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(54) **Unit for washing kitchenware and the like**

functionally associated with respective independent elements for drawing and feeding the liquids. A corresponding branch (2) of a supply circuit (6) extends from each tank (3, 4) and is connected to the chamber (2) for mixing the liquids substantially upon their entry into the chamber (2).



Description

[0001] The present invention relates to a unit for washing kitchenware and the like.

[0002] As is known, automatic appliances designed to wash (and often also dry) plates, pots, cutlery and other kitchenware and accessories are now widespread both at home and in industrial environments.

[0003] These appliances are provided typically with an internal washing chamber, which is capable of accommodating a certain number of items of kitchenware, which optionally can be placed in adapted holder baskets. The chamber is then affected by the operation of a plurality of nozzles, some of which are designed to spray a mixture of water and detergent to wash the kitchenware, whereas other nozzles allow subsequent rinsing by means of pressurized hot water (possibly with the addition of rinse aid).

[0004] More precisely, and with reference to dishwashers used in the industrial or professional environments (for example in kitchens of restaurants, canteens, etcetera), the procedure that is commonly adopted provides for introducing into the washing chamber a product that has both detergent and sanitizing properties, is typically chlorine-based and stored in a respective tank. From the tank, the product is drawn and collected in an open-top reservoir, in which it is heated to be then sent to the chamber that accommodates the kitchenware by means of a respective pump.

[0005] Subsequently, in the pre-rinse step, the kitchenware is typically treated with a rinse aid, which facilitates drying and assists in the complete removal of the last residues of dirt: this rinse aid is contained in an adapted tank and is drawn from there by an additional pump to be mixed with the rinsing water.

[0006] However, this constructive solution is not free from drawbacks.

[0007] Chlorine-based products (which are widely used since they are substantially the only ones, among those that can be used for the specific application being considered, that indeed have both sanitizing and detergent properties) are pollutants, and therefore the management of wastewater at the end of washing and rinsing is problematic, since the risk of releasing potentially toxic substances into the environment is significant.

[0008] The aim of the present invention is to solve the drawbacks described above, by providing a unit that can wash and sanitize kitchenware and the like while respecting the environment and limiting polluting waste.

[0009] Within this aim, an object of the invention is to provide a unit that is suitable for washing kitchenware in an industrial and professional environment.

[0010] Another object of the invention is to provide a unit that can ensure optimum washing and sanitizing of kitchenware and the like.

[0011] A further object of the invention is to provide a unit that ensures high reliability in operation.

[0012] Another object of the invention is to provide a unit that can be obtained easily starting from commonly

commercially available elements and materials.

[0013] Another object of the invention is to provide a unit that has low costs and is safe in application.

[0014] This aim and these objects are achieved by a unit for washing kitchenware and the like, comprising means for the controlled spraying of a chamber, suitable to accommodate kitchenware and the like, for washing and/or sanitizing it, characterized in that said means comprise a first tank for a predefined detergent liquid and a second tank for a predefined sanitizing liquid, functionally associated with respective independent elements for drawing and feeding the liquids, a corresponding branch of a supply circuit extending from each one of said tanks and being connected to said chamber for mixing said liquids substantially upon their entry into said chamber.

[0015] Further characteristics and advantages of the invention will become more apparent from the description of a preferred but nonexclusive embodiment of the unit according to the invention, illustrated by way of nonlimiting example in the accompanying drawings, wherein:

Figure 1 is a schematic view of the unit according to the invention in a first embodiment;

Figure 2 is a schematic view of the unit according to the invention in a second embodiment.

[0016] With reference to the figures, a unit according to the invention, generally designated by the reference numeral 1, is particularly suitable for washing kitchenware, such as plates, glasses, cups, cutlery, pots and the like, both in a domestic environment and in an industrial/professional environment.

[0017] It is useful to specify from the outset that a preferred application of the present invention is the use of the unit 1 for washing and sanitizing kitchenware in an industrial environment, and therefore the unit 1 can be used by canteens and kitchens of restaurants (and/or in similar facilities).

