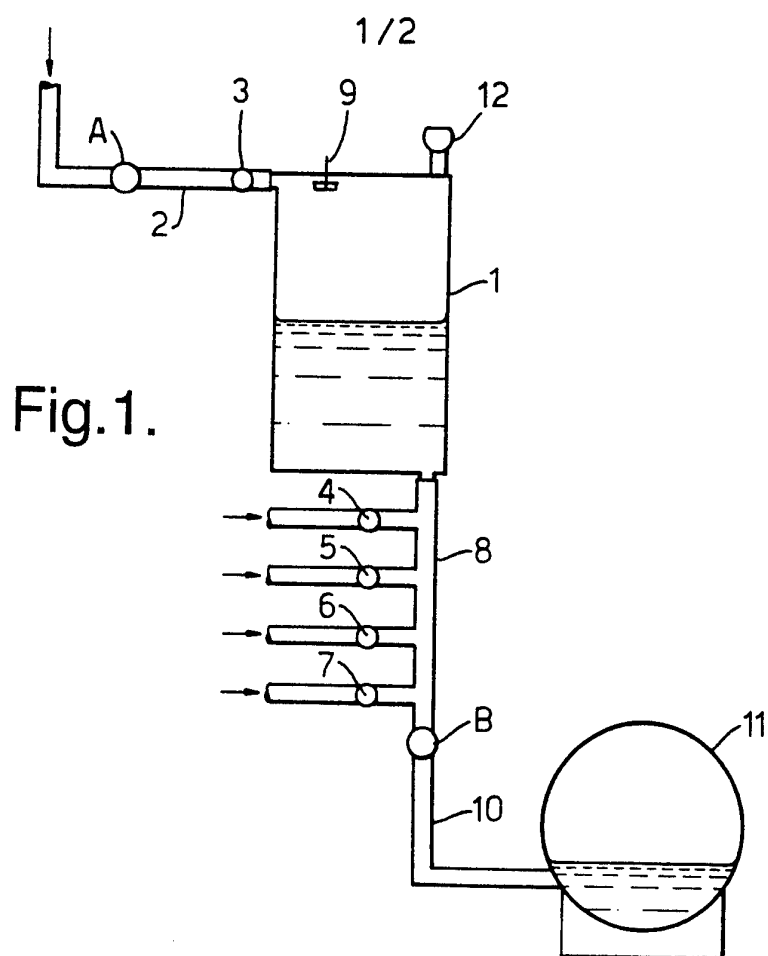
First, line 10 is emptied and cleaned by closing valve B and opening air valve C, as shown in Figure 3. Subsequently, the rest of the system is cleaned by closing air valve C, opening again valve B, closing air vent 12, and opening air valve D (see Figure 4).

