(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 3 756 526 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
30.12.2020 Bulletin 2020/53

(51) Int Cl.:
A47L 15/00 *(2006.01)* ***A47L 15/42*** *(2006.01)*

(21) Application number: **20181914.1**

(22) Date of filing: **24.06.2020**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **27.06.2019 IT 201900010245**

(71) Applicant: **Silanos S.r.l.**
20096 Pioltello MI (IT)

(72) Inventor: **COLOMBO, Marco**
20125 Milano (IT)

(74) Representative: **Modiano, Micaela Nadia et al**
Modiano & Partners
Via Meravigli, 16
20123 Milano (IT)

(54) RINSING SYSTEM FOR DISHWASHERS, AND DISHWASHER COMPRISING THE RINSING SYSTEM

(57) A rinsing system (30) for dishwashers, comprising:
- a connection device (12) to a water system, adapted to connect the rinsing system (30) to the water system for the inflow of a rinse water flow;
- an uncoupling device (14) from the water system, adapted to prevent the effects of any unwanted vacuums;
- at least two groups of rinsing sprayers (18s, 18i), adapted to dispense the rinse water toward kitchenware to be washed;
- a system of ducts, adapted to guide the rinse water flow from the connection device (12) to the at least two groups of rinsing sprayers (18s, 18i); and
at least one distribution device (22s, 22i), adapted to adjust the distribution of the rinse water flow between the at least two groups of rinsing sprayers (18s, 18i).

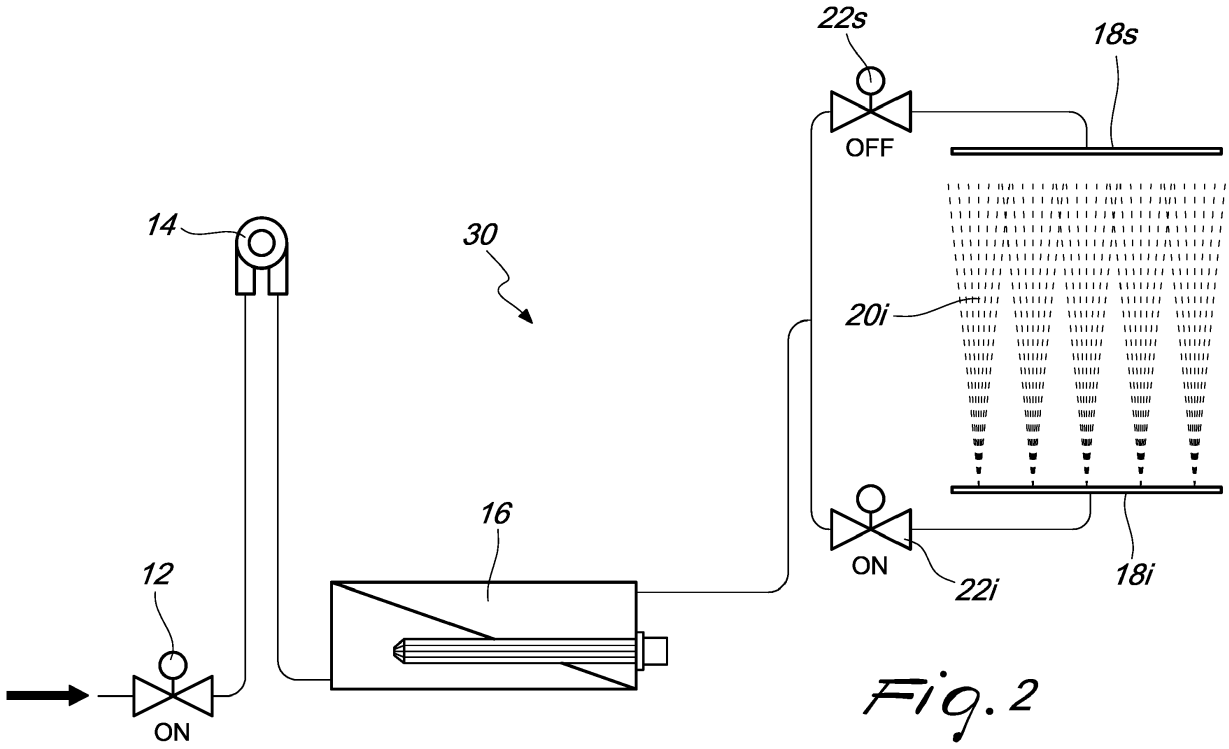

Fig. 2

EP 3 756 526 A1

Description

[0001] The present invention relates to a rinsing system for dishwashers, particularly of the cycle type, for example with front opening or domed opening. The present invention also relates to a dishwasher comprising said rinsing system.

[0002] The rinsing system and the dishwasher according to the invention are particularly but not exclusively useful and practical in the field of the industrial washing of kitchenware, where the term "kitchenware" is understood to refer to plates, cutlery and glasses, as commonly understood, but also pots, containers, kitchen utensils and other similar objects.

[0003] Dishwashers are currently known which are used in the industrial field and comprise, substantially inside their boxlike body, two different complementary systems:

- a washing system, adapted to dispense a detergent solution onto the kitchenware to be washed, which is contained in an adapted basket, in order to dissolve the dirt and degrease the kitchenware; and
- a rinsing system adapted to dispense clean water onto the kitchenware, which as mentioned is contained in the basket, in order to remove the dirt and the detergent solution from the kitchenware.

[0004] Typically, the clean water is mixed with rinse aid, in order to allow almost instantaneous drying when the basket that contains the washed kitchenware is removed.

[0005] In particular, the washing system of a dishwasher of the known type substantially comprises:

- a washing tank which contains the detergent solution, arranged in the lower portion of the boxlike body of the dishwasher;
- one or more groups of fixed or preferably rotating washing sprayers provided with adapted nozzles for dispensing the detergent solution toward the kitchenware contained in the basket: typically an upper group, a lower group, a lateral group or any combination of the three;
  and
- a washing pump and a system of ducts adapted respectively to force and guide a flow of detergent solution from the washing tank to the groups of washing sprayers.