[0018] However, use of the unit 1 according to the invention for washing and/or sanitizing kitchenware in a domestic environment and/or for washing different objects according to the specific requirements is not excluded and is in any case within the protective scope claimed herein.

[0019] The unit 1 comprises means for the controlled spraying of a chamber 2, which is suitable for accommodating kitchenware and the like, for washing and/or sanitizing it. According to known methods, the chamber 2 (which is typically shaped like a parallelepiped and is connected to the water mains so that it can be treated by jets of rinsing water, or during washing) can also contain kitchenware containment baskets, so as to facilitate its placement in a stable position, within the chamber 2, and to ensure that such position is maintained during the washing/sanitizing steps.

[0020] According to the invention, the means comprise a first tank 3 for a predefined detergent liquid (for example of the type usually commercially available) and a second

tank 4 for a predefined sanitizing liquid, which are functionally associated with respective independent elements for drawing and transferring such liquids. A corresponding branch 5 of a supply circuit 6 connected to the chamber 2 further extends from each tank 3, 4 so as to allow mixing of the liquids substantially upon their entry into the chamber 2.

[0021] Conveniently, the predetermined sanitizing liquid is based on oxygen and, due to the properties of this element, is capable of ensuring a high sanitizing effectiveness. Furthermore, this effectiveness is achieved while respecting the environment, since oxygen, once it is released into the environment after use, is not a dangerous pollutant (as instead is chlorine, used in sanitizing liquids, and in kitchenware washing assemblies of the known type).

[0022] More particularly, the predetermined sanitizing liquid comprises hydrogen peroxide, in a percentage comprised preferably between 50% and 70%, where the percentages refer to the overall weight (and for example said predetermined sanitizing liquid could be of the type commercially distributed by the Applicant under the trade name DOX).

[0023] Advantageously, the predefined detergent liquid comprises sodium hydroxide, in a percentage comprised between 5% and 15%, where the percentages refer to the total weight. In this case also, the detergent liquid can be of a type commercially distributed by the Applicant, for example the detergent liquid known by the trade name MATIC PLUS.

[0024] As illustrated in the accompanying figures, according to the preferred constructive solution, which however does not limit the application of the invention, the supply circuit 6 comprises a collection reservoir 7, which is interposed between the branches 5 and the chamber 2, for mixing the above-mentioned liquids substantially only upon their entry into the chamber 2. The liquids in fact mix in the reservoir 7 (or proximate thereto) and a terminal duct 8 extends from the reservoir 7 and leads to at least one nozzle 9, which faces the chamber 2. Preferably, the unit 1 has, as shown in the figure, a plurality of nozzles 9, which are distributed conveniently to facilitate optimum spraying of the chamber 2 and therefore complete washing/sanitizing of the kitchenware.

[0025] According to a first possible embodiment, shown in Figure 1 by way of non-limiting example of the application of the invention, each branch 5 of the supply circuit 6 leads to at least one respective inlet hole 10, which faces the collection reservoir 7. The liquids that arrive from the respective tanks 3, 4 can thus be sprayed separately in the reservoir 7 through the respective holes 10, so as to be mixed upon entry into the chamber 2 (which is separated from the reservoir 7 only by the terminal duct 8).

[0026] According to a different solution, shown in Figure 2, which does not exhaust the possible embodiments of the unit 1, each branch 5 merges with a common portion 11 of the supply circuit 6.

[0027] The common portion 11 in turn leads to a common inlet 12, which faces the collection reservoir 7, so that the mixing, in this embodiment, occurs at the common portion 11 and therefore proximate to their entry into the reservoir 7 and therefore into the chamber 2.

[0028] As can be seen in the accompanying figures, according to the preferred embodiment the withdrawal and feeding elements comprise a first dosage pump 13 and a second dosage pump 14 (for example the type of peristaltic pumps), which are associated respectively with the first tank 3 and with the second tank 4 and are arranged along the corresponding branch 5, so as to ensure the independent drawing of the corresponding liquid and its feeding to the reservoir 7 and thus to the chamber 2.

[0029] Conveniently, the spraying means also comprise a containment vessel 15 for a predefined rinse aid, which is associated with respective drawing and feeding elements: the vessel 15 is connected to an additional branch 5 of the supply circuit 6, which leads to the chamber 2.

