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(54) **A system for treating a detergent solution in a washing or rinsing plant for containers and a method for managing the operation thereof**

(57) The invention relates to a system (1) for treating the detergent solution used in a washing or rinsing plant for containers, the system comprising first and second treatment means of the detergent solution; first and second means (31L, 32L) for detecting and transmitting a first quantity relative to the flow of detergent solution to be treated, respectively upstream and downstream of said first treatment means (3); first and second means for detecting and transmitting a second quantity relative to the flow of detergent solution to be treated, upstream and downstream of the second treatment means (4); a control unit (U) programmed to manage the activation of the treatment system (1) and the starting of the operations of washing and recovery of the filtering functionality of said first and second treatment means (3, 4) as a function of the measured values of the quantities relative to the flow of solution to be treated.

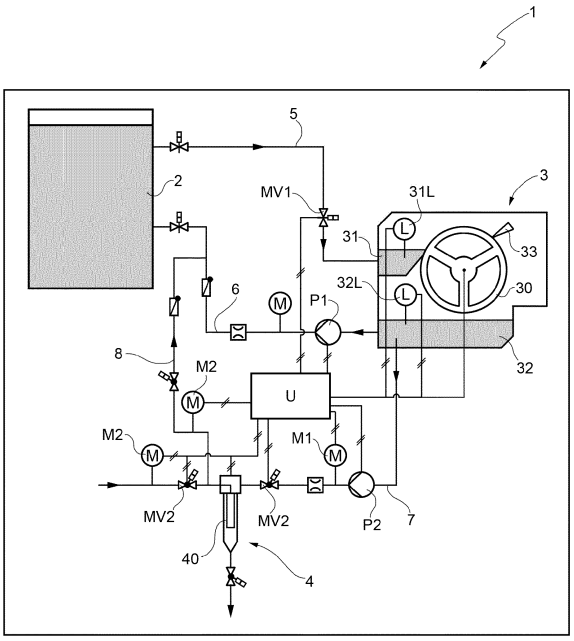


FIG. 1

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Description

[0001] The present invention relates to a system for treating a detergent solution and to a method for managing the operation thereof. More in particular, the invention relates to a system for treating a detergent solution in a washing or rinsing station for containers, mainly bottles, of the type which is commonly associated to a system for bottling a pourable product, especially in the food sector.

[0002] In order to ensure the appropriate hygiene to the bottled product, it is known to accurately wash the bottles, before filling, by means of bottle washing machines or rinsing machines. The type of machine that is used depends mainly on the type of bottles used (new or reusable).

[0003] New bottles coming from glass factories are typically packaged on wooden platforms and are protected by appropriate thermoretractable caps made of plastic which protect them from dirt. Although, in this way, the bottles are maintained substantially clean, they can in any case have traces of dirt due to the conditions and modes of transport, as well as to the duration and mode of storage. Therefore, before filling, these containers are rinsed by means of dedicated rinsing machines which, by means of filtered and sterilised water jets, remove and expel from the containers every trace of dust or other impurity present therein.

[0004] Reusable bottles, instead, are generally dirty both inside and outside and therefore require an effective washing action.

[0005] For this purpose, washing machines are used in which the bottles are subjected to a series of soaking and spraying treatments with detergent solutions at a high temperature alternated with repeated filling and emptying operations, followed by one or more rinsing operations with potable water and finally by draining. As well as ensuring a strong washing of the containers with the removal of every trace of dirt and of all the microorganisms possibly present therein, the washing machines should also remove the labels or parts thereof, ideally without causing defibrating and kneading, which result in considerable drawbacks.

[0006] The operative variables, such as the composition of the washing cycle, the operation modes, the operation temperature, the type of solution (acid, alkaline or neutral) etc., depend on the machine used, on the degree of dirt of the bottles to be washed, on the features of the water used and on the pressure of the water jets, on the glue used for the labels, on the degree of concentration of the detergent solutions used etc.

[0007] Most part of the solution used in the bottle washers contain, as main constituent, caustic soda (NaOH), generally mixed with other alkaline substances or synthetic detergents, which increase the detergent power.

[0008] An important aspect to be considered is connected to the water that should be used for washing and rinsing the bottles before they come out of the washing machine. Current regulations provide that potable water is used for the final rinsing of the bottles. Where this kind of source is not available, the law allows the use of purified water obtained by dedicated treatment plants which allow to meet the chemical and microbiological requirements set for the specific use.