[0006] With reference to Figure 1, the rinsing system 10 of a dishwasher of the known type substantially comprises:

- a device 12 for connection to the water system, and consequently to the water mains, for the inflow of a flow of clean water for rinsing the kitchenware, such as for example an electric inflow valve;
- an uncoupling device 14 from the water system, according to the applicable statutory provisions, such as for example a vacuum breaker valve or a so-called break tank or air gap, arranged after the device 12 for connection to the water system;
- one or more groups of rinsing sprayers 18s, 18i which are fixed or preferably rotating, are provided with adapted nozzles for dispensing the water toward the kitchenware contained in the basket, and are arranged after the device 12 for connection to the water system and the uncoupling device 14 from the water system: typically, an upper group 18s, a lower group 18i, a lateral group or any combination of the three;
- optionally, a water heating device 16, such as for example a boiler 16, also arranged after the device 12 for connection to the water system and the uncoupling device 14 from the water system;
- optionally, a rinsing pump (not shown) adapted to force the flow of water from the device 12 for connection to the water system to the groups of rinsing sprayers 18s, 18i, or from the water heating device 16 to the groups of rinsing sprayers 18s, 18i, increasing the pressure of said water flow; and
- a system of ducts adapted to guide a flow of water from the device 12 for connection to the water system to the groups of rinsing sprayers 18s, 18i.

[0007] Typically, the operation of a dishwasher of the known type consists of a washing step, in which the groups of washing sprayers operate simultaneously, then a dripping pause, and finally a rinsing step in which the groups of rinsing sprayers 18s, 18i operate simultaneously.

[0008] During the washing step, the washing system of the traditional dishwasher continuously recirculates the same detergent solution that is dispensed onto the kitchenware to be washed, which is contained in the basket, from the washing pump through the groups of washing sprayers. It should be noted that typically the washing pump has a high power level, in order to allow the execution of a complete washing process in a few minutes.

[0009] During the rinsing step, which is performed by mechanical removal and by dilution, the rinsing system 10 of the traditional dishwasher dispenses clean water, as mentioned typically mixed with rinse aid, which is dispensed onto the kitchenware to be washed, which as mentioned is contained in the basket, through the groups of rinsing sprayers 18s, 18i.

[0010] The rinsing water - in a quantity that depends on the size of the dishwasher and on the value of the dispensing pressure - ends in the washing tank, diluting the detergent solution, which overflows by the same amount toward a drain through an overflow tube. Therefore, it is necessary to compensate the quantity of detergent that is dispersed together with a portion of dirty water.

[0011] This operation of detergent compensation can be performed manually or by resorting to a peristaltic

pump or to another (internal or external) dosage device which automatically draws a quantity of detergent every time the device 12 for connection to the water system is activated.

[0012] However, known solutions are not free from drawbacks, which include the fact that the simultaneousness of the operations of the groups of rinsing sprayers 18s, 18i of the rinsing system 10, associated with the randomness of the arrangement of the kitchenware inserted in the basket, entails a contamination of the portions of kitchenware that have already been rinsed, requiring an extension of the rinsing step in order to facilitate dilution. In summary, the above can be termed "self-contamination" effect.

[0013] Furthermore, this so-called self-contamination effect and the consequent extension of the rinsing step produce a double drawback: on the one hand, a reduction of the quality of the rinsing, and on the other hand an increase in the consumption of water, detergent, rinse aid and electric power on the part of the dishwasher.

[0014] The aim of the present invention is to overcome the limitations of the background art described above, providing a rinsing system for dishwashers and a dishwasher comprising said rinsing system that allow to achieve better effects than those obtainable with known solutions and/or similar effects at a lower cost and with higher performance.

[0015] Within the scope of this aim, an object of the present invention is to devise a rinsing system and a dishwasher that allow to eliminate or at least minimize the self-contamination effect.

[0016] Another object of the present invention is to devise a rinsing system and a dishwasher that allow to optimize the rinsing step, directing the flow of water toward a single group of rinsing sprayers in order to increase the pressure of said flow of water and consequently its mechanical action to the detriment of dilution.

[0017] A further object of the present invention is to devise a rinsing system and a dishwasher that allow to optimize the rinsing step, activating sequentially the operations of the individual groups of rinsing sprayers, for example the upper group and lower group.

[0018] Another object of the present invention is to devise a rinsing system and a dishwasher that allow to optimize the rinsing step, using nozzles that have a shape and an atomization that are different for the individual groups of rinsing sprayers, for example of the upper group and of the lower group.

[0019] A further object of the present invention is to devise a rinsing system and a dishwasher that allow to optimize the rinsing step, calibrating the quantity of water dispensed by the individual groups of rinsing sprayers, for example the upper group and the lower group, adapting the rinsing to the type of kitchenware to be washed.

[0020] Another object of the present invention is to devise a rinsing system and a dishwasher that allow to reduce the consumption of water, detergent and electric power on the part of the dishwasher.

[0021] Another object of the present invention is to provide a rinsing system and a dishwasher that are highly reliable, relatively simple to provide and economically competitive if compared with the background art.

[0022] This aim, as well as these and other objects which will become better apparent hereinafter, are achieved by a rinsing system for dishwashers, comprising:

- a connection device connection to a water system, adapted to connect said rinsing system to said water system for the inflow of a rinse water flow;
- an uncoupling device from said water system, arranged after said connection device and adapted to prevent the effects of any unwanted vacuums;
- at least two groups of rinsing sprayers, arranged after said connection device and said uncoupling device and adapted to dispense said rinse water toward kitchenware to be washed; and
- a system of ducts, adapted to guide said rinse water flow from said connection device to said at least two groups of rinsing sprayers;

characterized in that it comprises at least one distribution device, arranged after said connection device and said uncoupling device and arranged before said at least two groups of rinsing sprayers, and adapted to adjust the distribution of said rinse water flow between said at least two groups of rinsing sprayers.

[0023] The intended aim and objects are also achieved by a dishwasher comprising a boxlike body, a washing system, and said rinsing system.