[0030] Furthermore, the supply circuit 6 comprises a boiler 16, which is connected to the water mains and interposed between the containment vessel 15 and the chamber 2 and is connected to the water mains: the boiler 16 can thus heat the solution of mains water and rinse aid, which is then sent, thanks to the mains pressure, to the chamber 2.

[0031] It is thus possible also to transfer the predetermined rinse aid to the chamber 2 (simultaneously with or subsequently to the feeding of the sanitizing liquid and of the detergent liquid), spraying it into the latter for example through additional nozzles 9 which face the chamber 2, optionally after pre-mixing with water drawn from the mains.

[0032] In particular, according to a preferred but not exclusive formulation, the predefined rinse aid comprises ionic and non-ionic surfactants, in a percentage, relative to the total weight, of less than 5%, citric acid, polycarboxylate and coloring agents.

[0033] Moreover, the possibility is not excluded of providing optionally for the presence of a third dosage pump 17 (also for example of the type of a peristaltic pump), which is associated with the vessel 15 and arranged along the corresponding branch 5, in order to facilitate withdrawal of the rinse aid and its subsequent feeding to the chamber 2.

[0034] According to the preferred embodiment, the first dosage pump 13, the second dosage pump 14 and the third dosage pump 17 are controlled individually by a respective electronic control unit (or similar device).

[0035] The operation of the unit according to the invention is as follows.

[0036] After accommodating kitchenware and the like in the chamber 2 (and appropriately reclosing such chamber), it is possible to start, by means of an adapted interface which is functionally associated with the withdrawal and feeding elements, a washing/sanitizing cycle, option-

ally according to one or more preset washing programs.

[0037] The activation of each one of these programs can thus determine the feeding of the liquids and/or of the rinse aid according to predefined steps and times, according to sequential logic criteria or even simultaneously, according to the specific requirements.

[0038] The detergent liquid and the sanitizing liquid are thus introduced beforehand into the reservoir 7 (by means of the first dosage pump 13 and the second dosage pump 14), where a resistance heater heats them: from there, as already noted, the two mixed liquids follow the terminal duct 8 and enter the chamber 2 through the nozzles 9, for example through the action of a washing pump 18.

[0039] Moreover, water is drawn from the water mains according to known methods during the steps of operation in which it is possibly required.

[0040] It is thus possible to ensure, for example, that the detergent liquid and the sanitizing liquid are drawn simultaneously to start a washing/sanitizing step; moreover, only at a later time the rinse aid is sent to the chamber 2 (optionally directly before an additional rinsing step, by means of water sprayed into the chamber 2).

[0041] Thanks to the presence of distinct branches 5, it is thus possible to ensure that the mixing between the sanitizing liquid and the detergent liquid occurs only substantially upon their entry into the chamber 2.

[0042] The choice to adopt distinct branches 5 thus allows the use of different sanitizing liquids with respect to the ones typically used, which are selected because they are capable of bonding with the detergent liquids. Therefore, with the unit 1 according to the invention it is possible to adopt sanitizing liquids that are highly effective and have a low pollutant content, such as oxygen-based ones, which cannot be used in known types of washing units, which are provided with a single tank (and with a single inlet branch) for liquids having both a sanitizing and a detergent action.

[0043] Differently, therefore, from known types of units, the unit 1 according to the invention, certainly suitable for industrial and professional uses, has a high sanitizing capacity, limiting polluting waste significantly (thanks to the properties of oxygen).

[0044] More precisely, according to the solution of Figure 1, mixing occurs in the reservoir 7, after the detergent liquid and the sanitizing liquid have run through respective distinct branches 5.

[0045] According to the solution of Figure 2, instead, the detergent liquid and the sanitizing liquid mix at the common portion 11 and proximate to their entry into the reservoir 7 and therefore to the chamber 2.

[0046] This solution is also of considerable interest for the application of the invention to existing units 1 which already have a single inlet 12 that leads to a reservoir 7: it is in fact sufficient to provide the unit 1, upstream of the inlet 12, with a common portion 11, which in turn is supplied by two distinct branches 5 (and therefore with a substantially T-shaped circuit 6), in order to allow the

desired mixing of the liquids only proximate to the reservoir 7 and the chamber 2, without having to modify or rebuild the reservoir 7 or the chamber 2.