[0009] Furthermore, it is desirable that the waters have a very low hardness, in order to limit as much as possible the formation of scaling within the washing plant, which, as well reducing efficiency, can compromise the operation thereof.

[0010] To avoid the formation of foam within the washing machine, with all the resulting undesirable consequences (overflows, reduction of the pressure in the jet nozzles, reduction of the sterilising efficiency, malfunctioning of the pumps, etc.), anti-foaming agents and surfactants are added to the detergent solutions and the machine is provided with appropriate structural anti-foam devices.

[0011] The temperature and concentration of the detergent solution are generally inversely proportional to the duration of the treatment, which in turn is a function of the complexity of the washing cycle of the bottles. Furthermore, the temperature and the concentration must be increased, as well as to shorten the washing cycle, in order to treat very dirty containers or containers provided with labels which are very hard to detach.

[0012] Given the importance of environmental issues, and in relation to measures for purifying water, great care must be taken in the treatment of the sewage deriving from the washing of bottles and from detergent products used for washing.

[0013] Given the number and extent of the parameters that the detergent solution must meet, both in view of the efficiency of the washing and sanitization of the bottles, and in view of the legal requirements, it is recommendable that the detergent solution is not discharged in the environment after only one use in a single washing/rinsing cycle of containers, but instead that its use can be prolonged as much as possible.

[0014] In the course of the washing operations, the detergent solution is not changed, but simply filtered with large mesh filters with 2-4 mm openings: in the course of time it is physically polluted with solid particles deriving from the paper of the labels, from inks, from glues and from dirt. Physical pollution caused by solid bodies is prevailing with respect to chemical pollution, as the concentration of the soda is continuously controlled and adjusted by an automatic control system for the concentration of the soda.

[0015] Therefore, when the content of the impurities in the used detergent solution exceeds given threshold values, operation problems can occur in the washing/rinsing plant. For example, mechanical problems can be detected at the pumps, when the detergent solution draws therein an excessive amount of suspended solid particles.

[0016] Accordingly, periodical maintenance interven-

tions are required to ensure the efficiency in the operation of the washing plant and of the filtering system of the detergent solution, especially as regards the most fragile components, such as filters and means adapted to create and direct jets of detergent solution within the bottle.

[0017] Typically, in the sector, the detergent solution can be periodically changed, for example every week or fortnight, so as to reduce the discharge costs. However, this periodicity is possible only by recycling the used detergent solution after having subjected it to an appropriate treatment which maintains the detergent properties thereof.

[0018] For this purpose, it is known in the sector to use systems for treating the detergent solution which at least partially recover the original physical-chemical properties. Typically, these are mechanical systems such as decantation, filtration etc., which are generally actuated when the bottling system is not working (for example during the weekends).

[0019] The need is therefore felt in the sector to increase the working life of the detergent solution and to reduce maintenance interventions, in particular those that imply downtimes.

[0020] In this connection, the need is felt in the sector to provide a system for treating the used detergent solution in a washing/rinsing plant for containers, which system allows to effectively remove the solid particles suspended in the detergent solution, preferably allowing to treat the detergent solution without interrupting the normal production cycle of the washing/rinsing plant.

[0021] Furthermore, it would be desirable to provide a system for treating the used detergent solution in a washing/rinsing plant for containers, which allows to effectively take advantage of the downtimes normally required to carry out the treatment, thus requiring minimal maintenance interventions, limiting the consumption of energy, water and detergent solution during the step of washing/rinsing, etc.

[0022] At least one of the above said needs is met by the present invention, as it provides a system for treating the used detergent solution in a washing or rinsing plant for containers as defined in claim 1.

[0023] Furthermore, it is an object of the present invention to provide a method for managing the operation of a system for treating the used detergent solution in a washing/rinsing plant for containers which allows to reduce the energy consumption and the wear of the moving parts. This object is achieved by the invention by providing a method according to claim 10.

[0024] For a better understanding of the present invention, a preferred embodiment is disclosed hereinafter by mere way of non-limitative example and with reference to the drawings of accompanying Figure 1, which diagrammatically shows a treatment system for the used detergent solution in a washing plant for containers according to the invention.

[0025] In Figure 1, numeral 1 indicates as a whole a treatment system of the used detergent solution in a washing plant for the containers.