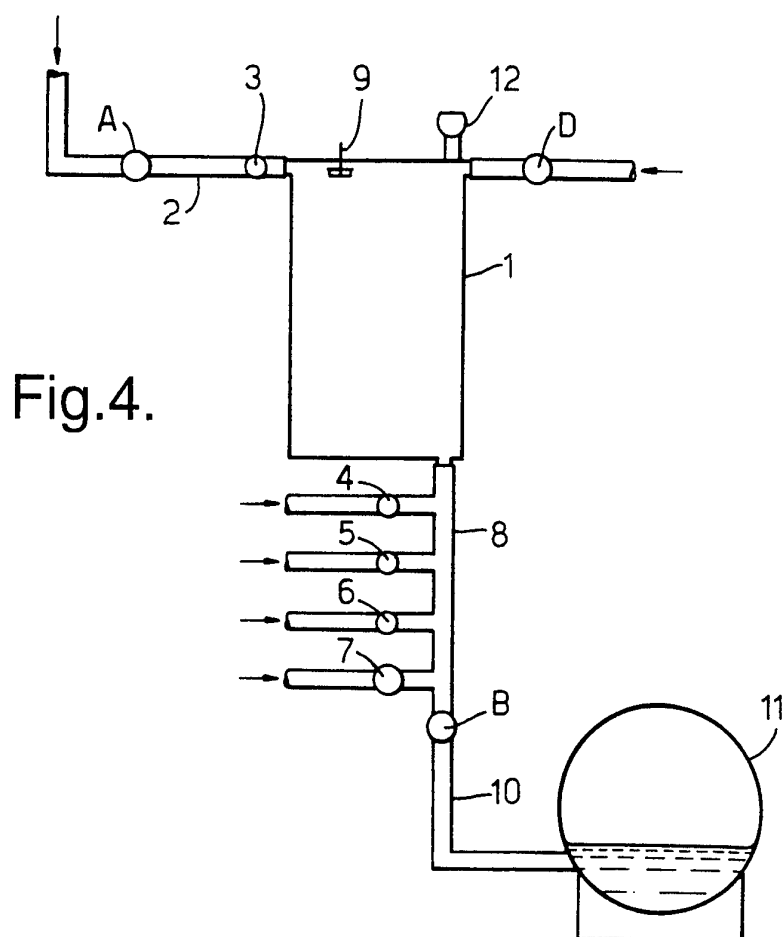
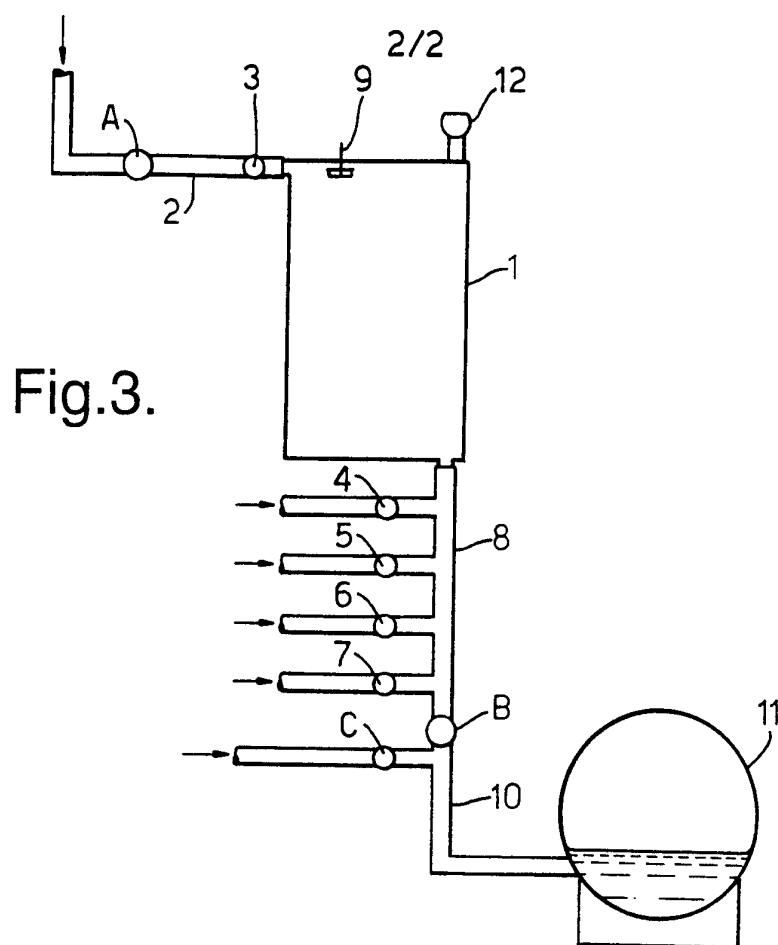


Claims

1. Method of delivering a liquid detergent product, characterised by the steps of
  - 5 (i) allowing a predetermined volume of water to be dosed into a container (1), using a flow meter (3), a valve means (A) and optionally a water supply pump means;
  - (ii) activating a pump means so as to deliver a liquid detergent product into said container until the container
  - 10 is completely filled, said filling operation being controlled by a level sensor (9) located on the container;
  - (iii) delivering the content of the container.
2. Method according to claim 1, wherein the pump means is  
15 one of a plurality of pump means (4-7) for pumping corresponding detergent products into the container.
3. Method according to claim 1 or 2, further including the step of opening valve means A and, optionally, activating  
20 the water supply pump means, so as to have water flowing through said container after each time that a liquid product has been pumped into the container and the contents of the container delivered, thereby flushing the container with water.
- 25 4. Method according to claim 3, further including the step of applying air to flush and empty the container.
5. Method according to any of claims 1-3, whereing high  
30 viscosity liquid detergent is applied, which is diluted with water in the container before being supplied into the washing machine.
6. Method according to any of claims 1-5, wherein the  
35 liquid detergent product is delivered into a washing machine.

7. A device for carrying out the method according to any of the preceding claims, comprising
- (a) a container (1) provided with a level sensor (9) and coupled with an output line (10) provided with an output  
5 valve (B);
  - (b) one or more pump means (4-7) coupled to said container, each pump means having means for pumping a corresponding detergent product into said container;
  - (c) an input valve means (A) and a flow meter (3) located  
10 on a water input line (2) connected to said container and allowing a predetermined amount of water to be accurately dosed;
  - (d) control means connected to said one or more pump means (4-7), said level sensor (9), said input and output valve  
15 means (A,B) and flow meter (3), for activating or deactivating specific pump means or the valve means A or B.





## INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 96/02293

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 D06F39/02

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 D06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US,A,4 503 575 (WHIRLPOOL CORPORATION) 12 March 1985 see column 2, line 48 - line 65 see column 4, line 67 - column 5, line 48; figures 2A,3 ---	1,3,5-7
A	US,A,3 336 767 (AEL PRODUCTS INC.) 22 August 1967 see the whole document ---	1,3,4,6, 7
A	EP,A,0 403 296 (DIVERSEY CORPORATION) 19 December 1990 cited in the application see column 5, line 47 - column 10, line 5; figure 1 -----	1-3,6,7

☐ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

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# INTERNATIONAL SEARCH REPORT

information on patent family members

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