[0047] Of course, it should be stressed that the possibility is not excluded of transferring the detergent liquid and the sanitizing liquid in separate and consequential steps, where this is deemed preferable for the specific requirements of application.

[0048] In practice it has been found that the unit according to the invention fully achieves the intended aim, since the adoption of two distinct tanks, respectively for a predefined detergent liquid and for a predefined sanitizing liquid, functionally associated with respective independent elements for drawing and feeding the liquids, with corresponding branches of a supply circuit, connected to the kitchenware washing chamber, which extend from the tanks, allows mixing of the liquid substantially upon their entry into the chamber and therefore makes it possible to wash and sanitize kitchenware and the like while respecting the environment and limiting polluting waste.

[0049] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims; all the details may further be replaced with other technically equivalent elements.

[0050] In the exemplary embodiments shown, individual characteristics, given in relation to specific examples, may actually be interchanged with other different characteristics that exist in other exemplary embodiments.

[0051] In practice, the materials used, as well as the dimensions, may be any according to requirements and to the state of the art.

[0052] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A unit (1) for washing kitchenware and the like, comprising means for the controlled spraying of a chamber (2), suitable for accommodating kitchenware and the like, for washing and/or sanitizing it, **characterized in that** said means comprise a first tank (3) for a predetermined detergent liquid and a second tank (4) for a predetermined sanitizing liquid, functionally associated with respective independent elements for drawing and feeding the liquids, a corresponding branch (2) of a supply circuit (6) extending from each one of said tanks (3, 4) and being connected to said chamber (2) for mixing said liquids substantially upon their entry into said chamber (2).

2. The unit according to claim 1, **characterized in that** said predetermined sanitizing liquid is oxygen-based.
3. The unit according to claim 2, **characterized in that** said predetermined sanitizing liquid comprises hydrogen peroxide, in a percentage comprised preferably between 50% and 70%, said percentages referring to the total weight.
4. The unit according to claim 1, **characterized in that** said predetermined detergent liquid comprises sodium hydroxide in a percentage comprised preferably between 5% and 15%, said percentages referring to the total weight.
5. The unit according to one or more of the preceding claims, **characterized in that** said supply circuit (6) comprises a collection reservoir (7), which is interposed between said branches (5) and said chamber (2), for mixing said liquids substantially upon their entry into said chamber (2), a terminal duct (8) extending from said chamber (2) and leading to at least one nozzle (9), which faces said chamber (2).
6. The unit according to one or more of the preceding claims, **characterized in that** each one of said branches (5) of said supply circuit (6) leads to at least one respective inlet hole (10), which faces said collection reservoir (7), for mixing of said liquids inside it.
7. The unit according to claims 1 to 5 and as an alternative to claim 6, **characterized in that** each one of said branches (5) merges with a common portion (11) of said supply circuit (6), which leads to a common inlet (12), facing said collection reservoir (7), for the mixing of said liquids at said portion (11).
8. The unit according to one or more of the preceding claims, **characterized in that** said withdrawal and feeding elements comprise a first dosage pump (13) and a second dosage pump (14), which are associated respectively with said first tank (3) and with said second tank (4) and arranged along the corresponding branch (5), for the independent drawing of the corresponding liquid and for transferring it into said reservoir (7).
9. The unit according to one or more of the preceding claims, **characterized in that** said spraying means comprise a vessel (15) for containing a predetermined rinse aid, which is associated with said respective withdrawal and feeding elements, said vessel (15) being connected to an additional branch (5) of said supply circuit (6), which leads to said chamber (2).
10. The unit according to one or more of the preceding claims, **characterized in that** said supply circuit (6) comprises a boiler (16), which is connected to the water mains and is interposed between said containment vessel (15) and said chamber (2), for heating a solution of mains water and rinse aid to said chamber (2).
11. The unit according to one or more of the preceding claims, **characterized in that** said predefined rinse aid comprises ionic and non-ionic surfactants in a percentage, referring to the total weight, of less than 5%, citric acid, polycarboxylate and coloring agents.