[0024] Further characteristics and advantages of the invention will become better apparent from the description of a preferred but not exclusive embodiment of the rinsing system for dishwashers according to the invention, illustrated by way of non-limiting example with the aid of the accompanying drawings, wherein:

Figure 1 is a schematic view of a rinsing system for dishwashers of the known type;
Figure 2 is a schematic view of an embodiment of the rinsing system for dishwashers according to the present invention in a first operating configuration, or in a first state of operation;
Figure 3 is a schematic view of an embodiment of the rinsing system for dishwashers according to the present invention, in a second operating configuration, or in a second state of operation;
Figure 4 is a schematic view of an embodiment of the rinsing system for dishwashers according to the present invention in a third operating configuration, or in a third state of operation.

[0025] With reference to Figures 2, 3 and 4, the rinsing system for dishwashers according to the invention, designated generally by the reference numeral 30, substantially comprises a connection device 12 to the water sys-

tem, an uncoupling device 14 from the water system, at least two groups of rinsing sprayers 18s, 18i, at least one distribution device 22s, 22i, and finally a system of ducts.

[0026] The connection device 12, such as for example an electric intake valve 12, is adapted to connect the rinsing system 30 to the water system and consequently to the water mains, for the inflow of a flow of clean water to rinse the kitchenware to be washed.

[0027] The uncoupling device 14 from the water system, such as for example a vacuum breaker valve 14, is arranged after the connection device 12 to the water system, and is adapted to reduce unwanted vacuums which in general can form in a container or in a duct which is closed. In practice, the uncoupling device 14 prevents the return into the water system of the flow of clean water for rinsing the kitchenware to be washed. This prevents contamination in case of a pressure drop of the water system or of the water mains.

[0028] The groups of rinsing sprayers 18s, 18i, which preferably rotate, are arranged after the connection device 12 to the water system and the uncoupling device 14 from the water system, and are adapted to dispense the water toward the kitchenware contained in the basket. The groups of rinsing sprayers 18s, 18i can be mutually different in terms of shape, atomization and flow rate. In particular, the groups of rinsing sprayers 18s, 18i can comprise respective nozzles which are mutually different in terms of shape, atomization and flow rate.

[0029] In the preferred and illustrated embodiment, the rinsing system 30 according to the invention comprises an upper group of rinsing sprayers 18s and a lower group of rinsing sprayers 18i. The upper group 18s sprays a respective quantity of rinsing water 20s downward from above, in the direction of the kitchenware to be washed contained in the basket. The lower group 18i sprays a respective quantity of rinsing water 20i upward from below, in the direction of the kitchenware to be washed contained in the basket.

[0030] The distribution device 22s, 22i is arranged after the connection device 12 to the water system and the uncoupling device 14 from the water system and is adapted to adjust (by opening or closing) the distribution of the flow of clean water for rinsing the kitchenware to be washed between the groups of rinsing sprayers 18s, 18i. Therefore, the distribution device 22s, 22i is arranged before the groups of rinsing sprayers 18s, 18i. Clearly, the distribution device 22s, 22i is arranged along the system of ducts that guides the flow of clean water to the groups of rinsing sprayers 18s, 18i.

[0031] In particular, the distribution device 22s, 22i is configured to distribute the flow of rinsing water to the groups of rinsing sprayers 18s, 18i exclusively (i.e., only one group at a time) and sequentially (i.e., one group first and then another group). In practice, with reference to the preferred and illustrated embodiment, the distribution device 22s, 22i distributes the flow of water first to just one group of rinsing sprayers, for example the lower one 18i, and then only to the other group of rinsing sprayers, for example the upper one 18s. In this manner, the distribution device 22s, 22i activates sequentially the groups of rinsing sprayers 18s, 18i and therefore the respective rinsing operations.

[0032] In a preferred embodiment of the rinsing system 30 according to the invention, a respective distribution device 22s, 22i is associated with each one of the groups of rinsing sprayers 18s, 18i and is arranged along the branch of the system of ducts that guides the flow of clean water to the individual group of rinsing sprayers 18s, 18i.

[0033] In the preferred and illustrated embodiment, the rinsing system 30 according to the invention comprises an upper distribution device 22s, associated with the upper group of rinsing sprayers 18s, and a lower distribution device 22i, associated with the lower group of rinsing sprayers 18i, which adjust (by opening or closing) the distribution of the flow of clean water for rinsing the kitchenware to be washed between the respective upper and lower groups of rinsing sprayers 18s and 18i.

[0034] Advantageously, each one of these distribution devices 22s, 22i can be selected from the group constituted by: an electric valve, a hydraulically actuated valve, a pneumatically actuated valve, and a pump.

[0035] Clearly, the rinsing system 30 according to the invention might comprise a combination of electric valves, hydraulically actuated valves, and pneumatically actuated valves, although this combination appears disadvantageous with respect to the embodiments that comprise a single type of distribution device, since it would introduce a greater constructive complexity.

[0036] As mentioned, in the rinsing system 30 according to the invention the distribution device 22s, 22i is configured to distribute the flow of water to one of the groups of rinsing sprayers 18s, 18i exclusively, by activating alternately (i.e., either one group or another group) the latter and therefore the respective rinsing operations.

[0037] With particular reference to Figure 2, in a first operating configuration, or in a first state of operation, of the rinsing system 30 according to the invention, the upper distribution device 22s and the lower distribution device 22i, such as for example the upper electric valve 22s and the lower electric valve 22i, are configured to distribute the flow of water to the lower group of rinsing sprayers 18i exclusively. In practice, the upper electric valve 22s is closed, while the lower electric valve 22i is open and it activates only the operations of the lower group of rinsing sprayers 18i, concentrating the entire flow of rinsing water toward said lower group of rinsing sprayers 18i.

[0038] With particular reference to Figure 3, in a second operating configuration, or in a second state of operation, of the rinsing system 30 according to the invention, the upper distribution device 22s and the lower distribution device 22i, such as for example the upper electric valve 22s and the lower electric valve 22i, are configured to distribute the flow of water to the upper group of rinsing sprayers 18s exclusively. In practice, the lower electric valve 22i is closed, while the upper electric valve 22s is open and it activates exclusively the operations of

the upper group of rinsing sprayers 18s, concentrating the entire flow of rinsing water toward said upper group of rinsing sprayers 18s.