[0026] System 1 is fluidically and operatively connected with a tank 2 that substantially coincides with the detergent bath of a washing/rinsing machine of the containers of the above said plant. When the machine comprises a plurality of detergent baths, the treatment system can conveniently be fluidically and operatively connected with one bath at a time (i.e. with one tank 2 at a time) by means of the opening/closing of relative feeding valves provided in each bath.

[0027] Furthermore, system 1 advantageously comprises first and second treatment means 3 and 4 configured to receive from tank 2 an adjustable flow of detergent solution to be treated and to recirculate to the same tank 2 an adjustable flow of treated detergent solution. The inlet and outlet points of the detergent solution must not be placed in areas that may alter the normal functioning of the machine.

[0028] Advantageously, tank 2 is fluidically connectable selectively:

- only to first treatment means 3 of the detergent solution (primary treatment circuit); and
- to first and second treatment means of the detergent solution 3, 4 in series (secondary treatment circuit).

[0029] In greater detail, system 1 comprises a primary feeding duct 5 and a primary recirculation duct 6 to fluidically connect the tank 2 to first treatment means 3 of the detergent solution. In particular, the detergent solution coming from tank 2 can flow through primary feeding duct 5, and the detergent solution treated by first treatment means 3 can flow through primary recirculation duct 6 so as to return to tank 2.

[0030] Furthermore, system 1 comprises a secondary feeding duct 7 to fluidically connect first treatment means 3 to second treatment means 4, and a secondary recirculation duct 8 to connect second treatment means 4 to tank 2. In particular, the detergent solution treated by first treatment means 3 and directed to second treatment means 4 can flow through secondary feeding duct 7, while the detergent solution treated in series by first and second treatment means 3, 4 can flow through secondary recirculation duct 8 so as to return to tank 2.

[0031] First treatment means 3 advantageously comprise a primary filter 30, preferably of the rotating drum type, which is provided with a top tank 31 to receive the detergent solution to be treated and with a lower tank 32 to collect the treated detergent solution.

[0032] The filtering portion of primary filter 30 is advantageously formed by triangular elements of the "wedge wire" type. Typically, these elements are welded to a support profile defined by the rotating drum. The distance between the triangular elements is controlled very accurately, since the width of the slits between two alongside triangular elements directly influences the filtering efficiency.

[0033] Advantageously, this type of filter provides con-

tinuous slits which, due to their geometries, considerably reduce the frequency of the clogging phenomena. Furthermore the size of the slits can be selected during design depending on the specific features of the detergent solution to be treated and of the type of impurities to be filtered. Preferably, primary filter 30 is configured to retain particles larger or equivalent to 500 μm.

[0034] Regarding the efficiency of the process, the wedge wire surface also allows to easily clean the filter mechanically or by a countercurrent flow.

[0035] For this purpose, primary filter 30 is provided with a blade 33 which scrapes the rotating surface thereof thus appropriately removing the scaling accumulated during the filtering process: thereby the cleaning requires no energy consumption and no water consumption for the counterwashing.

[0036] Furthermore, it should be noted that reduced load losses are typically associated to this type of filter.

[0037] Both top and bottom tanks 31, 32 advantageously comprise respective level probes 31L and 32L.

[0038] Treatment system 1 advantageously comprises a control unit U operatively connected with level probes 31L and 32L, with control means MV1 of the flow of detergent solution flowing in and out of the first treatment means, and with first treatment means 3; and configured to control the operation of first treatment means 3 as a function of the level of the detergent solution in top and bottom tanks 31 and 32 (upstream and downstream of primary filter 30).

[0039] More in particular, control unit U is configured to control the operation of first treatment means 3 according to the logic that will be disclosed in greater detail hereinafter. Furthermore, the control unit is completely independent of the washing/rinsing machine for bottles, so that it can work independently of the state of the machine.

[0040] Particularly, depending on the level measured in top tank 31, control unit U selectively opens/interrupts the fluidic connection between first treatment means 3 and tank 2, appropriately acting on control means MV1 of the flow of detergent solution flowing in and out of the first treatment means and on a pump P1 arranged along primary recirculation duct 6, downstream of filter 30, and adapted to withdraw the treated detergent solution from first means 3 and convey it to tank 2.

[0041] By monitoring the level in lower tank 32, suitable conditions can be provided at the same time for the correct operation of pump P1 (for example avoiding that it is idle, avoiding the occurrence of cavitation phenomena, etc.)