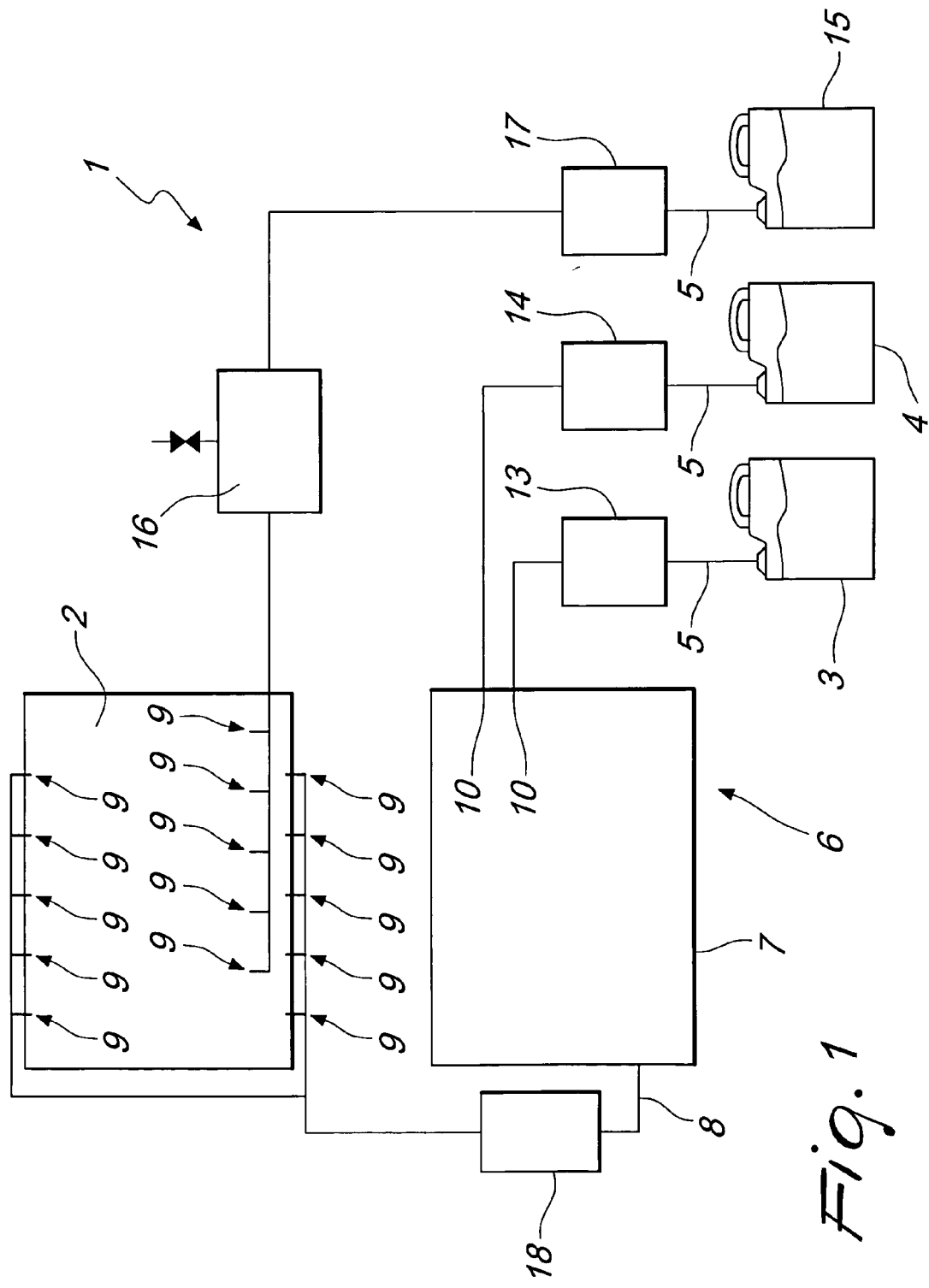


Fig. 1

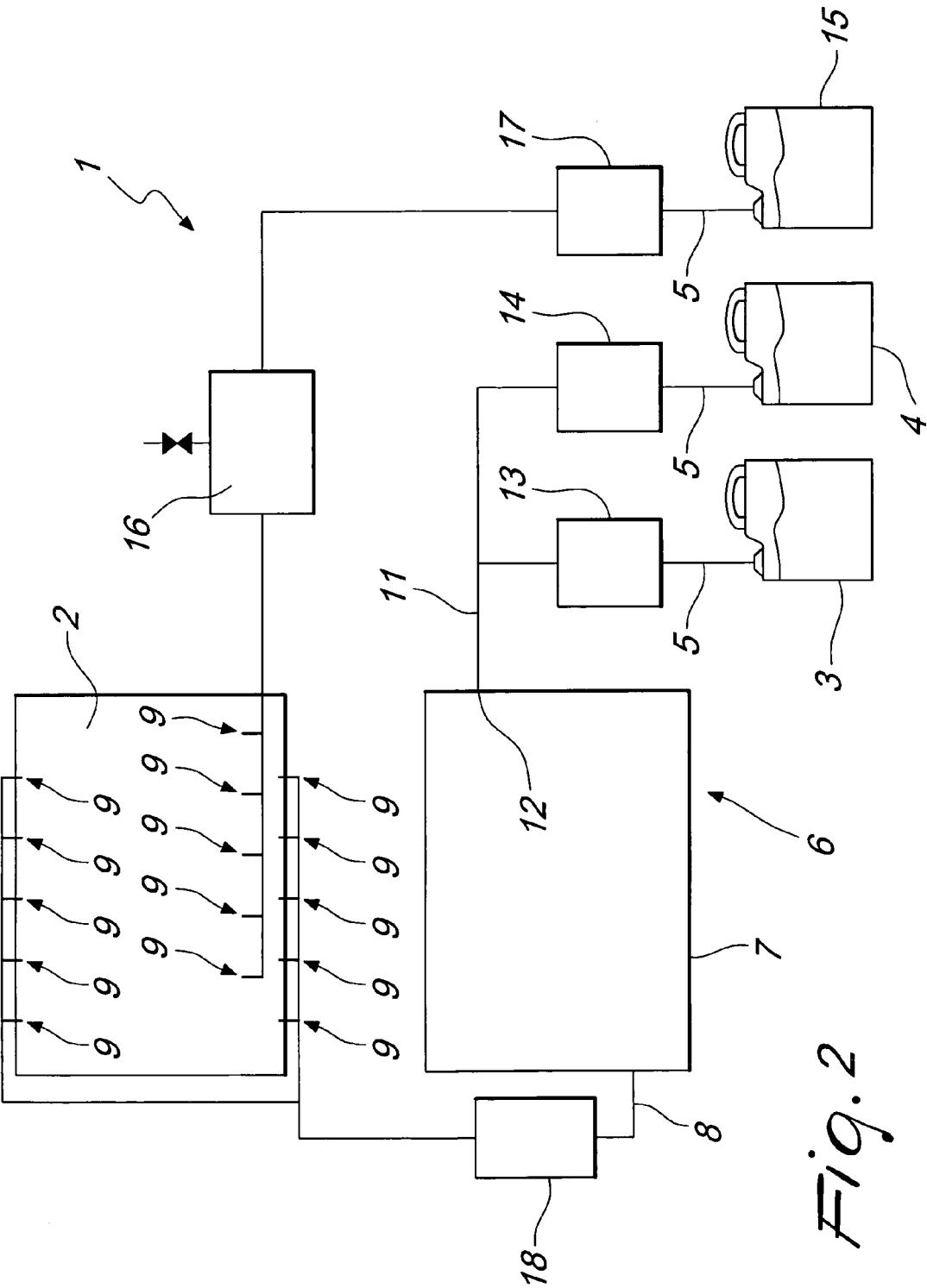


Fig. 2



EUROPEAN SEARCH REPORT

Application Number
EP 11 42 5259

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 7 March 2012	Examiner Hannam, Martin
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 11 42 5259

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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