[0039] Therefore, by way of example, a same rinsing step of the rinsing system 30 according to the invention can comprise a first time interval T1 in which only the lower group of washing sprayers 18i operates (as shown in Figure 2), and a second time interval T2 in which only the upper group of washing sprayers 18s operates (as shown in Figure 3).

[0040] Also by way of example, a same rinsing step of the rinsing system 30 according to the invention can comprise a first time interval T1 in which only the upper group of washing sprayers 18s operates (as shown in Figure 3), and a second time interval T2 in which only the lower group of washing sprayers 18i operates (as shown in Figure 2).

[0041] In one embodiment of the rinsing system 30 according to the invention, the distribution device 22s, 22i is further configured to distribute the flow of water to the groups of rinsing sprayers 18s, 18i uniformly, activating them and therefore the respective rinsing operations simultaneously. Advantageously, the uniform distribution of the flow of rinsing water precedes the exclusive and sequential distribution of the flow of rinsing water.

[0042] With particular reference to Figure 4, in a third operating configuration, or in a third state of operation, of the rinsing system 30 according to the invention, the upper distribution device 22s and the lower distribution device 22i, such as for example an upper electric valve 22s and a lower electric valve 22i, are configured to distribute the flow of water uniformly to the upper group of rinsing sprayers 18s and to the lower group of rinsing sprayers 18i, respectively. In practice, the upper electric valve 22s and the lower electric valve 22i (or the like) are both open and they activate simultaneously the operations of the upper group of rinsing sprayers 18s and of the lower group of rinsing sprayers 18i, dividing the flow of rinsing water into two substantially identical portions, the first portion being directed toward the upper group of rinsing sprayers 18s and the second portion being directed toward the lower group of rinsing sprayers 18i.

[0043] Therefore, by way of example, a same rinsing step of the rinsing system 30 according to the invention can comprise a first time interval T1 in which the upper and lower groups of washing sprayers 18s and 18i operate simultaneously (as shown in Figure 4), a second time interval T2 in which only the lower group of washing sprayers 18i operates (as shown in Figure 2), and a third time interval T3 in which only the upper group of washing sprayers 18s operates (as shown in Figure 3).

[0044] Also by way of example, a same rinsing step of the rinsing system 30 according to the invention can comprise a first time interval T1 in which the upper and lower groups of washing sprayers 18s and 18i operate simultaneously (as shown in Figure 4), a second time interval T2 in which only the upper group of washing sprayers 18s operates (as shown in Figure 3), and a third time interval T3 in which only the lower group of washing sprayers 18i operates (as shown in Figure 2).

[0045] The rinsing system 30 according to the invention can comprise furthermore a control unit (not shown) configured to control the opening or closing of the distribution device 22s, 22i and consequently to control the distribution of the flow of clean water for rinsing the kitchenware to be washed between the groups of rinsing sprayers 18s, 18i.

[0046] By doing so, the control unit is also configured to actuate the transition from one operating configuration, or one state of operation, to another operating configuration, or another state of operation, by performing a same rinsing step in which the operating configurations, or states of operation, shown in Figures 2, 3 and 4, like the rinsing step described above by way of example, can be alternated.

[0047] In particular, the control unit is configured to actuate the distribution device 22s, 22i to distribute the flow of rinsing water to the groups of rinsing sprayers 18s, 18i exclusively (i.e., only one group at a time) and sequentially (i.e., one group first and then another group).

[0048] In one embodiment, the control unit is further configured to actuate the distribution device 22s, 22i to distribute the flow of water to the groups of rinsing sprayers 18s, 18i uniformly.

[0049] In the preferred and illustrated embodiment of the rinsing system 30 according to the invention, the control unit is configured to actuate the opening or closing of the upper distribution device 22s and of the lower distribution device 22i, such as for example of the upper electric valve 22s and of the lower electric valve 22i, distributing the flow of water directed toward the respective upper and lower groups of rinsing sprayers 18s and 18i.

[0050] In a preferred embodiment, the rinsing system 30 according to the invention can further comprise a water heating device 16, such as for example a boiler 16, arranged after the connection device 12 to the water system and the uncoupling device 14 from the water system, and before the distribution device 22s, 22i and the groups of rinsing sprayers 18s, 18i.

[0051] In one embodiment, the rinsing system 30 according to the invention can further comprise at least one rinsing pump (not shown), arranged after the connection device 12 to the water system and the uncoupling device 14 from the water system, and before the groups of rinsing sprayers 18s, 18i. The rinsing pump is adapted to force the flow of water from the connection device 12 to the water system to the groups of rinsing sprayers 18s, 18i, or from the water heating device 16 (if present) to the groups of rinsing sprayers 18s, 18i, increasing the pressure of said water flow.

[0052] In this embodiment of the rinsing system 30 according to the invention, the upper distribution device 22s can be an upper rinsing pump, associated with the upper group of rinsing sprayers 18s, and the lower distribution device 22i can be a lower rinsing pump, associated with the lower group of rinsing sprayers 18i, which force the

distribution of the flow of water between the respective upper and lower groups of rinsing sprayers 18s and 18i.

[0053] The system of ducts is adapted to guide the flow of water from the connection device 12 to the water system to the groups of rinsing sprayers 18s, 18i, passing through the uncoupling device 14 from the water system, the distribution device 22s, 22i, the water heating device 16 (if present), and the at least one rinsing pump (if present).

[0054] In practice it has been found that the invention fully achieves the intended aim and objects. In particular, it has been shown that the rinsing system for dishwashers and the dishwasher comprising said rinsing system thus conceived allow to overcome the qualitative limitations of the background art, since they allow to achieve better effects than those obtainable with known solutions and/or similar effects at a lower cost and with higher performance.

[0055] One advantage of the rinsing system and of the dishwasher according to the present invention resides in that they allow to eliminate or at least minimize the self-contamination effect.

[0056] Another advantage of the rinsing system and of the dishwasher according to the present invention resides in that they allow to optimize the rinsing step, directing the flow of water toward a single group of rinsing sprayers in order to increase the pressure of said flow of water and consequently increase the corresponding mechanical action to the detriment of dilution.

[0057] A further advantage of the rinsing system and of the dishwasher according to the present invention resides in that they allow to optimize the rinsing step, by sequentially activating the operations of the individual groups of rinsing sprayers, for example the upper group and the lower group.