[0042] It should then be considered that the amount of detergent solution that passes through filter 30 (and thus passes from top tank 31 to bottom tank 32) directly depends on the relative clogging degree.

[0043] Periodically, in use, drum filter 30 must be rotated about the relative axis so that blade 33 can scrape off from the surface of the drum the layer of filtered material that has accumulated in the course of time, thus exposing at the same time a portion of the clean filtering surface to the inflow of detergent solution to be treated.

[0044] Advantageously, control unit U is configured to activate the rotation of drum filter 30 (i.e. a relative operation of cleaning and recovery of the filtering functionality) when the level of the solution in top tank 31 exceeds a predetermined threshold value L_0.

[0045] Furthermore, control unit U is advantageously configured to measure and store time t_i that elapses between two subsequent actuations of the rotation of filter 30.

[0046] When time t_i exceeds a predetermined threshold value t_0, control unit U interrupts the feeding of detergent solution from tank 2 to first filtering means 3 as the solution can be considered clean.

[0047] In practice, control unit U detects, by means of measurements of the level in top and bottom tanks 31 and 32, the occurrence of a threshold clogging condition of the filtering surface portion of primary filter 30 exposed to the inflow of detergent solution to be treated (hereinafter also referred to as "operative portion of the primary filter"). When this condition occurs, control unit U activates the rotation of primary filter 30 as disclosed previously. As time t_i that elapses between the occurrence of two subsequent threshold clogging conditions of the operative portion of primary filter 30 represents an indirect index of the degree of dirt in the detergent solution to be treated, a threshold value t0 of this time interval can be identified, above which the detergent solution inflowing in primary filter 30 meets the desired quality requirements, i.e. is clean.

[0048] Furthermore, control unit U is configured so as to intervene when, by the detection of the level in top and bottom tanks 31 and 32, operation anomalies are detected which can be ascribed to the clogging of ducts 5, 6; to a clogging or impossibility of rotating primary filter 30; to the emptying of tank 2, etc.

[0049] Second treatment means 4 advantageously comprise a secondary filter 40, preferably of the type with self-cleaning static rings. More preferably, secondary filter 40 is configured to retain particles larger or equivalent to 5 μm.

[0050] This type of filter comprises an outer sleeve within which the actual filtering elements are housed. These are formed by concentrical metal rings which rest one on another and are pressed by means of a pneumatic actuator. The compression force and the surface configuration of the rings ensure the correct degree of filtration required.

[0051] During normal filtration, the detergent solution enters between sleeve and rings, is filtered by passing through the rings and flows out of the filter along the inner channel defined by the rings; the material left after filtration is therefore deposited on the outer surface of the rings.

[0052] To remove the material left after filtration, a counterwashing operation is provided, during which the flow of solution to be treated flowing in secondary filter

40 is interrupted. Compressed air is injected in the channel internal to the rings, the pneumatic actuator eliminates pressure between the rings and the air passes between the rings removing the material left after filtration. Simultaneously, a valve placed at the bottom of the sleeve is opened allowing the material left after filtration, the detergent solution left in the filter and the counter washing air to flow out. After a few seconds, the valves change state and the normal flow is recovered.

[0053] Treatment system 1 also comprises first and second means M1 and M2 for detecting a first and a second pressure value, respectively upstream and downstream of second treatment means 4 (in practice, to detect a pressure variation between upstream and downstream of secondary filter 40), and means MV2 for adjusting the flow of detergent solution treated by first treatment means 3 and flowing in second treatment means 4. Furthermore, a pump P2 to feed a flow of treated water from first treatment means 3 to second treatment means 4 along secondary feeding duct 7 may be provided.

[0054] Advantageously, control unit U is operatively also connected with the first and second pressure detecting means M1 and M2, with means MV2 for adjusting the flow of detergent solution flowing in second treatment means 4 and with second treatment means 4, and is configured to control the operation of second treatment means 4 according to a logic that will be disclosed in greater detail hereinafter.

[0055] Preferably, control unit U is also operatively connected with pump P2, if present.

[0056] In particular, control unit U is configured to control the flow of detergent solution flowing in, and from, second treatment means 4 as a function of the pressure difference detected between upstream and downstream of second treatment means 4.

[0057] Furthermore, the degree of clogging of secondary filter 40 is advantageously controlled.

[0058] In particular, as a function of the measured pressure difference between upstream and downstream of secondary filter 40, control unit U selectively opens/interrupts the fluidic connection between second treatment means 4 and tank 2, appropriately acting on means MV2 for controlling the flow.

[0059] In practice, when the pressure difference between upstream and downstream of second treatment means 4 reaches a predetermined threshold value ΔP_0, the valves are closed upstream and downstream of secondary filter 40 and a counterwashing operation of the secondary filter is started in order to recover its functionality.

[0060] Furthermore, as a function of the measured pressure difference between upstream and downstream of second treatment means 4, control unit U activates/inactivates a pump P2 arranged along duct 7, upstream of secondary filter 40, to withdraw the treated detergent solution from first means 3 and convey it to secondary filter 40.

[0061] Advantageously, control unit U is also configured to activate, as briefly disclosed previously, a counterwashing operation of secondary filter 40 when the value of the pressure fall between upstream and downstream of secondary filter 40 exceeds the above said threshold value ΔP_0.

[0062] Furthermore, control unit U is advantageously configured to measure and store time t_i' that elapses between two subsequent activations of the counterwashing operation of secondary filter 40. In these circumstances, control unit U accordingly interrupts the possible feeding of treated detergent solution from first treatment means 3 to second treatment means 4 - i.e. interrupts the flow thereof along duct 7 appropriately acting on the control means of flow MV2.

[0063] When time t_i' exceeds a predetermined threshold value t_0', control unit U interrupts the possible feeding of treated detergent solution from first treatment means 3 to second treatment means 4 (favouring thereby the accumulation of all the solution which has already been treated in tank 2) as the solution can be considered clean.

[0064] In practice, control unit U detects, by means of pressure variation measurements between upstream and downstream of second treatment means 4, the occurrence of a threshold clogging condition of secondary filter 40. When this condition occurs, control unit U starts a counterwashing operation of secondary filter 40 as previously disclosed. As time t_i that elapses between the occurrence of two subsequent threshold clogging conditions of the operative portion of primary filter 30 represents an indirect index of the degree of dirt in the detergent solution to be treated, a threshold value t_0' of such a time interval can be identified above which the detergent solution flowing in secondary filter 40 meets the desired quality requirements, i.e. is "clean" and reusable in new washing/rinsing cycles.

[0065] At the same time, by monitoring the level of the pressure upstream/downstream of secondary filter 40, it is possible to ensure conditions suitable for the correct operation of pump P2 (avoiding it being idle, avoiding the occurrence of cavitation phenomena, etc.)

[0066] From an analysis of the features of treatment system 1 of a detergent solution in a washing or rinsing plant for containers according to the present invention the advantages it allows to obtain are apparent.

[0067] In particular, treatment system 1 allows to considerably increase the working life of the detergent solution. Six- or even seven-fold increases of the working life of the detergent solution have been recorded with respect to conventional systems.

[0068] Furthermore, treatment system 1 substantially eliminates the problems connected to downtimes of the plant. At the same time, the working lives of the pumps are also increased and the need for maintenance interventions is reduced, since the pumps operate in better conditions. Finally, the accumulation of dirt is virtually eliminated in the rinsing area.

[0069] In more general terms, treatment system 1 ac-

cording to the invention allows to reduce the energy consumption associated to the washing/rinsing operations of containers within a typical filling plant of the food sector, as it allows a more rational use of the treatment means (filtering means).

[0070] In particular, according to the method of the invention, the operation of treatment system 1 is advantageously and promptly interrupted when, as indirectly detected on the basis of the frequency by which the operations of cleaning and recovery of the filtering functionality on first and second treatment means 3, 4, must be performed, the control unit detects a condition of sufficient "cleaning" of the treated detergent solution, which can therefore be conveniently reused in a washing/rinsing cycle of the containers.

[0071] This more rational use of the treatment system allows to considerably reduce energy waste in the downtimes of the washing/rinsing plant.

[0072] Furthermore, as the frequency of discharge of exhaust detergent solution in the environment is reduced with respect to known systems, treatment system 1 according to the invention allows at the same time to reduce the environmental impact. Since system 1 of the invention allow an easy separation and collection of the filtrate, the latter can easily be disposed of as generic solid waste. This represents another useful result as regards the overall management costs.

[0073] Finally, it is clear that modifications and variants not departing from the scope of protection of the independent claims can be made to the disclosed and shown system for treating detergent solution.