[0058] Another advantage of the rinsing system and of the dishwasher according to the present invention resides in that they allow to optimize the rinsing step, using nozzles that have a different shape and atomization for the individual groups of rinsing sprayers, for example of the upper group and of the lower group.

[0059] A further advantage of the rinsing system and of the dishwasher according to the present invention resides in that they allow to optimize the rinsing step, calibrating the quantity of water dispensed by the individual groups of rinsing sprayers, for example the upper group and the lower group, adopting the rinsing to the type of kitchenware to be washed.

[0060] Moreover, an advantage of the rinsing system and of the dishwasher according to the present invention resides in that they allow to reduce the consumption of water, detergent and electric power on the part of the dishwasher.

[0061] Although the rinsing system and the dishwasher according to the invention have been conceived in particular for the industrial washing of kitchenware, for example in restaurants, canteens and the like, they can in any case be used more generally for the washing of kitchenware in any public or private space.

[0062] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the accompanying claims. All the details may furthermore be replaced with other technically equivalent elements.

[0063] In practice, the materials used, so long as they are compatible with the specific use, as well as the contingent shapes and dimensions, may be any according to the requirements and the state of the art.

[0064] To conclude, the scope of the protection of the claims must not be limited by the illustrations or preferred embodiments shown in the description by way of example, but rather the claims must comprise all the characteristics of patentable novelty that reside in the present invention, including all the characteristics that would be treated as equivalents by the person skilled in the art.

[0065] The disclosures in Italian Patent Application no. 102019000010245, from which this application claims priority, are incorporated herein by reference.

[0066] 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 rinsing system (30) for dishwashers, comprising:

- a connection device (12) to a water system, adapted to connect said rinsing system (30) to said water system for the inflow of a rinse water flow;
- an uncoupling device (14) from said water system, arranged after said connection device (12) and adapted to prevent the effects of any unwanted vacuums;
- at least two groups of rinsing sprayers (18s, 18i), arranged after said connection device (12) and said uncoupling device (14) and adapted to dispense said rinse water toward kitchenware to be washed; and
- a system of ducts, adapted to guide said rinse water flow from said connection device (12) to said at least two groups of rinsing sprayers (18s, 18i);

characterized in that it comprises at least one distribution device (22s, 22i), arranged after said connection device (12) and said uncoupling device (14) and arranged before said at least two groups of rinsing sprayers (18s, 18i), and adapted to adjust the distribution of said rinse water flow between said at least two groups of rinsing sprayers (18s, 18i).

2. The rinsing system (30) for dishwashers according to claim 1, **characterized in that** a respective distribution device (22s, 22i) is associated with each one of said at least two groups of rinsing sprayers (18s, 18i).

3. The rinsing system (30) for dishwashers according to claim 1 or 2, **characterized in that** it comprises an upper group of rinsing sprayers (18s), which sprays a respective quantity of said rinse water (20s) downward from above, and a lower group of rinsing sprayers (18i), which sprays a respective quantity of said rinse water (20i) upward from below.

4. The rinsing system (30) for dishwashers according to claim 3, **characterized in that** it comprises an upper distribution device (22s), which is associated with said upper group of rinsing sprayers (18s), and a lower distribution device (22i), which is associated with said lower group of rinsing sprayers (18i), which adjust the distribution of said rinse water flow between said respective upper and lower groups of rinsing sprayers (18s, 18i).

5. The rinsing system (30) for dishwashers according to any one of the preceding claims, **characterized in that** said at least one distribution device (22s, 22i) is selected from the group constituted by: an electric valve, a hydraulically actuated valve, a pneumatically actuated valve, and a pump.

6. The rinsing system (30) for dishwashers according to any one of the preceding claims, **characterized in that** said at least one distribution device (22s, 22i) is configured to distribute said rinse water flow to said at least two groups of rinsing sprayers (18s, 18i) exclusively and sequentially.

7. The rinsing system (30) for dishwashers according to claim 6, **characterized in that** said upper distribution device (22s) and said lower distribution device (22i) are configured to distribute said rinse water flow exclusively to said lower group of rinsing sprayers (18i).

8. The rinsing system (30) for dishwashers according to claim 6, **characterized in that** said upper distribution device (22s) and said lower distribution device (22i) are configured to distribute said rinse water flow exclusively to said upper group of rinsing sprayers (18s).

9. The rinsing system (30) for dishwashers according to any one of the preceding claims, **characterized in that** said at least one distribution device (22s, 22i) is configured to distribute said rinse water flow uniformly to said at least two groups of rinsing sprayers (18s, 18i).

10. The rinsing system (30) for dishwashers according to claim 9, **characterized in that** said upper distribution device (22s) and said lower distribution device (22i) are configured to distribute said rinse water flow uniformly to said upper group of rinsing sprayers (18s) and to said lower group of rinsing sprayers (18i), respectively.

11. The rinsing system (30) for dishwashers according to any one of the preceding claims, **characterized in that** it further comprises a control unit which is configured to control said at least one distribution device (22s, 22i) and consequently control the distribution of said rinse water flow between said at least two groups of rinsing sprayers (18s, 18i).

12. The rinsing system (30) for dishwashers according to claim 11, **characterized in that** said control unit is configured to control said upper distribution device (22s) and said lower distribution device (22i), distributing said rinse water flow directed toward said respective upper and lower groups of rinsing sprayers (18s, 18i).

13. The rinsing system (30) for dishwashers according to any one of the preceding claims, **characterized in that** it further comprises a water heating device (16), arranged after said connection device (12) and said uncoupling device (14), and arranged before said at least one distribution device (22s, 22i) and said at least two groups of rinsing sprayers (18s, 18i).

14. The rinsing system (30) for dishwashers according to any one of the preceding claims, **characterized in that** it further comprises at least one rinsing pump, which is arranged after said connection device (12) and said uncoupling device (14) and is arranged before said at least two groups of rinsing sprayers (18s, 18i).

15. A dishwasher comprising a boxlike body, a washing system, and said rinsing system (30) according to any one of the preceding claims.

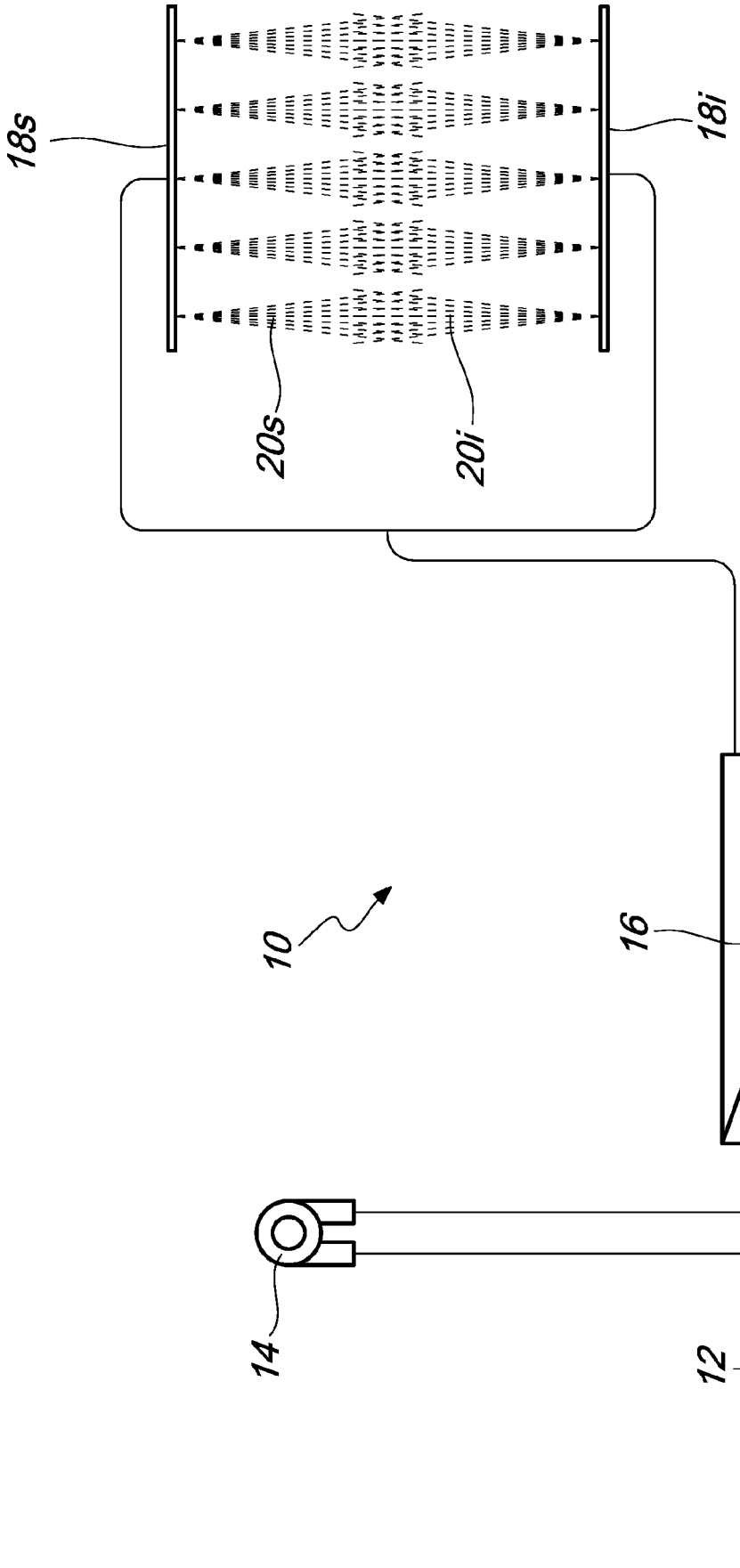

Fig. 1
PRIOR ART

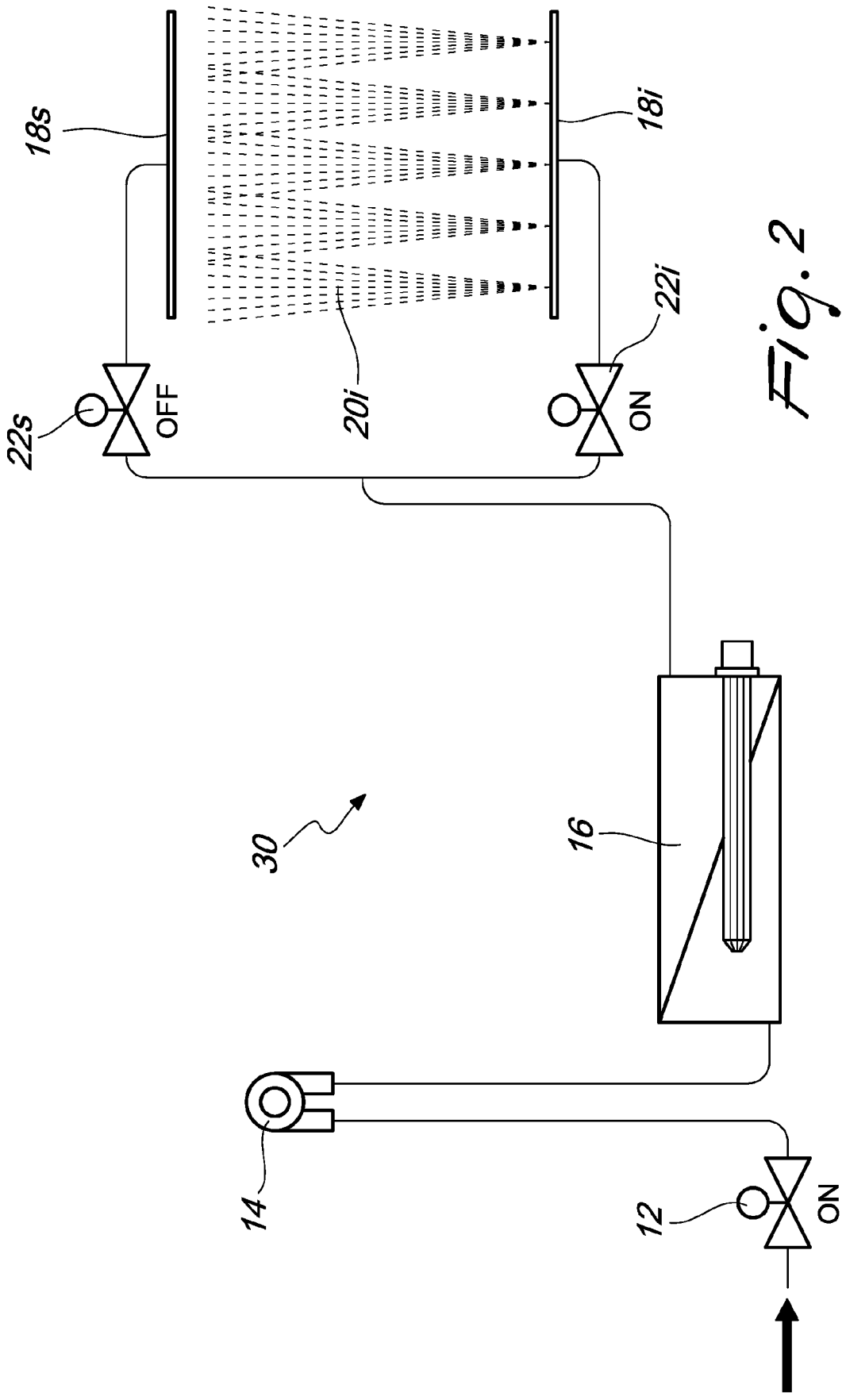

Fig. 2

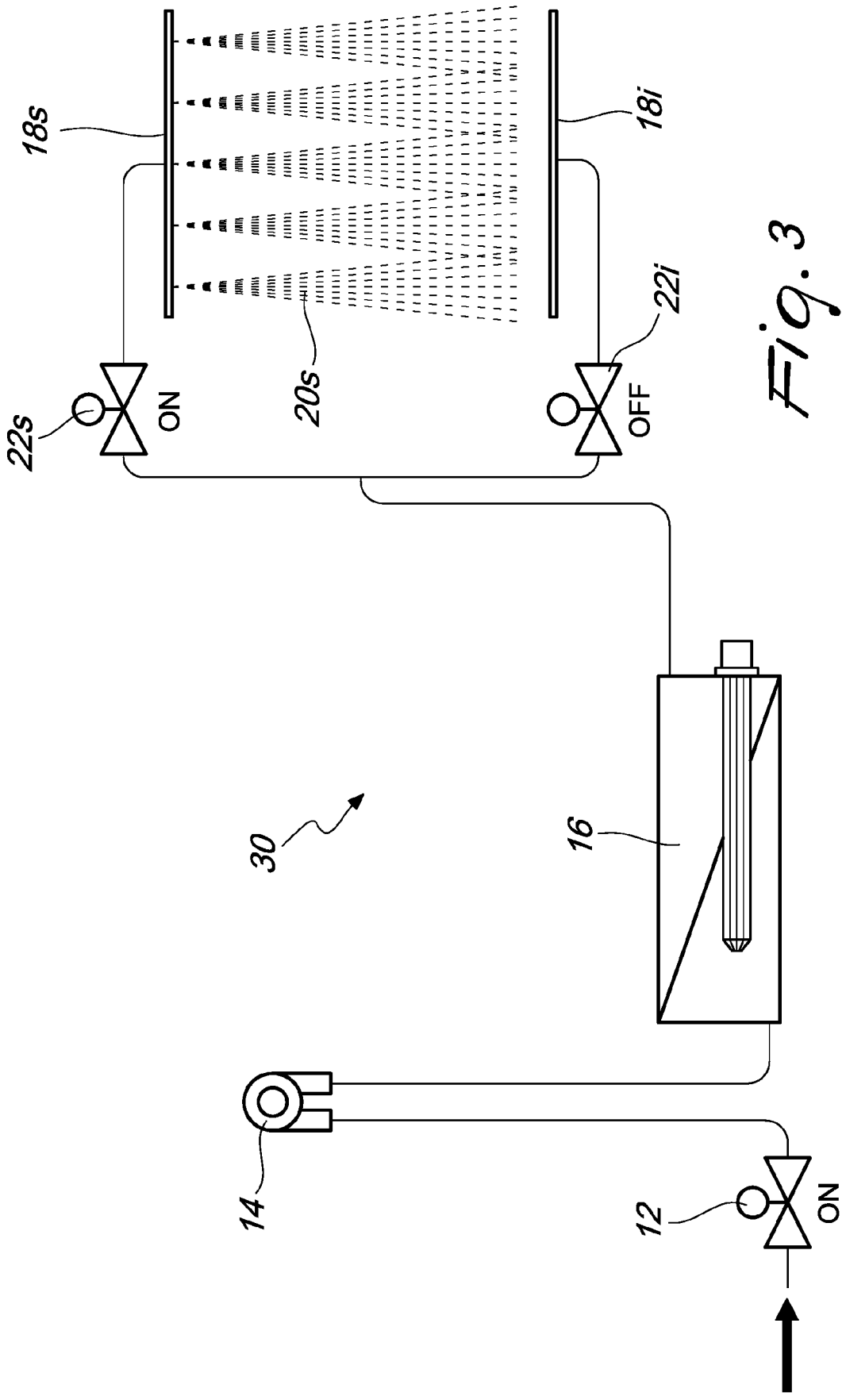

Fig. 3

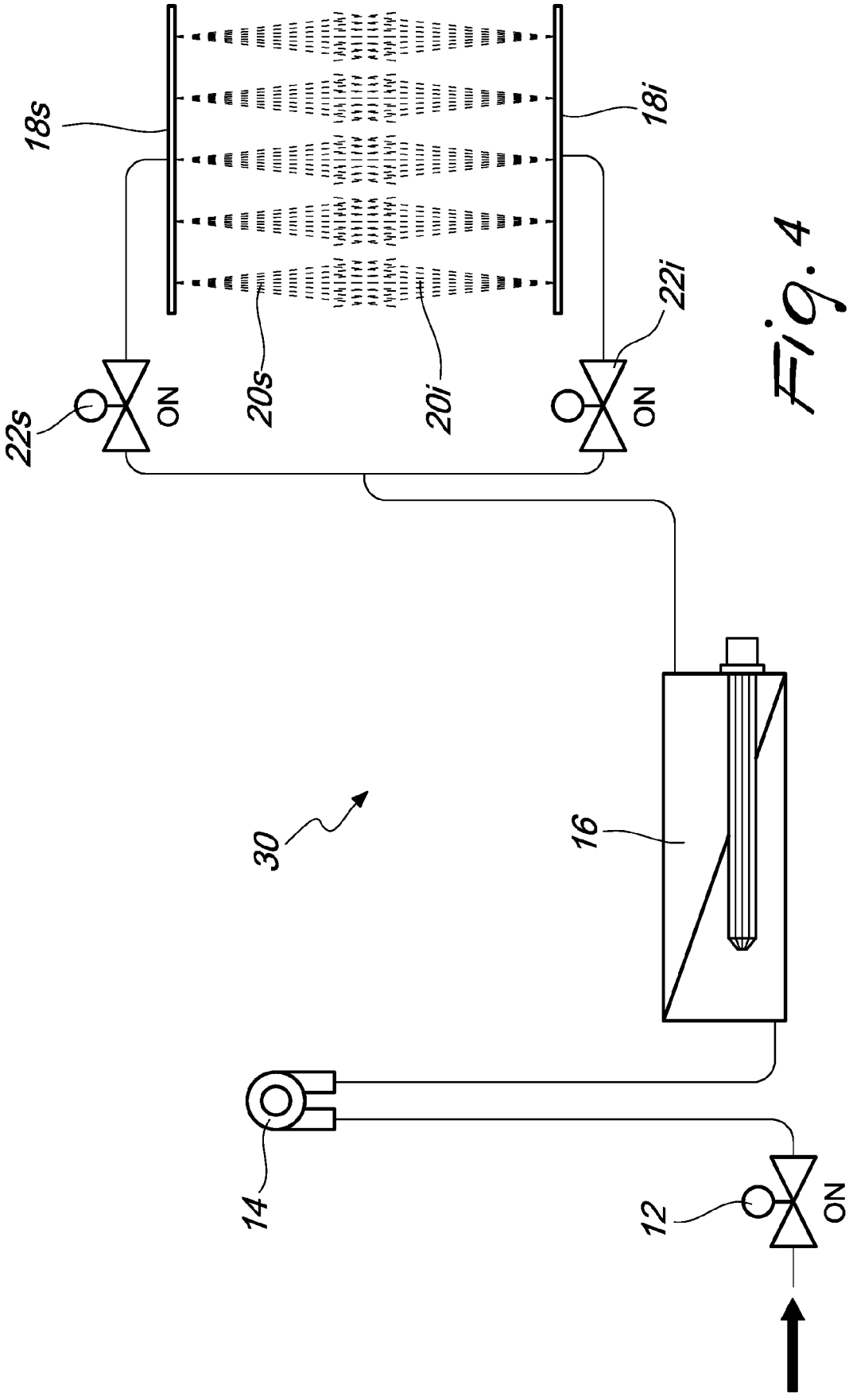

Fig. 4

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 20 18 1914

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2016/018780 A1 (ILLINOIS TOOL WORKS [US]; CHERICONI ALESSIO [IT] ET AL.) 4 February 2016 (2016-02-04) * abstract * * paragraphs [0017] - [0031]; figures 1-3 * -----	1-15	INV. A47L15/00 A47L15/42
X	EP 0 786 230 A2 (CANDY SPA [IT]) 30 July 1997 (1997-07-30) * abstract * * column 1, lines 19-44 * * column 2, lines 20-48 * * column 3, line 9 - column 5, line 59; figure 1 * -----	1-15	
X	DE 10 2013 002116 A1 (AWECO APPLIANCE ENTWICKLUNGS UND ENGINEERING GMBH [DE]) 14 August 2014 (2014-08-14) * abstract * * paragraphs [0028] - [0033]; figure * -----	1-15	