Claims

1. A system (1) for treating a used detergent solution in a washing or rinsing plant for containers, the system being connected to the tank (2) of the detergent bath of a washing and rinsing machine for containers and **characterised by** comprising first and second means (3, 4) for treating the detergent solution configured to receive from said tank (2) an adjustable flow of the detergent solution to be treated and to recirculate to the same tank (2) an adjustable flow of treated detergent solution reusable in the process of washing or rinsing; said tank (2) being fluidically connectable selectively: only to said first treatment means (3) of the detergent solution; and to said first and second treatment means (3, 4) of the detergent solution in series;
   the system (1) also comprising:

   - first and second means (31L, 32L) for detecting and transmitting a first quantity relative to the flow of detergent solution to be treated, respectively upstream and downstream of said first treatment means (3);
   - first and second means for detecting and transmitting a second quantity relative to the flow of detergent solution to be treated, respectively upstream and downstream of said second treatment means (4);
   - a control unit (U) operatively connected to said first and second treatment means (3, 4), to said first and second means for detecting and transmitting a first quantity of the flow of solution to be treated, and to said first and second means for detecting and transmitting a second quantity of the flow of solution to be treated; and programmed to manage the activation of the treatment system (1) and the starting of the operations of washing and recovery of the filtering functionality of said first and second treatment means (3, 4) as a function of the measured values of said first and second quantities relative to the flow of solution to be treated.

2. The treatment system according to claim 1, **characterised in that** said first and second means for detecting and transmitting a first quantity of the flow of solution to be treated comprise level probes (31L, 32L) arranged upstream and downstream of said first treatment means (3), said control unit (U) being programmed to start an operation of washing and recovery of the filtering functionality of said first treatment means (3) when the level of the solution to be treated detected upstream of said first treatment means (3) exceeds a predetermined threshold value L_0.

3. The treatment system according to claim 2, **characterised in that** said control unit (U) is programmed to interrupt the feeding of detergent solution to be treated from said tank (2) to said first treatment means (3) when the time t_i between two subsequent starts of said operation of washing and recovery of the filtering functionality of said first treatment means (3) exceeds a predetermined threshold value t_0.

4. The treatment system according to any of claims 1 to 3, **characterised in that** said first and second means for detecting and transmitting a second quantity of the flow of solution to be treated comprise pressure detecting means (M1, M2) arranged upstream and downstream of said second treatment means (4), said control unit (U) being programmed to start an operation of washing and recovery of the filtering functionality of said second treatment means (4) when the pressure difference between upstream and downstream of said second treatment means (4) exceeds a predetermined threshold value ΔP_0.

5. The treatment system according to claim 4, **characterised in that** said control unit (U) is programmed to interrupt the feeding of detergent solution to be treated from said first treatment means (3) to said

second treatment means (4) when the time t_i between two subsequent starts of said operation of washing and recovery of the filtering functionality of said first treatment means (4) exceeds a predetermined threshold value t_0'.

6. The treatment system according to any of claims 1 to 5, **characterised in that** said first treatment means (3) comprise a rotating drum primary filter (3) of the type with wedge wire elements and configured to retain particles larger or equal to 500 μm.

7. The treatment system according to any of claims 1 to 6, **characterised in that** said second treatment means (4) comprise a ring secondary filter (40) configured to retain particles larger or equal to 5 μm.

8. A plant for bottling a pourable product, comprising a treatment system (1) of the detergent solution for washing or rinsing containers to be filled according to any of claims 1 to 7.

9. A control unit (U) for a treatment system (1) of the detergent solution used in a plant for washing or rinsing containers according to any of the preceding claims.

10. A method for managing the operation of a system (1) comprising first (3) and second (4) treatment means for the detergent solution used in a plant for washing and rinsing containers, comprising the steps of:

a) detecting a first quantity relative to the flow of detergent solution to be treated upstream and downstream of said first treatment means (3);
b) detecting a second quantity relative to the flow of detergent solution to be treated upstream and downstream of said second treatment means (4);
c) starting respective operations of washing and recovery of the filtering functionality of said first and second treatment means (3, 4) as a function of said first and second measured quantities relative to the flow of solution to be treated; and
d) interrupting the feeding of detergent solution to be treated to said first treatment (3) when the time t_i between two subsequent starts of said operations of washing and recovery of the filtering functionality of said first treatment means (3) exceeds a predetermined threshold value t_0.