X	CN 106 923 767 A (HANGZHOU SANHUA HOME APPLIANCE THERMAL MAN SYSTEM CO LTD) 7 July 2017 (2017-07-07) * abstract * * paragraphs [0070] - [0072], [0076]; figure 1 * -----	1-15	TECHNICAL FIELDS SEARCHED (IPC) A47L
X	US 5 131 419 A (ROBERTS DONALD E [US]) 21 July 1992 (1992-07-21) * abstract * * column 1, lines 28-46 * * column 2, lines 19-59 * * column 8, line 20 - column 9, line 57; figures 2-5 * ----- -/--	1-15	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	25 August 2020	Prosig, Christina

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

EPO FORM 1503 03.82 (P04C01)

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 20 18 1914

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 2 042 073 A1 (BONFERRARO SPA [IT]) 1 April 2009 (2009-04-01) * claim 1; figure 1 *	1-15	
A	DE 198 12 231 A1 (AEG HAUSGERAETE GMBH [DE]) 23 September 1999 (1999-09-23) * the whole document *	1-15	
			TECHNICAL FIELDS SEARCHED (IPC)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	25 August 2020	Prosig, Christina

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

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 20 18 1914

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

25-08-2020

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2016018780 A1	04-02-2016	EP 3174447 A1	07-06-2017
		WO 2016018780 A1	04-02-2016
EP 0786230 A2	30-07-1997	DE 69625787 T2	02-10-2003
		EP 0786230 A2	30-07-1997
		IT MI960140 A1	28-07-1997
DE 102013002116 A1	14-08-2014	CN 103976702 A	13-08-2014
		DE 102013002116 A1	14-08-2014
		EP 2764814 A1	13-08-2014
CN 106923767 A	07-07-2017	NONE	
US 5131419 A	21-07-1992	NONE	
EP 2042073 A1	01-04-2009	AT 432649 T	15-06-2009
		EP 2042073 A1	01-04-2009
		ES 2327876 T3	04-11-2009
DE 19812231 A1	23-09-1999	DE 19812231 A1	23-09-1999
		EP 0943282 A2	22-09-1999

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- IT 102019000010245 **[0065]**