11. The method according to claim 10, **characterized by** comprising the step of:

e) interrupting the feeding of detergent solution to be treated from said first treatment means (3) to said second treatment means (4) when the time t_i' between two subsequent starts of said operations of washing and recovery of the filtering functionality of said second treatment means (3) exceeds a predetermined threshold value t_0'.

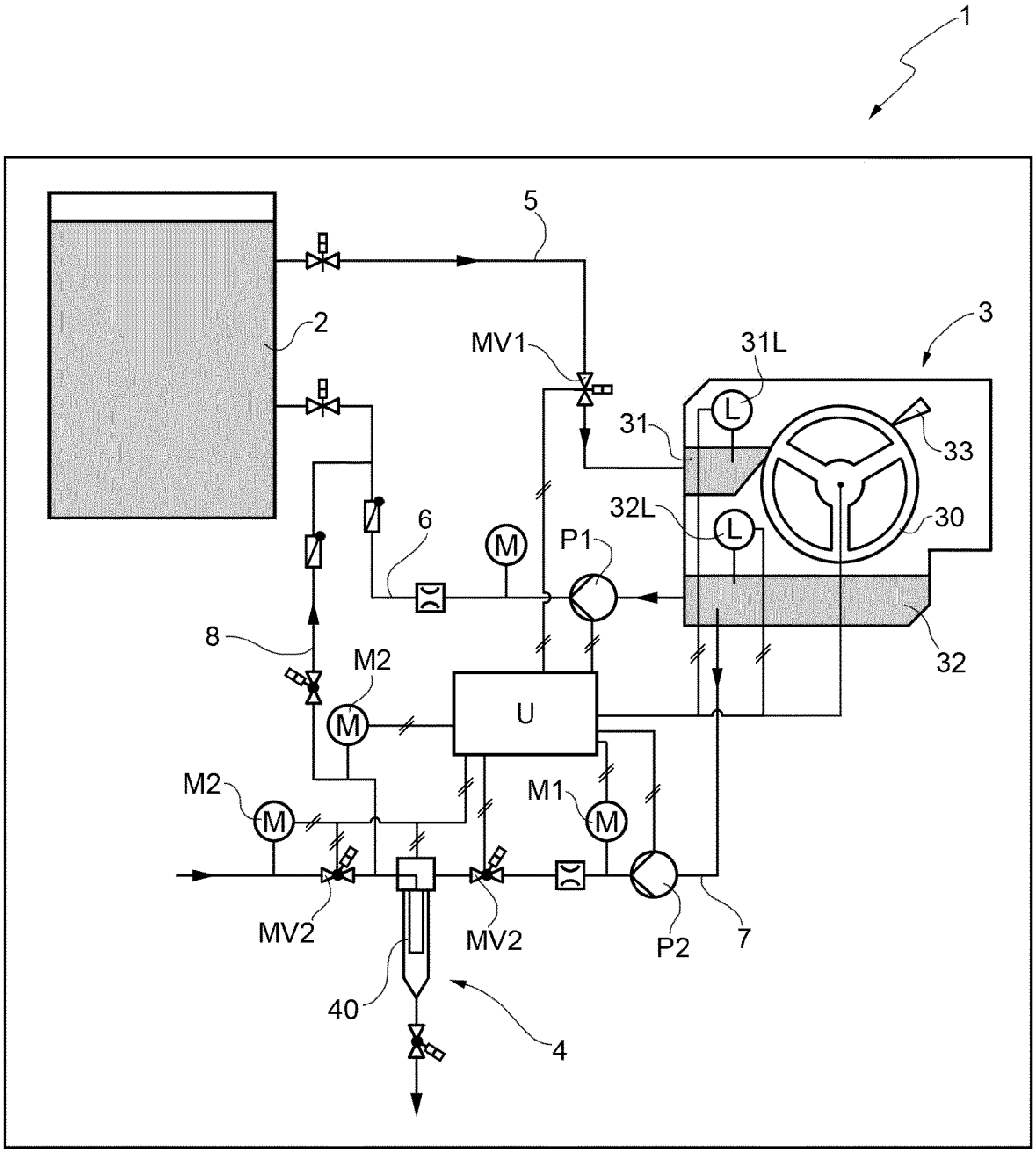


FIG. 1

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EUROPEAN SEARCH REPORT

Application Number
EP 12 19 7347

DOCUMENTS CONSIDERED TO BE RELEVANT

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	22 January 2013	Muller, Gérard

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 12 19 7347

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